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DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, SEATTLE DISTRICT
P.O. BOX 3755
SEATTLE, WASHINGTON 98124-3755

REPLY TO
ATTENTION OF

February 6, 2018

Office of Counsel

John Greenewald, Jr.
The Black Vault
27305 W. Live Oak Rd., Suite 1203
Castaic, CA 91384-4520

Dear Mr. Greenewald:

In response to your Freedom of Information Act (FOIA) request enclosed is the 1975 Environmental Atlas for Washington.

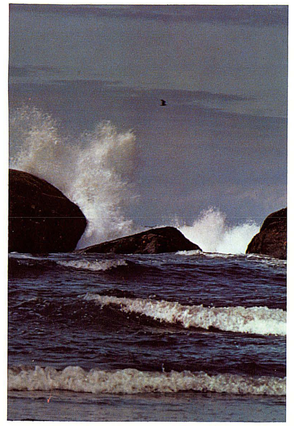
Because the cost of processing your request was minimal, there is no charge. If you have any questions, you can contact me at (206) 764-3735.

Sincerely,

Richard Hynes
FOIA Officer

Enclosure

NPSP 1105-1-1
JANUARY 1975







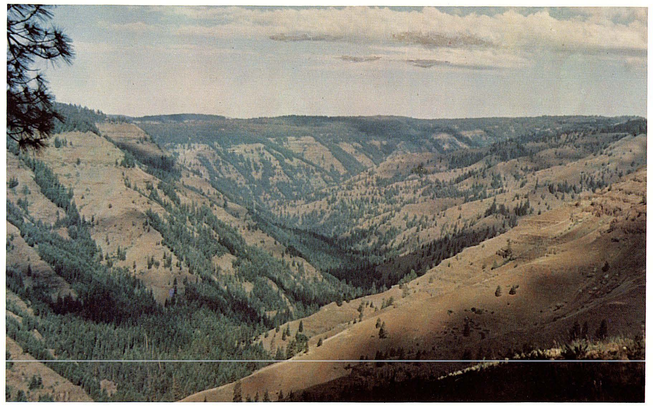














WASHINGTON ENVIRONMENTAL ATLAS

U.S. ARMY CORPS OF ENGINEERS

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
4735 EAST MARGINAL WAY SOUTH
SEATTLE, WASHINGTON 98134

Dear Reader:

The Washington Environmental Atlas identifies and describes many resources and amenities important to the citizens of the State of Washington. The environment is described not only in terms of the preferences and values of people and agencies, but also in terms of the structure and function of basic ecosystems. Accordingly, significant effort was devoted to a map overlay of ecological life zones, species lists and habitats.

Experts in environmental fields, who represent universities and private and public agencies, were invited to contribute to the Atlas. Their unabridged papers reflect their sensitivities and their points of view, and are included for the purpose of providing a wide range of views for the user.

Planning for resource management and development requires the correlation of a vast amount of knowledge involving many fields and disciplines. Information in the Atlas is arranged so that the preferences and values of people are integrated with the technical considerations of the professions. Thus, a planner can identify some of the most important environmental values and concerns at the beginning of his planning process. Although the contents of the Atlas are comprehensive, they are not all-inclusive and may not represent the values and concerns pertinent to some plans and studies. However, the material can help government agencies and non-government groups during the planning process.

We expect the Washington Environmental Atlas to be extremely useful and informative to private citizens and to private and public agencies. We welcome your comments.

RAYMOND J. EINERSEN
Colonel, Corps of Engineers
District Engineer

STATE OF WASHINGTON
OFFICE OF THE GOVERNOR
OLYMPIA

DANIEL J. EVANS
GOVERNOR

A Message from the Governor:

It gives me great pleasure to introduce and endorse the Washington Environmental Atlas. This effort, identifying and listing areas, plants and animals, waters and other environmental and cultural features of statewide and national significance, is important and helpful for the citizens of the state—and, indeed, of the nation.

As a new activity of the Corps of Engineers within our state, this atlas will be welcomed by all our citizens. It is heartening, too, to see the attention given by the Corps to the relationship of water resources to other overall environmental resources. Recognition of this relationship is an indispensable step in any planning activity.

Agencies of the State of Washington gave the fullest possible cooperation to the Corps both in the original data-collection process and in review and revision, which were conducted under the direction of the University of Washington's Institute for Environmental Studies. This volume, therefore, reflects many of the environmental concerns of organized state government. The wide public review means that it also reflects the concerns of citizens.

The atlas, though necessarily not complete or exhaustive, will have many uses. Its value in the planning process for projects and programs is obvious. Those who plan projects within the state—highways, dams, new towns, large buildings, parks—will be on notice concerning some of the environmental resources that might be disturbed. Historical and cultural resources are included as equivalent in importance. If a state or Federal environmental impact statement is required for a project, and both now usually are, this volume can help identify some of the environmental elements that would be affected. Citizens of an area will have this listing to help them question an unwisely planned or improperly placed project.

Perhaps more satisfying than these practical uses is the sheer enumeration of the wealth of environmental, historical and cultural elements in our state. Anyone who looks through this volume will identify many treasured spots, and will note many more that he or she would wish to visit, evaluate or preserve.

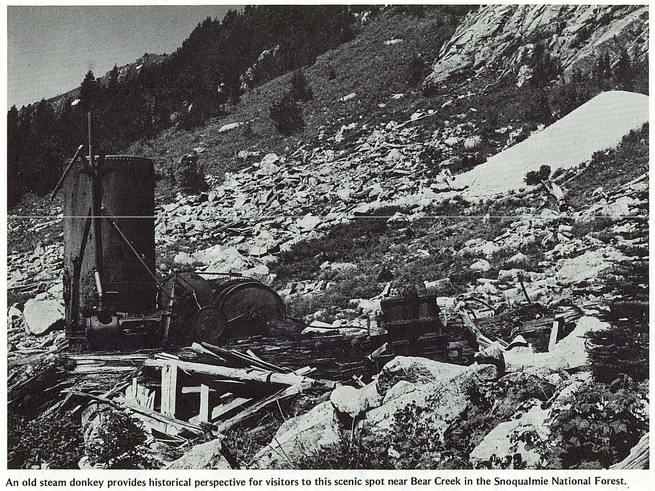
Since any effort of this nature must necessarily be incomplete and also subject to change over time, there must be provision for periodic revision and updating. The State of Washington will use every means possible to help insure that this is done. If the atlas is to continue to be useful, such revision is essential.

The selection of Washington by the Corps as one of only four states (and the only one in the West) for this pilot inventory is encouraging, and complimentary to the citizen environmental concerns and the natural environmental wealth of our state. This new tool should both increase our awareness of this wealth, and help us protect it.

Daniel J. Evans
Governor



A remote valley in the Olympic Mountains.



An old steam donkey provides historical perspective for visitors to this scenic spot near Bear Creek in the Snoqualmie National Forest.

WASHINGTON ENVIRONMENTAL ATLAS

Prepared by Environmental Resources Section,
Seattle District, U.S. Army Corps of Engineers,
with assistance of the
Institute for Environmental Studies, University of Washington

This change to NPSP 1105-1-1, January 1973 provides a completely revised and rewritten environmental atlas for the State of Washington. The title of the document has been changed from "Provisional U. S. Army Corps of Engineers Environmental Reconnaissance Inventory of the State of Washington" to "Washington Environmental Atlas," Second Edition, January 1975.

Library of Congress Catalog Card Number: 74-600033

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SIERRA CLUB
324 C Street, S.E.
Washington, D.C. 20003

Dear Readers:

Compiling a list of historical, cultural, and natural features for the State of Washington is a most excellent project and idea. All those involved in the effort should be commended highly. It is an enormous undertaking and I hope the beginning of a continuous effort.

One of the most wonderful qualities of Washington is that, small as it is, there are still many features which have been experienced by only a few people. I feel privileged to have been one of those persons who have travelled a great deal in the magnificent Washington wilderness.

Much as I love many of the individual features appearing in the atlas, I cannot stress too much the importance of understanding the interrelationship between the maps -- features may appear on separate maps but they must be treated as parts of a whole and not pieces.

I appreciate this opportunity to express my opinions on the importance of the atlas project. Washington is a wonderful state and I heartily support any attempt to preserve the amenities that still exist. I hope that the good faith efforts of the people who spent countless hours writing about features they value will result in a broader public agency sensitivity and understanding as reflected in their projects and programs of the future.

Sincerely,

Brock Evans

Editors' Note: Mr. Evans is currently Director of the Washington, D.C. office of the Sierra Club and is Washington Representative for the Federation of Western Outdoor Clubs. From 1968 to 1972, he was the Northwest Representative for the Sierra Club and Federation of Western Outdoor Clubs.

WASHINGTON ENVIRONMENTAL COUNCIL
107 SOUTH MAIN, SEATTLE, WA. 98104 / 623-1483

Dear Readers:

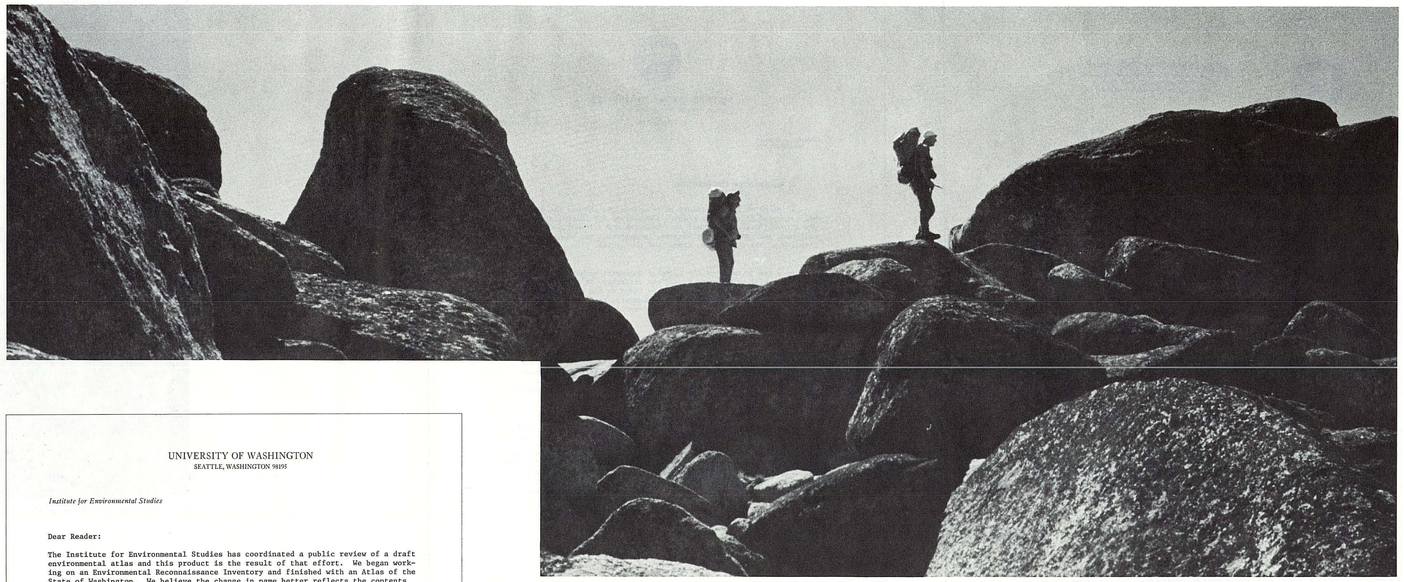
The Washington Environmental Council is pleased to see the Army Corps of Engineers Atlas developed and made available to the citizens of Washington. What strikes one upon reviewing the Atlas is the wealth of information gathered in a format which creates dynamic perceptions of the interdependence of Washington's geologic, biologic, botanic and aesthetic resources. Environmentalists often speak of the basic principle that all life is a system with each part dependent upon the other. This Atlas is a tool and a beginning for those wishing to understand and perceive the integrity of Washington's land ecosystem.

We must stress that the Atlas before you is only an attempt to inventory the basic qualities and quantities of our environment. In a complementary attempt, the citizens of Washington identified certain basic concerns for their shorelines with the Shoreline Management Act of 1971. By our vote we identified and applied certain values to part of the land system. This Atlas contains some of the basic information for making wise decisions about the rest of the land system. It can instruct one to think in wholes and to plan in wholes.

We hope that government and citizens will see the value of this inventory and the perception it inspires. We hope that the Atlas will be used as a tool to decide how to use the land, how to preserve the health of its inhabitants, and how to understand our ecosystem.

Sincerely,

Mike Galvin
President



Rockclimbing in the rugged Enchantment Range.

UNIVERSITY OF WASHINGTON
SEATTLE, WASHINGTON 98195

Institute for Environmental Studies

Dear Reader:

The Institute for Environmental Studies has coordinated a public review of a draft environmental atlas and this product is the result of that effort. We began working on an Environmental Reconnaissance Inventory and finished with an Atlas of the State of Washington. We believe the change in name better reflects the contents of this document. It is not a complete and scientific inventory of features of national and statewide significance. Rather, it more closely resembles a partial listing of features some people of the state consider of value. Several comments that we have received from contributors indicate a great concern that features not included in this Atlas will be considered "insignificant" by their omission. The Institute shares this concern. It is extremely important that this Atlas not constitute the sole basis of information for assessing the environmental impact of a project. If any message flows from the Atlas, it should be that the complex, interrelated balance of Washington's features--natural, historical, and cultural--should be investigated in depth and dealt with carefully prior to any action.

On the other hand, comments were also received from contributors who feared the danger of the opposite extreme--considering the pieces and forgetting the whole. One reviewer suggested that the Atlas simply consist of one map of the state. Everything was important to him. The Institute also shares this concern and asked Richard Untermann to reflect on this. His thoughts are included in the form of a summary of the total landscape of the state.

The role of the Institute has been to transcribe comments received and not to evaluate. The Institute has gathered opinions and collected what people have written during the public review period. We have not filtered opinions nor have we attempted to fill information gaps. The Atlas is, therefore, uneven and weighted with information that individuals and groups sent in during the review period. Thus, the contents of this Atlas represent no consensus and will evolve into a truly valuable tool only if a much broader expression of opinion is received over a long period of time and that information continually updated and revised.

Clearly, if we have learned anything, it is that much more time must be spent in these collective dialogues. Let us all hope that this Atlas represents the beginning of this effort.

Sincerely yours,

Robert O. Sylvester
Director

cs

Recycled Paper



Black brant winging across stormy Padilla Bay.



Cattle ranch in eastern Washington.

INTRODUCTION

This *Washington Environmental Atlas* is the result of continuing cooperative efforts between many people. It documents environmental values contributed by concerned citizens, environmental interest groups, and State and Federal resource agencies. The objective in initiating development of such an atlas is to provide a ready reference of current environmental data for planning and evaluation purposes.

The present document is a revision and updating of a first edition published in January of 1973, entitled *Provisional U.S. Army Corps of Engineers Environmental Reconnaissance Inventory of the State of Washington.* This atlas is part of a national pilot test effort being conducted to explore the environmental information needs of planners. It is being used to develop approaches for the collection, compilation, usage and methods of updating environmental information.

It is expected that demand for this kind of environmental information will be great as such a compilation for Washington State does not presently exist elsewhere. Federal, State and local agencies should find this information useful in their respective planning, development and related activities. It will also be useful in evaluating the plans and proposals of other agencies.

The atlas will help provide early identification of environmental concerns in beginning studies by defining environmental problems and needs. In use, it will assist in the early identification of environmental resources which should be preserved, protected or approached with careful deliberation. Non-governmental groups and the public in general will also find this information of value in considering environmental problems, needs and priorities, and in responding to agency plans and proposals.

Initial input for the first edition was solicited during the summer and fall of 1972. Corps personnel contacted public agencies, known experts and environmental groups in the State and requested information on environmental values "... of statewide or national significance." All material derived from that effort was compiled into the first edition by The Engineer Agency for Resource Inventories in Washington, D.C.

Upon publication of the first edition, the Seattle District asked the University of Washington's Institute for Environmental Studies to coordinate a two-month public review. The Institute divided the State into twelve geographic regions by county and selected a citizen to coordinate the review of the atlas in each area. These regional coordinators determined the best review methods to use in their own localities. For publicity, they contacted editors of local newspapers and newsletters. They displayed and discussed the atlas in libraries, shopping centers, banks and churches, and obtained contributions from many groups and individuals. All reviewers were given prepared review sheets and requested to write in corrections and additions to the atlas. The sheets were sent to the Institute and there edited, mapped, compiled and used to correct and update the previously published information. The Environmental Resources Section, Seattle District of the Corps of Engineers, then completed final compilation, editing and layout to bring it to its present form in this much-expanded second edition.



A view of Mount Rainier and Cougar Lake from east of the Cascades.

The Hydrological Section is introduced by overview papers by Wolf Bauer and Joan Thomas. Mr. Bauer's paper deals with the dynamics of shoreline processes in the natural environment, and how these processes are affected by human interference. Ms. Thomas relates some of the recent history of water and shoreline concerns and the political activity which has led to legislation of the Shorelines Management Act. A matrix, comparing stretches of various rivers, was compiled by the Washington Kayak Club using geohydraulic considerations presented by Wolf Bauer. Such features as free-flowing rivers and streams, whitewater reaches, waterfalls, and inland and estuarine marshes are mapped and indexed.

The Biological Section opens with Dr. Gordon Orians' general introductory paper on the importance of ecological considerations and the distributions of Washington's life zones. The next paper by Robert Mowrey and John Garcia explains the use of a multi-colored Transparent Life Zone Overlay for developing wildlife checklists by use of up-to-date species lists compiled for the State. The Botanical Section, Zoological-Aquatic Section, and Zoological-Terrestrical Section are sub-categories of this larger consideration. Each is introduced by one or more overview papers dealing with their respective subjects, and each contains a full-color map displaying specific environmental features. Important timber stands, climax communities and notable mycological areas are among features mapped on the Botanical map.

The Zoological-Aquatic and Zoological-Terrestrial maps identify important habitats for Washington's aquatic and terrestrial animal species. A fourth category, branching off from general biological considerations, is presented in the section entitled "Some Important Wildlife of Washington." Papers by Robert Mowrey and Terence Wahl describe habitat considerations and the need to protect critical wildlife habitats. Over 100 species and their ranges are highlighted on seventy-three small maps with accompanying text. Many of these animals are threatened by man's alteration of habitats and have become subjects of national concern by agencies, environmental groups and private citizens.

Following the range maps is a photo-essay using pictures from *North American Indians,* a twenty volume set of books by Edward S. Curtis, a noted photographer of the early 20th Century. These exceptional photographs are part of Curtis' life work of recording Indian life in their native environment in the early Pacific Northwest. Accompanying the essay is a map denoting the original distribution of Washington's tribes prior to white man's coming.

The Archeological Section continues with man's increasing involvement with the environment. The map has been color-coded to indicate areas and degrees of archeological importance. In addition, selected sites of early Indian habitations, edited by the Washington Archeological Research Center, have been mapped. The overview paper by Harvey Rice, Assistant Director of the Center, explains the archeological considerations within the State.

The Historical and Contemporary Cultural Section, through a paper by Gary Fuller Reese, advances to man's involvement with the Washington environment as his numbers increased in the region. National and State historical sites are mapped together with early transportation routes, educational centers, ethnic sites, museums, scenic roads and trails, and fair and festival grounds.

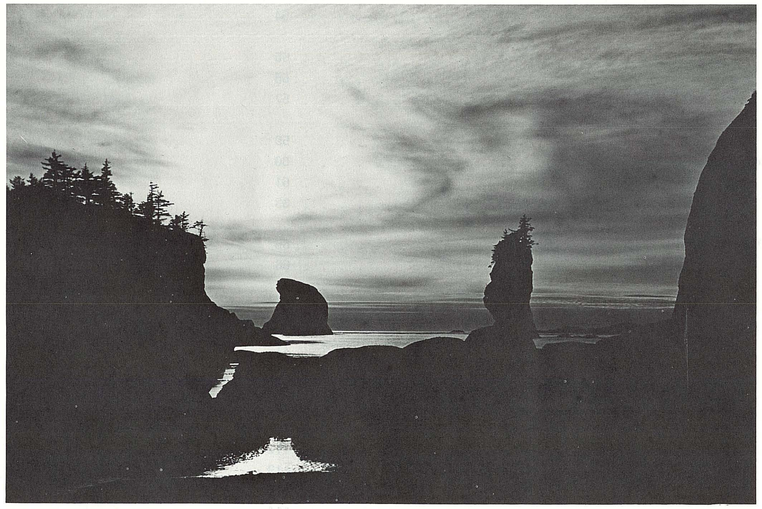
Man's involvement with his environment today has largely moved into the political arena. What the future land and water uses of Washington's environment will be ultimately rests in his legal processes. Which lands will be set aside as wilderness areas, parks, national seashores, or educational or research areas, and which lands will be developed for consumptive purposes, will be decisions of our political system. The Environmental Use and Recreational Management Section reflects this trend through overview papers by Washington Department of Game officials Eugene Dziedzic and Carroll Rieck, and by conservationist Polly Dyer. Features noted on the Environmental Use map reflect existing and potential officially designated wilderness areas, National Forests and recreation areas. In addition, other features noted include wild, scenic or recreational rivers and "defacto" wilderness as defined by conservation groups.

A paper by Richard Untermann entitled "In Praise of the Common Landscape", and the ERTS Imagery Section, conclude the main body of the atlas. In these papers, the authors refocus the reader's perceptions upon considerations of the State as a total unity, not as simply a source of the limited considerations hereto examined. Richard Untermann comments upon the importance of the non-spectacular, every-day landscape on the citizenry of the State. In the ERTS section, John Garcia examines the impact and possibilities of environmental assessment opened up through photo-interpretation of information relayed from the ERTS satellite orbiting our world.

Finally, the eleventh section, the County Discussion Section following the ERTS photograph, provides detailed supplemental information on the sites mapped within each county. These texts were derived from comments received from concerned citizens, environmental interest groups and State and Federal resource agencies.

As a document, the atlas can reflect trends as well as straight information. As a compilation of environmental information, the atlas surely reflects a growing knowledge and awareness. A point continuously touched upon by those who contributed overview papers has been that there is much need for a genuine sensitivity to Washington's notable environment.

This atlas is largely the culmination of concerted efforts by hundreds of citizens of Washington who have expressed their values of the State's environment. Their participation was voluntary and without remuneration. Their enthusiasm and cooperation helped to carry this publication through to its appearance and it is hoped that these qualities will continue to be manifest through future revisions of this document. The experts can add to man's store of knowledge, but hand in hand with it must go a broad awareness of environmental quality. We must retain a willingness to use both knowledge and awareness in making planning and policy decisions which will determine what our environment will ultimately become.



Sunset over the Pacific, from Cape Flattery.

There is in the information collected much that is opinion on what is "environmentally significant." There is also a great deal of factual information based upon scientific studies and resource management experience of contributors. As it stands, it is recognized that the atlas is still incomplete. For the future, we look forward to more comprehensive inventory and evaluation of all environmental resources and amenities throughout the State.

It must be emphasized that any blank spot on a map, or information gap in text, should not be interpreted as an area having nothing of significant environmental value. On the contrary, the atlas reflects what has been contributed up to this time. It is a display of the knowledge and number of people who participated and the limited time available for information gathering and public participation. The atlas must be periodically updated and improved to be of maximum value.

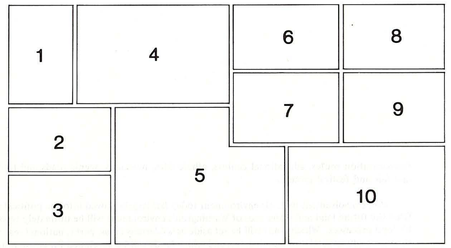
The atlas has been developed to provide a reference of environmental information about the State. To this end, it is organized into eleven major sections. Eight sections contain overview papers which provide the reader with background information plus a full-color map displaying features of significant environmental value. A ninth section presents current ranges of over 100 important wildlife species; a tenth section presents a mosaic photograph of Washington taken by the Earth Resources Technology Satellite (ERTS); an eleventh section incorporates hundreds of contributors' statements in a comprehensive county discussion. Most of the mapped sites are supplemented by explanatory text in the County Discussion Section in the back of the atlas. The format has been arranged along evolutionary lines, beginning with basic environmental components, and inhabitants of the natural world, and proceeding to man's increasing involvement and awareness of his place in that world.

The environmental data submitted has been divided into six broad areas of consideration: Geological, Hydrological, Biological, Archeological, Historical and Contemporary Cultural, and aspects of Environmental Use and Recreational Management. The Biological considerations have been further subdivided into Botanical, Zoological-Aquatic, and Zoological-Terrestrial categories with the addition of a special section highlighting some important wildlife species. Because information submitted by contributors may fall within more than one area of consideration, all sections should be checked to insure comprehensive coverage of any site or feature.

Unique geological features are identified in the Geological Section. Among these are canyons, distinctive mountains and rock formations, evidence of volcanic activity, fossil caves, islands and sand dunes. The overview paper by Dr. David Rahm examines the need for awareness of the State's often unique geological formations.



Sand Dunes near Potholes Reservoir in the Columbia Basin.



Cover designed by artist Hal Street. Preperation of color montage donated by CREATIVE IMAGES, Jerry Hicklin & Jim Maloney

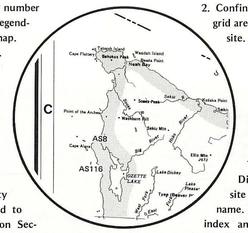
1. "Kalaloch" *by Jim Maloney*
2. "Pacific Beach" *by Jerry Hicklin*
3. "Sunset and Seagulls, Moclips Beach" *by Jim Maloney*
4. "Mt. Maude" *by William Boehm*
5. "Forest Waterfall" *by Jerry Hicklin*
6. "Liberty Mining Shack" *by Jerry Hicklin*
7. "Wenatchee Apple Blossoms" *by Washington Apple Commission*
8. "Looking North From Molybenite Mountain" *by U.S.D.A. Forest Service, Colville Nat. Forest.*
9. "Spokane River Canyon" *by Washington Department of Parks & Recreation*
10. "Wenaha Backcountry" *by U.S.D.A. Forest Service, Umatilla Nat. Forest.*

HOW TO USE THE ATLAS MAPS

Information on sites mapped in the atlas is organized for use in two steps. One can either begin by first referring to a mapped site and proceed to the referenced County Discussion Section or perform the process in reverse. The following is an example taken from the Archeology map for the site named "Cape Alava and Wedding Rocks":

1. Note map key number AS116 and its legend-letter prefix on map. Proceed to index.

2. Note feature name and county in index. Proceed to County Discussion Section in back of the atlas.



2. Confine map search to grid area noted. Locate site.

1. Read County Discussion. Note site name and map name. Proceed to map index and note grid & site numbers.

-OR-

Map Key No.	Map Index Grid Ref.	Feature	County
114	F-6	Gable Mountain Ceremonial Locality	Benton
115	H-4	Indian Race Track	Skamania
116	C-1	Cape Alava - Wedding Rocks	Clallam
117	H-3	Indian Pits	Skamania
118	H-3	Vancouver Site - Buried Village	Clark

CAPE ALAVA AND WEDDING ROCKS

This site's outstanding features are its petroglyphs depicting birds, whales, people and old ships. They are an important element of Washington archeology in conjunction with the digging going on about 10 miles to the north at the Ozette Village site. Some coastal tribes held their marriage rituals at this site, hence the name. The rocks lie at the high tide mark and have been recommended be placed under the jurisdiction of the National Park Service. The beach can be reached by a unique plank trail from Ozette. See Archeological map.

HOW TO CORRECT ATLAS MAPS AND SUBMIT REVISIONS: Every Atlas map plate has register marks ✥ for use in matching one plate to another and for use in preparing an overlay of additions or revisions for the next edition. In making corrections on an overlay for atlas revision, use a sheet of transparent material (a non-shrinking stable base is preferable), full map size, and trace on it all the plate's register marks. This permits accurate transfer of information onto master overlays, with reference to the marks, by the Atlas staff. All the large map plates have been left blank on their back surfaces, permitting removal of any plates desired and their combination over a light table for further study of how mapped features are integrated in the overall land-use patterns prevalent in the state. Send revisions to Chief, Environmental Resources Section, U.S. Army Corps of Engineers, Seattle District, 4735 East Marginal Way South, Seattle, Washington 98134. NOTE TO ATLAS RECIPIENTS: Future partial Atlas revisions and fully updated editions are anticipated. It is requested that any Atlas recipients wishing to be kept abreast of current information send name and address to the above address. In addition, for purposes of survey of the Atlas readership and utility achieved by these contents, the following information from recipients would be helpful and welcome: specific uses to which Atlas is put by individuals, groups and agencies; general comments as to basic format design and content; comments on Atlas strengths and weaknesses; and on areas needing improvement.

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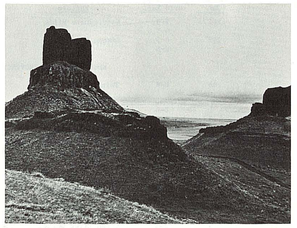
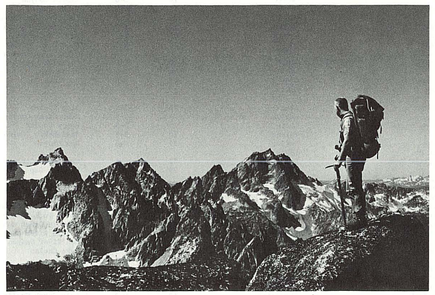
GEOLOGICAL FEATURES



Moses Coulee



Solitary climber looks westward toward Mount Stuart from the Enchantment Range.

WASHINGTON — A GEOLOGIC OVERVIEW

By

David A. Rahm

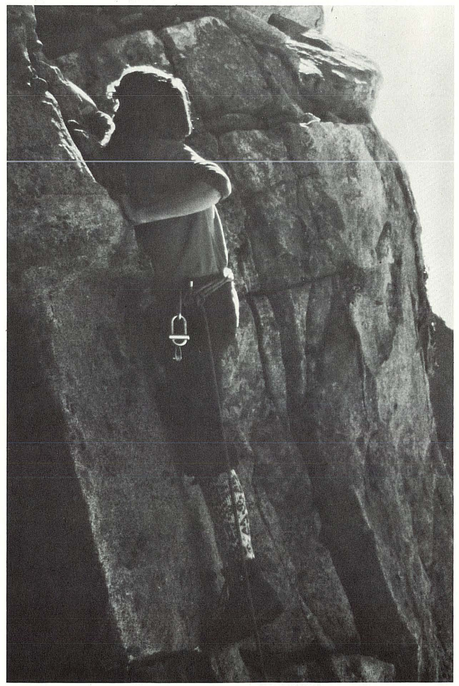
Washington is as much a geologist's paradise as any of our states and definitely has more to offer than most. Some of its geologic wonders such as the Olympic Mountains and much of the Olympic Coast, the North Cascades, and Mount Rainier have merited protection as national parks. Other spectacular features such as the volcanoes Mount Baker, Mount Adams, Glacier Peak, and Mount Saint Helens are either parts of wilderness areas or are under the management of national forests. Still other features, perhaps less imposing than the volcanoes, are protected in state parks. Examples are Steptoe Butte, Kamiak Butte, Palouse Falls, and Dry Falls. But there are countless other geologic features, some of them fragile, many of them unique, that are just as deserving of protection.

Fragile features that could be quarried away, cut apart by land development, eroded because of poor watershed management, underminded by roadcuts or buried under fills, pavements, and buildings are worth considering in terms of examples.

For example, much of Douglas County is an outdoor museum of continental glaciation replete with all types of glacial drift and a variety of landforms such as moraines, kame terraces, kames, kettles, outwash channels, giant glacial erratics, and eskers. Because of the semiaridity and sparsely vegetated landscape most of these features are excellently well-preserved and unencumbered with a concealing growth of forest. Happily, for the same reason, Douglas County is sparsely populated and not particularly altered by the works of man. But the eskers provide a ready source of well-sorted, water-rounded gravels. What a tragedy it would be if these delicate landforms, among the best in the world, were pitted and removed by commercial gravel operators! There are many other places where good gravel can be just as easily obtained. A little intelligence in the location of gravel pits can, therefore, go a long way toward preserving the better parts of our glacial inheritance.

On the intricate shores of Puget Sound and around the edges of the San Juan Islands are many graceful spits, hooks, bars, and tombolos, all representing the precarious balance of wave action, longshore transport of sediment and deposition in postglacial time. Today many of these are under attack by the builders of marinas, housing developments, sawmills and other forms of industry. In places the sediment supply is cut by neighbors living upcurrent until undernourished shorelines begin to recede under the attack of unimpeded waves -- often to the displeasure of the new settlers on the spit. Again, a little intelligent shoreline management could maintain the natural equilibria.

Other fragile features that should be considered not only for the sake of their own preservation, but also as part of interdependent systems include the classically beautiful deltas of Hood Canal, the Chinese-wall dikes of Swauk Pass, the sand dunes of Moses Lake, the cinder cones of the Mount Adams region, the talus cones and aprons along the Snake, Columbia, and the walls of various coulees, the landslides and earthflows of the Columbia Gorge, the pothole lakes of the Channeled Scablands, the frost mounds of Mima Prairie, the solifluction lobes of hillsides in the Columbia Basin, the moraines and terraces left by alpine glaciers in the Cascades and Olympics, the giant gravel bars and ripples of the Channeled Scablands, and so on.



Climber ascends a rocky face at LaBohn Gap in the proposed Alpine Lakes Wilderness

On another scale there should be some means of protection against the indiscriminate removal of petrified wood, agates, gemstones, basalt columns, unique rock types and other geologic materials that may be rare, valuable or in short supply.

Finally, there are larger, more durable features that lend character and beauty to our geologic environment. They too, are worthy of protection. Consider, for example, the desirability of preserving the scenic grandeur of the Columbia Gorge, the Grand Coulee, the Canyon of the Yakima River, Lake Chelan, Z-Canyon, Moses Coulee, and other landscapes of similar dimension. Consider the uniqueness of the Channeled Scablands and how they record the world's largest floods. Should places like these be undercut, undermined, overgrazed, deforested, burned, plowed, paved, overburdened and encrusted indiscriminately with the structures of a randomly burgeoning population?

Logically it would be unwise, wasteful and ultimately uneconomical to allow such things. We therefore have at least one good reason for compiling this atlas.

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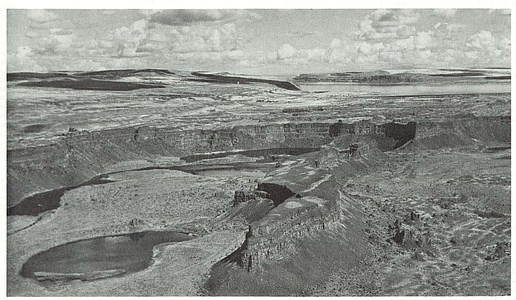
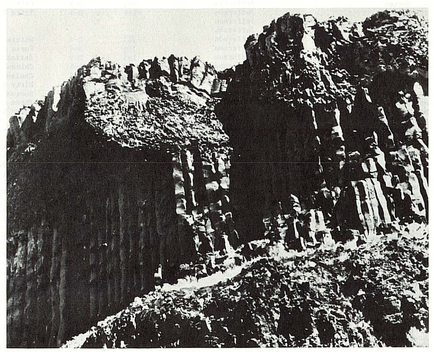
Glacier Peak, prominent feature of the north-central Cascades.



Dry Falls was carved by the Columbia River when glacial ice dammed its ancient rivercourse. Banks Lake may be seen in the background.



The "Devil's Fenceposts," columnar jointing of crystallized lava, are common formations throughout eastern Washington's channeled Scablands.

GEOLOGICAL INDEX

MAP CONVENTIONS ADOPTED FOR THIS ATLAS EDITION: Map callouts for site locations have been changed to an alpha-numeric system for economy in map preparation, to conserve space by omitting symbols, and to adapt all maps for eventual computer-ization. Most callouts have been centered directly over their site locations. On the average, a callout contains two letters and two numbers of dimensions 2mm X 7mm. At the map scale of 1:750,000 such a callout covers an Earth surface area of dimensions 1 mile X 3.5 miles. Exact site plotting has therefore not been attempted by use of the map graphics. Instead, to facilitate the reader's research of more precise location data, site names indexed have been selected for their common usage on current published maps of larger scale such as township and range maps, quadrangle sheets and highway maps.

The Geological Index presented below, plus the geological features cited in the County Discussion Section, together form a total listing of geological information of statewide and national significance supplied by atlas contributors. With respect to mountain features contributed, where one is prominent and specifically named and point-located on the base information of the map, a callout is assigned to it. Otherwise the feature has simply been indexed. All of the mountains are grouped within the index into Washington's eight major physiographic provinces. For precise locations of mountain features cited in the index but not mapped, consult large-scale maps published by the U.S. Geological Survey.

Map Key No.	Map Index Grid Ref.	Feature	County
Distinctive mountain features GM			
		COASTAL RANGE PROVINCE	
1	C-2	Mount Storm King	Clallam
2	D-2	Hurricane Ridge	Clallam
3	D-2	The Brothers	Jefferson
4	D-2	Mount Constance	Jefferson
5	D-2	Mount Jupiter	Jefferson
6	D-2	Mount Olympus	Jefferson
7	D-2	Tyler Peak	Jefferson
8	D-2	Mount Anderson	Jefferson
9	D-2	Mount Claywood	Jefferson
10	D-2	Mount Steel	Jefferson
11	D-2	Athena/Athena's Owl/Hermes Circle/ Aries/Aphrodite/Icarus	Jefferson
12	D-2	The Valhallas	Jefferson
13	D-2	Mount Currie	Jefferson
14	D-2	Mount Fitz Henry	Jefferson
15	D-2	Mount Dana	Jefferson
16	D-2	Kimta Peak	Jefferson
17	D-2	Mount Seattle	Jefferson
18	D-2	Mount Christie	Jefferson
19	D-2	Duncaster Mountain	Jefferson
20	D-2	Mount Scott	Jefferson
21	D-2	Mount Angeles	Jefferson
22	D-2	Mount Ino	Jefferson
23	D-2	Boulder Ridge	Jefferson
24	D-2	Mount Townsend	Jefferson
25	D-2	Cat Peak	Jefferson
26	D-2	Bailey Mountain Range	Jefferson
27	D-2	Mount Zindorf	Jefferson
28	D-2	The Needles	Jefferson
29	D-2	Mount Stone, Mount Hopper, and The Bandersnatch	Mason
30	D-2	Mount Washington	Mason
31	D-2	Sawtooth Range	Mason
32	D-3	Mount Walker	Jefferson
33	F-2	Black Hills	Thurston, Grays Harbor
34	F-2, G-2	Willapa Hills	Pacific, Lewis,
35	D-2	Thorson Peak, Mount Pershing, and Mount Ellinor	Grays Harbor, Mason
36	D-2	Boulder Peak	Jefferson
37	D-2	Ruth Peak, Stephen Peak, and Sue Peak	Jefferson
38	D-2	Alpine Peak	Jefferson
39	D-2	Mount Elk Lick	Jefferson
40	D-2	Mount La Crosse	Jefferson
41	D-2	Mount Worthington, Hawk Peak and Iron Mountain	Jefferson
42	D-2	Crystal Peak	Jefferson

In addition to the above mapped sites, the following features were submitted and are found in the Coastal Range Province:

D-2		Cameron Peak/Lost Peak	Jefferson
D-2		Sentinel Peak	Jefferson
D-2		Mount Fromme	Jefferson
D-2		Wellesley Peak	Jefferson
D-2		Mt. Deception	Jefferson
D-2		Mt. Mystery/Little Mystery	Jefferson
D-2		Mt. Pulitzer	Jefferson
D-2		The Ragmuffin and The Urchin, Mt. Childs	Jefferson
D-2		McCartney Peak	Jefferson
D-2		Chimney Peak	Jefferson
D-2		White Mt.	Jefferson
D-2		Diamond Mt.	Jefferson
D-2		Maynard Peak	Jefferson
D-2		Gray Wolf Ridge	Jefferson
D-2		Buckhorn Mt.	Jefferson
D-2		Welch Peaks	Jefferson
D-2		Alphabet Ridge	Jefferson
D-2		Warrior Arm	Jefferson
D-2		Ridge of the Gargoyles	Jefferson
D-2		Cloudy Peak/Warrior Peak	Jefferson
D-2		Mt. Mathias/Mt. Mercury	Jefferson
D-2		Steeple Rock	Jefferson
D-2		Mt. Appleton	Jefferson
D-2		Mt. Queets	Jefferson
D-2		Mt. Meany	Jefferson
D-2		Mt. Norton	Jefferson
D-2		Mt. Lawson	Jefferson
D-2		Mt. Wilder	Jefferson
D-2		Mt. Noyed	Jefferson
D-2		June 10th Peak	Jefferson
D-2		Mt. Barnes	Jefferson
D-2		Ludden Peak	Jefferson
D-2		Mt. Ferry	Jefferson
D-2		Mt. Duckabush	Jefferson
D-2		Mt. Skokomish	Mason
D-2		Mt. Henderson	Mason
D-2		Mt. Bretherton	Mason
D-2		Mt. Lincoln	Mason
D-2		Copper Mountain	Mason
D-2		Mount Rose	Mason
		PUGET TROUGH PROVINCE	
43	B-3	Mount Constitution	San Juan
44	B-3	Lummi Island Mountain	Whatcom
45	C-3	Mount Erie	Skagit
46	C-3	Little Mountain	Skagit
47	E-4	Tiger Mountain	King
		NORTH CASCADES PROVINCE	
48	B-3	Blue Mountain	Skagit
49	B-3	Bald Mountain	Skagit
50	B-4	Bear Mountain	Whatcom
51	B-4	Mount Redoubt	Whatcom
52	B-4	Mount Baker	Whatcom
53	B-4	Twin Sisters Mountain	Whatcom
54	B-4	Mount Shuksan	Whatcom
55	B-4	Mount Terror	Whatcom
56	B-4	Mount Ross	Whatcom
57	B-4	Davis Rock	Whatcom
58	B-4	Elephant Butte	Whatcom
59	B-4	Hozomeen Mountain	Whatcom
60	B-4	Desolation Peak	Whatcom
61	B-4	Middle Peak	Whatcom
62	B-4	Ruby Mountain	Whatcom
63	B-4	Oakes Peak	Whatcom
64	B-4	Mount Challenger	Whatcom
65	B-4	Loomis Mountain	Whatcom
66	B-4	Anderson Butte	Whatcom
67	B-4	American Border Peak	Whatcom
68	B-4	Pioneer Ridge	Whatcom
69	B-4	Mount Blum	Whatcom
70	B-4	Easy Ridge	Whatcom
71	B-4	Paul Bunyan's Stump, The Needle, and The Horsemen	Whatcom, Skagit
72	B-4	Teebone Ridge	Skagit
73	B-4	Hidden Lakes Peaks	Skagit
74	B-4	Sauk Mountain	Skagit
75	B-5	Majestic Mountain	Whatcom
76	B-5	Liberty Bell, Early Winters Spires, and Lexington and Concord Towers	Whatcom, Chelan, Okanogan
77	B-5	Rainy Pass	Skagit
78	B-5	Ragged Ridge and Red Mountain	Skagit
79	B-5	Azurite Peak	Skagit, Okanogan
80	B-5	Mount Logan	Skagit, Chelan
81	B-5	Washington Pass	Chelan, Okanogan
82	B-5	Kangaroo Ridge	Okanogan
83	B-5	Gardner Mountain	Okanogan
84	B-5	North Gardner Mountain	Okanogan
85	B-5	Silver Star Mountain	Okanogan
86	B-5	Snagtooth Ridge	Okanogan
87	B-5	Billy Goat Mountain	Okanogan
88	B-5	Goat Mountain	Okanogan
89	B-5	Goat Peak	Okanogan
90	B-5	Joker Mountain	Whatcom
91	B-5	Devils Dome	Whatcom
92	B-5	Jack Mountain	Whatcom
93	B-5	Robinson Mountain	Okanogan
94	B-5	Passayten Peak	Okanogan
95	B-5	Patarigan Peak	Okanogan
96	B-5	Mount Lago	Okanogan
97	B-5	Gray Mountain	Okanogan
98	C-3	Big Rock	Kittitas
99	C-4	Illabot Peaks	Skagit
100	C-4	Mount Chaval	Skagit
101	C-4	Hurricane Peak	Skagit
102	C-4	Snowking Mountain	Skagit
103	C-4	Peak 7160	Skagit
104	C-4	Cascade Pass	Skagit
105	C-4	Sahale Mountain	Chelan,
106	C-4	Dome Peak	Skagit, Chelan
107	C-4	Whitehorse Mountain	Snohomish
108	C-4	Three Fingers Mountain	Snohomish
109	C-4	Liberty Mountain	Snohomish
110	C-4	Bullen Mountain	Snohomish
111	C-4	Jumbo Mountain	Snohomish
112	C-4	Mount Pilchuck	Snohomish
113	C-4	Bald Mountain	Snohomish
114	C-4	White Chuck Mountain	Snohomish
115	C-4	Pugh Mountain	Snohomish
116	C-4	Devils Thumb	Snohomish
117	C-4	Big Bear Mountain	Snohomish
118	C-4	Twin Peaks	Snohomish
119	C-4	Red Mountain	Snohomish
120	C-4	Stillaguamish Peak	Snohomish
121	C-4	Glacier Peak	Snohomish
122	C-4	Vesper Peak	Snohomish
123	C-4	Sloan Peak	Snohomish
124	C-4	Black Mountain	Snohomish
125	C-4	Portal Peak	Snohomish
126	C-4	White Mountain	Snohomish, Chelan
127	C-5	Fortress Mountain	Chelan, Snohomish
128	C-5	Chiwawa Ridge	Chelan, Snohomish
129	C-5	Clark Mountain	Chelan
130	C-5	Buck Mountain	Chelan
131	C-5	Liberty Cap	Chelan, Snohomish
132	C-5	McGregor Mountain	Chelan
133	C-5	Seven Fingered Jack	Chelan
134	C-5	Sitting Bull Mountain	Chelan
135	C-5	Pyramid Mountain	Chelan
136	C-5	Mount Lyall	Chelan
137	C-5	Neddie Peak	Chelan
138	C-5	Flora Mountain	Chelan
139	C-5	Bonanza Peak	Chelan
140	C-5	Tupshin Peak	Chelan
141	C-5	White Goat Mountain	Chelan
142	C-5	South Navarre Peak	Chelan
143	C-5	Reynolds Peak	Chelan
144	C-5	Sawtooth Mountains	Chelan, Okanogan
145	C-5	Lookout Mountain	Okanogan
146	C-5	Oval Peak	Okanogan
147	C-5	Abernathy Peak	Okanogan
148	D-4	Red Mountain	Snohomish
149	D-4	Gunn Peak	Snohomish
150	D-4	Spire Mountain	Snohomish
151	D-4	Mount Stickney	Snohomish
152	D-4	Stevens Pass	King
153	D-4	Garfield Mountain	King
154	D-4	Mount Index	King
155	D-4	McClain Peaks	King
156	D-4	Mount Daniel	Kittitas, King
157	D-4	Mount Tenerriffe	King
158	D-4	Bessemer Mountain	King
159	D-4	Quartz Mountain	King
160	D-4	Mount Si	King
161	D-4	Little Si	King
162	D-4	Trico Mountain	Chelan, Kittitas, King
163	D-4	Whitter Peak	Chelan
164	D-4	Poets Range	Chelan
165	D-5	Entiat Mountain Range	Chelan
166	D-5	Chiwaukum Mountains	Chelan
167	D-5	Chelan Mountain Range	Chelan
168	D-5	Dirty Face Peak	Chelan
169	E-4	Snoqualmie Pass	King
170	E-4	Three Queens	Kittitas
171	E-5	Three Brothers	Chelan
172	E-5	Mount Stuart	Chelan
173	E-5, D-5	McClellan Ridge	Chelas
174	E-5	Hawkins Mountain	Kittitas
175	D-5	Twin Peaks	King
176	E-4	Snoqualmie Mountain	King
177	E-4	Chimney Rock and Overcoat Peak	King, Kittitas
178	E-4	Chickamin Peak and Lemah Mountain	Kittitas, King
179	E-4	Red Mountain	Kittitas
180	D-5	Jack Ridge	Chelan
181	D-4	Scorpion Mountain	Snohomish
182	D-4	Captain Point	King
183	D-4	Mount Fernow	King
184	D-4	Thunder Mountain	King, Chelan
185	D-4	Mac Peak	Chelan
186	D-4	Baring Mountain	Snohomish, King
187	E-5	Ingalls Peak	Chelan, Kittitas
188	E-5	Stuart Range (includes The Knitting Needles, The Nightmare Needles, Flagpole Needles, Temple Ridge, Mount Temple, April Fool and Easter Towers, and Snow Creek Wall)	Chelan
189	D-4	Malachite Peak	King
190	D-4	Bald Eagle Peak	King
191	E-4	Summit Chief Mountain/ Little Big Chief/Middle Chief	King
192	D-4	Big Snow Mountain	King
193	E-4	Wright Mountain	King
194	E-4	Bryant Peak and The Tooth	King

The following features were also submitted and are part of the North Cascades Province:

B-4		Pinnacle Peak and the Barrier Pinnacles	Whatcom
B-4		Hagan Mountain	Whatcom
B-4		Bacon Peak	Whatcom
B-4		Diobsud Buttes	Skagit
B-4		Inspiration Peak and Towers	Whatcom
B-4		McMillan Spire, The Pyramid and Degenhardt Mountain	Whatcom
B-4		Sourdough Mountain	Whatcom
B-4		Mount Prophet	Whatcom
B-4		Crescent Creek Spires	Whatcom
B-4		Twin Needles	Whatcom
B-4		Big Devil Peak	Skagit
B-4		Little Devil Peak	Skagit
B-4		The Triad	Skagit
B-4		Boston Peak	Skagit
B-4		Sharkfin Tower and Forbidden Peak	Skagit
B-4		Mount Torment	Skagit
B-4		Eldorado Peak and Dorado Needle	Skagit
B-4		Klawatti, Primus, and Triconni Peaks	Skagit
B-4		Damnation Peak	Whatcom
B-4		Mount Triumph	Whatcom
B-4		Trappers Peak	Whatcom
B-4		Colonial Peak	Whatcom
B-4		Snowfield Peak	Skagit
B-4		Pinnacle Peak	Whatcom
B-4		Pyramid Peak	Whatcom
B-4		Little Jackass Mountain	Whatcom
B-4		Nodoubt Peak	Whatcom
B-4		Mount Spickard	Whatcom
B-4		Mox Peaks	Whatcom
B-4		Ridge of the Gendarmes	Whatcom
B-4		Redface Mountain	Whatcom
B-4		Indian Mountain	Whatcom
B-4		Ruth Mountain	Whatcom
B-4		Icy Peak	Whatcom
B-4		Seahpo Peak	Whatcom
B-4		Jagged Ridge	Whatcom
B-4		Nooksack Tower	Whatcom
B-4		Copper Mountain	Whatcom
B-4		Whatcom Peak	Whatcom
B-4		Liberty Mountain	Whatcom
B-4		Bullen Mountain	Whatcom
B-4		Jumbo Mountain	Whatcom
B-4		Crooked Thumb Peak	Whatcom
B-4		Phantom Peak	Whatcom
B-4		Mount Watson	Whatcom
B-4		Church Mountain	Whatcom
B-4		Bearpaw Mountain	Whatcom
B-4		Coleman Pinnacle	Whatcom
B-4		Mount Sefrit	Whatcom
B-4		Nooksack Ridge	Whatcom
B-4		Tomyhoi Peak	Whatcom
B-4		Yellow Aster Butte	Whatcom
B-4		Mount Larrabee	Whatcom
B-4		The Pleiades	Whatcom
B-4		Winchester Mountain	Whatcom
B-4		Hannegan Peak	Whatcom
B-4		Granite Mountain	Whatcom
B-4		Goat Mountain	Whatcom
B-5		Gabriel Peak	Skagit
B-5		Elija Ridge	Whatcom
B-5		Beebe Mountain	Whatcom
B-5		Cutthroat Peak	Chelan, Okanogan, Skagit
B-5		Whistler Mountain	Chelan
B-5		Fisher Peak	Chelan, Skagit
B-5		Mount Arrival	Chelan, Skagit
B-5		Black Peak	Chelan, Skagit
B-5		Cortee Peak	Chelan, Skagit
B-5		Crater Mountain	Whatcom
B-5		Tatie Peak	Okanogan, Whatcom, Skagit
B-5		Storey Peak	Okanogan
B-5		Bemmel Mountain	Okanogan
B-5		Peepsight Mountain	Okanogan
B-5		Sheep Mountain	Okanogan
B-5		Big Craggy Peak	Okanogan
B-5		West Craggy Peak	Okanogan
B-5		Mount Carru	Okanogan
B-5		Osceola Mountain	Okanogan
B-5		Castle Peak	Okanogan, Snohomish
B-5		Freezeout Mountain	Okanogan, Chelan
B-5		Devils Peak	Okanogan
B-5		Last Chance Point	Okanogan
B-5		Lake Mountain	Okanogan
B-5		Mount Rolo	Okanogan
B-5		Blackcap Mountain	Okanogan
B-5		Monument Peak	Okanogan
B-5		Many Trails Peak	Okanogan
B-5		Lost Peak	Okanogan
B-5		The Three Pinnacles	Okanogan
B-5		Skagit Peak	Whatcom
B-5		Spratt Mountain	Whatcom
B-5		Methow Pinnacles	Okanogan
B-5		Tower Mountain	Okanogan
B-5		The Needles	Okanogan
B-5		Mount Hardy	Okanogan, Skagit
B-5		Holliway Mountain	Okanogan
B-5		Golden Horn	Okanogan
B-5		Haystack Mountain	Okanogan
B-5		Tamarack Peak	Okanogan, Whatcom
B-5		Holman Peak	Okanogan
B-5		Three Fools Peak	Okanogan, Whatcom
B-5		Blizzard Peak	Okanogan, Whatcom
B-5		Mount Winthrop	Okanogan
B-5		Cathedral Peak	Okanogan
C-4		Mount Buckindy	Skagit
C-4		Peak 7103	Skagit
C-4		Peak 6971	Skagit
C-4		Cascade Mt. and The Triplets	Skagit, Chelan
C-4		Johannesburg Mountain	Skagit
C-4		Magic Mountain	Chelan, Skagit
C-4		Pleton and Mix-up Peaks	Chelan
C-4		Trapper Mountain	Chelan
C-4		Hurry-up Peak	Skagit, Chelan
C-4		Spider Mountain	Skagit, Chelan
C-4		Le Conte Mountain	Skagit, Chelan
C-4		Sentinel Peak	Skagit, Chelan
C-4		Lizard Mountain	Skagit, Chelan
C-4		Spire Mountain	Skagit, Chelan
C-4		Ripsaw Ridge and Horseshoe Peak	Chelan
C-4		Indian Head Peak	Chelan
C-4		Mount Forgotten	Snohomish
C-4		Lewis Peak	Snohomish
C-4		Hall Peak	Snohomish
C-4		Marble Peak	Snohomish
C-4		Big Four Mountain	Snohomish
C-4		Little Chief Peak	Snohomish
C-4		Sperry Peak	Snohomish
C-4		Morningstar Peak	Snohomish
C-4		Bedal Peak	Snohomish
C-4		Sheep Mountain	Snohomish
C-4		Foggy Peak	Snohomish
C-4		Spring Mountain	Snohomish
C-4		Skullcap Peak	Snohomish
C-4		Helena Peak	Snohomish
C-4		Devils Peak	Snohomish
C-4		Dickerman Mountain	Snohomish
C-4		Downey Mountain	Snohomish
C-4		Sulphur Mountain	Snohomish
C-4		Peak 7368	Snohomish
C-5		Buckner Mountain	Skagit, Chelan
C-5		Booker Mountain	Chelan
C-5		Goode Mountain	Chelan
C-5		Hemaloose Ridge	Chelan
C-5		Helmet Butte	Chelan, Snohomish
C-5		Saddle Bow Mountain	Snohomish, Chelan
C-5		Plummer Mountain	Snohomish
C-5		Devils Smoke Stack	Chelan
C-5		Rampart Mountain	Chelan
C-5		Fifth of July Mountain	Chelan
C-5		Carne Mountain	Chelan
C-5		Old Glb Mountain	Chelan
C-5		Estes Butte	Chelan
C-5		Cloudy Peak	Chelan
C-5		North Star Mountain	Chelan
C-5		Martin Peak	Chelan
C-5		Riddle Peaks	Chelan
C-5		Castle Peak	Chelan
C-5		Devore Peak	Chelan
C-5		Wy' East Mountain	Chelan
C-5		Bowan Mountain	Chelan
C-5		Rainbow Mountain	Chelan
C-5		Glory Mountain	Chelan
C-5		Mount Saul	Chelan
C-5		Ice Creek River Ridge	Chelan
C-5		Spectacle Buttes	Chelan
C-5		Mountain Maude and Marmot Pyramid	Chelan
C-5		Red Mountain	Chelan
C-5		Dumbell Mountain	Chelan
C-5		Copper Peak	Chelan
C-5		Mount Fernow	Chelan
C-5		Buckskin Mountain	Chelan
C-5		Tin Pan Mountain	Chelans
C-5		Pyramid Mountain	Chelan
C-5		Graham Mountain	Chelan
C-5		Emerald Peak	Chelan
C-5		Saska Peak	Chelan
C-5		Gopher Mountain	Chelan
C-5		Cardinal Peak	Chelan
C-5		Lone Mountain	Chelan
C-5		Boulder Butte	Chelan
C-5		Sun Mountain	Chelan, Okanogan
C-5		Star Mountain	Skagit, Chelan, Okanogan
C-5		Grey Peak	Chelan, Okanogan
C-5		Finney Peaks	Chelan
C-5		Skookum Pass Mountain	Chelan
C-5		Stilletto Peak	Chelan
C-5		McAlester Mountain	Chelan, Okanogan
C-5		North Navarre Peak	Chelan, Okanogan
C-5		Gilbert Mountain	Okanogan
C-5		Midnight Mountain	Okanogan
C-5		Hoodoo Peak	Okanogan
C-5		Foggy Dew Ridge	Okanogan
D-4		Mount Persis	Snohomish
D-4		Merchant Peak	Snohomish
D-4		Townsend Mountain	Snohomish
D-4		Cadet Peak	Snohomish
D-4		Monte Cristo, Columbia and Wilmon Peaks	Snohomish
D-4		Kyes Peak	Snohomish
D-4		Goblin Mountain	Snohomish
D-4		Bear Mountain	Snohomish
D-4		Troublesome Mountain	Snohomish
D-4		Scott Peak	Whatcom
D-4		Hubbart Peak	Snohomish
D-4		Mineral Butte	Snohomish
D-4		Crested buttes and Sheep Gap Mt.	Snohomish
D-4		Silvertip Peak	Snohomish
D-4		Gothic and Del Campo Peaks	Snohomish
D-4		Bears Breast Mountain	Kittitas
D-4		The Citadel	Kittitas
D-4		Cathedral Rock	Kittitas
D-4		Mount Hinman	Kittitas, King
D-4		Mount Phelps	King
D-4		Lennox Mountain	King
D-4		Crosby Mountain	King
D-4		Plamer Mountain	King
D-4		Grotto Mountain	King
D-4		Silver Eagle Peak	King
D-4		Iron Gap Mountain	King
D-4		Prospectors Ridge	King
D-4		Bulls Tooth	Chelan
D-4		Jim Hill Mountain	Chelan
D-4		Bryant Peak	Chelan
D-4		Irving Peak	Chelan
D-4		Poe Peak	Chelan
D-4		Longfellow Mountain	Chelan
D-4		The Castle	Chelan
D-4		Granite Mountain	Chelan, Whatcom
D-5		Mount Jonathan	Okanogan
D-5		Mount David	Chelan
D-5		Three Musketeers and Mole Ridges	Chelan
D-5		Icicle River Ridge and Rocks	Chelan
D-5		Garland Peak	Chelan
D-5		Eightmile Mountain	Chelan
D-5		Cashmere Mountain	Chelan
D-5		Dudley Spire	Chelan
D-5		Snowgrass Mountain	Chelan
E-4		Mt. Defiance	King
E-4		Mount Roosevelt	King
E-4		Kaleetan Peak	King
E-4		Chair Peak	King
E-4		Denny Mountain	King
E-4		Jolly Mountain	Kittitas
E-4		Hibox Peak	Kittitas
E-5		Esmeralda Peaks	Chelan, Kittitas, Chelan
E-5		Mount Temple	Chelan
E-5		Navaho Peak	Chelan, Kittitas
E-5		Volcanic Neck	Chelan, Kittitas
E-5		Earl Peak	Chelan
E-5		Iron Peak	Kittitas, Chelan
E-5		Nadine Spire	Kittitas, Chelan
E-5		Colchuck Peak and Colchuck Balanced Rock	Chelan
E-5		Dragontail Peak	Chelan
E-5		Rosebud Spire	Chelan
E-5		Sherpa and Argonaut Peaks	Chelan
		SOUTH CASCADES PROVINCE	
E-4		Kelly Butte	King
E-4		Mount Peak (Pinnacle Peak)	King
E-4		Mount Gardner	King
E-4		Stampede Pass	Kittitas, King
E-4		Silver Peak	King, Kittitas
E-4		Tinkham Peak and Mouth Catherine	Snohomish
E-4		Naches Pass	Pierce
E-4		Old Baldy Mountain	Pierce
F-3		Rimrock	Pierce
F-4		Mount Rainier	Pierce
F-4		Mother Mountain	Pierce
F-4		Crystal Mountain	Pierce
F-4		Sourdough Mountains	Pierce
F-4		Pinnacle Peak and the Castle	Lewis
F-4		Mount Wow	Pierce
F-4		White Pass	Yakima, Lewis
F-4		Tolmie Peak	Pierce
F-4		Observation, Echo and Hessong Rocks, Mt. Pleasant, Fay Peak	Pierce
F-4		Howard and Arthur Peaks	Pierce
F-4		Echo and Observation Rocks	Pierce
F-4		Hessong Rock	Pierce
F-4		Chutla Peak	Lewis
F-4		Eagle Peak	Lewis
F-4		Lane, Plummer, and Wahpenayo Peaks	Lewis
F-4		Unicorn and Boundary Peaks	Lewis
F-4		Stevens Peak	Lewis
F-4		Mount Curtis Gilbert	Lewis, Yakima
F-4		Ives Peak	Lewis, Yakima
F-4		Old Snowy Mountain	Yakima
F-4		Tieton Peak	Yakima
F-4		Bear Creek Mt.	Yakima
F-4		Big and Little Horn	Lewis, Yakima
F-4		Jumpoff Lookout	Yakima
F-4		Spiral Butte	Yakima
F-4		Devils Table	Yakima
F-4		Meeks Table	Yakima
G-3		Mount Saint Helens	Skamania
G-3		Mount Margaret	Skamania
G-4		Mount Adams	Yakima
H-3		Beacon Rock	Skamania
H-3		Prindle Mountain	Skamania
H-3		Archer Mountain	Skamania
H-3		Silver Star Mountain	Skamania
H-3		Mount Hamilton	Skamania
H-4		Table Mountain	Skamania
H-4		Greenleaf Peak	Skamania
H-4		Wind Mountain	Skamania
H-4		Dog Mountain	Skamania
H-4		Augspurger Mountain	Skamania
F-4		Naches and Yakima Peaks	Yakima

The following features were submitted but not mapped; they are found in the South Cascades Province:

E-4		Granite Mountain	King
E-4		Guye Peak	King
E-4		Lundin Peak	King
E-4		Red Mountain	King
E-4		Mount Thompson	King
E-4		Abbie Peak	King
E-4		Summit Chief Mountain	King
		Little Big Chief	King
		Middle Chief	King
E-4		McClellan Butte	King
E-4		Humpback Mountain	King
F-4		Pampart Ridge	Kittitas
E-4		Alta Mountain	Kittitas
E-4		Bearhead Mountain	Pierce
E-4		Pitcher Peak	Pierce
F-4		Pyramid Peak	Pierce
F-4		Mount Ararat	Pierce
F-4		Iron Mountain	Pierce
F-4		Tokaloo Spire	Pierce
F-4		Governor's Ridge	Pierce
F-4		Goat Island Mountain	Pierce
F-4		Tamanoe Peak	Pierce
F-4		Double Peak	Pierce
F-4		Little Tahoma Peak	Pierce
F-4		Cowlitz Chimneys	Pierce
F-4		Burroughs Mountain	Pierce
F-4		Skyscraper Mountain	Pierce
F-4		Redstone Peak	Pierce
F-4		Tyee Peak	Pierce
F-4		Sluiskin Mountain	Pierce
F-4		Old Desolate	Pierce
F-4		Crescent Mountain	Pierce
F-4		Tolmie Peak	Pierce
F-4		Observation, Echo and Hessong Rocks, Mt. Pleasant, Fay Peak	Pierce
F-4		Howard and Arthur Peaks	Pierce
F-4		Echo and Observation Rocks	Pierce
F-4		Hessong Rock	Pierce
F-4		Chutla Peak	Lewis
F-4		Eagle Peak	Lewis
F-4		Lane, Plummer, and Wahpenayo Peaks	Lewis
F-4		Unicorn and Boundary Peaks	Lewis
F-4		Stevens Peak	Lewis
F-4		Mount Curtis Gilbert	Lewis, Yakima
F-4		Devils Horns	Yakima
F-4		Bismarck Peak	Yakima
F-4		Fifes Peak	Yakima
H-4		Aldrich Butte	Skamania
		OKANOGAN HIGHLANDS PROVINCE	
242	B-6	Mount Bonapart	Okanogan
243	B-7	Sherman Peak	Ferry
244	B-7	Bangs Mountain	Ferry
245	B-7	White Mountain	Ferry
246	B-8	Hoodnose Mountain	Stevens
247	B-8	Abercrombie Mountain	Stevens
248	B-8	Gypsy Ampitheaters	Pend Oreille
249	B-8	Hall Mountain	Pend Oreille
250	B-8	Gypsy Peak	Pend Oreille
251	C-8	Calispell Peak	Stevens
252	C-7,8,	Selkirk Mountains	Stevens, Pend Oreille
253	B-7,8 D-8	Mount Spokane	Spokane
		COLUMBIA BASIN PROVINCE	
254	E-8	Steptoe Butte	Whitman
255	F-5	Gates of Yakima	Yakima
256	F-6	Drumheller Channels	Grant, Adams
257	F-6	Gable Mountain	Benton
258	F-7	Scabland Island Hills	Adams
259	F-8	Scabland Island Hills	Whitman
260	F-8	Kamiak Butte	Whitman
261	G-6	Horse Heaven Hills	Benton
262	G-5	Toppenish Ridge	Yakima, Kittitas
263	F-5	Yakima Ridge	Yakima
264	F-5, G-5,6	Rattlesnake Hills	Yakima
265	G-5, H-5	Simcoe Mountains	Yakima, Klickitat
		BLUE MOUNTAINS PROVINCE	
266	G-8	Twin Buttes	Columbia
		Canyons, gorges, coulees, water gaps GW	
1	D-6	Grand Coulee	Grant
2	D-6	Moses Coulee	Douglas
3	F-6	Drumheller Channels	Grant, Adams
4	G-8	Canyon of the Grande Ronde River	Asotin
5	H-4	Columbia Gorge	Skamania, Klickitat
6	F-5	Yakima Canyon	Kittitas, Yakima
7	F-8

GEOLOGICAL INDEX

Map Key No.	Map Index Grid Ref.	Feature	County
46	H-4	Erosional Scarp	Skamania
47	B-3	Lake Campbell Cliffs	Skagit
48	G-1	North Head	Pacific
Rock formations GR			
1	C-1	Point of the Arches	Clallam
2	D-6	Steamboat Rock	Grant
3	E-1	Elephant Rock	Grays Harbor
4	C-1	Cape Flattery Sea Stacks	Clallam
5	H-3	Beacon Rock	Skamania
6	G-7	Table Rock	Walla Walla
7	B-3	Chuckanut Drive	Skagit
8	C-3	Deception Pass	Skagit
9	B-3	Blow Hole	Whatcom
10	B-8	Pend Oreille River Gorge	Pend Oreille
11	B-6	Hee-Hee Stone	Okanogan
12	D-1	Quillayute Needles	Clallam
13	E-6	Rosa Basalt Flow	Grant
14	G-6	Earthflow Topography	Benton
15	H-4	Earthflow Topography	Skamania
16-17			
18	F-4	Klootchman Rocks	Yakima
19	B-8	Marl Deposits	Pend Oreille
20	B-8	Marl Deposits	Pend Oreille
21			
22	F-4	Chimney Peaks	Yakima
23	G-7	Twin Sisters	Walla Walla
24	G-1	Cape Disappointment	Pacific
25	G-4	Shark Rock Unusual Interest Area	Skamania
26	D-8	Bowl and Pitcher Area, Riverside St. Park	Spokane
27	F-4	Palisades	Lewis
28	D-3	Basalt Outcroppings	Snohomish
29	H-3	Phoca Rock	Skamania
30	H-4	Bingen Anticline	Klickitat
31	H-4	Eagle Creek Formation	Skamania
32	D-5	Peshastin Pinnacles	Chelan
33	D-5	Chumstick Snag	Chelan
34	D-5	Tumwater Canyon Rocks, Towers, and Columns	Chelan
35	C-3	Iceberg Point	San Juan
36	B-3	Eagle Rock	Skagit
37	C-3	Hole in the Wall	Skagit
38	H-4	Dog Mountain	Skamania
39	C-2	Oak Point Basalt Palisades	Cowlitz
40	C-3	The Rock	Skagit
41	C-2	Goblin Gates	Clallam
42	C-3	Castle Island	San Juan
43	E-1	Pliocene Rocks	Grays Harbor
44	E-1	Pliocene Rocks	Grays Harbor
45	E-2	Dikes, Sills, and Intrusive Bodies	Grays Harbor
46	E-2	Dikes, Sills, and Intrusive Bodies	Grays Harbor
47	E-2	Dikes, Sills, and Intrusive Bodies	Grays Harbor
48	E-1	Oligocene-Miocene Rocks	Grays Harbor
49	G-2	Dikes, Sills, and Intrusive Bodies	Pacific
50	F-2	Rock Outcrops	Grays Harbor
51	E-2	Rock Outcrops	Grays Harbor
52	E-8	Natural Bridges and Arches	Whitman
53	D-8	Browne Mountain	Spokane
54	F-4	Andesite Formation	Lewis
55	G-2	Rock Stacks	Wahkiakum
56	G-2	Pillar Rock	Wahkiakum
57	G-3	Castle Rock	Cowlitz
58	E-5	Spanish Castle Rocks	Kittitas, Chelan
59	D-1	Teahwhit Head	Jefferson
60	D-1	Rob Head	Jefferson
61	D-3	Restoration Point	Kitsap
62	G-4	Natural Bridge	Skamania
63	F-8	Granite Point	Garfield
64	H-3	Columbia River Gorge	Skamania
65	H-3	Troutdale Formation	Clark
66	H-4	Hood River Syncline	Klickitat
67	H-4	Mosier Syncline	Klickitat
68	H-4	Ortley Anticline	Klickitat
69	H-4	Dallas Syncline	Klickitat
70	E-5	Rock Island Canyon	Douglas
71	D-5	Lincoln Rock	Douglas
Evidence of volcanic activity GV			
1	B-4	Mount Baker	Whatcom
2	F-4	Mount Rainier	Pierce
3	G-4	Mount Adams	Yakima
4	G-3	Mount Saint Helens	Skamania
5	G-3	Lava Tubes	Skamania
6	F-6	Drumheller Channels	Grant, Adams
7	G-3	Ape Cave	Skamania
8	H-3	Beacon Rock	Skamania
9	C-4	Glacier Peak	Snohomish
10	F-4	Goat Rocks	Yakima, Lewis
11	H-4	Basalt Dikes	Klickitat
12	B-4	Sulphur Creek Lava Flow	Whatcom
13	B-4	Schriebers Meadow Cinder Cone	Whatcom
14	C-4	Cinder Cones	Chelan
15	G-3	Lava Flows	Skamania
16	H-4	Lava Tubes at Trout Lake Valley	Klickitat
17	B-8	Shedroof Glacial Striate	Pend Oreille
18	F-4	Spiral Butte	Yakima
19	H-4	Big Lava Bed	Skamania
20	F-6	Pillow Lavas	Grant
21	E-8	Pillow Lavas	Spokane
22	F-5	Tieton Flow	Yakima
23	G-8	Canyon of the Grande Ronde River	Asotin
*	*	Bedrock of Volcanic Origin	Ferry
*	*	Columbia River Basaltic Lava Beds	*
26	F-4	Klootchman Rocks	Yakima
27	F-4	Chimney Peaks	Yakima
28	F-4	Boulder Cave (Location unknown)	Yakima
29	F-4	Devils Table	Yakima
30	F-4	Meeks Table	Yakima
31	H-4	Lava Beds	Skamania
32	H-4	Crater Peak	Skamania
33	H-4	Lava Tube Caves	Skamania
34	D-4	High Rock	Snohomish
35	H-3	Mount Zion	Skamania
36	H-4	Wind Mountain	Skamania
37	H-4	Underwood Rim	Skamania
38	G-3	Mount St. Helens Lava Flows	Skamania
39	G-4	Slime Cave	Skamania
40	H-4	New Cave	Skamania
41	E-8	Lava Tree Cast	Whitman
42	E-5	Lahar Deposit	Kittitas
43	D-4	Cinder Cones	Chelan
44	H-3	Skamania Volcanics	Clark
45	H-3	Cleono Rock	Clark
46	F-4	Tumac Mountain	Yakima, Lewis
Glaciers or glacial features GG			
1	F-2	Mima Mounds	Thurston
2	D-6	Kame Terraces	Douglas, Chelan, Okanogan
3	D-6	Withrow Terminal Moraine	Douglas
4	D-6	Drumlins	Douglas
5	D-6	Erratic Boulders	Douglas
6	D-6	Esker Area	Douglas
7	D-6	Polished Bedrock	Douglas
8	E-5	Giant Ripples	Kittitas
9	E-6	Boulder Field	Grant
10	E-8	Hole-in-Ground	Whitman
11	E-8	Scabland Area	Adams, Lincoln, Whitman
12	D-8	Terminal Moraine	Spokane
13	D-8	Lake of the Woods	Pend Oreille
14	F-4	Mount Rainier (27 named glaciers)	Pierce
15	F-4	Emmons Glacier	Pierce
16	B-4	Mount Baker	Whatcom
17	B-7	Erratics on Bangs Mountain	Ferry
18	B-8	Kettle Topography	Pend Oreille
19	B-7	Hoo Doo Canyon	Ferry
20	B-8	Dry Canyon	Pend Oreille
21	B-8	Gypsy Amphitheaters	Pend Oreille
22	D-3	Magnolia Bluffs	King
23	D-4	Gordon Marckworth Experimental Forest	Snohomish
24	C-4	Glacier Peak	Snohomish
25	D-2	Blue Glacier	Jefferson
26	C-5	Methow Valley Terminal Moraine	Okanogan
27	D-6	Great Terrace of the Columbia	Chelan
28	C-6	Alta Coulee	Okanogan
29	C-6	Nespelem Varved Silts	Okanogan
30	C-5	Methow River Kame Terraces	Okanogan
31			
32	C-5	Railroad Creek Hanging Valley	Chelan
33	F-7	Shoulder Bar	Columbia
34	B-8	Hooknose Mountain	Pend Oreille
35	B-8	Hall Mountain	Pend Oreille
36	D-4	Hinman and Lynch Geological Areas	King
37	D-4	Columbia Geological Area	Snohomish
38			
39	B-8	Slate Creek	Pend Oreille
40			
41	B-7	Sherman Creek Kame Terraces	Ferry
42			
43	C-8	Bear Canyon	Stevens
44	B-4	Nooksack Cirque, Mt. Shuksan	Whatcom
45	C-4	S. Fork Cascade River Cirque and South Cascade Glacier	Skagit
46	C-4	Flat Creek Cirque	Chelan
47	C-4	W. Fork Agnes Creek Ice Wall	Chelan
48	C-4	Mt. Adams (9 named glaciers)	Yakima
49	G-3	Mt. St. Helens (11 named glaciers)	Skamania
50	B-5	Boston Glacier	Skagit
51	C-4	Boulder River Valley	Snohomish
52	C-4	Three Fingers High Country	Snohomish
53	D-4	High Rock	Snohomish
54	D-4	S. Side Skykomish	Snohomish
55	C-5	Lake Chelan River	Chelan
56	B-8	Sullivan Lake	Pend Oreille
57	B-3	Washington Park	Skagit
58	F-3	Mound Prairie	Thurston
59	C-3	Cattle Point	San Juan
60	E-5	Glacial Erratics	Chelan, Douglas
61	C-6	Chalk Hills	Douglas
62	B-8	Hall Mt.	Pend Oreille
63	B-8	Shed Roof Mt.	Pend Oreille
64	B-8	Ambercrombie Mt.	Stevens
65	B-8	Hooknose Mountain Cirque	Pend Oreille
66	B-7	Donaldson Draw	Ferry
67	E-4	Morainal Embankment	King
68	E-2	Wildcat Creek Gravels	Grays Harbor
69	F-2	Oakville Area	Grays Harbor
70	F-2	Ford Mounds	Grays Harbor
71	F-2	Red Gravels	Grays Harbor
72	F-2	Grays Harbor City Bluff	Grays Harbor
73	F-1	James Rock	Grays Harbor
74	D-6	Waterville Plateau	Douglas
75	C-2	Kame Terraces	Clallam
76	C-2	Eskers, Moraines, etc.	Clallam
77	F-3	Tenino Terminal Moraine	Thurston
78	D-2	Anderson and Ell Glaciers	Jefferson
79	D-2	The Brothers Cirque	Jefferson
80	D-2	Quilcene Glacier	Jefferson
81	D-2	Cameron Glaciers	Jefferson
82	C-4	Whitehorse Glacier	Snohomish
83	C-4	Three Fingers Glacier	Snohomish
84	D-2	Mount Olympus	Jefferson
85	C-8	Phillips Lake	Stevens
86	B-4	Ptarmigan Ridge	Whatcom
87	D-2	Quilcene Glacier	Jefferson
88	B-4	Coleman Glacier	Whatcom
89	C-5	Stehekin Valley	Chelan
90	D-4	N. Fork of the Snoqualmie	King
91	D-4	Middle Fork of the Snoqualmie	King
92	E-4	S. Fork of the Snoqualmie	King
93	D-5, E-5	The Enchantment Lakes	Chelan
94	D-8	Bailey Lake	Spokane
95	B-7	Curlew Lake	Ferry
96	F-2	Outwash Prairies	Grays Harbor
Riverine features GN			
1	E-3	Nisqually River Delta	Thurston, Pierce
2	C-3	Skagit River Delta	Skagit
3	B-3	Nooksack River Delta	Whatcom
4	D-6	Dry Falls	Grant
5	F-5	Union Gap	Yakima
6	F-5	Yakima River Watergap	Yakima, Kittitas
7	G-8	Snake River Beaches	Asotin
8	D-4	Skykomish River Gravel Bars	Snohomish
9	B-3	Samish River Delta	Skagit
10	H-4	Klickitat River Delta	Klickitat
11	C-3, D-3	Snohomish River Delta	Snohomish
12	C-3	Stillaguamish River Delta	Snohomish
13	C-2	Elwha River Delta	Clallam
14	C-2	Dungeness River Delta	Clallam
15	C-2	Salt Creek Delta	Clallam
16	E-4	Green River Gorge Riverine Features	King
17	G-8	Grande Ronde River Meanders	Asotin
Fossil evidence GF			
1	F-5	Ginkgo Petrified Forest	Kittitas
2	G-3	Ape Cave	Skamania
3	B-8	Cambrian Fossils	Pend Oreille
4	C-8	Addy Cambrian Fossil Site	Stevens
5	C-8	West Addy Cambrian Fossil Site	Stevens
6	B-8	Colville Cambrian Fossil Site	Stevens
7	C-7	Rice Ordovician Fossil Site	Stevens
8	B-8	Northeast Metaline Ordovician Fossil Site	Pend Oreille
9	B-8	North Metaline Ordovician Fossil Site	Pend Oreille
10	B-8	Fence Creek Devonian Fossil Site	Pend Oreille
11	C-8	Springdale Valley Carboniferous Fossil Site	Stevens
12	B-7	Kettle Falls Permian Fossil Site	Stevens
13	B-7	Curlew Triassic Fossil Site	Ferry
14	B-7	Donville Triassic Fossil Site	Ferry
15	B-2	Jurassic Fossils	San Juan
16	B-3	Cretaceous Fossils	San Juan
17	F-2	Porter-Malone Tertiary Fossil Sites	Grays Harbor
18	G-3	Vader Tertiary Fossil Site	Lewis
19	C-2	Port Angeles Tertiary Fossil Site	Clallam
20	B-3	Tertiary Fossils	Whatcom
21	G-6	Ringold Tertiary Fossil Site	Franklin
22	B-6	Booker Lake Quaternary Fossil Site	Okanogan
23	D-8	Miocene Fossils	Spokane
24	D-8	Miocene Fossils	Spokane
25	B-3	Chuckanut Drive	Skagit
26	C-4	Higgins Fossil Area	Skagit
27	C-4	Deer Creek Road Fossils Area	Snohomish
28	B-4	Church Mountain Fossil Bed	Whatcom
29	C-3	Racus Hill Quarry	Skagit
30	F-6	Saddle Mountain Petrified Forest	Grant
31	E-6	Fossil Caves	Grant
32	F-5	Petrified Wood	Kittitas
33	E-5	Agate and Petrified Wood Exposure	Kittitas
34	F-6	Petrified Wood	Kittitas
35	F-5	Petrified Wood	Yakima
36	G-5	Petrified Wood, Agate, and Jasper Exposure	Klickitat
37	F-6	White Bluffs	Benton
38	D-8	Deep Creek Fossil Area	Spokane
39	D-8	Fossil Area	Spokane
*	*	Diatomite Beds	Yakima
*	*	Trilobites	Pend Oreille
40-42			
43	D-8	Orazada Creek	Stevens
44	D-3	Fiddlers Bluff	Snohomish
45	C-3	S. Fork Stillaguamish	Snohomish
46	H-4	Rock Creek Gorge	Skamania
47	D-6	Rhinoceros Cast	Grant
48	G-6	Rattlesnake Hills	Benton, Yakima
49	F-5	Yakima Firing Center	Kittitas, Yakima
50	G-5, G-6	Horse Heaven Hills (North slope)	Yakima
51	F-5	Manashtash Ridge (North slope)	Kittitas
52	F-3	Eocene Fossils	Thurston, Pierce
53	C-5	Pipestone Canyon	Okanogan
54	E-2	Skokomish Valley Fossils	Mason
55	E-5	Petrified Tree	Kittitas
56	E-3	Green River Gorge Paleobotany Site	King
57	E-4	Sasse Ridge Fossil Palm Leaves	Kittitas
58	F-3	Tono Vicinity	Thurston
59	F-2	Fossil Bearing Concretions	Grays Harbor, Pacific
60	G-2	Fossil Area	Wahkiakum
61	G-3	Fossil Areas	Cowlitz
62	H-5	Rock Creek Canyon	Klickitat
63	H-5	Pine Creek and Wood Gulch	Klickitat
64	H-5, H-6	Alder Creek and Dead Canyon	Klickitat
65	H-6, G-6	Glade Creek Canyon	Benton, Yakima
66	H-3	Skamania Volcanics	Clark
67	H-4	Columbia River Gorge	Klickitat, Skamania
68	G-6	Prosser Vicinity	Benton
69	E-5	Wenatchee Vicinity	Chelan
70	F-5	Ellensburg Vicinity	Kittitas
71	C-1	Fossil Area	Clallam
72	C-2	Fossil Area	Clallam
73	G-7	Dry Creek Fossil Beds	Walla Walla
74	B-4	Sauk Mountain Fossil Beds	Skagit
75	G-7	Burungame Ditch Area	Walla Walla
Caverns, caves GC			
1	G-3	Ape Cave	Skamania
2	H-4	Ice Caves	Skamania
3	D-6	Chelan Ice Cave	Chelan
4	C-2	Agate Bay Caves	Clallam
5	C-1	Carson Cave	Clallam
6	D-1	Hole-in-the-Wall	Clallam
7	G-3	String Cave	Cowlitz
8	E-4	Clark's Cave	King
9	E-4	Cliff Cave	King
10	E-4	Danger Cave	King
11	E-4	Danger Cave Annex	King
12	D-3	Dan's Cave	King
13	E-4	Hellhole Cave	King
14	E-4	Ledge Pit	King
15	E-4	Lookout Cave	King
16-17			
18	B-8	Gardner Cave	Pend Oreille
19	F-4	Ice Caves	Pierce
20	D-4	Twin Falls Natural Caves	Snohomish
21	C-3	Cave on Iceberg Point	San Juan
22	E-6	Fossil Caves	Grant
23	F-4	Boulder Cave	Yakima
24	E-6	Lake Lenore Caves (State Park)	Grant
25	C-8	Manressa Cave	Pend Oreille
26	E-1	Littoral Caves	Grays Harbor
27	G-1	Cape Disappointment Cave	Pacific
28	F-6	Mary Louise Ice Cave	Grant
29	H-4	Spear Point Cave	Skamania
30	B-3	Sumas Mountain Cave	Whatcom
31	G-4	Slime Cave	Skamania
32	H-4	New Cave	Skamania
33	D-6	Rhinoceros Cave	Grant
34	D-6	Dry Falls Cave	Grant
35	E-4	Newton Cave	King
36	E-4	Red Cave	King
37	G-3	Ole's Cave	Skamania
38	H-4	Peterson Prairie Cave System	Skamania
39	B-4	Clyde Senger Talus Caves	Skagit
41	F-7, F-8	Caves and Caverns along the Snake River	Columbia, Garfield, Franklin
42	B-6	Axwell Cavern	Chelan
Land-water interfaces GL			
1	C-2	Dungeness Spit	Clallam
2	F-1	Ocean Shores Spit	Grays Harbor
3	G-1	Long Beach Spit	Pacific
4	E-3	Des Moines Marine Shoreline	King
5	D-3	Alki Point Marine Shoreline	King
6	E-3	Quartermaster Harbor Marine Shoreline	King
7	D-3	Miller Bay Marine Shorelines	Kitsap
8	D-3	Seabeck Beach	Kitsap
9	D-3	Tacoma Narrows Marine Shoreline	Pierce
10	C-1	Mukkaw Bay	Clallam
11	C-2	Eagle Point and Eagle Cove	San Juan
12	D-3	Poverty Bay	King
13	C-2	Ediz Hook	Clallam
14	B-3	Birch Bay	Whatcom
15	D-3	Hood Canal	Mason, Kitsap, Jefferson
16	F-1	Twin Harbors Beaches	Grays Harbor, Pacific
17	E-1	Copalis Beach	Grays Harbor
18	D-3	Golden Gardens	King
19	D-3	Lincoln Park	King
20	C-2	False Bay	San Juan
21	C-3	Deception Pass	Island, Skagit
22	C-1	Sekiu to Mukkaw Bay	Clallam
23	C-1	Mukkaw Bay to Cape Alava	Clallam
24	C-1	Shi Shi Beach	Clallam
25	C-3	Ebey's landing and Perrigo Bluffs	Island
26	B-3	Crescent Beach	San Juan
27	C-2	Crescent Beach	Clallam
28	E-1	Cape Elizabeth	Grays Harbor
29	C-1	Point of the Arches	Clallam
30	E-1	Elephant Rock	Grays Harbor, Clallam
31	D-1	Teahwhit Head	Jefferson
32	D-1	Rob Head	Jefferson
33	C-3	Ada Spit	Island
34	C-3	Fidalgo Bay	Skagit
35	C-3	Burrows Bay	Skagit
36	E-3	Nisqually Delta	Thurston, Pierce
37	G-1	North Head	Pacific
Islands GI			
1	B-3	Pointer Island	San Juan
2	C-3	Whidbey Island	Island
3	B-2	Barren Island	San Juan
4	B-2	Posry Island	San Juan
5	B-2	Battleship Island	San Juan
6	B-2	Low Island	San Juan
7	B-2	Rock Island	San Juan
8	B-2	Ripple Island	San Juan
9	B-2	Skipjack Island	San Juan
10	B-2	Low Island	San Juan
11	B-2	Knob Island	San Juan
12	B-2	Wasp Island	San Juan
13	B-3	Freeman Island	San Juan
14	B-3	Victim Island	San Juan
15	B-3	Skull Island	San Juan
16	B-2	Gull Rock	San Juan
17	B-2	White Rock	San Juan
18	B-3	Peapod Rocks	San Juan
19	B-3	Shoe Rocks	San Juan
20	B-3	The Sisters	San Juan
21	C-3	Mummy Rocks	San Juan
22	C-3	Secar Rocks	San Juan
23	C-3	Hall Island	San Juan
24	C-3	Iceberg Island	San Juan
25	B-3	Cypress Island	Skagit
26	C-2	Long Island	Pacific
27	C-3	Campbell Lake Island	Skagit
28	C-1	Waadah Island	Clallam
29	C-1	Tatoosh Island	Clallam
30	H-3	Pierce Island	Skamania
31	C-3	Protection Island	Jefferson
32	F-6	Locke Island	Benton
33	G-2	Puget Island	Wahkiakum
34	H-3	Reed Island	Skamania
35	H-4	Hamilton Island	Skamania
36	H-4	Pierce Island	Skamania
37	D-1	Destruction Island	Jefferson
38	B-3	Blakely Island	San Juan
39	B-2	San Juan Island	San Juan
40	B-3	Shaw Island	San Juan
41	B-3	Orcas Island	San Juan
42	C-3	Lopez Island	San Juan
43	C-3	Camano Island	Island
44	D-1	James Island	Clallam
45	C-3	Ika, Greenback, Brown Lily, Shypoke, McGlinn, Goat, Hope, Little Hope, and Kiket Islands	Skagit
Reefs GS			
1	C-3	Lawson Reef	San Juan
2	B-3	North Pacific Rock	San Juan
3	B-3	Halftide Rock	San Juan
4	B-2	Gull Reef	San Juan
5	B-2	Danger Rock	San Juan
6	C-3	Dot Rock	San Juan
7	B-3	Parker Reef	San Juan
8	C-1	Slip Point Reef	Clallam
9	C-2	Tongue Point	Clallam
Dunes GD			
1	E-6	Moses Lake Sand Dunes	Grant
2	F-7	Dune Area	Adams
3	G-6	Sand Dunes	Franklin
4	G-7	Juniper Forest	Franklin
5	G-6	Cold Creek Dunes (Also known as the Arid Lands Ecology Sand Dune Study Area)	Benton
6	C-3	Jetty Island	Snohomish
7	F-1	Westport-Grayland Area	Grays Harbor
8	F-6	Lower Crab Creek	Grant
9	G-7	Twin Sisters Dunes	Walla Walla
Unusual exposed minerals GE			
1	C-2	Jasper Exposure	Clallam
2	B-3	Jasper Exposure	Skagit
3	C-3	Jade Exposure	Skagit
4	B-7	Garnet and Agate Exposure	Ferry
5	D-1	Agate Exposure	Grays Harbor
6	E-5	Rose Quartz Exposure	Chelan
7	E-3	Petrified Wood Exposure	Pierce
8	E-5	Agate and Petrified Wood Exposure	Kittitas
9	F-6	Petrified Wood	Kittitas
10	F-3	Agate Exposure	Thurston
11	F-3	Agate Exposure	Lewis
12	F-5	Petrified Wood	Yakima
13	F-2	Jasper Exposure	Grays Harbor
14	G-5	Petrified Wood, Agate, and Jasper Exposure	Klickitat
15	H-4	Jasper Exposure	Skamania
16	F-6	Saddle Mountain Petrified Forest	Grant
17	C-5	Silver	Okanogan
18	E-6	Montronite	Grant
19	B-6	Thulite Lenses	Okanogan
20	B-4	Twin Sisters Mountain	Whatcom
21	B-4	Agate and Jasper Exposure	Whatcom
22	F-3	Carnelian Agate Exposure	Lewis
23	B-4	Garnet exposure at Browns Creek	Whatcom
24	D-4	Monroe Quarry	Snohomish
25	D-4	Cherry Creek	Snohomish
26	D-4	Cedar Ponds	Snohomish
27	D-4	Galena to Index	Snohomish
28	F-3	Hanaford Valley Strip Mines	Lewis, Thurston
29	H-5	Rock Creek Canyon	Klickitat
30	H-5	Pine Creek and Wood Gulch	Klickitat
31	H-5	Alder Creek	Klickitat
32	H-6	Dead Canyon	Klickitat
33	H-6, G-6	Glade Creek Canyon	Benton, Yakima
34	D-2, E-2	Olympic Manganese Exposures	Jefferson
35	D-2	Concretions in Eagle Creek Canyon	Mason
Other unusual geological or pedological features GO			
1	H-4	North Bonneville Landslide	Skamania
2	F-2	Mima Mounds	Thurston
3	G-8	Topographically Youtnful Tilted Surface	Asotin
4	D-6	Grand Coulee	Grant
5	F-7	Palouse Canyon	Franklin, Whitman
6	F-7	Devil's Canyon	Franklin
7	E-6	Frenchman Springs Coulee	Grant
8	E-6	Potholes Cataract	Grant
9	D-6	Moses Coulee	Douglas
10	D-5	Knapp Coulee	Chelan
11	B-6	Sinlahekin Coulee	Okanogan
12	C-6	Omak Lake Trench	Okanogan
13	C-6	Box Canyon	Douglas, Okanogan
14	B-6	Wagonroad Coulee	Okanogan
15	B-7	Lower Sherman Creek Postglacial Slot	Ferry
16	G-8	Basalt Dike	Asotin
17	E-5	Vertical Dikes	Chelan, Kittitas
18	F-8	Granite Point	Garfield
19	D-5	Top of Ribbon Mesa	Chelan
20	F-4	Goose Egg Mountain	Yakima
21	C-8	Lane Mountain	Stevens
22	F-4	Blue Slide	Yakima
23	D-5	Rock Slide at Earthquake Point	Chelan
24	G-6	Basalt Wall	Benton
25	E-5	Wenatchee Boulder Fields	Chelan, Douglas
26	D-3	Issaquah Deltas	King
27	F-3	Glacial Outwash Prairies and Drumlins	Thurston, Pierce
28	C-3	Salmon Creek	Skagit
29	E-2	Klone Lakes	Grays Harbor
30	B-4	The Grandy Slide	Skagit
31	H-3	Giant Gravel Beds	Clark
32	D-2	Convulsion Canyon Landslide	Clallam
33	E-8	Scabland Channels	Spokane
34	D-2	Thrust Fault	Jefferson
35	E-3, E-4	Osceola Mudflow	King, Pierce
36	C-1	Faulting, Recent	Clallam
37	C-3	Burlington and Blackburn Hills	Skagit
38	H-3	Columbia River Gorge	Skamania
39	H-4	Collins Slide	Skamania
40	H-4	Underwood Mountain	Skamania
41	H-4	Columbia River Basalt "Flour" Soils	Klickitat, Skamania
42	D-3	Kennydale Mud Slide and Underwater Forest	King
43	B-7	Lake Roosevelt Land Slump	Stevens
44	F-6	Columbia River Mounds	Benton, Grant
45	C-8	Devil's Well	Pend Oreille



LEGEND

- GW CANYON, GORGE, COULEE, WATERGAP
- GM DISTINCTIVE MOUNTAIN FEATURES
- GB CLIFF, BLUFF, PALISADE, DRY FALLS
- GR ROCK FORMATION
- GV EVIDENCE OF VOLCANIC ACTIVITY
- GG GLACIER OR GLACIAL FEATURES
- GN RIVERINE FEATURES
- GF FOSSIL EVIDENCE, PETRIFIED WOOD
- GC CAVERNS, CAVES
- GL LAND-WATER INTERFACES
- GI ISLANDS
- GS REEFS
- GD DUNES
- GE UNUSUAL EXPOSED MINERAL
- GO OTHER UNUSUAL GEOLOGICAL OR PEDOLOGICAL FEATURES

STATE OF WASHINGTON

GEOLOGICAL FEATURES

Washington Environmental Atlas
Second Edition, January 1975

Base modified from U.S. Geological Survey State
Base Map: Washington, 1:500,000, 1962

- State capital
- County seat
- City, town, or village
- Corporate boundary shown for towns over 5000 population

SCALE 1:750,000

10 0 10 20 30 40 miles

10 0 10 20 30 40 50 Kilometers

HYDROLOGICAL FEATURES



Palouse Falls

SHORE RESOURCE OVERVIEW

By

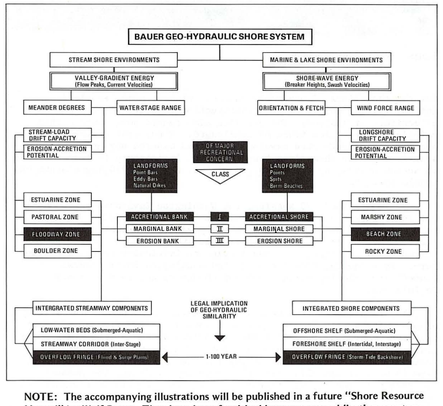
Wolf Bauer

An environmental resources survey and inventory based on a preliminary search of existing data plus opinions and facts supplied by various citizens is, at best, a spotty and fragmented beginning to what should emerge as a basic data bank. In such a survey there invariably exists the implication of individuality or locally-weighted factors which lack appropriate references to the geographic or quantitative whole. Thus there are obvious limitations to the initial use of such an inventory for the purpose of planning and management. There is the particular danger in geographic spot-listing shore forms and waterways at the risk of loosing sight of all other similar entities subject to the same basic environmental problems. If a listed entity is, already part of a limited and unique resource, there is little purpose in listing only those portions with which particular individuals may be familiar. Furthermore, many shore forms and geophysical features listed as visual entities are often highly integrated components of dependent systems left out of the inventory.

What will obviously be needed is a baseline identification of resources; a classification of forms and types; an uniqueness factor that pinpoints local or regional significance; a value factor that reflects functions and their relative importance; and finally, a time factor that sets priorities in terms of problem recognition and protective management policies.

The time is already past when we can point to isolated river reaches, beach forms, or estuaries and set them apart as unique examples of shores of statewide significance. The time has arrived to make a case for the shore resource as a viable and integrated system. For example, in talking about highest overall-priority recreational river reaches, we are really focusing on the intermediate-gradient Floodway Zone, (Zone III), where a broad and often braided streamway contains the wildlife cover and buffer, spawning gravels, park-like open meadows and beaches with interspersed islands and backwaters, a characteristic Heritage Zone produced by a combination of glacial drift and valley gradient between 5 and 25 feet per mile. Yet, while this zone has the prime sand and gravel beaches, each of the other three geohydraulic zones has its characteristic environment, functions, and predominant resource values. Thus, part of any zone still operating in a natural-process environment is of state significance, and should be accounted for in the inventory.

Likewise, there is an urgent need to place all remaining natural marine accretional shore forms, such as points, spits, and Class I dry berm beaches, into the category of shores of statewide significance, along with their feeder bluffs and driftways. Along with the remaining open and closed estuaries of any size, these forms must now be classified as endangered resources of the first order. Focus must not on individual specimens, but on the whole.



NOTE: The accompanying illustrations will be published in a future "Shore Resource Manual" by Wolf Bauer. They have been furnished here as a pre-publication courtesy by the author.

A shore resource inventory covering the remaining natural marine, estuarine, lacustrine, and riverine systems is undoubtedly the most urgent need today. It is relatively simple to produce such an inventory without specific priority assignments. However, this can only be done if a baseline resource identification and classification is made available that allows interdisciplinary communication and use. To this purpose, a diagram of the geohydraulic shore classification system is presented here, along with its legal implications, and its application to environmental resource management.

THE CASE FOR GEOHYDRAULIC INTEGRITY OF OUR SHORE RESOURCE

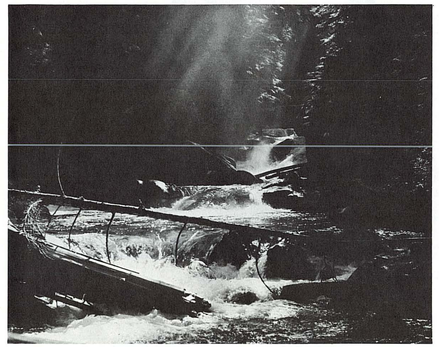
THE EDUCATION GAP. In order to embark upon a meaningful planning and management program encompassing our fluvial, lacustrine, and marine environments, whether for land-use or associated water-use purposes, we must learn to treat the shore phenomenon as an existing operative and dynamic system. It is now time to reeducate the public, government, and courts to the fundamental mechanisms and functions of this resource - dynamic processes that, perhaps better than any others, illustrate how a flexible biosphere adapts to a less flexible geosphere.

It is always difficult to unlearn, but as members of the most flexible segment of the bioshere, men need only to rid themselves of outdated philosophies rather than endure hardships or burdensome constraints. Few states have a greater immediate stake in recognizing the true nature and value of their shore resources than has Washington with its 300 seacoast miles, 2,000 miles of in land marine shores, and over 50,000 miles of river and lake shores. Yet, nowhere in our laws or public education have we recognized and defended the shore system as an operating dynamic entity, which critically influences the environments upon which some of this state's most valuable commercial and recreational resources depend. Even today, guidelines are drawn up ignoring basic geologic and hydraulic processes which dictate baseline limits, and opportunities for intelligent shore resource management. We are saddled with arbitrary, hazy definitions and unrelated shore boundary lines, whether they be archaic mean-higher-high tide or existing streambank property lines, or more recent wetland management lines. We attempt to manage a resource that operates as a system on both sides of arbitrary boundary lines and divisions which have no basis in nature, thereby forcing the courts to decide in favor of legal precedent at the expense of the geologic precedent which created and maintains the resource and its far-reaching sphere of influence.

TOWARD A NEW SHORELINE CONCEPT. Our reluctance in assigning system and resource status to the shore begins with the misleading and restrictive word "shoreline." While there may be an instantaneous waterline, the vertical and horizontal width of the shore complex operating as a integrated whole through geologic and hydraulic processes is anything but a line, and may extend from inches to miles. As we begin to monitor the distribution of trace elements and critical substances in waterway pollution studies, it is apparent there are not only continuous and cyclic movements of organic and inorganic elements from the land and shore fringes through the streamway and marine shore corridors into the waterways, but that this transport and its effects can spread hundreds of miles along the coastal waters. Thus, we need to visualize the shore as a critical membrane between all land and water bodies. In the case of streams and creeks this takes on the aspects and functions of a root or capillary system supplying sustenance to the lake or ocean environments. It becomes obvious that streamway corridors with their channel-fringe vegetation, backwaters, marshes, and sloughs are a fundamental component of the riverine-shore complex, and that normal, seasonal flushing action of streams over their streamways is the built-in mechanism whereby this cyclic transfusion must take place. To consider a stream or river simply as a hydraulic channel for water runoff is to miss its most significant aspect.

By the same token, estuaries, tidal lagoons and marshes are critical horizontal membranes for photosynthetic-organic reactions at the base of the food chain. These important basic shore resource functions are a result of adjacent but seemingly unrelated geohydraulic processes and shore forms, a management pivot point requiring public education and legal expression.

SHORE SYSTEM SIMILARITIES. The State of Washington's largest and most unique shore resource is Puget Sound with its interdependent riverine root system. Because of the glacial clay, sand, and gravel covering much of this basin, roughly 80 percent of the stream and marine shores are beach type, of several thousand miles extent. While there appears to be substantial differences between a riverbank shore and a salt-water beach, this is actually not the case from a geohydraulic process standpoint, especially in the Puget Sound basin where the marine and streambank shores are operating in the same glacial drift media. In each case characteristic shore environments are a result of the prevailing hydraulic energy level. The kinetic energy of streams is a function of valley gradient, while the energy level of still-water shores is a function of wave-size exposure. In each case, the shore environment is locked into the three dynamic processes of erosion-transport-accretion, a supply source, a transport passage way,



This stretch of the Rapid River is in the proposed Alpine Lakes Wilderness.

and a terminal dumping area respectively. The maintenance and perpetuation of the shore system as a viable public resource depends on either wave-generated (nontidal) water currents, or on gravity-actuated stream currents. And in each case the major shore action is cyclic and variable, and coincident with high-water stages, whether tidal or rain runoff. The lateral shore membrane is activated by built-in design. With rivers this membrane is the high-stage wetted streamway corridor, and with marine shores it is the storm-tide wetted backshore between normal high tide and the coastline.

Thus there are two basic mechanisms operating on all shores. The geohydraulic action of erosion-transport-accretion produces, alters, or maintains a shore form, and the biochemical and biophysical interchange action directly and indirectly affects the local and distant biosphere. These similarities in shore mechanisms and functions invite baseline legal approaches in shore resource management. The Intermediate Regional Storm-Tide Line (100-year frequency) occurs when an extreme high tide is reinforced by wind pressure surge plus gale-force waves. This combination can inundate the backshores of points, spits, marshes and barrier beaches as much as feet above normal high water, even on Puget Sound. This line is just as realistic and pertinent a base for flood plain constraints and management policies as the accepted Intermediate Regional Flood LIne (100-year frequency) used on rivers.

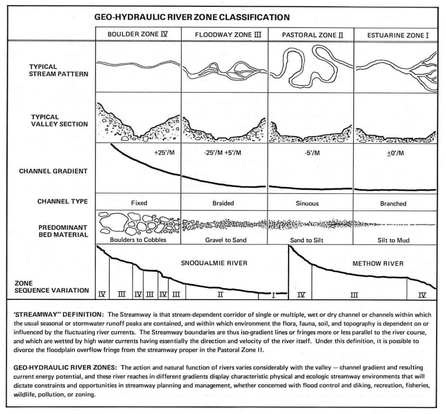
THE INTEGRITY OF NATURAL PROCESSES. While not all natural processes are beneficial to man, there is, nevertheless, a growing realization that the long-established patterns of natural-process phenomena may be tolerated more readily and economically by flexible man than fought, confined, altered, or destroyed. Increased environmental knowledge continues to uncover beneficial effects in mechanisms traditionally viewed as only destructive. So it is with the geohydraulics of shore systems.

We often associate the word "erosion" with a negative and destructive condition in nature, seldom viewing it as representing only half of a mechanism in which a balancing and positive accretion process takes place as a result. Part of this one-sided perception is due to the difference in visual impact of these two processes. It is dramatic and obvious where a concave streambank has eroded and washed out; but it is much more difficult to identify the voluminous accumulation of bedload and suspended load deposits in areas which may seed themselves with vegetation in a single season. Stream erosion usually occurs as a vertical cutting or caving action with sharp boundary lines, while accretion is spread out horizontally, in thin and often hidden layers over larger growth-covered areas.

Within the corridor of a river course there persists a more or less predictable pattern of meander amplitude and frequency in which both the accretion pointbars and the opposite erosion banks slowly shift down-valley without necessarily removing the valley floor, or lowering the streamway or channel bed level. Under some conditions just the opposite is true, and most of the lower gradient valleys are, in fact, receiving an excess of the fine mineral and organic materials that selectively travel faster and farther during high water transport.

Thus, when a landowner complains of washouts of pastures, barns, roads, or other structures, it is because his invasion of the operations corridor of the geohydraulic shore zone has involved him in its normal operation as a public resource. The farmer, developer, or vacation home owner should be protected from such losses by education and shore resource zoning, not by subsidy through public works and other forms of public risk sharing.

The case for marine shore systems integrity is even more pertinent, because the ratio of erosion shore to accretion shore is so much greater and more critical in terms of resource values. While rivers in the median-gradient sand and gravel floodway zone may contain from 20 to 40 percent Class I accretion beaches, the shores of Puget Sound, for example, never did have more than about 5 to 10 percent of dry above-tide accretion shores, and nearly half of these high priority beaches have already been turned into Class III type erosion shores by misguided bulkheading.



"STREAMWAY" DEFINITION: The Streamway is that stream-dependent corridor of single or multiple, wet or dry channel or channels within which the usual seasonal or stormwater runoff peaks are contained, and within which environment the flora, fauna, soil, and topography is dependent on or influenced by the fluctuating river currents. The Streamway boundaries are thus iso-gradient lines or fringes more or less parallel to the river course, and which are wetted by high water currents having essentially the direction and velocity of the river itself. Under this definition, it is possible to divorce the floodplain overflow fringe from the streamway proper in the Pastoral Zone II.

GEO-HYDRAULIC RIVER ZONES: The action and natural function of rivers varies considerably with the valley - channel gradient and resulting current energy potential, and these river reaches in different gradients display characteristic physical and ecologic streamway environments that will dictate constraints and opportunities in streamway planning and management, whether concerned with flood control and diking, recreation, fisheries, wildlife, pollution, or zoning.

However, the need for a legal umbrella extends much further than these precious and sparse accretion shores making up the few remaining points, spits, and barrier beaches. It must extend equally over the feeder bluff or source quarry from which the building material is derived that maintains these shore forms. This umbrella must also cover the driftway along which the sand and gravel constantly travels in the integrated shore-system operation. Each independent drift sector therefore becomes a resource entity as far as its geohydraulic operation is concerned. It is just as detrimental to bulkhead the toe of the feeder bluff as it is to constrict or block the driftway between it and the accretion beach with protruding revetments and groins. Not only is the feeder bluff the necessary element that produces and maintains a rare Class I berm beach along a point or spit, but its function also produces the marsh and lagoon on the leeward side of such shore forms. It is thus directly responsible for creating and maintaining a flood-chain baseline environment perhaps a mile or more away. Geohydraulics thus sets the stage for biologic performance, and becomes a public responsibility.

A COURSE OF ACTION. Our environmental conscience is approaching that degree of maturity which should allow us to start a reclassification and rededication of our shores from waterfront real estate to functional resource status. This will require first a draft of the legal implications and a legislative expression in the public interest.

Ideally, the shore diffusion and operations zone would be acquired and placed into the public domain for the overall highest benefit, whether that be for commercial or sports fisheries, shellfish production, wildlife, phyto-plankton and other baseline generation habitat, shore recreation, or shore esthetics as an economic state resource. Like the present staged pollution-abatement program, there should begin a gradual phasing out of backshore and foreshore structures and modifications deterimental to long-term shore functions.

HYDROLOGICAL FEATURES

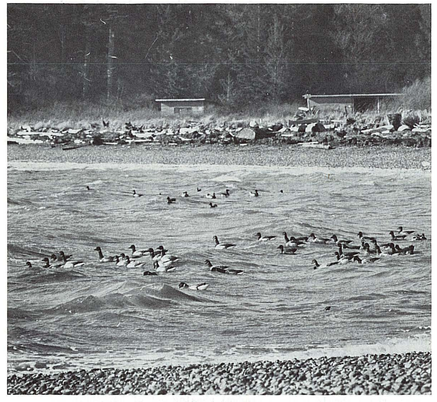
If existing private ownerships within a naturally operating shore zone are retained, then realistic responsibilities for protection, enhancement, or rehabilitation must be assigned to the combined ownership of each shore sector entity or streamway zone, and must include the identification of property parcels in terms of their functional contribution to the shore system. In designing a legal foundation for realistic shore management, shore inventories must identify all independently operating shore sectors, so that all activities can be identified with the appropriate sector. (Rocky fixed shores can be excluded from this insofar as geohydraulic processes are involved.)

In the 1,800 miles of the state's inland marine shores there are several hundred independently operating beach sectors of varying lengths, material characteristics, and activity or energy levels. Within each such sector, the shore system performs its normal operation of erosion-feeding, drift transport, and accretion building or maintenance. Each parcel of land within the foreshore or backshore component of such a sector is a part of the action, and should perform its established function by virtue of its makeup and location. It may be part of the feeder-stream or feeder-bluff area, lie within a multidirectional driftway, or be part of the accretion terminal. It may perform an noncritical or a very vital role as an operational shore component. Sectors may contain a fully occupied beach community or spottily used mix of ownership parcels, but any shore modification by one will affect all. Most critical, however, is the effect in terms of physical and biologic process integrity, one that has taken thousands of years to develop.

Forging legal safeguards and winning public respect for the integrity of natural processes is not new among world governments. It will nevertheless be a soul-searching experience for many citizens, even in this day and age of changing values and priorities. It is obvious that if we are indeed ready to admit resource status and assign public responsibility to the dynamic shore zones, we must create terminology and definitions that are scientifically tenable. There must be public understanding of shore processes, as well as a grasp of the direct and indirect functions these shore mechanisms perform for the dependent ecology. Particularly, the U.S. Army Corps of Engineers should reflect planning and management approaches that recognize systems rather than isolated visual shore forms, as is being done by so many local agencies today. Hopefully the emerging atlas and inventory can eventually be guided into a format that will serve this purpose more directly.

BASELINE SHORE IDENTIFICATION. It was in anticipation of the eventual recognition of the logic and soundness of "Natural Process Integrity" that this unified geo-hydraulic classification system was developed, one which would be field-identifiable by the general public, represent a scientific fact-of-life, and would invite legal defense. It has already made its initial impact in public shore-use priorities and decisions. If the categories of an inventory system of shores and shore-forms reflect genetic and integral process relationships, then it is possible to meet one of the prime objectives of the Environmental Reconnaissance Inventory, namely to provide an environmental "Early Warning System." It is to this objective, as well as that of providing public information on present shore-use problems, that those guidelines and analysis have been presented.

WOLF BAUER, P.E., is a consulting engineer with 25 years of worldwide professional experience specializing in shorelines. He is a member of the University of Washington faculty, and guest lecturer for the Engineering College. Along with numerous articles, he has authored A Time For Understanding, a pamphlet concerning the economics of shoreline planning, and has created the River Classifications System adopted by the State of Washington.



Gravel beaches, like this one at Padilla Bay, provide critical habitat for species like the black brant.



Cannonball Island as seen from the tip of Cape Alava.

SHORELINES — AN HISTORICAL AND POLITICAL PERSPECTIVE

By

Joan Thomas

> "The legislature finds that the shorelines of the state are among the most valuable and fragile of its natural resources and that there is great concern throughout the state relating to their utilization, protection, restoration, and preservation."
> Chapter 286, Laws of 1971, 1st executive session

What are these valuable and fragile natural resources? It is not difficult to conjure up a shoreline scene and a happy memory to go with it:

> ...hiking or strolling on the rocky beaches of the Olympic coast ...tidepools teeming with marine life...digging for razor clams on the smooth sand of the ocean beaches...the dunes and shifting sands of the accreted lands...the beauty of the San Juan Islands ...the fascination of busy commercial ports...the economic wonder of industrial areas...the fun of boating, skindiving, beachcombing ...the unlimited possibilities of exploring nature, history, geology...the maze of shorelines and estuarine systems that we call Puget Sound.

But perhaps your mental picture is of a lake — Lake Washington, Lake Sammamish, Liberty Lake ···

> ...sailboats, water skiing, fishing practically in your front yard...attractive homes that represent a life style envied by many, available to few...a sparkling jewel in a mountain setting ...Or a stream ··· drifting down a river in an innertube or on a raft...rushing down in a kayak or canoe...fishing, sunning or picnicking on its banks...

Swamps, bogs, marshes, ponds, creeks, sloughs are less celebrated, but they are an integral part of our shoreline system. We would do well to heed Wolf Bauer's admonition to consider the shore resource as a viable and integrated system. The descriptions and definitions he has contributed to this atlas are essential to an understanding of the relationships within the system and to full appreciation of our shoreline heritage.

Why did the state legislature in 1971 find "great concern throughout the state relating to their utilization, protection, restoration and preservation?" With their endless variety, unsurpassed beauty, and ready accessibility, surely there were enough shorelines for everyone in the state to use or enjoy in one way or another. Commerce, industry, recreation, and housing, these uses had coexisted since statehood, but by the late 1960's there was growing awareness of conflicts in use, of irrevocable changes in use, and of the disappearance of natural shoreline areas.

Memories of lost shorelines fade as we become accustomed to the new use:

> ...how many of today's University of Washington students who park in the Montlake lot know, much less remember, that Union Bay Marsh once occupied that space?

...do visitors to Pt. Defiance Park in Tacoma pause to imagine what the adjacent shoreline was like without the slag heaps that provide moorage for the Tacoma Yacht Club?

...we are impressed and proud of Grand Coulee Dam. We enjoy recreation on Roosevelt Lake and Banks Lake, but few stop to wonder about the geological and archaeological wonder of the shoreline that has been forever inundated.

...if we are offended by the pollution of Everett Harbor and Bellingham Harbor, we only have to go a few miles to find the highest quality of salt water and abundant fish life.

...school children in Seattle and Tacoma learn about the engineering wonders that produced great industrial areas in the estuaries of the Duwamish and the Puyallup, but the workers who travel back and forth every day probably don't think of their place of employment as a former shoreline.

...after all, we saved the Nisqually Delta, didn't we? It won't end up like the Puyallup and Duwamish estuaries. So why worry about a freeway and a few trailer parks?

...there is a move to save the "last free-flowing stretch of the Columbia River," although that description is challenged by proponents of the Ben Franklin Dam.

...there is growing awareness in cities and towns along the Columbia and other major rivers of their riverfront and what can be done to reverse the use pattern that put railroad tracks and highways and garbage dumps along the waterfront, because that's where the land was cheap.

A shoreline gone or altered is a shoreline taken from future generations. Perhaps another kind of atlas is needed to remind us of what we have already lost and cannot restore. We have come to realize that unregulated and unmanaged development could destroy our heritage, and we have begun a program of action to protect and manage our shorelines. Political solutions do not always recognize the realities of nature, as Wolf Bauer points out, but we have much to be proud of in our past record and reason to be optimistic in our expectations for the future.

Viewed in the context of Washington's constitutional and legislative history, shoreline management is but one of many steps in the protection of our water and related resources. Our state constitution recognizes the public interest and public rights in our water resources and shoreline areas by directing how harbor lines are to be established, reserving the area inside harbor lines for conveniences of navigation and commerce, and prohibiting the giving, selling, or leasing to private parties of any rights whatever in waters beyond harbor lines. Restrictions were placed on leasing and maintenance of wharves and docks within harbor areas, and cities were allowed to extend their streets over intervening tidelands. (Washington State Constitution, Article XV).

Article XVII of the constitution asserts the ownership of the State of Washington of "the beds and shores of all navigable waters in the state" and Article XXI declares the use of state waters for irrigation, mining and manufacturing purposes to be public uses.

Dating back to territorial days, the state ground and surface water code is based upon the concept of public ownership of all waters within the state, with the right to use them acquired only by appropriation for a "beneficial use." The procedures for obtaining the right to use water are set out in detail. In 1967, the legislature recognized that the beneficial use policy set fourth in the water code was not being adequately implemented and enforced, and it set up a system for registration of water rights.

Pollution control laws requiring treatment of waste discharges were another step taken by the state to protect the quality of our water resources. Unfortunately, a great deal of damage had already been done, and the repair and restoration has been slow and costly. Still, it is taking place.

The citizens of Washington have proven willing to tax themselves to provide the capital needed for waste treatment facilities. The residents of the metropolitan Seattle area won national recognition for digging into their own pockets, in pre-federal grant days, to clean up Lake Washington. Twice in recent years, statewide bond issues for pollution control facilities have been overwhelmingly approved by the ballot box: $25 million in 1968 and $225 million in 1972.

In 1971 two monumental pieces of legislation were enacted: The Water Resources Management Act and the Shorelines Management Act. Prompted in part by talk of diversion of Columbia River water to the thirsty southwest, the legislature took a long, hard look at our water resource policies and give recognition to the values of a more environmentally aware society. The 1971 Water Resources Management Act established policies and guidelines for an active program to protect the state's water resources and provide an ongoing management system under the direction of the Department of Ecology. The act is to insure that the state's waters are protected from misuse, pollution, and other perils of this modern world, and to direct that these waters be used as fully as possible in the best interests of the people of Washington. The act defines beneficial uses and sets forth policies that require allocation among various users that will bring the maximum net benefit to all the people of the state. Among such benefits are: preservation and protection of the natural environment, maintenance of water quality by treatment of all wastes, potable drinking water for all, consideration of the natural interaction between surface and groundwater supplies, and public participation in water planning and allocation.

The same session of the legislature passed the Shorelines Management Act of 1971 in response to another set of stimulii. Talk of Columbia River diversion came from outside the state. The impetus for legislative action on shorelines arose within the state from an initiative to the legislature proposed by a citizens group, the Washington State Environmental Council and by a State Supreme Court decision, Wilbour v. Gallagher.

The history of shorelines legislation goes back to the 1967 legislative session, when conservation and outdoor groups proposed a bill to identify and manage natural rivers. Wild, scenic and recreational rivers were being rip-rapped, channelized, dredged, filled, and built upon at an alarming rate, but the zeal of the proponents was no match for the economic and development interests and a legislature not yet attuned to environmental concerns.

The next session, in 1969, the wild river enthusiasts were back, and they were joined by citizens concerned about protection of our saltwater beaches. The Washington Environmental Council, a new citizens' organization was born of the 1967 legislative failure, and carried the banner of wild rivers and saltwater beaches. The legislative response in 1969 was more positive, and a proposal for "Seacoast Management" was considered but not enacted. A committee of legislators worked on this proposal with conservation and development interests during the interim and came back to the legislature in the 1970 extraordinary session with a Seacoast Management Act that looked as if it had a chance. Environmentalists considered it a barely acceptable beginning, but they were willing to support it. However, by the time the opponents of any regulation and the development interests worked their way through the legislative process, the Seacoast Management bill had been amended into what the Washington Environmental Council labelled a "Seacoast Giveaway." The bill was defeated in the closing days by an all-out effort of the Council and other citizen groups.

The State Supreme Court decision came in December, 1969 in a case involving a fill for development in Lake Chelan. The decision in Wilbour v. Gallagher was interpreted to mean that the public's right to use the surface of state waters could be restricted or interfered with only as a result of legislative action based on some kind of planning



Seattle's Fort Lawton shoreline

for the shorelines of navigable waters. Without such legislative action, filling and over-water construction in state waters were effectively prohibited. The decision also caused some concern that existing construction could be challenged. Thus, many of those who had favored unrestricted development or had opposed any management of shorelines found themselves beseeching the legislature to take the kind of action invited by the Wilbour decision, but the 1970 legislature was unable to agree.

Following the 1970 session, the Washington Environmental Council got its forces together and drafted the "Shorelines Protection Act" to be submitted as an initiative to the legislature. Washington's constitution provides for enactment of legislation by the initiative process in two ways: initiative to the people and initiative to the legislature. By using the second method, the Washington Environmental Council gave the legislature another chance to act on shorelines legislation.

In its proposal, the Council amalgamated the ideas of the rivers people and the saltwater beach people into a unified program of planning and management for all fresh and saltwater shorelines. The underlying philosophy of the Shoreline Protection Act was one of state management of a valuable and endangered state resource. Titled Initiative 43 when it was filed with the Secretary of State, the measure set up state policies for all shorelines, regulated development within 500 feet of all bodies of water by a state permit system, provided for direct citizen participation in the planning process and for enforcement by citizens in the event of government inaction.

HYDROLOGICAL FEATURES

The Washington Environmental Council, with the help and support of many other citizens and groups gathered some 160,000 signatures on Initiative 43 petitions in a ten-week period. When the legislature met in January, 1971, it was directly confronted with the action of the people in Initiative 43. Washington's constitution allows the legislature three choices: 1) to enact the initiative directly into law without change; 2) to take no action, thereby referring the initiative automatically to a vote of the people at the next general election; 3) to enact an alternative measure to be submitted to the people alongside the initiative for their choice. This was the course of action taken by the legislature. They developed and passed Alternative Measure 43B but put it into immediate effect instead of holding it in abeyance until the people had chosen one of the two alternatives, or neither, as provided by the constitution.

The Shorelines Management Act (43B), now the law of the state, provides for a program of planning and management which involves partnership between state and local government. It regulates development within 200 feet and/or the associated wetlands of certain bodies of water by a local permit system under state guidelines. Named bodies of water are designated as "shorelines of statewide significance" and they are treated somewhat differently than "shorelines of the state." Many of the concepts embodied in Initiative 43 and Alternative Measure 43B are the same. The two bills represented different approaches to the same goal.

In the campaign preceding the November, 1972, general election, the major issues were threefold: 1) management versus no management; 2) state-local relationships in the planning and management process; 3) the total amount of shorelines covered by each act. There were two questions on the ballot: 1) Are you FOR or AGAINST any shorelines regulation? 2) Do you prefer Initiative 43 or Alternative Measure 43B? The vote in November was in favor of shorelines regulation and 43B was preferred over Initiative 43. Thus, the Shorelines Management Act of 1971 remained law.

The planning aspect of the Shorelines Management Act will not be fully implemented until mid-1974. The permit requirement went into effect with the act in June, 1971; the Department of Ecology issued preliminary guidelines for local government in September, 1971 and final guidelines in mid-1972. Local governments are required to inventory their shorelines and to prepare master programs for their use by December, 1973. These master programs require citizen participation and are to be submitted to the Department of Ecology for review and eventual approval. Meanwhile, master programs for shorelines of statewide significance are also to be developed by local governments, but they are subject to stronger guidelines and review authority by the state.

The regulatory program is a permit system administered by local governments, with review by the state. With certain, specifically named exceptions, substantial development ($1,000 or more) taking place in shorelines requires a permit. Once master programs are adopted and approved, they will provide the criteria for permit issuance. Until then, permits must conform to the policies of the act. These policies express the thinking of the legislature and are worthy of reproduction here:

> "It is the policy of the state to provide for the management of the shorelines of the state by planning for and fostering all reasonable and appropriate uses. This policy is designed to insure the development of these shorelines in a manner which, while allowing for limited reduction of rights of the public in the navigable waters, will promote and enhance the public interest. This policy contemplates protecting against adverse effects to the public health, the land and its vegetation and wildlife, and the waters of the state and their aquatic life, while protecting generally public rights of navigation and corollary rights incidental thereto.
>
> "...in the implementaton of this policy the public's opportunity to enjoy the physical and aesthetic qualities of natural shorelines of the state shall be preserved to the greatest extent feasible consistent with the overall best interest of the state and the people generally. To this end uses shall be preferred which are consistent with control of pollution and prevention of damage to the natural environment, or are unique to or dependent upon use of the state's shoreline. Alterations of the natural condition of the shorelines of the state, in those limited instances when authorized, shall be given priority for single family residences, ports, shoreline recreational uses including, but not limited to parks, marinas, piers, and other improvements facilitating public access to shorelines of the state, industrial and commercial developments which are particularly dependent on their location on or use of the shorelines of the state and other development that will provide an opportunity for substantial numbers of people to enjoy the shorelines of the state.
>
> Permitted uses in the shorelines of the state shall be designed and conducted in a manner to minimize, insofar as practical, any resultant damage to the ecology and environment of the shoreline area and any interference with the public's use of the water."

In addition to this overall policy, the legislature made further provision for shorelines of statewide significance:

> "The legislature declares that the interest of all of the people shall be paramount in the management of shorelines of state-wide significance. The department (of Ecology), in adopting guidelines for shorelines of state-wide significance, and local government, in developing master programs for shorelines of state-wide significance, shall give preference to uses in the following order of preference which:
>
> (1) Recognize and protect the state-wide interest over local interest;
> (2) Preserve the natural character of the shoreline;
> (3) Result in long term over short term benefit;
> (4) Protect the resources and ecology of the shoreline;
> (5) Increase public access to publicly owned areas of the shorelines;
> (6) Increase recreational opportunities for the public in the shoreline;
> (7) Provide for any other element as defined in section 11 of this 1971 act deemed appropriate or necessary."

It is important to understand the definitions of "shorelines," "shorelines of state-wide significance," and "wetlands" in order to know what is covered by the act and in what way.

> "Shorelines means all of the water areas of the state, including reservoirs, and their associated wetlands, together with the lands underlying them; except (i) shorelines of state-wide significance; (ii) shorelines on segments of streams upstream of a point where the mean annual flow is twenty cubic feet per second or less and the wetlands associated with such upstream segments; and (iii) shorelines on lakes less than twenty acres in size and wetlands associated with such small lakes.
>
> 'Shorelines of state-wide significance' means the following shorelines of the state:
>
> (i) The area between the ordinary high water mark and the western boundary of the state from Cape Disappointment on the south to Cape Flattery on the north, including harbors, bays, estuaries, and inlets;
> (ii) Those areas of Puget Sound and adjacent saltwaters and the Strait of Juan de Fuca between the ordinary high water mark and the line of extreme low tide as follows:
>
> (A) Nisqually Delta -- from DeWolf Bight to Tatsolo Point,
> (B) Birch Bay -- from Point Whitehorn to Birch Point,
> (C) Hood Canal -- from Tala Point to Foulweather Bluff,
> (D) Skagit Bay and adjacent area -- from Brown Point to Yokeko Point, and
> (E) Padilla Bay -- from March Point to William Point;
>
> (iii) Those areas of Puget Sound and the Strait of Juan de Fuca and adjacent saltwaters north to the Canadian line and lying seaward from the line of extreme low tide;
> (iv) Those lakes, whether natural, artificial or a combination thereof, with a surface acreage of one thousand acres or more measured at the ordinary high water mark;
> (v) Those natural rivers or segments thereof as follows:
>
> (A) Any west of the crest of the Cascade range downstream of a point where the mean annual flow is measured at one thousand cubic feet per second or more,
> (B) Any east of the crest of the Cascade range downstream of a point where the annual flow is measured at two hundred cubic feet per second or more, or those portions of rivers east of the crest of the Cascade range downstream from the first three hundred square miles of drainage area, whichever is longer;
>
> (vi) Those wetlands associated with (i), (ii), (iv), and (v) of this subsection (2) (e);
>
> 'wetlands' or 'wetland areas' means those lands extending landward for two hundred feet in all directions as measured on a horizontal plane from the ordinary high water mark; and all marshes, bogs, swamps, floodways, river deltas, and flood plains associated with the streams, lakes and tidal waters which are subject to the provisions of this act; the same to be designated as to location by the Department of Ecology."

Note that water and water areas are included. Those shorelines and wetlands not covered by the act are not to be presumed to be less important or less environmentally sensitive, nor are lands adjacent to the defined shoreline zones to be ignored in the planning process - they simply are not subject to the same regulatory system. It must be said again: Administrative systems usually do not coincide with ecological or hydrological systems. The legislature responded to an environmental need within a political framework, and, after all, that is what representative government is all about.

Future legislatures will be confronted by continuing and growing concern for some of the things left out of the Shorelines Management Act. They may respond by extending the shorelines management concept or in an entirely different way. Small lakes, creeks, bogs, marshes, and ponds need understanding and protection. They are disappearing before our eyes, especially in urbanizing areas. A bill restricting alteration of these wetlands was introduced in the 1973 legislature, but did not progress very far.

A bill to identify and manage wild, scenic and recreational rivers was revived in 1973 and would be complementary to the shorelines act, replacing a perennial study on how to go about identifying, classifying and managing our state's rivers.

The question of the public's rights to use accreted lands must be settled, either legally or legislatively. These ocean beaches are too valuable a resource to be squandered in ill-planned, environmentally damaging commercial development.

Although the Shorelines Management Act regulated forest practices in the shoreline area, there is need to consider the effect of logging and associated activity on all streams and establish forest practice laws and regulations that will protect all waters of the state.

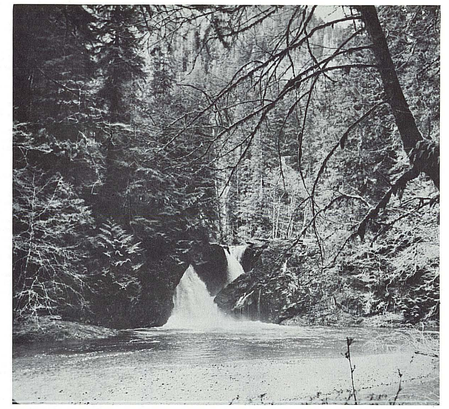
The shorelines act recognized another need and directed the Department of Ecology, the Attorney General and the Harbor Line Commission to study the location of all harbor lines, the uses and activities within harbors and to report back to the legislature. The legislature can then consider whether changes in the law are needed in order to implement and enforce the requirements of the state constitution concerning harbor lines and harbor areas.

It is hoped a legal crisis or the use of initiative power will not be required to spur the legislature to action in these areas. This atlas will surely be of help to present and future legislative bodies and to those in charge of impiementing existing laws. it shows the user the kinds of things that citizens value, and it shows some of the institutional arrangements by which we do manage and protect our resources. It reflects the enthusiasm of various groups for certain natural features, and it contains expert analysis and advice. There are sufficient cautions on what it is and what it isn't - they need not be repeated here. Used properly, it should make future generations proud.

JOAN THOMAS, A.B., is past President and a Director of the Washington Environmental Council. She is active in the environmental and political scenes statewide, and has served on several committees at the state and local levels. Ms. Thomas is listed in Who's Who in American Women.



Kayakers enjoy the challenge of the Middle Fork Snoqualmie River.



Wynoochee Falls on the upper Wynoochee River.

WASHINGTON'S RIVERSCAPE AND MAN

By

George B. Yount

The Washington Kayak Club has used Washington's rivers, lakes and salt water for more than thirty years. The Sauk, Snoqualmie, Methow, Yakima and many others have shared with us their challenging white water, placid pools, sunny gravel bars, and scenic grandeur. We shall be eternally grateful to our natural heritage for the spiritual inspiration it gives to us.

We are not the only ones there. In fact, we are but a humble minority. In the past six years we have witnessed a water-oriented recreation bomb explode. It used to be an occasional fisherman casting into the stream. Now we see hikers, picnickers and campers in ever-increasing numbers. One winter day for example 125 river users were counted in a 5 mile stretch of the Snoqualmie-Snohomish River.

Recreation and tourism play a key role in our state's economy. If we are to maintain these narrow ribbons, where people with a variety of interests can enjoy a natural setting without interference with the next fellow, sound steps must be taken to identify rivers, indeed all shorelines, and protect them in a manner that will insure their survival as an ecological entity. Their ecological integrity is our economic and environmental salvation.

One means of comparing stretches of rivers is to use a matrix of some of the values which make riverscape important to man. In order to illustrate this technique we have developed the matrix below from characteristics used by Wolf Bauer in such analysis and applied them to sample runs of some high priority rivers of environmental uniqueness in the State that are close to major urban centers. The Zones I, II, III and IV in the matrix are defined graphically on page 7 in Bauer's river zone diagram. The matrix provides a survey of the total recreation potentialities of the rivers studied.

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Matrix of some high priority Washington rivers of environmental uniqueness located near major urban centers.

| PHYSICAL FACTORS | Beaver River - Zone IV | Beaver River - Zone III | Elwha River - Zone IV | Elwha River - Zone III | Sauk River - Zone III | Sauk River - Zone II | Skagit River - Zone IV | Skagit River - Zone III | Skagit River - Zone II | Skagit River - Zone I | Stillaguamish River - Zone III | Stillaguamish River - Zone II | Stillaguamish River - Zone I | Snoqualmie River - Zone IV | Snoqualmie River - Zone III | Snoqualmie River - Zone II | Snoqualmie River - Zone I | Cedar River - Zone III | Cedar River - Zone II | Cedar River - Zone I | Green River - Zone III | Green River - Zone II | Green River - Zone I | Puyallup River - Zone III | Puyallup River - Zone II | Puyallup River - Zone I | Nisqually River - Zone III | Nisqually River - Zone II | Nisqually River - Zone I | Cowlitz River - Zone III & IV | Cowlitz River - Zone II | Cowlitz River - Zone I | Lewis River - Zone III & IV | Lewis River - Zone II | Lewis River - Zone I | Wind River - Zone III & IV | Wind River - Zone II | Wind River - Zone I | Klickitat River - Zone III & IV | Klickitat River - Zone II | Klickitat River - Zone I | Methow River - Zone III & IV | Methow River - Zone II | Methow River - Zone I | Yakima River - Zone III & IV | Yakima River - Zone II | Yakima River - Zone I | Nooksack River - Zone III & IV | Nooksack River - Zone II | Nooksack River - Zone I | Skykomish River - Zone III & IV | Skykomish River - Zone II | Skykomish River - Zone I | Wenatchee River - Zone III & IV | Wenatchee River - Zone II | Wenatchee River - Zone I | Entiat River - Zone III & IV | Entiat River - Zone II | Entiat River - Zone I | Chelan River - Zone III & IV | Chelan River - Zone II | Chelan River - Zone I | Pend Oreille River - Zone III & IV | Pend Oreille River - Zone II | Pend Oreille River - Zone I |
|---|---|---

HYDROLOGICAL INDEX

HYDROLOGIC ELEMENTS

Map Key No.	Map Index Grid Ref.	Feature	County
Lakes, sloughs HL			
1	E-6	Soap Lake	Grant
2	E-7	Sylvan Lake	Lincoln
3	D-8	Reardan Slough	Lincoln
4	F-7	Twelve Mile Slough	Adams
5	E-6	O'Sullivan Reservoir and Associated Potholes	Grant
6	C-5	Lake Chelan	Chelan
7	D-3	Lake Washington	King
8	C-2	Lake Crescent	Clallam
9	D-5	Lake Wenatchee	Chelan
10	B-4	Ross Lake	Whatcom
11	C-1	Ozette Lake	Clallam
12	C-6	Omak Lake	Okanogan
13	D-6	Banks Lake	Lincoln
14	C-7	Franklin D. Roosevelt Lake	Lincoln, Ferry, Grant, Stevens, Okanogan
15	B-4	Upper Baker Lake	Whatcom
16	B-8	Sullivan Lake	Pend Oreille
17	C-3	Barney Lake	Skagit
18	C-3	DeHay Slough	Skagit
19	H-4	Trout Lake	Klickitat
20	D-4	Twin Falls Lake (location unknown)	Snohomish
21	C-3	Perego's Lake	Island
22	G-3	Lake Merril	Cowlitz
23	C-8	Bead Lake	Pend Oreille
24	C-8	Marshall Lake	Pend Oreille
25	C-8	Sacheen Lake	Pend Oreille
26	C-8	Diamond Lake	Pend Oreille
27	C-8	Calispell Lake	Pend Oreille
28	C-8	Browns Lake	Pend Oreille
29	C-8	Deer Lake	Pend Oreille
30	C-8	Trout Lake	Pend Oreille
31	C-8	Horseshoe Lake	Pend Oreille
32	C-8	Davis Lake	Pend Oreille
33	C-8	Power Lake	Pend Oreille
34	C-8	Fan Lake	Pend Oreille
35	B-7	Curlew Lake	Ferry
36	D-4	Lake Hancock	King
37	D-3	Lake Sammamish	King
38	E-3	Fern Lake	Kitsap
39	D-3	Green Lake	King
40	B-8	Lake Thomas	Stevens
41	B-8	Lake Sherry	Stevens
42	B-8	Lake Gillette	Stevens
43	B-8	Black Lake	Stevens
44	H-4	Drano Lake	Skamania
45	H-4	Horsethief Lake	Klickitat
46	H-3	Vancouver Lake	Clark
47	H-3	Lackamas Lake	Clark
48	H-4	Tunnel Lake	Skamania
49	H-4	Carpenters Lake	Skamania
50	H-4	Bass Lake	Skamania
51	H-4	Wauna Lakes	Skamania
52	H-4	Evergreen Lakes	Skamania
53	H-4	Spring Lake	Skamania
54	H-4	Gillette Lake	Skamania
55	H-4	Butlers Lake	Skamania
56	H-4	Bowles Lake	Skamania
57	H-4	Ashes Lake	Skamania
58	H-4	Man Lake	Skamania
59	H-4	Little Birch Lake	Skamania
60	H-4	Crescent Lake	Skamania
61	H-4	Kidney Lake	Skamania
62	E-8	Bonnie Lake	Spokane
63	E-8	Badger Lake	Spokane
64	E-8	Amber Lake	Spokane
65	E-8	Williams Lake	Spokane
66	E-8	Chapman Lake	Spokane
67	E-8	Downs Lake	Spokane
68	E-8	Fishtrap Lake	Spokane, Lincoln
69	D-8	Clear Lake	Spokane
70	D-8	Silver Lake	Spokane
71	D-8	North Silver Lake (or Granite Lake)	Spokane
72	D-8	Medical Lake	Spokane
73	D-8	West Medical Lake	Spokane
74	B-4	Diablo Lake	Whatcom
75	B-4	Keechelus Lake	Kittitas
76	E-4	Kachess Lake	Kittitas
77	E-4	Cle Elum Lake	Kittitas
78	F-4	Bumping Lake	Yakima
79	F-4	Tieton Reservoir (or Rimrock Lake)	Yakima
80	F-4	Packwood Lake	Lewis
81	F-4	Spirit Lake	Skamania
82	G-3	Quinault Lake	Grays Harbor
83	E-2	Lake Lenore	Grant
84	E-6	Blue Lake	Grant
85	D-6	Park Lake	Grant
86	D-6	Sprague Lake	Lincoln, Adams
87	E-8	Fourth of July Lake	Lincoln, Adams
88	E-8	Pines Lake	Adams
89	E-8	Rock Lake	Whitman
90	D-8	Liberty Lake	Spokane
91	D-8	Newman Lake	Spokane
92	D-8	Waits Lake	Stevens
93	C-8	Loon Lake	Stevens
94	C-8	Deer Lake	Stevens
95	C-8	Eloika Lake	Spokane
96	C-8	Twin Lakes	Ferry
97	C-7	Owhi Lake	Okanogan
98	C-7	Buffalo Lake	Okanogan
99	C-7	Goose Lake	Okanogan
100	C-6	Bonaparte Lake	Okanogan
101	B-6	Osoyoos Lake	Okanogan
102	B-6	Palmer Lake	Okanogan
103	B-6	Wannacut Lake	Okanogan
104	B-6	Spectacle Lake	Okanogan
105	B-6	Whitestone Lake	Okanogan
106	B-6	Blue Lake	Okanogan
107	B-7	Conconully Lakes	Okanogan
108	B-7	Alta Lake	Okanogan
109	C-6	Clear Lake	Yakima
110	F-4	Horseshoe Lake	Yakima
111	H-3	Lake Merwin	Clark, Cowlitz
112	G-3	Yale Lake	Clark, Cowlitz
113	G-3	Swift Creek Reservoir	Skamania
114	G-3	Silver Lake	Cowlitz
115	G-4	Walupt Lake	Lewis
116	D-4	Snoqualmie Lake	King
117	E-6	Moses Lake	Grant
118	F-6	O'Sullivan Seep Lakes, including Goose, Warden, and Soda Lakes	Grant, Adams
119	E-6	Billy Clapp Lake (or Long Lake Reservoir)	Grant
120	D-6	Jameson Lake	Douglas
121	F-3	Lake Mayfield	Lewis
122	F-3, G-3	Riffe Lake (or Davisson Lake)	Lewis
123	B-7	Swan Lakes	Ferry
124	H-3	McCurdy Lake (or Lost Lake)	Clark
125	H-3	Battleground Lake	Clark
126	F-4	Numerous High Alpine Lakes (Cougar Lakes Area)	Yakima, Lewis
127	B-3	Hummel Lake	San Juan
128	E-3, F-3	Numerous Small Lakes, including Offut, Hicks, Grass, Clear, and McIntosh Lakes	Thurston, Pierce
129	G-4	Indian Heaven Backcountry Lakes	Skamania
130	F-3	Alder Lake	Lewis, Pierce
131	C-3	Gage's Slough	Skagit
132	C-5	Pearrygin Lake	Okanogan
133	C-5	Patterson Lake	Okanogan
134	B-6	Fish Lake	Okanogan
135	C-3	Union Slough	Snohomish
136	D-3	Steamboat Slough	Snohomish
137	D-3	Chase Lake	Snohomish
138	G-1	Numerous Small Lakes of the Long Beach Peninsula	Pacific
139	E-1	Carlisle Lakes	Grays Harbor
140	E-2	Failor Lake	Grays Harbor
141	F-2	Lake Aberdeen	Grays Harbor
142	F-2	Lake Sylvia	Grays Harbor
143	F-2	Small Lakes and Sloughs	Grays Harbor
144	E-2	Bunch Lake, Elk Lake, Other small lakes	Grays Harbor
145	F-2	Peels Slough	Grays Harbor
146	F-2	Elliott Slough	Grays Harbor
147	F-2	Blue and Mox Sloughs	Grays Harbor
148	F-2	Preacher's Slough	Grays Harbor
149	E-3	Lake Tapps	Pierce
150	G-2	Roaring Creek Slough	Pacific
151	H-3	Franz Lake	Skamania
152	C-1	Lake Dickey	Clallam
153	C-1	Seafield Lake	Clallam
154	C-1	Willoughby Lake	Clallam
155	D-2	Sundown Lake	Mason
156	D-2	Lake Constance	Jefferson
157	D-2	Lakes Margaret and Mary	Jefferson
158	D-2	Lake Angeles	Clallam
159	D-2	Seven Lakes Basin	Clallam
160	F-3	Ohop Valley Lakes (includes Harts, Silver, Tanwax, and Clear Lakes)	Pierce
161	E-6	Caliche Lakes	Grant
162	G-3	Mount Margaret Backcountry Area Lakes	Skamania
163	G-2	Fawn Lake	Cowlitz
164	G-2	Coal Creek Slough	Cowlitz
165	G-3	Lake Sacajawea	Cowlitz
166	F-3	McIntosh Lake	Thurston
167	B-3	Samish Lake	Whatcom
168	C-3	Cranberry Lake	Island
169	C-3	Swinomish Slough	Skagit
170	C-3	Indian, Telegraph, and Joe Leary Sloughs	Skagit
171	C-3	Sullivan Slough	Skagit
172	C-3	Clear and Beaver Lakes	Skagit
173	C-3	Big Lake	Skagit
174	C-3	Day Lake	Skagit
175	C-3	Sixteen Lake	Skagit
176	C-3	Lake McMurray	Skagit
177	C-3	Pass Lake	Skagit
178	C-3	Lake Erie	Skagit
179	C-3	Heart Lake	Skagit
180	C-3	Lake Campbell	Skagit
181	C-3	Ebey Slough	Snohomish
182	B-3	Lake Whatcom	Whatcom
183	E-2	Summit Lake	Thurston
184	E-2	Island Lake	Mason
185	E-3	Phillips Lake	Mason
186	E-2	Cranberry Lake	Mason
187	E-3	Mason Lake	Mason
188	C-1	Lake Pleasant	Clallam
189	F-3	Black Lake	Thurston
190	H-4	Bonneville Reservoir	Skamania, Klickitat
191	H-4, H-5	Lake Celilo	Klickitat
192	H-5, H-6	Lake Umatilla	Klickitat, Benton
193	H-6, G-6, G-7	Lake Wallula	Benton, Walla Walla, Franklin
194	F-6	Priest Rapids Reservoir	Yakima, Kittitas, Grant
195	F-6, E-5	Wanapum Lake	Kittitas, Grant, Chelan, Douglas
196	E-5	Rock Island Reservoir	Chelan, Douglas
197	D-5, D-6	Lake Entiat	Chelan, Douglas
198	C-6	Lake Pateros	Okanogan, Chelan, Douglas
199	C-6	Rufus Woods Lake	Douglas, Okanogan
200	G-7	Lake Sacajawea	Franklin, Walla Walla
201	F-7	Lower Monumental Reservoir	Franklin, Walla Walla, Whitman, Columbia
202	F-8	Lake Bryan	Garfield, Columbia, Whitman
203	F-8, G-8	Lower Granite Reservoir	Whitman, Garfield, Asotin
204	D-4	Lake Chaplain	Snohomish
205	D-4	Spada Lake	Snohomish
206	B-4	Lake Shannon	Skagit
207	E-7	Cow Lake	Adams
208	E-5	Snow Lakes	Chelan
209	D-2	Fish Lake	Chelan
210	D-5	Wapato Lake	Chelan
211	D-5	Alkali Lake	Chelan
212	C-2	Lake Aldwell	Clallam
213	C-2	Sutherland Lake	Clallam
214	H-3	Campbell Lake	Clark
215	H-3	Ridgefield Lake	Clark
216	H-3	Canvasback Lake	Clark
217	H-3	Hathaway Lake	Clark
218	D-4	Tolt Reservoir	King
219	H-3	Steigerwald Lake	Clark
220	H-3	Green Lake	Clark
221	D-6	Haynes Lake	Douglas
222	D-6	Grimes Lake	Douglas
223	F-7	Kahlotus Lake	Franklin
224	F-6	Scooteney Reservoir	Franklin
225	F-1	Duck Lake	Grays Harbor
226	E-3	Lake Sawyer	King
227	E-3	Angle Lake	King
228	E-3	Lake Youngs	King
229	E-3	Lake Meridian	King
230	E-4	Walsh Lake	King
231	E-4	Masonry Pool	King, Pierce
232	E-4	Rattlesnake Lake	King
233	E-4	Snow Lake	King
234	D-3	Portage Bay	King
235	D-3	Lake Union	King
236	D-4	Calligan Lake	King
237	D-4	Phillippa Lake	King
238	D-4	Joy Lake	King
239	E-4	Mud Mountain Reservoir	King, Pierce
240	E-4	Chester Morse Lake	King
241	D-3	Wildcat Lake	Kitsap
242	D-3	Kitsap Lake	Kitsap
243	D-3	Panther Lake	Kitsap, Pacific
244	E-3	Long Lake	Kitsap
245	E-4	Lake Easton	Kittitas
246	E-4	Lost Lake	Kittitas
247	E-4	Cooper Lake	Kittitas
248	F-3	Mineral Lake	Lewis
249	E-7	Pacific Lake	Lincoln
250	E-7	Tule Lake	Lincoln
251	E-7	Coffee Pot Lake	Lincoln
252	D-8	Little Falls Reservoir	Lincoln, Stevens
254	D-8	Long Lake	Lincoln, Stevens, Spokane
255	E-2	Lost Lake	Mason
256	E-2	Isabella Lake	Mason
257	E-2	Nahwatzel Lake	Mason
258	E-3	Spencer Lake	Mason
259	E-3	Devereaux Lake	Mason
260	D-3	Tiger Lake	Mason, Kitsap
261	E-2	Lake Cushman	Mason
263	B-6	Salmon Lake	Okanogan
264	B-6	Chopaka Lake	Okanogan
265	B-6	Sidley Lake	Okanogan
266	G-1	Loomis Lake	Pacific
267	C-8	Kent Meadows Lake	Pend Oreille
268	B-8	Boundary Reservoir	Pend Oreille
269	E-3	Bay Lake	Pierce
270	F-3	Kapowsin Lake	Pierce
271	E-3	Gravelly Lake	Pierce
272	E-3	Spanaway Lake	Pierce
273	E-3	Lake Steilacoom	Pierce
274	E-3	American Lake	Pierce
275	B-3	Cascade Lake	San Juan
276	B-3	Mountain Lake	San Juan
277	B-3	Judy Reservoir	Skagit
279	D-3	Ballinger Lake	Snohomish
280	D-3	Silver Lake	Snohomish
281	D-4	Flowing Lake	Snohomish
282	D-4	Blanca Lake	Snohomish
283	D-4	Roesiger Lake	Snohomish
284	E-3	Cassidy Lake	Snohomish
285	C-3	Goodwin Lake	Snohomish
286	C-3	Shoecraft Lake	Snohomish
287	C-3	Lake Stevens	Snohomish
288	D-8	Upper Falls Reservoir	Spokane
289	D-8	Nine Mile Reservoir	Spokane
290	C-8	Jumpoff Lake	Stevens
291	B-7	Pierre Lake	Stevens
292	B-8	Deep Lake	Stevens
293	F-3	Lawrence Lake	Thurston
294	E-3	Long Lake	Thurston
295	E-3	Capitol Lake	Thurston
296	F-3	Patterson Lake	Thurston
297	F-3	St. Clair Lake	Thurston
298	B-3	Padden Lake	Whatcom
299	B-3	Terrell Lake	Whatcom
300	B-3	Barrett Lake	Whatcom
301	B-3	Wiser Lake	Whatcom
302	B-3	Silver	Whatcom
303	B-3	Judson Lake	Whatcom
304	G-5	Griffin Lake	Yakima
305	E-6	Potholes Lakes (includes Ancient Lake, Stan Coffin Lake, and Evergreen Reservoir)	Grant
306	D-6	Deep Lake	Grant
307	E-6	Black Lake	Grant
308	E-6	Winchester Wasteway Reservoir	Grant
309	F-6	Winchester Extension Reservoir	Grant
310	F-6	Frenchman Hills Lake	Grant
311	E-6	Round Lake	Grant
312	E-6	Brook Lake	Grant
313	D-6	Alkali Lake	Grant

Ponds HP

1	E-5	Englehorn Pond	Kittitas
2	E-8	Ephemeral Ponds	Spokane
3	E-1	Small Ponds	Grays Harbor
4	G-2	Wirkkala, Naselle, and Rador Ponds	Pacific
5	E-1	Carlisle Ponds	Grays Harbor
6	G-4, H-4	Indian Heaven Area	Skamania

Free-flowing rivers and streams (color indicated in map legend)

F-5		Ahtanum Creek	Yakima
F-4		American River	Yakima
G-8		Asotin Creek	Asotin
B-4		Baker River	Whatcom
D-3		Big Quilcene River	Jefferson
B-8		Big Sheep Creek	Stevens
F-2		Black River	Thurston
D-1		Bogachiel River	Clallam, Jefferson
C-4		Boulder River	Snohomish
F-4		Bumping River	Yakima
D-1		Calawah River	Clallam
E-2		Canyon River	Grays Harbor, Mason
E-3, F-4		Carbon River	Pierce
C-4		Cascade River	Skagit
E-3		Cedar River	King
F-2		Chehalis River	Lewis, Grays Harbor
B-5		Chewack River	Okanogan
D-5		Chiwawa River	Chelan
G-4		Cispus River	Lewis, Yakima
C-1		Clallam River	Clallam
D-1		Clearwater River	Jefferson
E-4		Cle Elum River	Kittitas
F-6		Cold Creek	Benton, Franklin
E-2		Cloquallum Creek	Grays Harbor, Mason
F-6		Columbia River (between Priest Rapids Dam and McNary Pool)	Yakima, Benton, Franklin
B-8		Colville River	Stevens
E-1		Copalis River	Grays Harbor
E-7, F-7		Cow Creek	Adams
F-7		Cow Creek	Lincoln
D-4		Tolt Reservoir	King
F-5		Cowiche Creek	Yakima
G-3, F-4		Cowlitz River	Cowlitz, Lewis
E-7		Crab Creek	Grant, Lincoln, Adams
G-2		Crooked Creek	Wahkiakum
G-2		Deep River	Wahkiakum
F-3		Deschutes River	Thurston
D-1, D-2		Dickey River	Clallam
C-1		Dosewallips River	Jefferson
D-2, C-2		Dungeness River	Jefferson, Clallam
D-2		Duckabush River	Jefferson
G-2		Elochoman River	Wahkiakum
D-2		Elwha River System (Upper)	Clallam, Jefferson
D-5		Entiat River	Chelan
G-6		Esquatzel Coulee	Franklin
F-2		Fall River	Pacific
G-6, H-6		Glade Creek	Yakima, Benton
G-8		Grande Ronde River (Lower)	Asotin
G-2		Grays River	Wahkiakum, Pacific
D-2		Gray Wolf River	Jefferson
E-3		Green River	Cowlitz
E-3, E-4		Green River	King
E-4		Greenwater River	King, Pierce
D-2		Hamma Hamma River	Mason
E-8		Hangman Creek (or Latah Creek)	Spokane
D-1, D-2		Hoh River	Jefferson
C-1		Hoko River	Clallam
E-2		Hoquiam River	Grays Harbor
E-2, E-1		Humptulips River	Grays Harbor
D-5		Icicle River	Chelan
G-3		Kalama River	Cowlitz
B-7		Kettle River	Ferry, Stevens
H-4, G-4		Klickitat River	Klickitat, Yakima
H-3		Lake River	Clark
H-3		Lewis River	Cowlitz, Clark, Skamania
E-6, 7		Lind Coulee	Grant, Adams
E-4		Little Naches River	Kittitas, Yakima
D-3		Little Quilcene River	Jefferson
D-8		Little Spokane River	Spokane, Pend Oreille
D-5		Little Wenatchee River	Chelan
H-4		Little White Salmon River	Skamania
C-2		Lyre River	Clallam
F-3		Mashel River	Pierce
C-5		Methow River	Okanogan
G-8		Mill Creek	Walla Walla
E-5, 6		Moses Coulee	Douglas
F-5		Naches River	Kittitas, Yakima
G-2		Naselle River	Pacific
G-2		Nemah River	Pacific
C-7		Newaukum River	Lewis
F-3, 4		Nisqually River	Pierce, Thurston, Lewis
B-3, 4		Nisqually River	Thurston, Pierce
F-3		North River	Grays Harbor
F-3		Ohop Creek	Pierce
C-6		Okanogan River	Okanogan
H-4		Outlet Creek	Klickitat
C-1		Ozette River	Clallam
F-2		Palix River	Pacific
F-8		Palouse River	Whitman, Adams, Franklin
F-8		Palouse River, North Fork	Whitman
C-3, 4, D-3		Pilchuck River	Snohomish
E-8		Pine Creek	Whitman
E-3, F-3		Puyallup River	Pierce
C-1		Pysht River	Clallam
D-1, 2		Queets River	Jefferson
D-1		Quillayute River	Clallam
E-1, D-1		Quinalt River	Grays Harbor, Jefferson
D-4		Raging River	King
F-4		Rattlesnake Creek	Yakima
F-8		Rock Creek	Whitman
B-3		Samish River	Skagit
C-7		San Poil River	Ferry
C-4		Sauk River	Skagit, Snohomish
E-2, F-2		Satsop River	Grays Harbor, Mason
C-1		Sekiu River	Clallam
B-6		Similkameen River	Okanogan
G-2		Skamokawa Creek	Wahkiakum
C-4		Skagit River	Skagit, Whatcom
F-3		Skookumchuck River	Lewis, Thurston
E-2, D-4		Skokomish River	Mason
D-4		Skykomish River System	Snohomish
G-8		Snake River (Middle)	Asotin
D-3		Snohomish River	Snohomish
D-4, E-4		Snoqualmie River System	King
D-1, C-1, 2		Soleduck River	Clallam
E-3, 4		South Prairie Creek	Pierce
D-8		Spokane River	Spokane, Stevens, Lincoln
C-5		Stehekin River	Chelan
C-3, 4		Stillaguamish River System	Snohomish
C-4		Sultatzle River	Skagit, Snohomish
B-8		Sullivan Creek	Pend Oreille
E-5		Teanaway River	Kittitas
F-5		Tieton River	Yakima
F-4		Tieton River (South Fork)	Yakima
F-3		Tilton River	Lewis
D-4		Tolt River	King
G-5		Toppenish Creek	Yakima
G-7		Touchet River	Walla Walla
G-3		Toutle River	Cowlitz
G-4		Trout Lake Creek	Klickitat, Skamania
F-7, G-8		Tucannon River	Columbia, Garfield, Asotin
C-5		Twisp River	Okanogan
F-8		Union Flat Creek	Whitman
G-7		Walla Walla River	Walla Walla
H-3		Washougal River	Clark, Skamania
F-5		Wenas Creek	Yakima
D-5		Wenatchee River	Chelan
D-5		White River	Chelan
E-3, 4		White River	King, Pierce
H-4		White Salmon River	Klickitat
F-2		Willapa River	Pacific
E-6, F-6		Wilson Creek	Lincoln, Adams
D-7			Grant
H-4		Wind River	Skamania
E-2		Wishkah River	Grays Harbor
E-2		Wynoochee River (Lower)	Grays Harbor
F-5		Yakima River	Kittitas, Yakima
E-4, 5		Yakima River (Upper)	kittitas

Whitewater stretches HW

1	G-8	Middle Snake River	Asotin
2	F-4	American River	Yakima
3	F-4	Bumping River	Yakima
4	E-4	Little Naches River	kittitas, Yakima
5	F-5	Naches River	Kittitas, Yakima
6	F-4	Rattlesnake Creek	Yakima
7	F-5	Tieton River	Yakima
8	F-5	Cowiche Creek	Yakima
9	F-5	Ahtanum Creek	Yakima
15	D-8	Spokane River Within Riverside State Park	Spokane
16	D-8	Spokane River Upstream of Millwood	Spokane
17	C-5	Methow River	Okanogan
18	C-5	Stehkin River	Chelan
19	D-5	Wenatchee River	Chelan
20	D-5	Chiwawa River	Chelan
21	E-5	Yakima River	Kittitas
22	E-5	Teanaway River	Kittitas
23	E-4	Cle Elum River	Kittitas
24	G-4	Cispus River	Lewis
25	F-4	Cowlitz River	Lewis
26	G-3	Toutle River	Cowlitz
27	F-2	North River	Grays Harbor, Pacific
28	D-1	Hoh River	Jefferson
29	C-1	Soleduck River	Clallam
30	C-2	Elwha River	Clallam
31	D-2	Upper Quinault River	Jefferson
32	E-2	Humptulips, West Fork	Grays Harbor
33	E-2	Wishkah River, Middle Fork	Grays Harbor
34	E-2	Wynoochee River	Grays Harbor
35	E-2	Satsop River, West Fork	Grays Harbor
36	E-2	Satsop River, Middle Fork	Grays Harbor
37	E-2	Canyon River	Grays Harbor
38	F-3	Deschutes River	Thurston, Pierce
39	F-3	Nisqually River	Thurston, Pierce
40	C-4	Stillaguamish River, North Fork	Snohomish
41	C-4	Canyon Creek	Snohomish
42	C-4	Stillaguamish River, South Fork	Snohomish
43	C-3, C-4, D-4	Pilchuck River	Snohomish
44	D-2	Dewatto Estuary	Mason
45	D-3	Indianola Estuary	Kitsap

Inland marshes, bogs, swamps HM

1	F-5	Moxee Bog	Yakima
2	B-8	Buff Lake Bog	Pend Oreille
3	B-8	Hunchgrass Meadow	Pend Oreille
4	B-8	Sema Meadows	Pend Oreille
5	B-8	Bogs and Fens	Pend Oreille
6	B-6	Watch and Gypsy Lakes	Pend Oreille
7	B-7	Davis Lake	Ferry
8	B-7	Trout Lake	Ferry
9	D-3	Bellfields Nature Park	King
10	B-4	Big Beaver Valley	Whatcom
11	C-3	Chinese Gardens Marsh	Jefferson
12	F-4	Cedar Swamp	Yakima
13	E-3, F-3	Numerous Small Lakes	Thurston, Pierce
14	D-3	Union Bay Marsh	King
15	D-1	Carlisle Bog	Grays Harbor
16	G-3	Silver Lake Marshlands	Cowlitz
17	D-3	Chase Lake Bog	Snohomish
18	G-1	Long Beach Peninsula	Pacific
19	E-3	Spanaway Bog	Pierce
20	E-3	Sphagnum Bog	King
21	E-3	Sphagnum Bog	Mason
22	E-3	Setchfield Lake	Thurston
23	F-2, F-3	Black River Swamp	Thurston
24	E-3	Large Swamp	Thurston
25	C-3	Cranberry Lake	Island
26	B-7	Trout Lake Marsh	Ferry
27	G-4, H-4	Indian Heaven Area	Skamania
28	B-3	Cranberry Lake, Sphagnum Bog	Skagit
29	A-3	Cranberry Lake	Skagit
30	B-3	Jorgensen Lake Bog	Whatcom
31	G-5	Toppenish Marsh	Yakima
32	E-3	Edmond Marsh	Pierce
33	G-6	Richland Flood Plain	Benton

Springs HS

1	D-2	Sol Duc Hot Springs	Clallam
2	B-4	Baker Hot Springs Geological Area	Whatcom
3	C-4	Sulphur Hot Springs	Snohomish
4	C-4	Kennedy Hot Springs	Snohomish
6	F-5	Springs	Kittitas, Yakima
7	H-4	Government Mineral Springs	Skamania
8	D-4	Garland Mineral Springs	Snohomish
9	D-2	Olympic Hot Springs	Clallam
10	G-3	Kalama Springs	Cowlitz
11	H-4	Moss Creek Springs	Skamania
12	E-3	McAllister Springs	Thurston
13	F-2	Artesian Wells	Pacific
14	E-3	Murray Springs	Pierce
15	C-4	Gamma Hot Springs	Chelan
16	B-8	Colville Springs	Stevens
17	E-3	Mason Gulch Springs	Pierce
18	H-4	Carson Hot Springs	Skamania
19	F-4	Ohanapecosh Hot Springs	Lewis
20	E-3	Wildwood Springs	Pierce
21	E-3	Maplewood Springs	Pierce
22	C-8	Valley Springs	Stevens

Waterfalls HF

1	D-4	Snoqualmie Falls	King
2	F-7	Palouse Falls	Franklin, Whitman
		Kettle Falls	Stevens
3	B-7	Pee Wee Falls	Pend Oreille
4	B-8	Three Mile Creek Falls	Pend Oreille
5	B-8	Boundary Creek Falls	Pend Oreille
6	B-8	Nooksack Falls	Whatcom
7	B-4	Rainbow Falls	Whatcom
8	B-4	North Fork Falls	Snohomish
9	C-4	Half-mile Falls	Snohomish
10	C-4	Deception Falls	King
11	D-4	Snoquera Falls	Pierce
12	E-4	Franklin Falls	Kittitas
13	E-4	Julia Falls	Lewis
14	F-4	Narada Falls	Lewis
15	F-4	Eagle Falls	Snohomish
16	D-4	Sunset Falls	Snohomish
17	D-4	Bridal Veil Falls	Snohomish
18	D-4	Wallace Falls	Cowlitz
19	G-3	Kalama Falls	Skagit
20	D-4	Curley Creek Falls	Skamania
21	B-8	Metaline Falls	Pend Oreille
22	B-3	Razehorse Falls	Whatcom
23	F-3	Lynch Creek Falls	Thurston
24	G-3	Cowlitz Falls	Lewis
25	D-2	Hamma Hamma Falls	Mason
26	C-5	Rainbow Falls	Chelan
27	B-6	Sumner Falls	Grant
28	E-2	Wynoochee Falls	Grays Harbor
31	C-4	Granite Falls	Snohomish
32	G-4	Clapan Falls	Skamania
33	G-2	Elochoman Falls	Wahkiakum
34	D-4	Bear Creek Falls	Snohomish
35	D-4	Deer Creek Falls	Snohomish
36	D-4	Mesatchee Falls	Yakima
37	F-4	Clear Creek Falls	Yakima
38	F-4	Alpine Falls	King
39	D-4	Shippard Falls	Skamania
40	H-4	Dougwallips Falls	Jefferson
41	B-3	Donevallips Falls	Jefferson
42	B-8	Upper & Lower Big Sheep Creek Falls	Stevens
43	B-4	Ladder Creek Falls	Whatcom
44	D-8	Spokane Falls	Spokane
45	B-3	Unnamed falls	Whatcom
46	B-3	" falls	Whatcom
47	B-3	" falls	Whatcom
48	B-3	" falls	Whatcom
49	B-8	Granite Creek Falls	Pend Oreille
50	B-7	Missemille Falls	Ferry
51	G-4	Lewis River Falls	Skamania
52	H-3	Fly Creek Falls	Clark
53	D-8	Missemille Falls	Spokane
54	B-4	Thunder Creek Falls	Skagit
55	B-4	Big Creek Falls	Skamania
56	H-3	Molten Falls	Clark
57	H-3	Sunset Falls	Clark
58	E-2	Wynoochee Falls	Grays Harbor
59	F-2	Rainbow Falls	Lewis
60	E-4	Unnamed falls	King
61	E-4	Twin Falls	King
62	D-4	Unnamed Falls	King
63	D-4

HYDROLOGICAL INDEX

Map Key No.	Map Index Grid Ref.	Feature	County
24	B-4	Diablo Dam	Whatcom
25	B-4	Ross Dam	Whatcom
26	F-3	La Grande Dam	Thurston, Pierce
27	F-3	Alder Dam	Thurston, Pierce
28	G-7	Ice Harbor Dam	Walla Walla, Franklin
29	F-7	Lower Monumental Dam	Walla Walla, Franklin
30	F-7	Little Goose Dam	Columbia, Whitman
31	F-8	Lower Granite Dam	Garfield, Whitman
32	C-2	Elwha Dam	Clallam
33	C-2	Glines Canyon Dam	Clallam
34	E-2	Cushman No. 1 Dam	Mason
35	F-3	Skookumchuck Dam	Thruston
36	F-4	Tieton Dam	Yakima
37	F-4	Packwood Dam	Lewis
38	E-4	Mud Mountain Dam	King
39	E-4	Howard Hanson Dam	King
40	E-4	Selleck Diversion Dam	King
41	E-4	Cedar Falls Dam	King
42	E-4	Chester Morse Dam	King
43	E-4	Keechelus Dam	Kittitas
44	E-4	Kachess Dam	Kittitas
45	D-4	Tolt Dam	King
46	B-4	Lower Baker or Baker Dam	Skagit
47	B-4	Upper Baker Dam	Whatcom
48	B-4	Nooksack Dam	Whatcom
49	F-4	Clear Creek Dam	Yakima
50	B-6	Conconully Dam	Okanogan
51	B-6	Blue Lake Dam	Okanogan
52	E-6	O'Sullivan Dam	Grant
53	D-6	Dry Falls Dam	Grant
54	D-6	North Dam	Grant
55	B-8	Box Canyon Dam	Pend Oreille
56	B-8	Sullivan Creek Dam	Pend Oreille
57	B-8	Boundary Dam	Pend Oreille
58	D-4	Chaplain Dam	Snohomish
59	D-4	George Colmback Dam	Snohomish
60	E-4	Cle Elum Dam	Kittitas
61	F-4	Bumping Lake Dam	Yakima
62	B-6	Salmon Lake Dam	Okanogan
63	C-8	Calispell Creek Dam	Pend Oreille
64	C-7	Owhi Dam	Okanogan
65	E-6	Pinto or Long Lake Dam	Grant
66	F-6	Scootenay Dam	Franklin
67	C-7	Twin Lakes Dam	Ferry
68	D-8	Little Falls Dam	Lincoln, Stevens
69	D-8	Long Lake Dam	Lincoln, Stevens
70	D-8	Ninemile Falls Dam	Spokane
71	D-8	Monroe Street Dam	Spokane
72	D-8	Upper Falls Dam	Spokane
73	B-6	Similkameen Dam	Okanogan
74	E-2	Cushman No. 2 Dam	Mason
75	B-8	Spokane Dam	Spokane
76	D-5	Dryden Dam	Chelan
77	F-5	Naches Dams	Yakima
78	B-4	Condit Dam	Skamania, Klickitat
79	E-2	Quinault Dam	Grays Harbor
80	F-3	Electron Dam	Pierce
81	F-3	Yelm Dam	Thurston, Pierce
82	D-4	Snoqualmie Falls Dams	King
83	E-4	White River Dam	Pierce, King
84	B-4	Newhalem Dam	Whatcom
85	B-4	Bear Creek Dam	Skagit
86	B-6	Spectacle Dam	Okanogan
87	D-5	Antilon Dam	Chelan
88	B-7	Meyers Falls Dam	Stevens
89	C-3	Swift No. 2 Dam	Skamania

Watersheds or Water Resource Inventory Areas WRIA

The following named drainage basins are in common use today by agencies engaged in resource planning in Washington.

Basin No.	Basin Name
1	Nooksack
2	San Juan
3	Lower Skagit
4	Upper Skagit
5	Stillaguamish
6	Island
7	Snohomish
8	Cedar
9	Green
10	Puyallup-White
11	Nisqually
12	Chambers-Clover
13	Deschutes
14	Kennedy-Goldsburough
15	Kitsap
16	Skokomish-Dosewallups
17	Quilcene-Snow
18	Elwha-Dungeness
19	Lyre-Hoko
20	Soleduck-Hoh
21	Queets-Quinalt
22	Lower Chehalis
23	Upper Chehalis
24	Willapa
25	Grays-Elochoman
26	Cowlitz
27	Lewis
28	Salmon-Washougal
29	Wind-White Salmon
30	Klickitat
31	Rock-Glade
32	Walla Walla
33	Lower Snake
34	Palouse
35	Middle Snake
36	Esquatzel Coulee
37	Lower Yakima
38	Naches
39	Upper Yakima
40	Alkali-Squilchuck
41	Lower Crab
42	Grand Coulee
43	Upper Crab-Wilson
44	Moses Coulee
45	Wenatchee
46	Entiat
47	Chelan
48	Methow
49	Okanogan
50	Foster
51	Nespelem
52	Sanpoil
53	Lower Lake Roosevelt
54	Lower Spokane
55	Little Spokane
56	Hangman
57	Middle Spokane
58	Middle Lake Roosevelt
59	Colville
60	Kettle
61	Upper Lake Roosevelt
62	Pend Oreille

HYDROLOGICAL FEATURES PROTECTED UNDER THE SHORELINES MANAGEMENT ACT

"Shorelines of state-wide significance" means the following shorelines of the state:

a. The area between the ordinary high-water mark and the western boundary of the state from Cape Disappointment on the south to Cape Flattery on the north, including harbors, bays, estuaries, and inlets;

b. Those areas of Puget Sound and adjacent saltwaters and the Strait of Juan de Fuca between the ordinary high-water mark and the line of extreme low tide as follows:

1. Nisqually Delta - from DeWolf Bight to Tatsolo Point;

2. Birch Bay - from Point Whitehorn to Birch Point;

3. Hood Canal - from Tala Point to Foulweather Bluff;

4. Skagit Bay and adjacent area - from Brown Point to Yokeko Point; and

5. Padilla Bay - from March Point to William Point.

c. Those areas of Puget Sound and the Strait of Juan de Fuca and adjacent saltwaters north to the Canadian line and lying seaward from the line of extreme low tide.

The following lakes, rivers, and streams are protected under the Shoreline Management Act of 1972. According to the language of that act, "lakes" means all the surface water areas of the state, including reservoirs, excepting lakes less than 20 acres in size. "Lakes of statewide significance" means those lakes, whether natural, artificial, or a combination thereof, with a surface acreage of one thousand acres or more measured at the ordinary high water mark.

ADAMS COUNTY LAKES

Rodeo Lake
Black Lakes - Upper
Nigger Lake
Twelve Mile Slough
Finnel Lake
Cow Lake
Fines Lake (Alkali Lake)
Fourth of July Lake
and 2 unnamed lakes
Linda Lake
Thread Lake
Owl Lake
Twelve Mile Lake
McElroy Lake
Hallin Lake
Green Lake
Palm Lake

ADAMS COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Sprague Lake

ASOTIN COUNTY LAKES

none

ASOTIN COUNTY LAKES OF STATEWIDE SIGNIFICANCE

none

BENTON COUNTY LAKES

Mound Pond
Yellepit Pond

CHELAN COUNTY LAKES

Black Lake (Spring Hill Reservoir)
Meadow Lake
Colchuck Lake
Snow Lake - Upper
Klonaqua Lakes - Upper
Loch Eileen Lake
Fish Lake
Wapato Lake
Wells Res.
Upper Wheeler Res.
Three Lakes Res.
(Coretz Lake)
Snow Lake - Lower
Klonaqua Lakes - Lower
Eight Mile Lake (Res.)
Chiwaukum Lake
Grass Lake (Dry Lake)
Alkali Lake (Roses Lake)
Antilon Lake (Res.)

CHELAN COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Wanapum Dam Res.
Entiat Lake
Chelan Lake
Rock Island Pool
Wenatchee Lake
Wells Res.

CLALLAM COUNTY LAKES

Wentworth Lake
Sutherland Lake
Pleasant Lake
Elk Lake
Aldwell Lake (Res.)
Beaver Lake
Dickey Lake
Seafield Lake

CLALLAM COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Ozette Lake

CLARK COUNTY LAKES

Post Office Lake
Lancaster Lake
Canvasback Lake
Widgeon Lake
Hathaway Lake
Lackamas Lake (Res.)
Steigerwald Lake
Curtis Lake
and 10 unnamed lakes
Campbell Lake
Carty Lake
Quigley Lake
Unnamed
Round Lake
Green Lake
Battleground Lake
Mud Lake

CLARK COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Vancouver Lake
Yale Res.
Merwin Lake (Res.)

COLUMBIA COUNTY LAKES

none

COLUMBIA COUNTY LAKES OF STATEWIDE SIGNIFICANCE

none

COWLITZ COUNTY LAKES

Horseshoe Lake
Sacajawea Lake
Merrill Lake
Fawn Lake

COWLITZ COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Merwin Lake (Res.)
Silver Lake
Yale Res.

DOUGLAS COUNTY LAKES

Jameson Lake
Atkins Lake
Grimes Lake
Stallard Lake
Cornell Lake
Elbow Lake
Smith Lake
and 5 unnamed lakes
Jameson Pothole
Intermittent
Haynes Lake
Sims Corner Res.
Murphy Lake
Wilson Lake
Black Lake

DOUGLAS COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Wanapum Dam Res.
Entiat Lake
Rufus Wood Lake
Rock Island Pool
Wells Reservoir

FERRY COUNTY LAKES

Mud Lake
Curlew Lake
Sanpoil Lake

FERRY COUNTY LAKES OF STATEWIDE SIGNIFICANCE

none

FRANKLIN COUNTY LAKES

Clark Pond
Bailie Pond
Kahlotus Lake
Scootney Reservoir
and 17 unnamed lakes
Mesa Lake
Sulphur Lake
Scootney Lake

FRANKLIN COUNTY LAKES OF STATEWIDE SIGNIFICANCE

none

GARFIELD COUNTY LAKES

1 unnamed lake

GARFIELD COUNTY LAKES OF STATEWIDE SIGNIFICANCE

none

GRANT COUNTY LAKES

Frenchman Hills Lake
Winchester Wasteway Extension
Warden Lake
Susan Lake
Virgin Lake
Heart Lake
Long Lake
Crescent Lake
Ancient Lake
Flat Lake
Burke Lake
Evergreen Res.
Crater Lake
Babcock Ridge Lake
Black Lake
Ephrata Lake
Willow Lake
Black Rock Lake
Brook Lake
Little Soap Lake
Farty Lake
Dry Falls Lake
Table Lake
Higginbotham Res.
and 5 unnamed lakes
Sand Lake
Goose Lake
Lower Goose Lake
South Warden Lake
Soda Lake
North Windmill Lake
Windmill Lake
Canal Lake
Stan Coffin Lake
Quincy Lake
Dusty Lake
Winchester Wasteway Reservoir
Artesian Lake
South Willow Lake
Broken Rock Lakes
Soap Lake
Round Lake
Alkali Lake (Part of Lenore)
Blue Lake
Deep Lake
Lena Lake (Coulee)
Crescent Bay Lake
Long Lake

GRANT COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Priest Rapids Dam Reservoir
Moses Lake
Long Lake Res.
Wanapum Dam Res.
Potholes Res.
Lenore Lake
Banks Lake

GRAYS HARBOR COUNTY LAKES

Aberdeen Lake (Res.)
Sylvia Lake (Res.)
and 3 unnamed lakes
Duck Lake
Failor Lake (Res.)

GRAYS HARBOR COUNTY LAKES OF STATEWIDE SIGNIFICANCE

none

ISLAND COUNTY LAKES

Goss Lake
Deer Lake
Hastie Lake
Cranberry Lake
and 3 unnamed lakes
Lone Lake
Crockett Lake
Kristoferson Lake

ISLAND COUNTY LAKES OF STATEWIDE SIGNIFICANCE

none

JEFFERSON COUNTY LAKES

Wahl Lake
Tarboo Lake
Crocker Lake
Lords Lake (Res.)
Gibbs Lake
and 1 unnamed lake
Peterson Lake
Sandy Shore Lake
Leland Lake
Anderson Lake
Kah Tai Lagoon

JEFFERSON COUNTY LAKES OF STATEWIDE SIGNIFICANCE

none

KING COUNTY LAKES

Bass Lake
Steel Lake
North Lake
Killarney Lake
Moneysmith Lake
Morton Lake
Mud Lake
Deep Lake
Howard Hanson Res.
Angle Lake
Shady Lake
Youngs Lake (Res.)
Shadow Lake
Pipe Lake
Walsh Lake
Masonry Pool
Burien Lake
Kathleen Lake
Kimball Creek Swamp
Derrick Lake
Wildcat Lake - Upper
Kaleetan Lake
Tusohatchie Lake - Lower
Iceberg Lake
Pine Lake
Intermittent Lake
Boyle Lake
Unnamed Marsh
Hancock Lake
Moolock Lake
Green Lake
Union Lake
Ames Lake
Black Lake
Bridges Lake
Lock Katrine (Lake) - Upper
Phillippa Lake
Margaret Lake (Res.)
Tolt Res.
Lynch Lake
and 4 unnamed lakes
White River Mill Pond
Dolloff Lake
Geneva Lake
Fivemile Lake
Sawyer Lake
Twelve Lake
Jones Lake
Eagle Lake
Findley Lakes (1)
Star Lake
Panther Lake
Meridian Lake
Wilderness Lake
Lucerne Lake
Retreat Lake
Mason Lake
Desire Lake
Spring Lake
Rattlesnake Lake
Caroline Lake
Thompson Lake
Kulla Kulla Lake
Snow Lake
Phantom Lake
Beaver Lake No. 2
Alice Lake
Klaus Lake
Snoqualmie Mill Pond
S.M.C. Lake
Martin Lake
Portage Bay
Loop Lake
Langlois Lake
Frazier Marsh
Hans Lake (Marsh)
Lock Katrine (Lake)
Calligan Lake
Cottage Lake
Joy Lake

KING COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Mud Mountain Res.
Lake Washington
Chester Morse Lake Res.
Lake Sammamish

KITSAP COUNTY LAKES

Wye Lake
Kitsap Lake
Union River Res.
Panther Lake
Twin Lakes (Res.)
Morgan Marsh
Long Lake
Miller Lake
Tahuya Lake
Carney Lake
Wildcat Lake
McCaslin Marsh
Mission Lake
Tiger Lake
Horseshoe Lake
Island Lake
William Symington

KITSAP COUNTY LAKES OF STATEWIDE SIGNIFICANCE

none

KITTITAS COUNTY LAKES

Manastash Lake
Lost Lake
Cooper Lake
and 1 unnamed lake
Easton Lake
Tucquala Lake

KITTITAS COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Priest Rapids Dam Res.
Cle Elum Lake (Res.)
Kachess Lake
Wanapum Dam Res.
Keechelus Lake

KLICKITAT COUNTY LAKES

Spearfish Lake
Trout Lake
Carp Lake

KLICKITAT COUNTY LAKES OF STATEWIDE SIGNIFICANCE

none

LEWIS COUNTY LAKES

Carlisle Lake
Mineral Lake

LEWIS COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Mayfield Res. (Proposed)
Alder Res.
Mossyrock Res. (Proposed)

LINCOLN COUNTY LAKES

Reisenauer Res.
Fourth of July Lake
Fishtrap Lake (Res.)
Downs Lake
Intermittent Lake
Sullivan Lake
Pacific Lake
Neves Lake
Goetz Lake
Deer Springs Lake
Twaress Lake
Draper Lake
Florence Lake
Phillips Lake
Meadow Lake
Whitaker Lake
Wagner Lake
Greenwood Lake
and 13 unnamed lakes
Sylvan Lake
Intermittent Lake
Peterson Lake
Wooley Lake
Tule Lake (Bobs)
Ames Lake
Coffee Pot Lake
Browns Lake
Twin Lakes - Lower
Cormana Lake
Wilts Lake
Twin Lakes - Upper
"H" Lake
Bergeau Lake
Swanson Lake
Wall Lake
Swanson Lake
Little Falls Res.

LINCOLN COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Sprague Lake
Long Lake (Res.)

MASON COUNTY LAKES

Fawn Lake
Lystair Lake
Stump Lake
Timber Lake
Island Lake
Intermittent Lakes
Nahwatzel Lake
Spencer Lake
Lake Limerick
Bingham Lake
Mason Lake
Cushman Res. No. 2
Wooten Lake
Haven Lake
Lilliwaup Swamp
Prince Lake
and 1 unnamed lake
Lost Lake
Simpson Lake
Phillips Lake
Forbes Lake
Isabella Lake
Hanks Lake
Benson Lake
Cranberry Lake
Intermittent Lake
Devereaux Lake
Prickett Lake
Maggie Lake
Tiger Lake
Bennettson Lake
Tee Lake
Melborne Lake
Panther Lake

MASON COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Cushman Lake (Res.)

OKANOGAN COUNTY LAKES

Alta Lake
Leader Lake (Res.)
Twin Lakes (Little)
Moccasin Lake
Green Lake
Duck Lake
Roberts Lake
Conconully Res.
Medicine Lake
Horseshoe Lake
Evans Lake
Round Lake
Forde Lake
Blue Lake (Res.)
Lower Sinlaheki Impoundment
Whitestone Lake (Res.)
Bonapart Lake
Meadow Lake
Wannacut Lake
Horseshoe Lake
Blue Lake
and 3 unnamed lakes
Muskrat Lake
Zosels Mill Pond
Rat Lake
Patterson Lake (Res.)
Twin Lakes (Big)
Davis Lake
Brown Lake
Crawfish Lake
Fearrygin Lake (Res.)
Salmon Lake
Booher Lake
Peninsula Lake
Alkali Lake
Fish Lake
Talkire Lake
"L" Lake
Lemanasky Lake
Aeneas Lake
Spectacle Lake
Fanchers Dam Res.
Walker Lake
Chopaka Lake
Milson Lake
and 4 unnamed lakes
Sidley Lake
Fields Lake

OKANOGAN COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Wells Dam Res.
Palmer Lake
Rufus Woods Lake
Osoyoos Lake

PACIFIC COUNTY LAKES

Breaker Lake
Loomis Lake
Skating Lake
Black Lake
Island Lake
Espy Lake

PACIFIC COUNTY LAKES OF STATEWIDE SIGNIFICANCE

none

PEND OREILLE COUNTY LAKES

Lost Lake
Trout Lake
Diamond Lake
Trask Pond
Kent Meadows Lake
Power Lake
Marshall Lake
Unnamed Slough
Kings Lake
Leo Lake
Yocum Lake
Browns Lake
Sullivan Res.
and 1 unnamed lake
Horseshoe Lake
Fan Lake
Chain Lake
Sacheen Lake
Davis Lake
Shearer Lake
South Skookum Lake
Parker Lake
Scotchman Lake
Nile Lake
Lone Mill Pond
Ledbetter Lake

PEND OREILLE COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Calispell Lake
Boundary Res.
Sullivan Lake

PIERCE COUNTY LAKES

Bay Lake
Cranberry Lake
Tule Lake
Kreger Lake
Carney Lake
Harts Lake
Silver Lake
Rapjohn Lake
Ohop Lake
Whitman Lake
Clear Lake
Mud Lake
Muck Lake
Florence Lake
Louise Lake
Spanaway Lake
Unnamed Lake
Mud Lake
Wapato Lake
Printz Basin
Stansberry Lake
Mud Mc. Res.
La Grande Res.
Tanwax Lake
Twenty Seven Lake
Kapowsin Lake
Morgan Lake
Josephine Lake
Gravelly Lake
Wickersham Basin
Vaughop Lake
Steilacoom Lake
Surprise Lake
Crescent Lake
Manmade Lake

PIERCE COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Alder Lake (Res.)
Tapps Lake (Res.)
American Lake

SAN JUAN COUNTY LAKES

Spencer Lake
Zylstra Lake
Woods Res. (Proposed)
Martins Lake
Sportsmans Lake
Mountain Lake
Hummel Lake
Trout Lake (Res.)
Horseshoe Lake
Briggs Pond
Cascade Lake

SAN JUAN COUNTY LAKES OF STATEWIDE SIGNIFICANCE

none

SKAGIT COUNTY LAKES

Devils Lake
McMurray Lake
Erie Lake
Pass Lake
Britt Slough
Beaver Lake
Cranberry Lake
Minkler Lake
Barnaby Slough
Granite Lake No. 3
Mill Slough
and 2 unnamed Lakes
Sixteen Lake
Cavanaugh Lake
Campbell Lake
Whistle Lake
Clear Lake
Barney Lake
Big Lake
Day Lake
Heart Lake
Judy Res.
Grandy Lake

SKAGIT COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Shannon Lake (Res.)

SKAMANIA COUNTY LAKES

Franz Lake
Stevenson Lake
Wauna Lake
Northwestern Lake
Venus Lake
Hanaford Lake
and 2 unnamed lakes
Ashes Lake
Greenleaf Slough (Lake)
Drano Lake
Trout Lake
Elk Lake

SKAMANIA COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Bonneville Pool
Muddy Res.
Swift Res.
Spirit Lake

SNOHOMISH COUNTY LAKES

Martha Lake
Crystal Lake (Res.)
Hannan Lake
Dagger Lake
Serene Lake
Hanson Slough
Storm Lake
Panther Lake
Chain Lake
Cochran Lake
Kellogg Lake
Boulder Lake
Purdy Creek Ponds
Roesiger Lake
East Boardman Lake
Copper Lake
Bosworth Lake
Howard Lake
Crabapple Lake
Sunday Lake
Bryant Lake
Riley Lake
Ballinger Lake
Fontal Lake
Tomtit Lake
Sunset Lake
Stickney Lake
Silver Lake
Flowing Lake
Blackmans Lake
Woods Lake
Chaplain Lake (Res.)
Wallace Lake
Blanca Lake
Hughes Lake
Echo Lake
Crelder Lakes - Upper
Cassidy Lake
Martha Lake
Ki Lake
Shoecraft Lake
Lona Lake
Armstrong Lake
Little Lake
Evangeline Lake

SNOHOMISH COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Stevens Lake

SPOKANE COUNTY LAKES

Fishtrap Lake (Res.)
Feuntal Lake
Badger Lake
Hog Lake
Amber Lake
Chapman Lake
Philleo Lake
Intermittent Lake
West Medical Lake
Lonelyville Lake
Medical Lake
Ring Lake
Willow Lake
Clear Lake
Upper Falls Res.
Liberty Lake
Woods Lake
Knight Lake
Dragoon Lake
and 9 unnamed lakes
Downs Lake
Williams Lake
Reflection Lake
Bonnie Lake
Alkali Lake
Mason Lake
Fish Lake
Intermittent Lake
Intermittent Lake
Silver Lake
Otter Lake
Granite Lake
Meadow Lake
Queen Lucas Lake
Shelley Lake
Horseshoe Lake
Nine Mile Res.
Bear Lake
Eloika Lake

SPOKANE COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Newman Lake
Long Lake (Res.)

STEVENS COUNTY LAKES

Little Falls Res.
Newbill Lake
Jumpoff Lake
Nelson Lake
Rainbow Lake (Fourmile Lake)
Bailey Lake
White Mud Lake
Starvation Lake
Spruce Lake (Twin Lakes)
Heritage Lake
Gillette Lake
Peterson Swamp
Perkins Lake
Williams Lake
Deep Lake
and 1 unnamed lake
Hunter Res.
Waitts Lake (Res.)
Beitey Res.
Clark Lake
Horseshoe Lake
Pond No. 1
Hatch Lake
Black Lake
Thomas Lake
Sherry Lake
Dilly Lake
Ryan Lake
Pierre Lake
Cedar Lake

STEVENS COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Long Lake (Res.)
Loon Lake
Deer Lake

THURSTON COUNTY LAKES

McIntosh Lake
Bushman Lake (Tempo)
Munn Lake
Pitman Lake
Deep Lake
Offutt Lake
Scott Lake
Long Lake
Hicks Lake
Chambers Lake
(Hussel Lake)
Patterson Lake
Barnes Lake
Simmons Lake
Black Lake
Hewitt Lake
Inman Lake
Clear Lake
Bald Hill Lake
Alder Lake (Reservoir)
Chambers Lake (Little Chambers Lake)
Southwick Lake
Capitol Lake
Grass Lake
Percival Lake
Ward Lake
Summit Lake
Lawrence Lake
Elbow Lake
St. Clair Lake

THURSTON COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Alder Lake (Res.)

WAHKIAKUM COUNTY LAKES

none

WAHKIAKUM COUNTY LAKES OF STATEWIDE SIGNIFICANCE

none

WALLA WALLA COUNTY LAKES

Johnson Pond
"J" Line Pond
Curlew Pond
Mill Creek Res.
Casey Pond

WALLA WALLA COUNTY LAKES OF STATEWIDE SIGNIFICANCE

none

WHATCOM COUNTY LAKES

Padden Lake (Res.)
Louise Lake
Toad Lake
Terrell Lake (Res.)
Tennant Lake
Fazon Lake
Pangborn Lake
Judson Lake
Samish Lake
Cain Lake
Squalicum Lake
Barrett Lake
Wiser Lake
Canyon Lake
Silver Lake

WHATCOM COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Whatcom Lake (Res.)

WHITMAN COUNTY LAKES

Texas Lake
Miller Lake (Alkali)
Snyder Slough
Folsom Lake
Bonnie Lake
Tule Lake
and 2 unnamed lakes
Intermittent Lake
Lavista Lake
Stevens Lake
Sheep Lake
Crooked Knee Lake

WHITMAN COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Rock Lake

YAKIMA COUNTY LAKES

Byron Ponds (Res.)
Yorgam Pond
Giffin Lake
Freeway Lake
Wenas Lakes (Res.)
and 1 unnamed lake
Horseshoe Lake
Horseshoe Lake
Oleys Lake
Cascade Mill Pond

YAKIMA COUNTY LAKES OF STATEWIDE SIGNIFICANCE

Priest Rapids Dam (Res.)

The streams and Rivers which constitute "Shorelines of the State" are defined in the Shorelines Management Act of 1972 as follows:

(1) Streams which constitute shorelines in western Washington are those "from the point at which the stream reaches a mean annual flow of 20 cubic feet per second down to the mouth of said stream or river;"

In eastern Washington "from the point at which the stream reaches a mean annual flow of 20 cubic feet per second down to the mouth of said stream or river;"

(2) Rivers which constitute shorelines of statewide significance in western Washington are those "where the mean annual flow reaches 1,000 cubic feet per second;"

In eastern Washington, either of the following points, whichever is farther upstream: "the point at which the mean annual flow exceeds 200 cubic feet per second, or the lowest extremity of the first 300 square miles of drainage area east of the crest of the Cascade range."

The following streams and rivers are protected at some point under the shorelines classification.

ASOTIN COUNTY

Asotin Creek (S. Fork)
Asotin Creek (N. Fork)
Grand Ronde River
Asotin Creek
George Creek
Snake River

BENTON COUNTY

Columbia River
Yakima River
Glade Creek

CHELAN COUNTY

Chelan River
Columbia River
Icicle Creek
Mission Creek
Peshastin Creek
Chumstick Creek
Entiat
Mad River
Columbia River
Wenatchee River

CLALLAM COUNTY

Big River
Beaver Creek
Bogachiel River
Clallam River
Coal Creek
Dickey River (all Forks)
Deep Creek
East Twin River
Elwha River
Hoko River
Little Hoko River
Lyre River
McDonald Creek
Pilchuck Creek
Ponds Creek
Pysht River (S. Fork)
Salt Creek
Skukwah Creek
Snag Creek
Sooes River
Umbrella Creek
Bear Creek
Bockman Creek
Calawah River (incl. N. & S. Forks)
Colby Creek
Crooked Creek
Dungeness River
Elk Creek
Herman Creek
Indian Creek
Little River (S. Br.)
Maxfield Creek
Murphy Creek
Morse Creek
Pysht River
Quillayute River
Sekiu River (incl. N. & S. Forks)
Skunk Creek
Soleduck River
Thunder Creek
West Twin River

CLARK COUNTY

Big Tree Creek
Burns Bridge Creek
Cedar Creek
Chelatchie Creek
Lewis River
Boulder Creek
Canyon Creek
Cedar Creek
Columbia River
Copper Creek

HYDROLOGICAL INDEX

CLARK COUNTY (continued)

Fifth Plain Creek
Gee Creek
Hagan Creek
Lackamas Creek
Lewis River (E. Fork)
Little Washougal River (E.Fork)
Mason Creek
Mill Creek
North Siouxon Creek
Salmon Creek
Unnamed Creek (Trib. to Chelatchie Creek)
Yacolt Creek
Fly Creek
Glenwoodd Creek
King Creek
Lake River
Little Washougal River
Lockwood Creek
Matney Creek
Morgan Creek
Rock Creek
Siouxon Creek
Washougal River

COLUMBIA COUNTY

Pataha Creek
Touchet River (incl. N.& S. Forks)
Tucannon River
Wolf Fork

COWLITZ COUNTY

Abernathy
Arkansas Creek
Bear Creek
Campbell Creek
Chehalis River (S. Fork)
Coldwater Creek
Cougar Creek
Cowlitz River
Delameter Creek
Elk Creek
Germany Creek
Goble Creek
Green River
Hoffstadt Creek
Johnson Creek
Kalama River (N. Fork)
Lewis River
Little Mill Creek
Monahan Creek
Olequa Creek
Ostrander Creek (S. Fork)
Salmon Creek
South Coldwater Creek
Stillwater Creek
Toutle River (incl. N. & S. Forks)
Unnamed Trib. to Speelyai Creek
Wild Horse Creek
Alder Creek
Baird Creek
Cameron Creek
Castle Creek
Coal Creek
Columbia River
Coweman River
Deer Creek
Devils Creek
Elochoman River (E. Fork)
Gobar Creek
Goble Creek (N. Fork)
Hemlock Creek
Jackson Creek
Kalama River
Landon Creek
Little Kalama River
Mill Creek
Mulholland Creek
Ostrander Creek
Rock Creek
Shultz Creek
Speelyai Creek
Studebaker Creek
Unnamed Trib. to Kalama River
Unnamed Trib. to Toutle River (S. Fork)
Wolf Creek
Wyant Creek

DOUGLAS COUNTY

Columbia River
Coulee (Rattlesnake Creek) (Douglas Creek)

FERRY COUNTY

Boulder Creek
Curlew Creek
Sanpoil River
Sherman Creek
Columbia River
Kettle River
Toroda Creek

FRANKLIN COUNTY

Columbia River
Palouse River
Esquatzel Coulee
Snake River

GARFIELD COUNTY

Pataha Creek
Snake River

GRANT COUNTY

Columbia River
Lind Coulee
Rocky Ford Creek
Crab Creek
Lower Crab Creek
Wilson Creek

GRAYS HARBOR COUNTY

Andrews Creek
Bitter Creek
Black River
Canyon River
Cedar Creek
Chehalis River
Connor Creek
Decker Creek
Delezene Creek
Elkhorn Creek
Elk River
Garrard Creek (S. Fork)
Independence Creek
Johns River (all Forks)
Little River
Little North River
Moclips River
Newman Creek
North River
Porter Creek (all Forks)
Rainie Creek (Rt. Fork)
Rock Creek
Sand Creek
Stevens Creek
Unnamed trib. to Humptuips River
Vesta Creek (E. Fork)
Williams Creek
Workman Creek
Big Creek
Black Creek
Boone Creek
Carter Creek
Charley Creek
Cloquallum Creek
Copalis River
Deep Creek
Donkey Creek
Elk River (E. Br.)
Garrard Creek
Hoquiam River (all Forks)
Humptulips River (all Forks)
Joe Creek
Little Hoquiam River
Lower Salmon Creek
Mox Chehalis Creek
Newskah Creek
Pioleer Creek
Raney Creek
Salmon Creek
Satsop River (all Forks)
Schafer Creek
Sylvia Creek
Vance Creek
Vesta Creek (W. Fork)
Wildcat Creek (all Forks)
Wishkah River (all Forks)
Wynoochee River

ISLAND COUNTY

None

JEFFERSON COUNTY

Big Quilcene River
Cedar Creek
Christmas Creek
Dosewallips River
Fulton Creek
Hoh River
Hurst Creek
Little Quilcene River
Matheny Creek
Miller Creek (E. Fork)
Mosquito Creek
Owl Creek
Shale Creek
Snow Creek
Stequaleho Creek
Bogachiel River
Chimacum Creek
Clearwater River
Duckabush River
Goodman Creek
Hoh River (S. Fork)
Kalaloch Creek
Maple Creek
Miller Creek
Minter Creek
Nolan Creek
Salmon River
Snahapish River
Solleks River
Winfield Creek

KING COUNTY

Bear Creek
Big Soos Creek
Boise Creek
Calligan Creek
Cedar River
Charley Creek
Coal Creek
Evans Creek
Friday Creek
Granite Creek
Green River (N. Fork)
Greenwater River
Hancock Creek
Index Creek
Jenkins Creek
Maloney Creek
May Creek
Miller River
Beckler River
Black River
Boxley Creek
Carroll Creek
Champion Creek
Cherry Creek
Covington Creek
Foss River
Gale Creek
Green River
Cottage Lake Creek
Griffin Creek
Harris Creek
Issaquah Creek
Kimball Creek
Martin Creek
Mercer Island
Money Creek

KING COUNTY (continued)

Newaukum Creek
North Fork Creek
Philippa Creek
Raging River
Sammamish River
Scatter Creek
Smay Creek
Sunday Creek
Taylor Creek
Tokul Creek
Tye River
Unnamed Trib. to Snoqualmie River (N. Fork)
White River
North Creek
Patterson Creek
Pratt River
Rock Creek
Sawmill Creek
Skykomish River (S. Fork)
Snoqualmie River (all Forks)
Swamp Creek
Ten Creek
Tolt River (all Forks)
Unnamed Trib. to Index Creek
Unnamed Trib. to Tolt River (S. Fork)
Spring Brook Creek

KITSAP COUNTY

Big Beef Creek
Burley Creek
Curley Creek
Union River
Black Jack Creek
Chico Creek
Tahuya River

KITTITAS COUNTY

Big Creek
Cherry Creek
Columbia River
Little Creek
Manastash Creek
Naneum Creek
Taneum Creek
Yakima River
Cabin Creek
Cle Elum River
Kachess River
Log Creek
Manastash Creek (S. Fork)
Swauk Creek
Teanaway River (all Forks)
Wilson Creek

KLICKITAT COUNTY

Bird Creek
Buck Creek
Dead Canyon Creek
Gotchen Creek
Klickitat River
Major Creek
Outlet Creek
Rock Creek
Summitt Creek
Trout Creek
White Creek
White Salmon River
Bowman Creek
Columbia River
Gilmer Creek
Holmes Creek
Little Klickitat River (E. Prong)
Mill Creek
Rattlesnake Creek
Snyder Canyon Creek
Swale Creek
Trout Lake Creek

LEWIS COUNTY

Big Creek
Bunker Creek
Catt Creek
Chehalis River (all Forks)
Cinnabar Creek
Coal Creek
Cowlitz River
David Creek
Deschutes River
Dillenbaugh Creek
Eight Creek
Gallup Creek
Green River
Hall Creek
Hanlan Creek
Johnson Creek
Kearney Creek
Kiona Creek
Lacamas Creek
Landers Creek
Lost Creek
Mill Creek
Brim Creek
Butter Creek
Cedar Creek
Cispus River
Connelly Creek
Crim Creek
Deep Creek
Devils Creek
East Creek
Elk Creek
Garrard Creek (S. Fork)
Halfway Creek
Hanaford Creek
Independence Creek
Jones Creek
King Creek
Klickitat Creek
Lake Creek
Lincoln Creek (all Forks)
Lucas Creek
Mineral Creek
Newaukum River (M. Fork)

LINCOLN COUNTY

Columbia River
Negro Creek
Wilson Creek
Crab Creek
Spokane River

MASON COUNTY

Baker Creek
Canyon River
Coulter Creek
Decker Creek
Dewatto River
Dry Creek
Goldsborough Creek (S. Fork)
Hamma Hamma River
Johns Creek
Lilliwaup Creek
Mission Creek
Satsop River (E. Fork)
Shumacher Creek
Skokomish River (N. Fork)
Skookum Creek
Union River
Vance Creek
Sherwood Creek
Bingham Creek
Cloquallum Creek
Cranberry Creek
Deer Creek
Dry Red Creek
Dry Run Creek
Gosnell Creek
Jefferson Creek
Kennedy Creek
McTaggert Creek
Rendaland Creek
Satsop River (M. Fork)
Skokomish River
Skokomish River (S. Fork)
Tahuya River
Unnamed Creek
Goldsborough Creek (N. Fork)

OKANOGAN COUNTY

Beaver Creek
Chewack River
Gold Creek
Myers Creek
Sanpoil River (W. Fork)
Sinlahekin River
Toroda Creek
Wolf Creek
Bonaparte Creek
Columbia River
Methow River
Okanogan River
Similkameen River
Toats Coulee Creek
Twisp River

PACIFIC COUNTY

Alder Creek
Blaney Creek
Butte Creek
Canyon Creek
Cedar River (N. Fork)
Clearwater Creek
Dell Creek
Elk Creek
Ellis Creek
Fairchild Creek (N. Fork)
Fall River
Fern Creek
Fork Creek
Grays River (S. Fork)
Half Moon Creek
Little Elk Creek
Middle Nemah River
Mitchell Creek
Naselle River (S. Fork)
North River
North Nemah River
Palix River (N. Fork)
Rainie Creek
Rock Creek
Bear River
Bone River
Camon River
Cedar River
Chinook River
Columbia River
Eight Creek
Elkhorn Creek
Fairchild Creek
Ellsworth Creek
Falls Creek
Flinn Creek
Grays River (E. Fork)
Hull Creek
Johnson Creek
Lower Salmon Creek
Mill Creek
Naselle River
Niawiakum River
North Naselle River
Palix River
Palix River (S. Fork)
Redfield Creek
Rue Creek

PACIFIC COUNTY (continued)

Salmon Creek
S. Nemah River
Trap Creek
Unnamed Trib. to Grays River
Unnamed Trib. to Palix River (N. Fork)
Wallacut River
W. F. Grays River
Willapa River
Williams Creek
Wilson Creek (N. Fork)
Smith Creek
Swen Creek
Unnamed Trib. to Cannon River
Unnamed Trib. to Hull Creek
Unnamed Trib. to Smith Creek
Ward Creek
Whitcomb Creek
Willapa River (S. Fork)
Wilson Creek

PEND OREILLE COUNTY

Calispell Creek
Le Clerc Creek
Le Clerc Creek (E. Branch)
Little Spokane River
Skookum Creek
Tacoma Creek
Calispell Creek (N. Fork)
Le Clerc Creek (W. Branch)
Pend Oreille River
Little Spokane River (W. Branch)
Sullivan Creek

PIERCE COUNTY

Beaver Creek
Carbon River
Clarks Creek
Clover Creek
Gale Creek
Little Mashel River
Mashel River
Minter Creek
Muck Creek
Nisqually River
Puyallup River
Rushingwater Creek
South Creek
Spanaway Creek
Twenty Five Mile Creek
Voight Creek
White River (W. Fork)
Busy Wild Creek
Chambers Creek
Clearwater River
Evans Creek
Greenwater River
Lynch Creek
Milky Creek
Mowick River
Niesson Creek
Ohop Creek
Rocky Creek
Sequalitchew Creek
South Prairie Creek
Tanwax Creek
Unnamed Trib. to Mashel River
White River
Wilkeson Creek

SAN JUAN COUNTY

None

SKAGIT COUNTY

Alder Creek
Bear Creek
Boulder Creek
Cascade River
Corkindale Creek
Day Creek
Finney Creek
Gilligan Creek
Hansen Creek
Illabot Creek
Jackman Creek
Jones Creek
Lake Creek
Mill Creek
Nooksack River (S. Fork)
Pilchuck Creek
Rocky Creek
Sauk River
Skagit River
Suiattle River
Thunder Creek
Unnamed Trib. to Bear Creek
White Creek
Baker Creek
Big Creek
Carpenter Creek
Cavanaugh Creek
Cumberland Creek
Deer Creek
Friday Creek
Grandy Creek
Howard Creek
Irene Creek
Joe Leary Creek
Jordan Creek
Little Deer Creek
Nookachamps Creek (E. Fork)
O'Toole Creek
Pressentin Creek
Samish River
Silver Creek
Stillaguamish River (N. Fork)
Tenas Creek
Thunder Creek (S. Fork)
Walker Creek
Youngs Slough

SKAMANIA COUNTY

Bear Creek
Canyon Creek
Columbia River
Dougan Creek
Forest Creek
Hagen Creek
Kanaka Creek
Lewis River
Little Wind River
Martha Creek
North Fork Toutle River
Ole Creek
Prospector Creek
Rock Creek
Spring Creek
Swift Creek
Unnamed Trib. to Swift Creek
Washougal River (W. Fork)
White Salmon River
Wind River
Buck Creek
Carson Creek
Deer Creek
Duncan Creek
Greenleaf Creek
Hamilton Creek
Lava Creek
Little White Salmon River
Lookout Creek
Muddy River
North Siouxon Creek
Panther Creek
Range Creek
Siouxon Creek
Stebbins Creek
Trout Creek
Washougal River
West Fork Swift Creek
Wildboy Creek
Woodward Creek

SNOHOMISH COUNTY

Anderson Creek
Barclay Creek
Brooks Creek
Dan Creek
Duhoque Creek
Elwell Creek
Jim Creek
May Creek
Montague Creek
North Creek
Pilchuck Creek
Portage Creek
Quilceda Creek
Sauk River
Skykomish River (N. Fork)
Snohomish River
Squire Creek
Stillaguamish River (all Forks)
Sultan River
Swamp Creek
Wallace River
Williamson Creek
Woods Creek (W. Fork)
Youngs Creek
Ashton Creek
Boulder River
Canyon Creek
Deer Creek
Elk Creek
French Creek
Little Pilchuck Creek
McCoy Creek
Mud Lake Outlet
Olney Creek
Pilchuck River
Proctor Creek
Rollins Creek
Skykomish River
Skykomish River (S. Fork)
Snoqualmie River
Stevens Creek
Stony Creek
Sultan River (N. Fork of S. Fork)
Unnamed Trib. to French Creek
Wallace River (N. Fork)
Woods Creek
Worthy Creek

SPOKANE COUNTY

Deadman Creek
Hangman Creek or Latah Creek
Little Spokane River (W. Branch)
Rock Creek
Dragon Creek
Little Spokane River
Pine Creek
Spokane River

STEVENS COUNTY

Big Sheep Creek
Chewelah Creek
Columbia River
Little Pend Oreille River
Mill Creek
Spokane River
Chamokane Creek
Colville River
Kettle River
Little Sheep Creek
Onion Creek

THURSTON COUNTY

Beaver Creek
Cedar Creek
Deschutes River
Little Nisqually River
McLane Creek
Mitchell Creek
Percival Creek
Sherman Creek
Thompson Creek
Woodland Creek
Black River
Chehalis River
Kennedy Creek
McAllister Creek
Mima Creek
Nisqually River
Scatter Creek
Skookumchuck River
Waddell Creek
Yelm Creek

WAHKIAKUM COUNTY

Alger Creek
Columbia River
Deep River
Fossil Creek
Hagen Creek
Jim Crow Creek
Mill Creek
Nelson Creek
Salmon Creek
West Valley Creek
Beaver Creek
Crooked Creek
Elochoman River (all Forks)
Falk Creek
Grays River (Incl. S. & W. Forks)
Hull Creek
McDonald Creek
Naselle River
Skamokawa Creek (all Forks)
Wilson Creek

WALLA WALLA COUNTY

Columbia River
Mill Creek
Touchet River
Dry Creek
Snake River
Walla Walla River

WHATCOM COUNTY

Anderson Creek
Bertrand Creek
Breckenridge Creek
Canyon Creek
Coal Creek
Fishtrap Creek
Galbraith Creek
Howard Creek
Johnson Creek
Maple Creek
Porter Creek
Rocky Creek
Samish River
Skookum Creek
Squalicum Creek
Tennalle Creek
Unnamed Trib. flowing to Canada
Austin Creek
Boulder Creek
California Creek
Clearwater Creek
Dakota Creek
Friday Creek
Hayden Creek
Hutchinson Creek
Kendall Creek
Nooksack River (all Forks)
Orsino Creek
Racehorse Creek
Saar Creek
Sisters Creek
Smith Creek
Sumas River
Terrell Creek
Warm Creek
West Cornell Creek

WHITMAN COUNTY

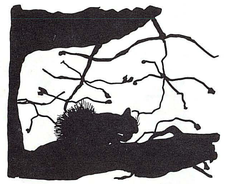
Hangman Creek (Latah Creek)
Palouse River
Pine Creek
Rock Creek
Union Flat Creek
Palouse River (S. Fork)
Snake River

YAKIMA COUNTY

Ahtanum Creek
Bird Creek
Cowiche Creek (S. Fork)
Dry Creek
Naches River
Tieton River
Yakima River
Ahtanum Creek (N. Fork)
Columbia River
Diamond Fork River
Klickitat River
Rattlesnake Creek
Trout Creek

Other very significant lakes and rivers, under various jurisdictions, are: Lake Crescent (Olympic National Park), Queets River (Olympic National Park), Lake Quinault (Quinault Tribal Council), Stehekin River (Lake Chelan National Recreation Area).


VANCOUVER ISLAND
STRAIT OF JUAN DE FUCA
PACIFIC OCEAN
SAN JUAN ISLAND
WHATCOM
SKAGIT
OKANOGAN
FERRY
STEVENS
PEND OREILLE
ISLAND
SNOHOMISH
CHELAN
DOUGLAS
LINCOLN
SPOKANE
JEFFERSON
KING
KITTITAS
GRANT
ADAMS
WHITMAN
GRAYS HARBOR
PACIFIC
LEWIS
YAKIMA
FRANKLIN
GARFIELD
WAHKIAKUM
COWLITZ
SKAMANIA
KLICKITAT
CLARK
BENTON
WALLA WALLA
COLUMBIA
ASOTIN
OREGON
BELLINGHAM
Anacortes
Port Angeles
Port Townsend
Edmonds
SEATTLE
Mountlake Terrace
Lynnwood
Mukilteo
Everett
Marysville
Arlington
Snohomish
Monroe
Sultan
Gold Bar
Index
Skykomish
Stevens Pass
Leavenworth
Cashmere
Wenatchee
East Wenatchee
Chelan
Entiat
Lake Chelan
Twisp
Winthrop
Mazama
Methow
Omak
Okanogan
Tonasket
Oroville
Republic
Curlew
Kettle Falls
Colville
Chewelah
Metaline Falls
Newport
Priest River
Sandpoint
Usk
Ione
Cusick
Ellensburg
Kittitas
Cle Elum
Roslyn
Easton
Snoqualmie
North Bend
Fall City
Issaquah
Bellevue
Kirkland
Redmond
Woodinville
Bothell
Lake Forest Park
Shoreline
Mountlake Terrace
Lynnwood
Mukilteo
Everett
Marysville
Arlington
Granite Falls
Darrington
Concrete
Sedro-Woolley
Burlington
Mount Vernon
Anacortes
La Conner
Bellingham
Ferndale
Lynden
Blaine
Point Roberts
Friday Harbor
Orcas
Eastsound
Lopez
Roche Harbor
Deception Pass
Oak Harbor
Coupeville
Langley
Clinton
Freeland
Greenbank
Port Townsend
Port Ludlow
Port Gamble
Kingston
Poulsbo
Bainbridge Island
Winslow
Bremerton
Port Orchard
Gig Harbor
Tacoma
Fife
Puyallup
Sumner
Auburn
Kent
Des Moines
Burien
Tukwila
Renton
Newcastle
Mercer Island
Bellevue
Issaquah
Snoqualmie
North Bend
Fall City
Carnation
Duvall
Woodinville
Kenmore
Lake Forest Park
Shoreline
Edmonds



BIOLOGICAL FEATURES

THE ECOSYSTEM PERSPECTIVE IN ENVIRONMENTAL QUALITY

By
Gordon H. Orians

The highly diverse topography and climatic conditions of Washington create a land of many contrasts. From the moist maritime environment of the Pacific Ocean in the west to the drier conditions of the eastern side of the State, a broad spectrum of relatively distinct community types has become established. Each community, containing many combinations of plant and animal associations, is the product of the State's varied geography, its climate and the unique evolutionary history of the organisms living here.

In Puget Sound and off our ocean shorelines there are such marine mammals as the harbor seal, the killer whale and the sea otter. Along with them are many important species of fish like the salmon which spawn in our watersheds.

On land, Washington shelters and sustains many kinds of birds, mammals, reptiles, amphibians and insects in complex community associations. Man, too, is a member of this community of life and to this complex array of ecological associations he adds a significant input. He occupies space. He uses water and cuts timber. He stops natural plant succession to grow his food and graze his cattle. He hunts, he fishes, and he moves out into the land and onto its waters in pursuit of still other values.

Man intensively uses and changes his environment in Washington State. With growing ecological conscience, however, he is slowing his pace to look at what he is doing to nature. More than ever he is starting to appreciate the value of refined environmental management and conservation based upon his esthetic interests and careful study of ecological principles.

Ecologists have found it convenient to divide the continuum of natural communities of plants and animals into a number of types. These are usually indicated by the dominant plants of the area, but notice is also taken of the most important animal species associated with the plants. These major community types are known as LIFE ZONES. Since the Life Zone concept includes both the physical environment and the living organisms, it is a useful way to view the environments of the State of Washington. Because of the diverse topography of the State, we are blessed with an unusual variety of Life Zones, each a vital part of our total environmental heritage.

The following aspects of Life Zones need to be considered in comparing them and understanding how they can be preserved, managed and enjoyed.

CLIMATE. The climate of an area exerts a major influence on the development of soils and vegetation, and on the kinds of animals that can live there.

SOILS. All natural communities depend directly upon green plants which extract most of their nutrients directly from the soil. The soils of Washington are very different with regard to their nutrient status and their vulnerability to disturbance.

PRODUCTIVITY. The productivity of the green plants on an area is determined by the availability of moisture and the temperatures during the growing season. The active period may range from a few months in the alpine areas to most of the year in the lowlands of western Washington.

TEMPORAL PATTERNS OF ACTIVITY. Depending on climate and the availability of resources, activity periods for different organisms in different communities vary considerably. Even in alpine areas, small rodents may be active all winter under the snow and mountain goats may find forage on cliffs where the wind blows the grass free of snow. Coastal areas may have the greatest abundances and varieties of waterfowl during the winter months. Flowering may be confined to a few months or may extend over most of the year. These temporal patterns influence the structure of the community and are also important determinants of the seasonal patterns of human use of the environment.

SPECIES RICHNESS. Most Life Zones support characteristic kinds and numbers of species of plants and animals. A desert grassland may have few species of plants, a handfull of birds, and a modest number of kinds of insects. A conifer forest will almost certainly have many more species in all of these groups. Species richness is important for the stability of the community and may be a factor in the value of the environment for human recreation or other uses.

MOVEMENT BETWEEN AREAS. Some of the species in any ecosystem may have regular seasonal movements between different Life Zones, no one zone providing all of their necessities for the entire year. The extent of this movement may have important implications for the relationships that ought to be developed among the different areas and how we attempt to preserve and use them.

VULNERABILITY TO DISTURBANCE. All ecosystems have a certain amount of resilience; that is they can rebound from some disturbance and return to their previous states, but some systems are much more resilient than others. An alpine meadow, damaged by trampling, may require decades to recover while a lowland pasture might return to its previous state within a few years. These aspects of the system will be vital to an understanding of the kinds of uses that are consistent with long-term preservation of the character of the system and therefore how much of this kind of Life Zone ought to be set aside to cover the anticipated uses of it.

PRESSURES FOR ALTERNATIVE USES. Some ecosystems, such as alpine meadows, have no real value other than as recreational areas while others, such as Palouse grasslands and interridal marshes, have alternative high economic values and uses to which they might be put. The nature of these alternative uses, and the strength of the pressures that they generate, are important considerations in establishing priorities for the preservation of these areas. For example, if a certain vegetation type has no other pressures on it then it might be given a lower priority than another type which is in danger of being eliminated because of these pressures. This rating need not imply that one type of vegetation is of more or less value than the other.

WHAT WILL HAPPEN TO THE VEGETATION IF IT IS LEFT ALONE? Many of the most characteristic vegetation types in the world are the products of various kinds of disturbance, including some that are often considered to be "virgin." For example, most grasslands require at least periodic burning to maintain them relatively free of woody plants which would otherwise invade and take over. "Preserving" these areas requires that the right kind of disturbance be maintained. At the other extreme, there are habitat types which are maintained only if disturbance is kept to a minimum. These community types need to be identified and management procedures established which are consistent with these facts.

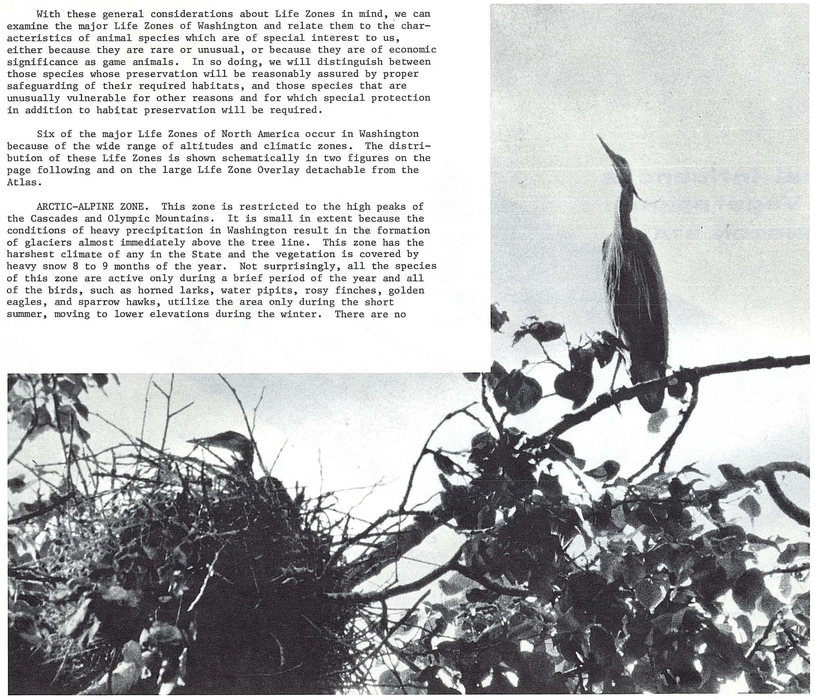
With these general considerations about Life Zones in mind, we can examine the major Life Zones of Washington and relate them to the characteristics of animal species which are of special interest to us, either because they are rare or unusual, or because they are of economic significance as game animals. In so doing, we will distinguish between those species whose preservation will be reasonably assured by proper safeguarding of their required habitats, and those species that are unusually vulnerable for other reasons and for which special protection in addition to habitat preservation will be required.

Six of the major Life Zones of North America occur in Washington because of the wide range of altitudes and climatic zones. The distribution of these Life Zones is shown schematically in two figures on the page following and on the large Life Zone Overlay detachable from the Atlas.

ARCTIC-ALPINE ZONE. This zone is restricted to the high peaks of the Cascades and Olympic Mountains. It is small in extent because the conditions of heavy precipitation in Washington result in the formation of glaciers almost immediately above the tree line. This zone has the harshest climate of any in the State and the vegetation is covered by heavy snow 8 to 9 months of the year. Not surprisingly, all the species of this zone are active only during a brief period of the year and all of the birds, such as horned larks, water pipits, rosy finches, golden eagles, and sparrow hawks, utilize the area only during the short summer, moving to lower elevations during the winter. There are no trees in this zone, but a number of dwarf shrubs and heathers may form extensive mats together with a variety of herbaceous plants. Because of the cold climate, plants can grow only for a few months each year and productivity is low. For the same reason this habitat type is especially sensitive to disturbance. Even a moderate amount of trampling by humans and domestic animals can cause severe damage to the vegetation and the rate of recovery is extremely low. Therefore, these areas can tolerate only a low level of use and sufficient areas need to be preserved to guard against excess use. With the possible exception of mining, there is no use of these areas other than recreation and the retention of snowpack to supply the streams. There is, thus, no major barrier to their preservation.



Band-tailed pigeons in flight are a common autumn sight in western Washington.



Common throughout Washington, these great blue herons and their rookery were photographed in Skagit County.

HUDSONIAN ZONE. This zone consists of the belt of rather open forest which is found immediately below the Arctic-Alpine Zone. The dominant trees are conifers and there is a rich understory of shrubs. In the wetter meadows there is an abundance of herbaceous plants which form some of the richest and most beautiful flower meadows in the entire world. Very heavy snows fall in winter and the period of vegetational activity is short: from 3 to 5 months depending upon slope, exposure and altitude. Heavy snows cause frequent landslides and there is regular damage to trees; therefore, the natural succession of vegetation is seldom allowed to be completed and many of the areas are in various stages of recovery from natural disturbances. This is a zone of intense biological activity during the short summer when there is massive flowering of plants, intense activity of pollenators like hummingbirds and bees, and breeding of birds and mammals. Most of the birds of this zone are present only during the summer, but some of them, such as Clark's nutcrackers, gray jays and mountain chickadees, are permanent residents.

Like the Arctic-Alpine Zone, the Hudsonian Life Zone is sensitive to disturbance and has a slow recovery time. There is low pressure from alternative uses, however, because trees grow slowly and are often deformed so that productivity for lumber is marginal. The health of the vegetation is important, however, for the protection of watersheds and the control of soil erosion which could become severe on the steep slopes characteristic of much of this zone.

CANADIAN ZONE. The tall dense conifer forests of the Canadian Life Zone extend in unbroken stretches the entire length of the Cascades on both sides of the crest and are also found in the Olympic Mountains and on the higher ranges of the eastern part of the State. A rich understory of shrubs occurs in many areas, but the diverse wet meadows of higher elevations are scarce and scattered. Snow cover is deep, but because of milder climatic conditions the ground becomes exposed sooner in the spring and there is a moderately-long growing season for plants. The higher productivity of the vegetation results in formation of a rich humus layer in the soil which supports large numbers of saprophytic plants, species lacking chlorophyll, which live on decaying organic matter in the soil. Most conspicuous are fungi, various orchids and a number of plants of the heather family.

Plant species are no richer in this zone than in the Hudsonian Zone, but because of the greater structural diversity of the vegetation there are many more species of birds present - most of them summer visitors. Growth of trees in this zone is good enough that there are pressures for logging in this area, but the steepness of the slopes and heavy precipitation make the area vulnerable to serious erosion from normal logging practices. Recreational use of the area is high and these forests are less vulnerable to disturbance by normal recreational use and so can sustain more intense levels than the higher zones.

TRANSITION ZONES. Below the Canadian Zone on the western slopes of the Cascades, the lush forests of the lowlands of western Washington are found. On the east slopes of the Cascades, however, the climate gets progressively drier with decreasing altitude and the denser forests give way to open forests and eventually grasslands and desert. The great differences in the Transition Zones on the two sides of the mountains require that they be treated separately.

HUMID TRANSITION. The tall forests of the Humid Transition Life Zone are dominated by Douglas-fir, western redcedar and western hemlock. Along the ocean beaches, lodgepole pine is a common tree and on the west side of the Olympic Peninsula Sitka spruce is a very common tree. Another conifer, western yew, occurs as a scattered understory tree and there are a number of species of deciduous trees which are, for the most part, early invaders after disturbance and are replaced by conifers as the vegetational succession proceeds toward climax. Originally, they were probably restricted primarily to disturbed areas along streams and in areas of landslides on the slopes. Today, however, as a result of man's disturbance, they are much more abundant and widespread than they were formerly. Shrub and herb layers are rich in species in this zone and the variety of species of vertebrates is high. Many of the birds are permanent residents and many of the species that spend the summer at higher elevations also winter here. Winters are mild and wet, spring comes early and there is a long growing season.

This zone sustains the densest human populations in the State and because the tall forests of this area were the most accessible to logging, virtually all of the virgin forests were cut many years ago. Only small patches of uncut forest remain and most areas are in various stages of succession. Pressures for alternative uses of this zone are strong, but because of the high population densities in the area the needs for recreational uses are also very strong. Also, the few remaining natural areas are vulnerable to further disturbance.

ARID TIMBERED TRANSITION. At higher elevations this forest is similar to that of the Canadian Zone. With decreasing elevation, however, several species drop out and are replaced by Douglas-fir and then by ponderosa pine. Ponderosa pine forms almost pure stands on the lower slopes just above the grasslands. In wetter sites there is a rich understory of shrubs and the river bottoms support a distinctive vegetation dominated by deciduous trees with dense understories of shrubs and herbaceous plants. Winters are cold and there is considerable accumulation of snow at the higher elevations, but this decreases at lower elevations.



BIOLOGICAL FEATURES

In this ponderosa pine zone the slopes are usually bare by early April. Summers are long, usually hot and dry, and forest fires are a constant danger. Because of drier conditions, the forests of the Arid Timbered Transition Life Zone are more open and characterized by an abundance of many species of grasses.

The vertebrate fauna of this zone share many species with the other zones, but there are a number of distinctive species that are not regularly found elsewhere. Temperatures are favorable for plant growth in this zone, but lack of summer moisture results in less productivity on the drier sites than would otherwise be possible. Growth is, however, lush in wetter areas during the summer. The area can sustain a heavy recreational use load, but there are also pressures for logging and heavy grazing in these forests which, when improperly done, can be very damaging. The zone is also of great significance as a wintering area for big game mammals, such as elk and deer, which spend the summer at higher elevations.

ARID GRASSLAND TRANSITION. The open ponderosa pine forest of the eastern slopes of the Cascades, the lower slopes of the Blue Mountains and the mountains of northeastern Washington, give way to a belt of grasslands commonly known as the Palouse Prairie. The most important species of grass here is bunchgrass, but many other grasses are present and there are many broad-leaved species which flower during the spring when there is still abundant moisture in the soil. In this zone shrubs are common along streams and in wetter depressions. Much less snow accumulates in this zone during the winter and mild winter rains can cause melting at any time. Temperatures are favorable for plant growth most of the year, but production is severely limited by moisture shortage during late spring, summer and autumn.

The zone is extremely favorable for agriculture, as may be seen in the ERTS photograph, particularly for the production of wheat, so that most of the original vegetation has been destroyed. Only small pockets along railroad right-of-ways, cemeteries, and in spots with difficult access, remain to indicate its former richness. Areas not actually plowed have been subjected to intensive grazing pressures - further modifying the original vegetation. This is the Life Zone which has been most severly destroyed in Washington and special efforts are needed to preserve the small remnants still available to us.

UPPER SONORAN ZONE. The lowlands of the Columbia Basin are extremely arid and support a "shrub-steppe" vegetation with various grasses and herbs growing among the shrubs. Winters are mild and summers are long and hot, but there is little vegetative productivity because of moisture shortage. The area is too dry for dryland farming, but the soils are excellent when irrigated and this area is rapidly being modified by expanding irrigation.

Most of the plants and animals of this zone are quite distinctive and occur only occasionally in the other zones. Many of them will become very rare if the present rate of destruction of their habitat continues for very long. Also, the region is an important wintering ground for species which breed in the higher vegetation zones surrounding the basin. Its lakes and marshes are unusually productive and some of the most important waterfowl wintering and breeding grounds are found here.

This brief account of Life Zones can do no more than summarize their most important characteristics. The listing of species is of necessity very incomplete and reflects certain human biases. Fortunately, for most of the species, their futures are secure if their proper habitats are preserved and maintained. Given suitable conditions they will maintain themselves. Some species, however, are subject to other pressures and need protection beyond simply preserving habitats. Among these are game birds and mammals which are vulnerable to hunting pressures, the larger birds of prey which are regularly shot and can readily be exterminated, and species dependent upon lakes and marshes for breeding because these areas are of small extent, readily polluted and subject to a variety of recreational and other pressures. Any inventory of habitats in the State of Washington needs to assess these special needs and to provide adequate protection for those organisms needing it.

The basic rule in dealing with natural communities of plants and animals is that we can never do just one thing. Because of the many and varied interactions among the species in the system, a change in one component often produces surprising results in other parts of the system. Nowadays we say that these complicated systems have counter-intuitive properties. Thus, the application of a pesticide sometimes produces more of the pest than there was before. Sometimes attempting to preserve a particular habitat type by leaving it alone, destroys it. To avoid making these kinds of mistakes, while we are genuinely attempting to enhance environmental quality and stability, we need to insure that some vital perspectives discussed below are included in our planning.

THE SIZE OF THE AREA THAT NEEDS TO BE PRESERVED. If we are interested in preserving a relict population of some small herbaceous plant a few acres might suffice, but if we are interested in maintaining an elk herd, hundreds of square miles may be needed. The animals may need separate summer and winter ranges and connecting corridors between them would be necessary. Unless we wish to get into the "bussing" business with elk, well preserved, but isolated, summer and winter ranges would be of little use. Therefore, any inventory that has as its eventual objectives the preservation of some of the diversity of natural systems must include an assessment of the spatial needs of the component organisms as a part of the inventory.

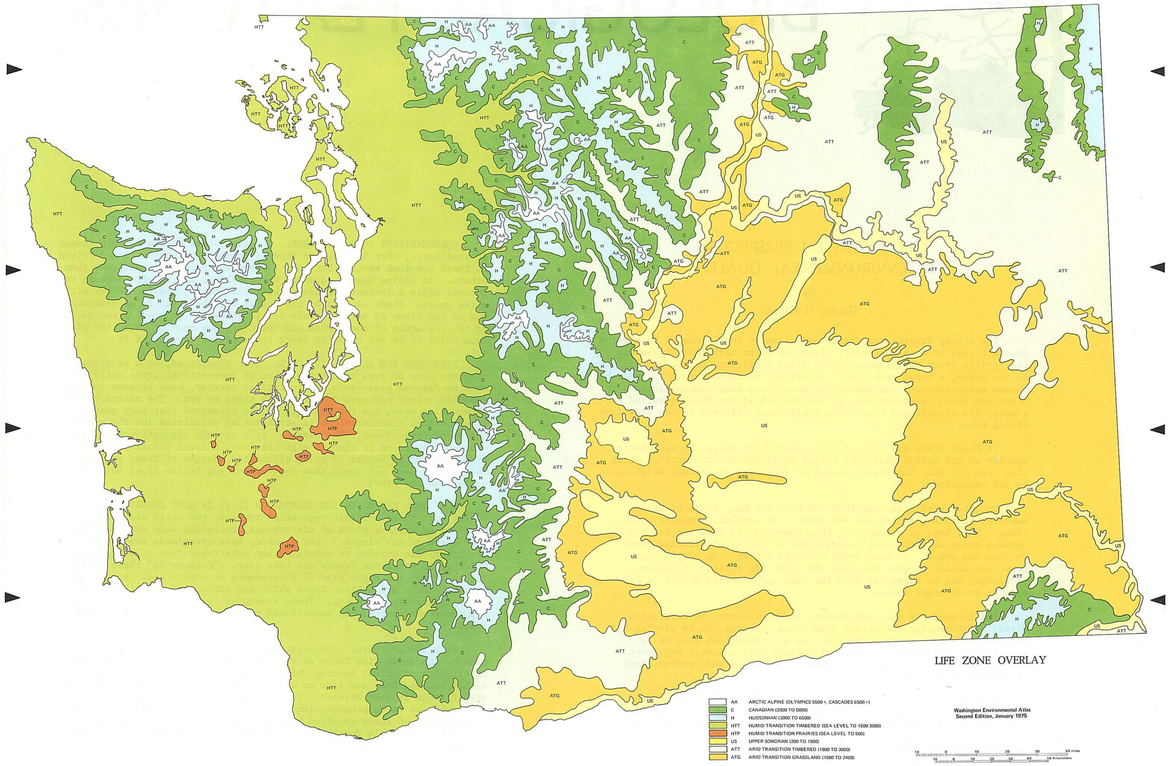
OTHER AREAS THAT ARE VITAL TO THE SUPPORT OF THE ONE WE WISH TO PRESERVE. In some communities the organisms are relatively sedentary, but in others there may be major exchanges from one area to another. Birds may spend the summer in one habitat, but winter in totally different areas. These alternative needs of the species in the system need to be determined; if they are not met, our preservation efforts may fail.

HOW MUCH HETEROGENEITY IS NEEDED? Over 40 years ago ecologists discovered that if systems of many species are put together in simple uniform environments, they cannot be maintained. Predators eliminate their prey, one species outcompetes another, and so on. The only way that stable systems with many species in them can be maintained is to make the environment nonuniform. We make refuges for the prey that make it impossible for the predator to eliminate them. These may be specific safe sites, or it may be sufficient to make the environment patchy enough so that the predator has difficulty in finding the prey in all the areas. Similarly, if the resources are made more heterogeneous, different competitors can each have a part of the resource spectrum on which it is the most efficient. If that is the case they are unable to eliminate one another.

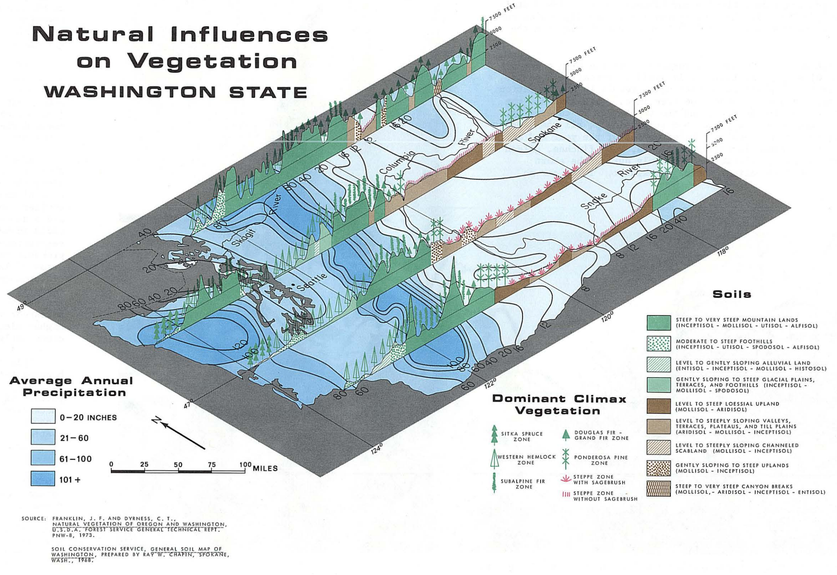
Surprisingly, the importance of larger and less uniform space extends out to remarkably large sizes. Even very large islands, such as New Guinea and Trinidad, have many fewer species of plants and animals on them than a comparable area on the nearby mainland. This suggests that the smaller a population is, the more likely it is to become extinct. We notice this on islands because it is more difficult for populations from the mainland to invade the island. The same thing probably goes on in all habitat "islands" on the mainland, but we don't notice it so much because the area is quickly reinvaded from another habitat "island" not very far away. However, if we expect to preserve our natural areas in Washington simply as small isolated "islands" with little exchange among them, we will almost certainly find that we will lose some of the species we want to preserve.

Once various habitat types and specific populations have been identified, we must move to a more integrated program of assessing the ecosystems on these sites. We must come to understand the basic dynamics of these systems and how these areas need to be considered as part of a system of areas which will guarantee that our descendents will be able to enjoy a diverse environment capable of yielding both the pleasure and the basic resources for a rewarding human existence.

GORDON H. ORIANS, Ph.D., is Professor of Zoology at the University of Washington. He is author of the general biology textbook The Study of Life and numerous zoological papers published in scientific journals.



LIFE ZONE OVERLAY



SOURCE: FRANKLIN, J. F. AND DYRNESS, C. T., NATURAL VEGETATION OF OREGON AND WASHINGTON, U.S.D.A. FOREST SERVICE GENERAL TECHNICAL REPT. PNW-8, 1973.

SOIL CONSERVATION SERVICE, GENERAL SOIL MAP OF WASHINGTON, PREPARED BY KARL W. GRAPHIC, SPOKANE, WASH., 1968.

MORE ABOUT LIFE ZONES

Using a life zone system in the Atlas provides a workable means of mapping broad distributions of flora and fauna. Initially proposed in 1894 by the American biologist, C. Hart Merriam, it is a system designed for the ecological classification of large-scale environments. Merriam's system was slightly modified by C. V. Piper around 1906 to adapt it to Washington's unique terrain. For use in the Atlas, Piper's portrayal of Washington's Life Zones was updated in 1974 using ERTS satellite imagery.

ABOUT THE LIFE ZONE TERMS USED BY ORIANS AND DAUBENMIRE. Zoologists have long used Merriam's system of life zones to describe the general distribution of animal populations in Washington. Botanists, on the other hand, have continuously reworked, redefined and updated their life zone system for the State and added a wealth of detail derived from extensive inventorying of existing plant communities. Dr. Orians, Professor of Zoology, uses Merriam's system in his general introduction to the foregoing paper, as do several other Atlas authors discussing Washington's wildlife. Dr. Daubenmire, Professor of Botany, discusses the State's important plant communities in a following paper. Both authors describe life zones in different terms which essentially correspond in the following manner:

Merriam	Daubenmire
1. Arctic-Alpine Zone	1. Alpine Zone
2. Hudsonian Zone	2. Subalpine Zone
3. Canadian Zone	3. Subalpine Zone
4. Humid Transition Timbered Zone	4. Montane & Lowland Forests West of the Cascades
5. Arid Transition Timbered Zone	5. Forests of Dry to Moderately Dry Climates
6. Arid Transition Grassland Zone	6. Steppe
7. Upper Sonoran Zone	7. Steppe

For extended depth of detail on plant communities of Washington and the life zone system favored by many botanists, consult the very notable work: Natural Vegetation of Oregon and Washington by Jerry F. Franklin and C. T. Dyrness, U.S.D.A. Forest Service General Technical Report PNW-8, published 1973. A 417-page illustrated book, it may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 - Stock No. 0101-00329.

ABOUT THE TWO FIGURES ON THIS PAGE. The top figure is a reduced copy of the large Life Zone Overlay detachable from the Atlas. The overlay is extensively utilized to integrate information about natural communities. Several papers refer to it, and the following paper describes how to use it in conjunction with other Atlas materials. The bottom figure, depicting natural influences governing the distribution of biotic communities, serves to add perspective about environmental relationships controlling the establishment of Life Zones. This figure displays the integration between four primary natural influences governing the ultimate distribution of Life Zones throughout the State: (1) soils, (2) physical topography and altitudes, (3) precipitation, and (4) climax vegetation.

In the lower figure, one can see the effect of mountains upon the Pacific weather systems and hence upon moisture available for vegetation growth. The western side of the State is wet, and wet coniferous forests prevail in a Humid Transition Life Zone and moist Canadian and Hudsonian Life Zones. The eastern side is much dryer, with an Arid Transition Life Zone dominated by dry coniferous forests on upper slopes and grassland at lower elevations, and the sagebrush desert of an Upper Sonoran Life Zone. In the rain shadow created by the Olympics, even vegetation on the San Juan Islands becomes a dry grassland kind of habitat similar to that found in eastern Washington - creating a dry oasis in the west surrounded by water both above and below.

The two figures have been matched by the addition of four marks on the left and right edges of the upper figure corresponding to the four profiles shown in the lower one. The profiles are transects cutting across Washington thusly: The first cuts across the North Cascades and Okanogan Highlands; the second cuts across the Olympics (Mount Olympus being the highest peak), the north-central Cascades and the northern Columbia Basin; the third cuts across the Chehalis River Valley, the southern Cascades (a few miles north of Mount Rainier) and the central Columbia Basin; and the fourth goes up the Columbia Valley, across Mount Saint Helens and Mount Adams, the southern Columbia Basin, and finally across the Blue Mountains.

The upper figure is the work of John Garcia. In a paper presented in another section of the Atlas, he describes the methods he used to update Merriam's life zones for Washington, as they appear in 1974. The lower figure is the work of Gene Turner, a doctoral candidate in the Department of Geography, University of Washington. This oblique map of the State is an experimental design created to integrate ecological relationships. It was recently awarded a first place blue ribbon in a contest sponsored by the American Congress on Surveying and Mapping.

SOILS REFERENCE. There are several different systems used for defining soil types in Washington. The reference upon which the lower figure is based is: Soil Classification, A Comprehensive System, Seventh Approximation, by Soil Survey Staff, U.S. Department of Agriculture, published by U.S. Government Printing Office, Washington, D.C., 1960. Some revisions were made to that document in 1964, but they are unpublished. Ray Chapin used this reference and the 1964 revisions in his preparation of the General Soil Map of Washington. Both that map and the above reference are available from the Government Printing Office.

LIFE ZONE OVERLAY

WILDLIFE IN WASHINGTON'S LIFE ZONES

By

Robert A. Mowrey and
John C. Garcia

A major problem in presenting information about wide-ranging animals is determining how to graphically depict their geographic distribution. The more species one considers, the more quickly a map of their ranges becomes a mass of confusing overlapping areas. When interest advances to treating a large number of species simultaneously as in this atlas, the problem dictates arrangement of information into a system of ecological communities. The Life Zone concept has been adopted to provide such organization here and to augment information about animals presented by other methods in the atlas.

METHODS EMPLOYED THROUGHOUT ATLAS TO PRESENT INFORMATION ABOUT ANIMALS. Several methods are used to present separate aspects of information about Washington's wildlife: (1) overview papers prefacing each major map in the Biological Section are written to provide general background and concepts pertaining to mapped wildlife information; (2) important terrestrial wildlife habitats are mapped on the Zoological-Terrestrial map and important marine mammal and fish habitats are mapped on the Zoological-Aquatic map, both with indexed sites cross-referenced to text in the County Discussion Section; (3) a wildlife entry concludes every county's text summarizing atlas contributors' comments on animals considered notable in each county; (4) currently-known limits of selected animal population ranges are outlined on small maps in the section entitled "Some Important Wildlife of Washington" with text stressing critical habitat requirements; and (5) the development of wildlife checklists for any site in the state by use of the atlas materials. The latter method, the subject of this paper, affords the reader the opportunity to analyze what animals may be present on a site by using a Life Zone Overlay which is integrated with appended vertebrate species lists categorized by habitat types the animals favor.

COMPONENTS OF ATLAS INTEGRATED TO FACILITATE CONSTRUCTION OF WILDLIFE CHECKLISTS. The major components of the atlas which have been integrated for purposes of constructing checklists are: (1) the Life Zone Overlay; (2) eight full-color environmental maps, the Zoological-Terrestrial map containing 64 useful "ground truth" checkpoints where field naturalists have recorded their observations on habitats and Life Zones present; (3) an ERTS satellite photograph of the entire state; (4) the Life Zone - Habitat Matrix; (5) overview papers and descriptive text about habitat types in Washington; (6) over 100 small wildlife range maps of selected species; and (7) species lists of the state-wide distribution of animals in the four vertebrate classes: birds, mammals, reptiles and amphibians.

The Life Zone Overlay, eight maps and ERTS photograph of the state are all scaled to match each other. The overlay can be removed from the atlas, placed over any map or the photograph, and be easily registered by reference to the marks placed in corresponding corners of each plate. The descriptive text about habitat types found in Washington, presented on the following page, provides definitions of the habitats tabulated in the lists and forms a basis for comparison with habitats one may observe on a site.

THE LIFE ZONE - HABITAT MATRIX. The matrix summarizes the state-wide distribution of habitats predominating in Washington's Life Zones. Used in conjunction with the species lists and Life Zone Overlay, the matrix is useful for determining the potential range of any vertebrate listed when the animal's habitats are known. In preparing a checklist, the matrix is a quick reference in analyzing potential habitats that may be present on a site.



HOW TO CONSTRUCT A WILDLIFE CHECKLIST

The first step in constructing a wildlife checklist is to determine as precisely as possible what habitats occur on the site. If the site is large in extent, covering many square miles, and remote, so that one cannot investigate it all or initially get into the field to make firsthand observations, then the Life Zone Overlay, matrix, maps, ERTS photograph and atlas text can be used to determine probable habitats present. If this is the case, proceed as follows:

1. Place the Life Zone Overlay in register with the Zoological-Terrestrial map. Use an erasable marking pen or grease pencil to lightly outline the site on the overlay. The outlining may also be done on a sheet of tracing paper or better, on a transparent stable-base material like Mylar. On the overlay, record all mapped sites in the area of interest and those from any of the other atlas maps. Study text written about the sites in the County Discussion Section. Some information about habitats and the influences of land-use will be gained through this process and serve to aid interpretation of the site's habitat characteristics. On the overlay, note the Life Zones covering the site and refer to the Life Zone - Habitat Matrix. List all the potential habitats on the site according to the matrix.

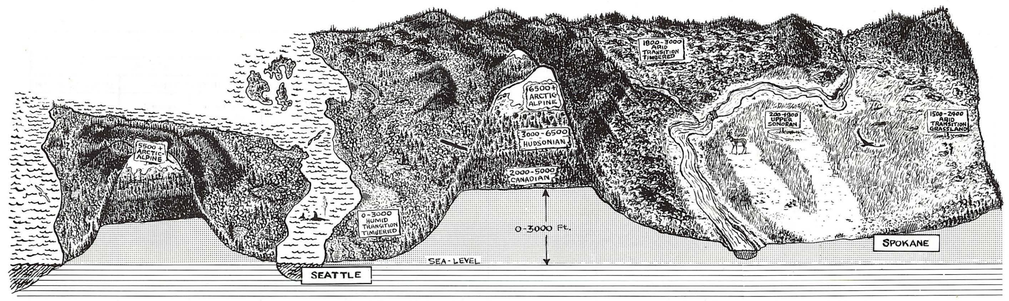
2. Evaluate the habitats listed by interpretation of the maps, text, ERTS photograph, and by reference to the habitat - life zone checkpoints mapped on the Zoological-Terrestrial map. Check the small wildlife range maps in the section entitled "Some Important Wildlife of Washington" for additional details. Some methods of photointerpretation are discussed in the section entitled "Earth Resources Technology Satellite Imagery." In interpreting habitats from the maps, rivers and lakes on the map base for example aid in defining fresh water (FW) and riparian woodland (RW) habitats. The ERTS photograph lends perspective to the maps and adds accuracy to habitat analysis by displaying current features of land-use by man. Since there may be other small habitats on the site not immediately evident through this analysis, reference to additional literature and communication with individuals who have visited the area would be desirable. Modify the list of habitats as evaluation indicates.

3. With a firm list of habitats in hand, proceed to the species lists. Follow appropriate region and habitat columns down through bird, mammal, reptile and amphibian classes and construct a wildlife checklist for the site. Note any additional information of interest for each species on range, breeding, seasonality, abundance and consumer class.

If a site is only a few acres in size and accessible, then habitats present may be easily determined from firsthand observation. If this is the case, record habitat characteristics and proceed directly to the species lists to construct the checklist. Any of the steps above may be performed for additional information as desired.



REASONS FOR EMPHASIS ON VERTEBRATES. Basing the lists on the four major animal classes of the vertebrate phylum should not be viewed as slighting the ecological significance of other phyla in the biosphere such as protozoa, mollusks, annelids and arthropods. Emphasis has been placed upon vertebrates for three main reasons. First, vertebrates are biological indicators of the health and stability of the ecosystems they share with man. Second, most vertebrates are threatened to some degree by what man is doing to the biosphere through his customary pursuits in this modern age. To look at vertebrates is to look at man, himself a vertebrate animal, as one who shares the stresses and the benefits delt out by ecological systems that can be easily destroyed or maintained depending upon his sensitivity and inclination. Third, because the speed of ecological disruption is increasing, creating conditions needing urgent attention, vertebrates are emphasized to augment the large body of current literature treating the ecology of vertebrates.



Vertebrates comprise the most thoroughly studied and visible animal group, with much information available on them. Such a body of knowledge permits the reader to easily supplement his or her study of the atlas with other sources. By adding to such literature, and keeping within an ecological community context developed on a state-wide scale, it is hoped that this atlas material will be useful in land-use planning that is responsive to the need to pay ever closer attention to ecological considerations.

LEVEL OF ACCURACY INHERENT IN A WILDLIFE CHECKLIST. Obviously, it would be best to visit a site and accurately census animals present over an appropriate time duration and record existing habitat conditions by direct observation. Developing checklists by use of the atlas material can adequately serve many needs but they are not suggested to be full substitutes for accurate field censusing.

Any checklist constructed with the atlas information should be viewed as a community index. The list will be general and indicate what vertebrates are to be expected given a certain life zone and habitat type. The checklist will depict only a few of the total organisms one might find on a site. As a minimum, view any site as a small component of a larger dynamic ecological system which requires for its efficient operation the continued existence of stable populations of a wide diversity of organisms. Vertebrate species listed in the atlas comprise only a small facet of this overall diversity. All organisms, whether microscopic or large, can be equally important to the balance of the ecological system in which they operate. Listing all organisms here, however, would be a colossal if not impossible task.

If a site has a high species diversity of vertebrates, it indicates presence of a sensitive food web with many niches; and such niches indicate presence of other animal phyla plus vegetation. In brief, an animal's niche is its ecological occupation. A vertebrate's "occuation" in a community may be "eater of moths" or "eater of snails and worms," or "eater of seeds in winter, but eater of all insects in summer." The possible combinations in a food web are staggering when a diverse community of animals occurs on a site. Thus, existence of vertebrate diversity on a site indicates diversity of other phyla not on the species lists.

A checklist can indicate the potential of even a small site of a few acres for supporting individual members of many diverse wildlife populations. For a small site however, the list won't reflect potential existence of sustained populations of those animals because vertebrates are typically a highly mobile group, especially the larger mammals and all the birds. Many warm-blooded vertebrates require large areas of home range for sufficient carrying capacity to support the reproductive potential of their populations and to maintain their numbers at optimum levels.

When the checklist indicates occurrence of an animal on a site, view its accuracy about that species in this light: (1) If habitat on the site is the same as that described in the atlas, there is high probability that some individuals of the species use that habitat for at least part of the year as a portion of their home range. If the habitat on the site only partly resembles conditions described, the species may still use it but the probablity is less. (2) While the site may be apparently suitable habitat for a species, the animal may not be found there at all due to unusual circumstances such as blocked migration routes, disturbance by man in the immediate vicinity, introduced exotic species dominating site, or noise and pollution. Such factors are mainly the reasons why the currently known distribution of a species presented on one of the small range maps may differ from the potential distribution for that species worked out by use of the Life Zone Overlay and species lists. In fact, maps of known and potential distribution can differ dramatically from a mapping of actual distribution established through laborious and time-consuming field censusing of the species.

Due to many variables, it is literally impossible to map with 100 percent accuracy the actual limits of range for highly mobile species. About the closest one can come to high accuracy of range depiction is for a rare animal of low mobility and very limited range, such as the Olympic mudminnow and the Larch Mountain salamander shown on the small maps.

The vertebrate lists in this atlas were developed through coordination with several active ornithologists, mammalogists, herpetologists and also staff of the Washington Department of Game - all knowlegable on the distribution of Washington fauna. The bird lists are reprinted from the book: A Guide To Bird Finding In Washington by Terence R. Wahl and Dennis R. Paulson.

The following people provided valuable information, review, and comments on the lists. On birds: Terence Wahl, Bellingham, Gordon Alcorn, University of Puget Sound, Gordon Orians, University of Washington; on birds and mammals: Earl Larrison, University of Idaho, Eugene Dziedzic and Carroll Rieck of the Washington Department of Game; on bats: Clyde Senger, Western Washington State College; on mammals, reptiles and amphibians: Murray Johnson, University of Puget Sound; on reptiles and amphibians: Robert Storm, Oregon State University, and James Slater, University of Puget Sound. The Consumer Class column was added to the entire list of species by Richard Taber and David Manuwal, Forest Zoologists, College of Forest Resources, University of Washington. The consumer class definitions prefacing the lists have been prepared from information supplied by Dr. Taber.

Just prior to press time for this Atlas edition, one final review of the lists was obtained from three experts recognized by their peers in the Northwest scientific community to be most intimately and currently familure with vertebrate distributions due to their many years of first-hand observation in the field. The lists, as they now stand, reflect the final judgement of these people: Terence R. Wahl (birds), Dr. Murray L. Johnson (mammals, reptiles and amphibians), and Dr. James R. Slater (reptiles and amphibians).

VALUE OF DEVELOPING WILDLIFE CHECKLISTS. Checklists can indicate what animals to expect before going into an area. They can guide development of appropriate assumptions to organize planning steps, and help in selection of investigation methods. Such lists also depict species diversity, a parameter of great ecological significance, and indicate some important food chains operating in the ecosystem of which the site may be just a component. A list of species, as can be derived from the atlas, may be used as a preliminary checklist to carry into the field. The list forms a base of information which can be edited according to the experience of the investigator.

Checklists can also aid in prediction of how species composition of a habitat will change if the habitat is altered. For example, large areas of the Upper Sonoran Life Zone are being irrigated and cultivated. What is the expected shift in species out of the old natural habitat of dry grassland and into the new farmland habitat created? Clearcutting is a common forest management practice in the Canadian Life Zone. What is the species composition on a virgin forest site before logging? What will happen to the animals present when the land is clearcut? What new species will take up residence on the clearcut land and what former species return? As controlled succession of the vegetation occurs from the first year on through 40 years of forest management, how will the animal species composition change in accordance with habitat change? Working out and analyzing wildlife checklists based on the atlas information can supply some of the answers to questions like these.

Checklists are also valuable in that they portray the time element compressed into one listing with respect to species movements. The lists can portray a good indication of potential species occupancy of a habitat because such lists represent species occurrence recorded over several years, as data upon which the lists are based has been worked out by zoologists with long-term experience in the field. The reader, however, may be limited in time, energy, expertise and available funds to carry out a thorough investigation of habitat on a site and its animals. Such limitations can bias analysis in many subtle ways. He may, for example, gather data at a time of day or year when many species will not be utilizing the area. Species not seen may in fact be abundantly present at another time. Also, it is characteristic for most animals to be secretive in nature, often nocturnal, and to avoid man whenever he enters their habitat. Such animal behavior can add further inaccuracies to analysis. In view of these considerations, it is useful to spend some time and effort in constructing wildlife checklists from the atlas to augment information about animals living in Washington.

LIFE ZONE OVERLAY

AA ARCTIC ALPINE (OLYMPICS 5500 +, CASCADES 6500 +)
C CANADIAN (2000 TO 5000)
H HUDSONIAN (3000 TO 6500)
HTT HUMID TRANSITION TIMBERED (SEA LEVEL TO 1500-3000)
HTP HUMID TRANSITION PRAIRIES (SEA LEVEL TO 500)
US UPPER SONORAN (200 TO 1900)
ATT ARID TRANSITION TIMBERED (1800 TO 3000)
ATG ARID TRANSITION GRASSLAND (1500 TO 2400)

Washington Environmental Atlas
Second Edition, January 1975

SCALE 1:750,000

10 0 10 20 30 40 miles
10 0 10 20 30 40 50 Kilometers

WASHINGTON HABITATS

LIFE ZONE—HABITAT MATRIX

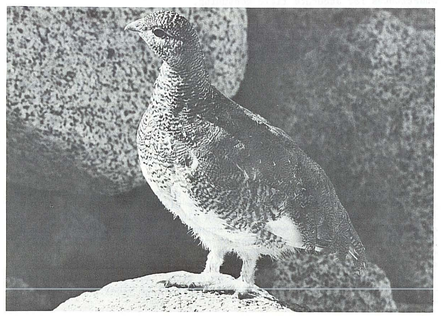
GEOGRAPHIC REGIONS			OFFSHORE (O)	COAST (C)	WEST (W)	MOUNTAINS (M)			EAST (E)		
LIFE ZONES				HUMID TRANSITION		CANADIAN	HUDSONIAN	ARCTIC-ALPINE	ARID TRANSITION		UPPER SONORAN
APPROXIMATE ELEVATIONS				Coasts & Estuaries at Sea Level	Lowlands from Sea Level up to 1500'-3000'	2000'-5000'	3000'-6500'	Above 5500' in Olympics Above 6500' in Cascades	Timbered 1800'-3000'	Grassland 1500'-2400'	200'-1900'
HABITATS	OPEN SALT WATER	SW	X	X							
	ROCKY SHORE	RS		X							
	SANDY SHORE	SS		X							
	FRESH WATER	FW		X	X	X	X	X	X	X	X
	WET CONIFEROUS FOREST	WC		X	X	X-West Slopes Cascades	X-West Slopes Cascades		X-High East Slopes Cascades		
	DRY CONIFEROUS FOREST	DC				X-East Slopes Cascades	X-East Slopes Cascades		X	Ecotone	Ecotone
	BROADLEAF FOREST	BF		X	X	Ecotone Lower Slopes			X		
	RIPARIAN WOODLAND	RW		X	X	X	X		X	X	X
	DRY GRASSLAND	DG		Dunes	San Juan Is.				Ecotone	X	Ecotone
	WET MEADOW	WM			Lowland Prairies	X-and Clearcuts 0-5 yrs. old	X	X		Some WM Provided by Farmland	Around Desert Lakes
	SAGEBRUSH DESERT	SD							Ecotone	Ecotone	X
	SHRUBBY THICKETS	ST		X	X	X-and Clearcuts 5-15 yrs. old	X		X	X	X
	PARKS AND GARDENS	PG		X	X	X			X	X	X
	FARMLAND	FL		X	X				X	X	X

The following descriptions of habitats have been reprinted by permission of the principal author and the publisher from A Guide To Bird Finding In Washington, by Terence R. Wahl and Dennis R. Paulson, Whatcom Museum, Bellingham, 1973. Descriptions have been slightly modified to incorporate information about Life Zones, sea level and ecotone. While the emphasis of the authors was to characterize habitat descriptions from the viewpoint of the requirements of birds, such description also serves to define the main structural habitat elements important to all four vertebrate classes in the wildlife species lists: birds, mammals, reptiles and amphibians. Because their book emphasized community associations and presented statewide bird distributions within a framework of habitats joined to Merriam's Life Zones, they stimulated Atlas format ideas and made feasible the five extentions on their work now developed in the Atlas: (1) expansion of the species lists into a more integrated community index format; the entire organization of the lists has been developed using the authoritative detail and basic concepts initially worked out by these authors; (2) development of an up-to-date Life Zone Overlay; (3) Life Zone - Habitat Matrix; (4) addition of the ERTS image for purposes of habitat analysis and statewide display of current land-use patterns; (5) the preparation of the paper on page 17, "Wildlife In Washington's Life Zones," which integrates concepts and explains how to construct wildlife checklists retained within a community context. In the wildlife lists following on pages 19 and 20, the habitats are abbreviated as follows:

SW - open salt water
RS - rocky shore
SS - sandy shore
FW - fresh water, marsh & shore
WC - wet coniferous forest
DC - dry coniferous forest
BF - broadleaf forest
RW - riparian woodland
DG - dry grassland
WM - wet meadow
SD - sagebrush desert
ST - shrubby thickets
PG - parks & gardens
FL - farmland

OPEN SALT WATER HABITAT (SW) is generally not considered to be within the Humid Transition Life Zone by established definition. On Washington's coast and in Puget Sound this Life Zone is usually mapped, as shown on the overlay, as stopping at the beach where "the marine community" continues on out into the open salt water. However, since a great number of birds freely move between land and marine environments, both regions supplying often critical habitat elements supporting many resident bird populations and migratory birds using the Pacific Flyway, this habitat is included within the Humid Transition Life Zone. For use in the matrix above and the species lists, all of Puget Sound's open salt water will be considered to be in this Life Zone - including all of the straits, bays and estuaries of the state and the Pacific coast out to the horizon, usually more than 20 miles offshore, out of sight of land. By this definition, the "offshore" region starts at the horizon and extends westward over the ocean. As adapted for use in the atlas, and more in line with the need to illustrate the spatial structure inherent to Rocky Shore and Sandy Shore Habitats, "sea level" will be defined here as that zone between mean low tide (MLT) to 15 feet above. Consider the "lowlands" of the Humid Transition Life Zone to begin above this zone.

ROCKY SHORE HABITAT (RS) is present in the Humid Transition Life Zone. This is especially characteristic of the outer coast, but the habitat is widespread elsewhere. Much of the coastline in many areas is near-vertical, affording little habitat for shorebirds except for those species that forage on the rocks exposed by low tide. The northern half of the Olympic Peninsula has the most productive rocky intertidal areas.



White- tailed Ptarmigan in an Arctic-Alpine Life Zone of the Enchantments.

SANDY SHORE HABITAT (SS) is present in the Humid Transition Life Zone. South of Grays Harbor, most of the shoreline is flat and sandy. Similar conditions prevail in many other areas. Mud flats are included in this habitat, and these are more productive of birds than are the coarse sand ocean beaches themselves.

FRESH WATER, MARSH AND SHORE HABITAT (FW) is characteristic of all the Life Zones. Fresh water habitats abound in the state, even in some parts of the desert. Large natural and artificial lakes are scattered throughout. Some of them, especially those with large shallow regions, are excellent for birds; those with no littoral zone are poor in general, although they may attract waterfowl in migration. Most of the ponds in the state are somewhat alkaline and support dense growths of cattails and bulrushes, and many of the species that forage in the open water live in these beds of vegetation. Acid bog ponds are widespread in the wetter regions, but these are usually not very productive of birds.

WET CONIFEROUS FOREST HABITAT (WC) is characteristic of the Humid Transition and the western slopes of the Hudsonian and Canadian Life Zones. This habitat is one of the dominant ones in Washington, being found from the coast to the upper east slopes of the Cascades and along the northern and eastern borders of the state. In many high mountain areas it is interrupted by islands of Wet Meadow Habitat where conditions change to Arctic-Alpine. Many burrowing mammals inhabiting such areas typically require dry, well-drained, grassy slopes and ridge tops interspersed with rocky outcroppings characteristic of timberline environments. Wet coniferous forest is the habitat most people associate with the Pacific Northwest. Originally, these forests were characterized by huge trees, and the forest interior was dark and humid with heavy epiphyte growths and a relatively open understory. With logging, the coniferous forests have been opened up, and now much of the state is forested with second growth, some of it impressive enough in its own right. Only a few remnants of lowland primary forest exist, but larger areas of mountain forest remain in a primeval state. Three species of trees characterize lowland coniferous forests of western Washington: Douglas-fir, western hemlock and western red cedar. In coastal areas the Sitka spruce becomes important and on the coast itself it is often the only species. Higher in the mountains these species are supplemented, and in some areas replaced, by silver and noble firs. With still greater elevation, the lowland species drop out and the dominant trees become silver fir, alpine fir, yellow cedar, lodgepole pine and mountain hemlock. The avifauna changes accordingly with increased elevation, although a fair number of species occur from the coast to tree line in these forests. Especially in logged areas the undergrowth is lush, consisting primarily of shrubs of the heath and rose families, and ferns and lilies.

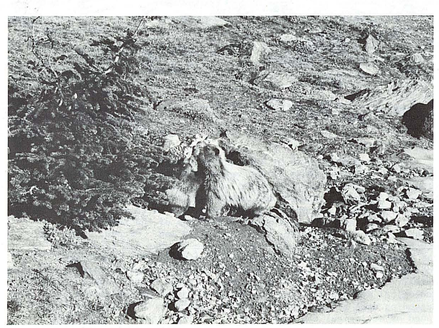
DRY CONIFEROUS FOREST HABITAT (DC) is characteristic of the eastern slopes of the Canadian and Hudsonian Life Zones and the Arid Timbered Transition Life Zone. This region extends as a belt around the desert and grassland of the Columbia basin. It is most extensive on the middle eastern slopes of the Cascades and in the Spokane area. The dominant, and in many areas the only, tree species is the ponderosa pine. In wetter valleys the Douglas-fir is associated with it, as are grand firs, western larches and other species that may also grow in wet forests. At higher elevations the Engelmann spruce is added to the list. In the ponderosa pine zone the understory is open, with relatively few shrubs - roses, serviceberries and mock orange for example, but with a great variety of herbaceous species. In typical form this is much drier and more open habitat than Wet Coniferous Forest Habitat, but the two interdigitate in a complex manner, especially in valleys, and ponderosa pines grow commonly with species from the wet forest.

The term "ecotone" in the Life Zone - Habitat Matrix denotes a zone existing where different habitats come together. Interspecies competition is intense there and the zone, as wildlife habitat, comes to contain a mix of features common to the adjoining habitats. To clarify this concept, the editors requested Oscar H. Soule, ecologist on the faculty of The Evergreen State College in Olympia, to supply a working definition of ecotone which follows: "An ECOTONE is a transitional 'zone' created by the interfacing of adjacent communities. The unique character of this assemblege is a result of the overlap in distribution of the plants and animals from the 'parent' communities. At times the ecotone is obscure; in other cases this 'zone' may be well established with a consistancy which permits its identification as a distinct ecological unit. In either case, the ecotonal nature of a habitat is most pronounced when the interfacing communities meet abruptly as compared to a gradual change in biological communities found along many environmental gradients."

BROADLEAF FOREST HABITAT (BF) may be found throughout the wetter parts of the state in the Humid and Arid Transition Life Zones, never as extensive as the coniferous forests. In western Washington red alder is the dominant species, usually accompanied by bigleaf maple and vine maple, and often by black cottonwood. All of these species may also grow in mixed stands with any of the conifers. East of the Cascades, the bigleaf and vine maples are replaced by the Rocky Mountain maple; the red alder is replaced by two smaller species, while the cottonwood occurs widely with its relative the quaking aspen, usually in moister areas. In eastern Washington the broad-leaf areas occur as islands in the pine forests.

RIPARIAN WOODLAND HABITAT (RW) may be found in the Humid and Arid Transition Life Zones, although it is more characteristic of eastern Washington. This habitat is like the Broadleaf Forest Habitat, but occurs in bands along streams or around lakes, either bordered by coniferous forest or by desert or grassland. The same tree species can be found, with cottonwoods and willows especially prominent in desert riparian situations.

DRY GRASSLAND HABITAT (DG) is limited to eastern Washington's Arid Transition Life Zone, with the one exception of San Juan Island which lies in the rainshadow of the Olympic Mountains and supports a small amount of this habitat. Large parts of eastern Washington once supported several species of bunchgrasses and many characteristic plants and animals. Unfortunately this region also proved excellent for the growing of wheat, and much of it has disappeared under tractor wheels. In many still unfarmed areas the introduced cheat grass has out-competed the native grasses and drastically transformed the nature of the vegetation. Now there are only relict patches of this habitat, and they can be expected to decrease further as few are protected. The grassland lies above the sagebrush desert in a belt around the Columbia basin, where it is too cold for much of the desert biota and too dry to support tree growth. Most of the herbaceous plant species are the same as those of the ponderosa pine zone, and the two habitats are very similar except for the very important difference of the trees.



Two Marmots in their Wet Meadow habitat.

WET MEADOW HABITAT (WM) is present in the Arctic-Alpine and Hudsonian Life Zones, and lowland prairies in the Humid Transition Life Zone. It is primarily an alpine habitat however, as most areas sufficiently moist to support a meadow succeed into forest very rapidly. Around the borders of desert lakes, in very boggy areas in the coniferous forest zone, and as a result of agriculture, there are sufficient meadows in the lowlands to serve as avian habitats. Above tree line in the wetter parts of the state (as in the Olympics, the Cascade crest and the west side of the Cascades) the herbaceous growth is lush, with grasses, sedges and forbs of many species, the latter erupting in a mid-summer floral display.

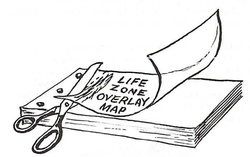
SAGEBRUSH DESERT HABITAT (SD) is characteristic of the Arid Transition Life Zone. Very large areas of this vegetation type are associated with the Columbia River basin and the lower slopes of the mountains around it. The sagebrush dominates this habitat, although other shrubs like rabbitbush, greasewood or antelope bush may be locally important; and many herbaceous species, especially grasses, are common. Bunchgrass and/or cheat grass fill the spaces between the shrubs. This is the driest and hottest habitat of the state, and it supports a biota with southern affinities.

SHRUBBY THICKET HABITAT (ST) may be found in all the Life Zones except the Arctic-Alpine and the Upper Sonoran. This category includes all such habitats either in or out of coniferous or broadleaf forest, as certain species of birds are characteristic of it. Many species of angiosperm shrubs and young trees occur, usually densely spaced.

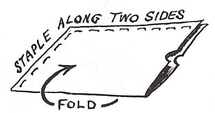
PARKS AND GARDENS HABITAT (PG) is an urban habitat characteristic of cities all over the state. Washington's cities occupy primarily the Humid Transition, Arid Transition and Upper Sonoran Life Zones. The habitat includes patches of native vegetation (for example, Douglas-fir forest in Seattle, sagegrush in Richland) often much modified by man, and is thus inhabited by a diverse assemblage of bird species.

FARMLAND HABITAT (FL) is largely confined to the Humid and Arid Transition and Upper Sonoran Life Zones. In the state there are large areas of pasture and agricultural land, often inhabited by bird species of the native grassland, although many of the latter are not able to switch to the simpler habitats produced by human endeavors. For example, the very simple and very extensive wheatfield habitat is used by only two species of birds, the ring-necked pheasant and horned lark, out of a great array that existed in the original grassland. Well-irrigated cropland attracts birds of wet meadows that might otherwise be lacking in many areas, for example killdeer and several blackbirds and sparrows.

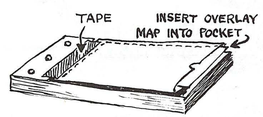
TO PREPARE LIFE ZONE OVERLAY POCKET ...



1. Cut off overlay along left-hand border --



2. Cut and fold heavy paper stock to form pocket of sufficient size to hold overlay map. Staple sheet on two sides --



3. With heavy masking tape fasten pocket to flap remaining from left-hand cut-off.

WILDLIFE SPECIES LISTS

KEY TO WILDLIFE SPECIES LISTINGS

The lists are divided into four major columns, from left to right, devoted separately to information covering (1) TAXONOMY: the species' common and scientific names; (2) REGIONS: the main areas of the state where the animals may be found in season; (3) HABITATS: the biotic communities most predominate in Washington's Life Zones that sustain populations of these animals, and (4) NOTES: a catch-all column for references to such things as consumer class, breeding, former names for the animals, records of sightings or specimens taken, restricted ranges where known, and footnotes.

These species lists are based upon the data and comments of a limited number of authorities, all of whom are acknowledged in a foregoing paper entitled "Wildlife In Washington's Life Zones." Information from other contributors is placed in the County Discussion Section and mapped on the Zoological-Terrestrial map and on the Zoological-Aquatic map. The bird lists are reprinted from the book: A Guide To Bird Finding In Washington, by Terence R. Wahl and Dennis R. Paulson, Whatcom Museum Press, 1973, used by permission of Mr. Wahl and the publisher. The lists have been expanded, with Mr. Wahl's permission, to include scientific names, using the latest (1973) information published by the American Ornithologist's Union (AOU). The bird distributions are reprinted exactly as they appear in the book with some updating by Mr. Wahl. This bird list includes all the species that have been recorded from the state, excluding those species the records of which are uncertain or of questionable validity. The most current names for the mammals, reptiles and amphibians are provided by Murray L. Johnson, Curator of Mammals, Puget Sound Museum of Natural History in Tacoma.

TAXONOMY. All of the animals listed are organized in "systematic, or phylogenetic, order" with the more primitive species set down first. This conforms to standard usage in museums, checklists and field guides and facilitates further literature research. Ordinarily the accepted form in writing the genus, species and subspecies is to underline each separately, as in the footnotes, if italic type style is unavailable. The scientific names are not underlined in the lists here to improve the lists' overall graphic appearance. All the common and scientific names are the most current obtainable. In many instances these lists update field guides in common use. Where there has been a recent name change, the old name dropped has been included in the NOTES column. The reader may find cases in the County Discussion Section where the old name for an animal has been used. In questions of proper spelling and current names for Washington's wildlife consult the lists below.

REGIONS. In the lists, Washington is divided into five major geographical regions as follows:

O - offshore; out of sight of land
C - coast; includes all coastal and estuarine areas
W - west of Cascades in lowlands, up to 3000'
M - all mountains above 3000' including the Olympics, Cascades, Okanogan Highlands and the Blue Mountains
E - east of Cascades in lowlands, up to 3000'

Within the REGIONS column, notations on the species' seasonal occurance in the state are abbreviated as follows:

R - resident; present all year, although abundance may vary seasonally
S - summer visitor only; includes spring and fall
W - winter visitor only; includes spring and fall
M - migrant; spring and fall only
F - fall only

HABITATS. When an animal listed is shown to utilize one or more habitats, consider such notation to indicate that the habitat supports some individuals of populations of the species named. For resident populations especially, their recorded habitats are critical to support of reproductive capability and hence of optimum population numbers. Distributed as a group, any one population of a species will have members residing within the habitat noted and other members on the move between adjacent habitats continually exploring and testing the current availability of food, water, cover and unoccupied space. As a population grows in numbers, intraspecific competition necessitates that individuals keep on the move until all available habitat carrying capacity is utilized within the community niche to which each species is adapted.

In reading the lists from top to bottom, under any one habitat, consider the combination of vertebrates compiled to represent the wildlife component of a dynamic ecological community. The habitats themselves, so briefly named and defined, are much more complex in interacting factors than the atlas text so far suggests. Every one of these habitats is constructed of the broadly-conceptualized components of wildlife plus phyla of many other animals, plants, microorganisms, water, soils, climate and the three-dimensional structure created by the community occupants of living things and inanimate objects.

In study of a list compiled under one habitat, or set of habitats in close proximity, consider the combination of species to represent a biotic community organized in a food web structure with each individual animal in active daily or nocturnal pursuit of food, water, comfort and protection from predation or stress. Finally, in overview of the list of animals assembled under each habitat, and each habitat recognized as a community component, consider the combination of animals and plants to be an interlocking set of constantly functioning operators, sustaining dynamic ecosystems, that are themselves living organisms having established adaptive traits based upon genetic histories spanning millions of years. Each community thereby is tied into the functions of a larger ecosystem. Projects that alter the functioning of ecosystems disrupt the interaction of firmly adapted organisms that can scarcely cope with the rapid and often catastrophic habitat changes imposed by project construction or pollution. Thus, since habitat carrying capacity is generally utilized to its maximum by animals, destruction of habitat is directly related to destruction of individual members of wildlife populations.

The 14 major habitat types used in the lists are defined in the foregoing paper entitled "Washington Habitats." In the lists, the habitats are abbreviated as follows:

SW - open salt water
RS - rocky shore
SS - sandy shore
FW - fresh water marsh & shore
WC - wet coniferous forest
DC - dry coniferous forest
BF - broadleaf forest
RW - riparian woodland
DG - dry grassland
WM - wet meadow
SD - sagebrush desert
ST - shrubby thickets
PG - parks & gardens
FL - farmland

Within the habitat columns, notations used to indicate the general recorded ABUNDANCE of the animals are abbreviated as follows:

C - common; often seen or heard in appropriate habitats
U - uncommon; usually present but not seen or heard on every visit to appropriate habitats
R - rare; present in appropriate habitats only in small numbers and seldom seen or heard

Use of a capital letter signifies breeding habitat; a lower case letter means non-breeding habitat. Where habitats are noted for a species, a dash signifies that past experience, specimens and observations presently indicate that the habitat "dashed" is not a normal and important element in the species' range; where all habitats are "dashed" it signifies that the species is relatively scarce and that insufficient data is available to define its habitat requirements specifically at this time. Future work by field observers may alter some of these wildlife distributions.

CONSUMER CLASS. This notation serves to indicate the animal's function as a consumer within the community food-web structure. When projects alter habitats and disrupt food-webs, such information can clarify the extent of environmental impacts imposed on communities. In the lists, three consumer classes are used and defined as follows:

CC1 - This animal consumes Class I foods most of the time. Class I foods are the vegetative parts of terrestrial and aquatic plants such as leaves, stalks, barks and twigs. Animals dependent upon Class I foods are adapted for dealing with large volumes of low quality foods which are regularly available. Many Class I consumers also takes some Class II foods in season.

CC2 - This animal consumes Class II foods most of the time. Class II foods are the storage parts of plants such as roots, bulbs, seeds, tubers, fruits and buds. Tree sap, cambium, and flower nectar are concentrated Class II foods. Annual plants in general have a higher seed production than perennials and hence supply more Class II food for wildlife. Animals dependent upon Class II foods are adapted for obtaining mid-quality food which is irregularly or seasonally available. Some Class II consumers also take various Class I and III foods in their diets, especially carrion, a Class III food, when available.

CC3 - This animal consumes Class III foods most of the time. Class III foods are any other palatable live animals of the animal kingdom and their eggs or larvae. To survive, carnivores must capture prey of sufficient size to balance the energy expended in hunting and capture efforts. Examples of Class III foods: small birds, mammals, reptiles and amphibians or their carrion and insects, all high protein foods. Animals dependent upon Class III foods are adapted for obtaining high quality foods that are difficult to obtain. Available insect supply is often the most critical factor during nesting season, due to the great nutritional requirements of growing nestling birds being fed by the parents. Some Class III consumers that are mammals also take many varieties of Class II foods in their diets.

When more than one consumer class is indicated for a species in the lists, the animal commonly takes these kinds of foods when available and thus does not specialize on primarily one kind. In combination, the food types indicated comprise the major portion of its diet. For further details on wildlife food habits consult: American Wildlife and Plants A Guide To Wildlife Food Habits, by Martin, A. C., H. S. Zim, and A. L. Nelson, Dover Publications, 1961. Other NOTES abbreviations are:

AC - also called by another name in common usage
B - known to breed regularly in the state
BOI - breeds on offshore islands
FI - an example: see footnote FI at end of list
FN - former name now officially superseded
I - introduced to state by man
NC - name continued; too long for TAXONOMY column
OF - occasionally found in ....
OW - occasional west
OWIW - occasional in winter west
RECORDS: RW - recorded west; 1R - one record; 1WIRE - one winter record east of Cascades; 1RE - one recent record; RWI - recorded in winter; RWIW - recorded in winter west; RSE - recorded in spring east; 2RE - 2 records east of Cascades; RE - recorded east of Cascades; RARE-W - rare west of Cascades; 1SR - one spring record; R-NORTH - recorded north
SRN - see range map for this species in the atlas section entitled "Some Important Wildlife Of Washington"
SSU - seasonal status uncertain
SU - status uncertain
U - uncommon

All notations about official species status, whether Endangered, Threatened, Protected, Game and so forth, are summarized and included at the end of the Zoological-Terrestrial map index. A brief table of status definitions is also included in the section "Some Important Wildlife Of Washington."

BIRDS:

TAXONOMY	REGIONS O C W M E	HABITATS SW RS SS FW WC DC BF RW DG WM SD ST PG FL	NOTES
GAVIIDAE			
COMMON LOON Gavia immer	- W M S M	c - - U - - - - - - - - - - -	CC1;B
YELLOW-BILLED LOON Gavia adamsii	- W - - -	r - - - - - - - - - - - - - -	CC3
ARCTIC LOON Gavia arctica	- W - - -	c - - - - - - - - - - - - - -	CC3
RED-THROATED LOON Gavia stellata	- W - - -	c - - - - - - - - - - - - - -	CC3;IWIRE;SRM
PODICIPEDIDAE			
RED-NECKED GREBE Podiceps grisegena	- W - - S	c - - U - - - - - - - - - - -	CC3;B
HORNED GREBE Podiceps auritus	- W M - S	c - - U - - - - - - - - - - -	CC3;B
EARED GREBE Podiceps nigricollis	- W M - S	c - - C - - - - - - - - - - -	CC3;B;FN:P. caspicus
WESTERN GREBE Aechnophorus occidentalis	- W M - S	c - - C - - - - - - - - - - -	CC3;B;SRM;SOME SUMMER ON COAST
PIED-BILLED GREBE Podilymbus podiceps	- W R - S	c - - U - - - - - - - - - - -	CC3;B
DIOMEDEIDAE			
SHORT-TAILED ALBATROSS Diomedea albatrus	S - - - -	r - - - - - - - - - - - - - -	CC3;1RE
BLACK-FOOTED ALBATROSS Diomedea nigripes	S - - - -	c - - - - - - - - - - - - - -	CC3;BWI
LAYSAN ALBATROSS Diomedea immutabilis	W - - - -	u - - - - - - - - - - - - - -	CC3
SHY ALBATROSS Diomedea cauta	F - - - -	u - - - - - - - - - - - - - -	CC3;1R;FN:WHITE-CAPPED ALBATROSS
PROCELLARIIDAE			
NORTHERN FULMAR Fulmarus glacialis	R - - - -	c - - - - - - - - - - - - - -	CC3
PINK-FOOTED SHEARWATER Puffinus creatopus	S - - - -	u - - - - - - - - - - - - - -	CC3
FLESH-FOOTED SHEARWATER Puffinus carneipus	S - - - -	u - - - - - - - - - - - - - -	CC3;FN:PALE-FOOTED SHEARWATER
BULLER'S SHEARWATER Puffinus bulleri	S - - - -	u - - - - - - - - - - - - - -	CC3;1R
SOOTY SHEARWATER Puffinus griseus	S S - - -	u - - - - - - - - - - - - - -	CC3
SHORT-TAILED SHEARWATER Puffinus tenuirostris	F - - - -	r - - - - - - - - - - - - - -	CC3;SSU;FN:SLENDER-BILLED SHEARWATER
MANX SHEARWATER Puffinus puffinus	F - - - -	c - - - - - - - - - - - - - -	CC3;1R
HYDROBATIDAE			
FORK-TAILED STORM PETREL Oceanodroma furcata	R - - - -	u - - - - - - - - - - - - - -	CC3;BOI;SRM;FN:FORK-TAILED PETREL
LEACH'S STORM PETREL Oceanodroma leucorhoa	S - - - -	u - - - - - - - - - - - - - -	CC3;BOI;FN:LEACH'a PETREL
PHAETHONTIDAE			
RED-BILLED TROPICBIRD Phaethon aethereus	S - - - -	- - - - - - - - - - - - - - -	CC3;1R
PELECANIDAE			
WHITE PELICAN Pelecanus erythrorhynchos	- F - - S	r - - U - - - - - - - - - - -	CC3;SRM
BROWN PELICAN Pelecanus occidentalis californicus	- F - - S	r - - - - - - - - - - - - - -	CC3;SRM
SULIDAE			
BLUE-FOOTED BOOBY Sula nebouxii	- F - - -	- - - - - - - - - - - - - - -	CC3;1R
PHALACROCORACIDAE			
DOUBLE-CRESTED CORMORANT Phalacrocorax auritus	- R S - S	C C - U - - - - - - - - - - -	CC3;B;VERY LOCAL EAST
BRANT'S CORMORANT Phalacrocorax penicillatus	- R - - -	C C - - - - - - - - - - - - -	CC3;B
PELAGIC CORMORANT Phalacrocorax pelagicus	- R - - -	C C - - - - - - - - - - - - -	CC3;B
ARDEIDAE			
GREAT BLUE HERON Ardea herodias	- R R -	C C C - - - - - - - - - - - -	CC3;B;SRM
GREEN HERON Butorides virescens anthonyi	- F R -	- - - U U - - - - - - - - - -	CC3;B;SRM;2RE
CATTLE EGRET Bubulcus ibis	- - F -	- - - - - - - - - - - - - - -	CC3;1R
GREAT EGRET Casmerodius albus	- S - -	C - - - - - - - - - - - - - -	CC3;FN:COMMON EGRET
SNOWY EGRET Egretta thula	- F - -	- - - - - - - - - - - - - - -	CC3;1R;FN:Leucophoyx thula
BLACK-CROWNED NIGHT HERON Nycticorax nycticorax	- F F -	C C - - - - - - - - - - - - -	CC3;B;SRM;RARE WEST;MC:M. n. hoactli
AMERICAN BITTERN Botaurus lentiginosus	- - S -	C - - - - - - - - - - - - - -	CC3;B
THRESKIORNITHIDAE			
WHITE-FACED IBIS Plegadis chihi	- - - -	S - - - - - - - - - - - - - -	CC3;2R
ANATIDAE			
WHISTLING SWAN Olor columbianus	W M - M	u - - u - - - - - - - - - - -	CC1;SRM
TRUMPETER SWAN Olor buccinator	- R R -	u - - - - - - - - - - - - - -	CC1;B;WINTERS MT.VERNON;RESIDENT TURNBULL NWR;SRM
CANADA GOOSE Branta canadensis	R R - R	u - - C - - - - - - - - - - -	CC1;B;SRM
BLACK BRANT Branta nigricans	- W - -	r - - - - - - - - - - - - - -	CC1;SRM;RE;1FI
EMPEROR GOOSE Philacte canagica	- W - -	r - - - - - - - - - - - - - -	CC1
WHITE-FRONTED GOOSE Anser albifrons	- M R -	r - - - - - - - - - - - - - -	CC1;RWIW
SNOW GOOSE Chen caerulescens	W - - M	c - - F - - - - - - - - - - -	CC1;F2;PRIMARILY SKAGIT CO.;FN:Chen hyperborea
ROSS' GOOSE Chen rossii	- W - -	r - - - - - - - - - - - - - -	CC1;1R
FULVOUS TREE DUCK Dendrocygna bicolor	- F - -	- - - - - - - - - - - - - - -	CC1+2;1R
MALLARD Anas platyrhynchos	- R R -	c - - C - - - - - - - - - - -	CC1+2;B
BLACK DUCK Anas rubripes	- F F -	r - - - - - - - - - - - - - -	CC1+2+3;2R
GADWALL Anas strepera	W W - R	u - - C - - - - - - - - - - -	CC1+2;B
PINTAIL Anas acuta	W W - R	u - - C - - - - - - - - - - -	CC1+2;B
GREEN-WINGED TEAL Anas crecca	W W - R	c - - C - - - - - - - - - - -	CC1+2;B;F3;FN:Anas carolinensis
BLUE-WINGED TEAL Anas discors	M S - S	r - - C - - - - - - - - - - -	CC1+2;B
CINNAMON TEAL Anas cyanoptera	M S - S	r - - C - - - - - - - - - - -	CC1+2;B
EUROPEAN WIGEON Mareca penelope	W W - M	r - - r - - - - - - - - - - -	CC1;FORMERLY SPELLED "WIDGEON"
AMERICAN WIGEON Mareca americana	W W - R	c - - C - - - - - - - - - - -	CC1;B
NORTHERN SHOVELER Anas clypeata	W W - R	c - - C - - - - - - - - - - -	CC1+2;B;FN:Spatula clypeata
WOOD DUCK Aix sponsa	- R - S	- - - U - - - - - - - - - - -	CC1+2;B
REDHEAD Aythya americana	- W W -	R - - - C - - - - - - - - - -	CC1+2;B
RING-NECKED DUCK Aythya collaris	W W - R	r - - C - - - - - - - - - - -	CC1+2;B
CANVASBACK Aythya valisineria	W W - R	r - - C - - - - - - - - - - -	CC1+2;B
GREATER SCAUP Aythya marila	W M - M	c - - u - - - - - - - - - - -	CC2+3
LESSER SCAUP Aythya affinis	W W - R	c - - C - - - - - - - - - - -	CC2;B
TUFTED DUCK Aythya fuligula	- W - -	r - - - - - - - - - - - - - -	CC2
COMMON GOLDENEYE Bucephala clangula	W W - W	c - - c - - - - - - - - - - -	CC3;MAY NEST IN THE STATE
BARROW'S GOLDENEYE Bucephala islandica	W W - W	r - - r - - - - - - - - - - -	CC3;B;UNCOMMON IN SUMMER
BUFFLEHEAD Bucephala albeola	W W - W	c - - c - - - - - - - - - - -	CC3;MAY NEST
OLDSQUAW Clangula hyemalis	W - - M	c - - - - - - - - - - - - - -	CC3
HARLEQUIN DUCK Histrionicus histrionicus	W - S -	u - - R - - - - - - - - - - -	CC3;B;RE
COMMON EIDER Somateria mollissima	W - - -	u - - - - - - - - - - - - - -	CC3;1R
KING EIDER Somateria spectabilis	W - - -	- - - - - - - - - - - - - - -	CC3;3R
WHITE-WINGED SCOTER Melanitta deglandi	W - - -	u - - - - - - - - - - - - - -	CC3;1;SOME SUMMER ON COAST;MAY NEST
SURF SCOTER Melanitta perspicillata	W M - M	c - - r - - - - - - - - - - -	CC3;SOME SUMMER ON COAST
BLACK SCOTER Melanitta nigra	W M - -	u - - - - - - - - - - - - - -	CC3;FN:COMMON SCOTER Oidemia nigra
RUDDY DUCK Oxyura jamaicensis	W W - R	u - - C - - - - - - - - - - -	CC1+2;B
HOODED MERGANSER Lophodytes cucullatus	W R - R	u - - C - - - - - - - - - - -	CC3;B
COMMON MERGANSER Mergus merganser	W R S R	u - - U - - - - - - - - - - -	CC3;B
RED-BREASTED MERGANSER Mergus serrator	W M - W	c - - r - - - - - - - - - - -	CC3
CATHARTIDAE			
TURKEY VULTURE Cathartes aura	- S - S	- - - - U U U U U - - - - - -	CC3-CARRION;B
ACCIPITRIDAE			
GOSHAWK Accipiter gentilis	- - R R	- - - - - U - - - - - - - - -	CC3;B;SRM
SHARP-SHINNED HAWK Accipiter striatus	- - R R	- - - - - u u U - - - - - - -	CC3;B;SRM
COOPER'S HAWK Accipiter cooperii	- - R R	- - - - - u u U - - - - - - -	CC3;B;SRM
RED-TAILED HAWK Buteo jamaicensis	- - R R	- - - - - C C C C C - - - - -	CC3;FN:B
SWAINSON'S HAWK Buteo swainsoni	- - S S	- - - - - - - - - U - - - - -	CC3;B;LOCAL WEST;SRM
ROUGH-LEGGED HAWK Buteo lagopus sanctijohannis	- W - -	- - - - - c c C u - - - - - -	CC3;B;SRM;FN:R. l. w.johannis
FERRUGINOUS HAWK Buteo regalis	- - - -	S - - - - - - - - U - U - - -	CC3;B;SRM
GOLDEN EAGLE Aquila chrysaetos canadensis	- R S W	- - - - - - - - - U U C - - -	CC3;B;SRM
BALD EAGLE Haliaeetus leucocephalus alascanus	R R - W	C C - C - - - - - - - - - - -	CC3;B;USUALLY FOUND NEAR WATER;SRM
MARSH HAWK Circus cyaneus hudsonius	- R M W	c - - c - - - - - - - - - - -	CC3;B;SRM
PANDIONIDAE			
OSPREY Pandion haliaetus carolinensis	- S S -	S U U - - - - - - - - - - - -	CC3;B;SRM
FALCONIDAE			
GYRFALCON Falco rusticolus obsoletus	- - W -	W - - r - - - - - - r - - - r	CC3;B;SRM
PRAIRIE FALCON Falco mexicanus	- - - R	- - - r - - - - - - R - R - -	CC3;B;SRM
PEREGRINE FALCON Falco peregrinus	- R R R	- - - r - - - - - - r - r - -	CC3;B;NESTING STATUS?;SRM
MERLIN Falco columbarius	- - R -	R - - - - - - - - - - - - u u	CC3;B;FN:PIGEON HAWK;SRM
AMERICAN KESTREL Falco sparverius sparverius	- R S R	- - - - U C U U C C - - - - c	CC3;B;FN:SPARROW HAWK;SRM
TETRAONIDAE			
BLUE GROUSE Dendragapus obscurus	- - R R	- - - - - C C - - - - - - - -	CC1+2;B;SRM
SPRUCE GROUSE Canachites canadensis franklinii	- - - R	- - - - - U - - - - - - - - -	CC1+2;B;SRM
RUFFED GROUSE Bonasa umbellus	- - R -	R - - - - C - C C - - - - - C	CC1+2;B;SRM
WHITE-TAILED PTARMIGAN Lagopus leucurus rainierensis	- - - R	- - - - - - - - - - U - - - -	CC1+2;B;SRM
SHARP-TAILED GROUSE Pediocoetes phasianellus	- - - R	- - - - - u - - U - - - - - -	CC1+2;B;SRM;NC:P. p. columbianus
SAGE GROUSE Centrocercus urophasianus phalos	- - - R	- - - - - - - - - - U - - - -	CC1+2;B;SRM
MOUNTAIN PLOVER Charadrius montanus	- M - M	- - - - - - - - - - - - - - -	CC1;2R;FN:Eupoda montana
BUFFLEHEAD Eudromias morinellus	- F - -	- - - - - - - - - - - - - - -	CC1;1R
AMERICAN GOLDEN PLOVER Pluvialis dominica	- M M -	r - - - r - - - - - - F - - -	CC3
BLACK-BELLIED PLOVER Pluvialis squatarola	W M M -	c - - - - - - - - - - u - - -	CC3;FN:Squatarola squatarola
SCOLOPACIDAE			
RUDDY TURNSTONE Arenaria interpres	- M - M	- u - - - - - - - - - - - - -	CC3;FN:Arenaria interpres
BLACK TURNSTONE Arenarius melanocephala	- W - -	- c u - - - - - - - - - - - -	CC3;FN:Arenaria melanocephala
COMMON SNIPE Capella gallinago delicata	- W R S	- - u C - - - - C - - - - - -	CC3;B;SRM
LONG-BILLED CURLEW Numenius americanus parvus	- M - S	- - - r - - - - - - - - - - -	CC3;B;SRM
WHIMBREL Numenius phaeopus	- M - M	- - - r - - - - - - - - - - -	CC3
UPLAND SANDPIPER Bartramia americana	- M - S	- - - C - - - - U - - - - - -	CC3;B-SPOKANE CO.;SRM;RARE-W;1F5
SPOTTED SANDPIPER Actitis macularia	- M S S	- - - c C - - - - - - - - - -	CC3;B;OWIW
SOLITARY SANDPIPER Tringa solitaria	- M M M	- - - r u - - - - - - - - - -	CC3
WANDERING TATTLER Heteroscelus incanus	- M - -	- - - c - - - - - - - - - - -	CC3;FN:Heteroscelus incanum
WILLET Catoptrophorus semipalmatus	- M - -	- - - r - - - - - - - - - - -	CC3
GREATER YELLOWLEGS Tringa melanoleuca	- M M -	- - - c - - - - - - - - - - -	CC3;OWIW;FN:Totanus melanoleucus
LESSER YELLOWLEGS Tringa flavipes	- M M -	- - - c - - - - - - - - - - -	CC3;FN:Totanus flavipes
SURFBIRD Aphriza virgata	- W - -	- - - c - - - - - - - - - - -	CC3
RED KNOT Calidris canutus	- M - -	- - - c - - - - - - - - - - -	CC3;SRM;FN:KNOT
ROCK SANDPIPER Calidris ptilocnemis	- W - -	- - - u - - - - - - - - - - -	CC3;FN:GENUS Erolia
SHARP-TAILED SANDPIPER Calidris acuminata	- F - -	- - - r - - - - - - - - - - -	CC3;SRM;FN:GENUS Erolia
PECTORAL SANDPIPER Calidris melanotos	- F F -	- - - r - - - - - - - - - - -	CC3;FN:GENUS Erolia
WHITE-RUMPED SANDPIPER Calidris fuscicollis	- M - F	- - - r - - - - - - - - - - -	CC3;FN:GENUS Erolia
BAIRD'S SANDPIPER Calidris bairdii	- M M -	- - - u - - - - - - - - - - -	CC3;FN:GENUS Erolia
LEAST SANDPIPER Calidris minutilla	- M M -	- - - c - - - - - - - - - - -	CC3;FN:GENUS Erolia
CURLEW SANDPIPER Calidris ferruginea	- - - -	- - - r - - - - - - - - - - -	CC3;1SR;FN:GENUS Erolia
DUNLIN Calidris alpina	- W M -	- - - c u - - - - - u - - - -	CC3;FN:GENUS Erolia
SEMIPALMATED SANDPIPER Calidris pusillus	- F F -	- - - r - - - - - - - - - - -	CC3;FN:Ereunetes pusillus
WESTERN SANDPIPER Calidris mauri	- M M -	- - - c - - - - - - - - - - -	CC3;OWIW; FN: Ereunetes mauri
SANDERLING Calidris alba	- W M -	- - - c - - - - - - - - - - -	CC3;FN:Crocethia alba
SHORT-BILLED DOWITCHER Limnodromus griseus	- M - -	- - - c - - - - - - - - - - -	CC3
LONG-BILLED DOWITCHER Limnodromus scolopaceus	- M M -	- - - c - - - - - - - - - - -	CC3;OWIW
STILT SANDPIPER Micropalama himantopus	- F F -	- - - r - - - - - - - - - - -	CC3
BUFF-BREASTED SANDPIPER Tryngites subruficollis	- F - -	- - - r - - - - - - - - - - -	CC3
MARBLED GODWIT Limosa fedoa	- M M -	- - - r - - - - - - - - - - -	CC3
HUDSONIAN GODWIT Limosa haemastica	- M - -	- - - r - - - - - - - - - - -	CC3;2R
RUFF Philomachus pugnax	- F - -	- - - r - - - - - - - - - - -	CC3;1R
RECURVIROSTRIDAE			
AMERICAN AVOCET Recurvirostra americana	- M - S	- - - r U - - - - - - - - - -	CC3;B
BLACK-NECKED STILT Himantopus mexicanus	- M - S	- - - r - - - - - - - - - - -	CC3
PHALAROPODIDAE			
RED PHALAROPE Phalaropus fulicarius	M M - -	- - u - r - - - - - - - - - -	CC3;RE
WILSON'S PHALAROPE Steganopus tricolor	- M M -	S - - u C - - - - - - - - - -	CC3;B
NORTHERN PHALAROPE Lobipes lobatus	M M M -	M - - u C - - - - - - - - - -	CC3
STERCORARIIDAE			
POMARINE JAEGER Stercorarius pomarinus	M - - -	- - - c - - - - - - - - - - -	CC2+3
PARASITIC JAEGER Stercorarius parasiticus	M M - -	- - - c - - - - - - - - - - -	CC2+3;RE
LONG-TAILED JAEGER Stercorarius longicaudus	M M - -	M - - r - - - - - - - - - - -	CC2+3
SKUA Catharacta skua	S - - -	- - - r - - - - - - - - - - -	CC2+3
LARIDAE			
GLAUCOUS GULL Larus hyperboreus	- W - M	r - - r - - - - - - - - - - -	CC2+3
ICELAND GULL Larus glaucoides	- - - W	- - - r - - - - - - - - - - -	CC2+3
GLAUCOUS-WINGED GULL Larus glaucescens	W R W -	M C C C u - - - - - - - - - -	CC2+3;B
WESTERN GULL Larus occidentalis	W R - -	C C C - - - - - - - - - - - -	CC2+3;B;RE
HERRING GULL Larus argentatus	W M M -	c - - c u - - - - - - - - - -	CC2+3;B
THAYER'S GULL Larus thayeri	- W - -	c - - c - - - - - - - - - - -	CC2+3;1F6
CALIFORNIA GULL Larus californicus	M M S -	c - - C - - - - - - - - - - -	CC2+3;B;RWIWE
RING-BILLED GULL Larus delawarensis	- M W S	u - - C - - - - - - - - - - -	CC2+3;B;RWIE
NEW GULL Larus canus	- W M -	u - - u - - - - - - - - - - -	CC2+3;RE
FRANKLIN'S GULL Larus pipixcan	- F F -	r - - r - - - - - - - - - - -	CC2+3;RECORDED SUMMER EAST
BONAPARTE'S GULL Larus philadelphia	W M - M	c - - c - - - - - - - - - - -	CC2+3;RECORDED SUMMER-COMMON
HEERMANN'S GULL Larus heermanni	F - - -	c - - c - - - - - - - - - - -	CC2+3
BLACK-LEGGED KITTIWAKE Rissa tridactyla	W - - -	c - - - - - - - - - - - - - -	CC2+3;SOME SUMMER-COMMON
SABINE'S GULL Xema sabini	M M - -	u - - - - - - - - - - - - - -	CC2+3;RE
FORSTER'S TERN Sterna forsteri	- M - S	r - - U - - - - - - - - - - -	CC2+3;B;RE
COMMON TERN Sterna hirundo	M M M -	c - - c - - - - - - - - - - -	CC2+3;RE
ARCTIC TERN Sterna paradisaea	M M - -	u - - r - - - - - - - - - - -	CC2+3;RE
CASPIAN TERN Hydroprogne caspia	- S - S	U - - U - - - - - - - - - - -	CC2+3;B;SRM
BLACK TERN Chlidonias niger	- M S -	U C - - - - - - - - - - - - -	CC2+3;B
ALCIDAE			
COMMON MURRE Uria aalge	W R - -	c C - - - - - - - - - - - - -	CC3;B
PIGEON GUILLEMOT Cepphus columba	- R - -	c C - - - - - - - - - - - - -	CC3;B
MARBLED MURRELET Brachyramphus marmoratus	- R - -	c C - - C? - - - - - - - - - -	CC3;B;FN:Brachyramphus marmoratum
XANTUS' MURRELET Endomychura hypoleuca	F - - -	- - - - - - - - - - - - - - -	CC3;3R
ANCIENT MURRELET Synthliboramphus antiquus	W W - -	u - - - - - - - - - - - - - -	CC3;B7;SRM;RE;FN:S. antiquum
CASSIN'S AUKLET Ptychoramphus aleuticus	W - - -	c - - - - - - - - - - - - - -	CC3;BOI;FN:P. aleutica
PARAKEET AUKLET Cyclorrhynchus psittacula	W - - -	c - - - - - - - - - - - - - -	CC3
RHINOCEROS AUKLET Cerorhinca monocerata	W R - -	c - - - - - - - - - - - - - -	CC3;BOI;SRM
HORNED PUFFIN Fratercula corniculata	W - - -	c - - - - - - - - - - - - - -	CC3;1RE-ZONE
TUFTED PUFFIN Lunda cirrhata	W S - -	c - - - - - - - - - - - - - -	CC3;BOI
COLUMBIDAE			
BAND-TAILED PIGEON Columba fasciata monilis	- - R F	- - - - - - C U U - - U U - -	CC2;B;SRM
ROCK DOVE Columba livia	- - F -	- - - - - - - - - - C C C - -	CC2;1F;INHABITS CLIFFS ANYWHERE
WHITE-WINGED DOVE Zenaida asiatica	- - F -	- - - - - - - - - - - - - - -	CC2;1R
MOURNING DOVE Zenaida macroura marginella	- - S -	- - - - - - C C C - - - - - -	CC2;OWI;1R;SRM;FN:GENUS Zenaidura
CUCULIDAE			
YELLOW-BILLED CUCKOO Coccyzus americanus	- - S -	- - - - - - - - - - - - - - -	CC3;STATUS DUBIOUS;NO RECENT RECORDS
BLACK-BILLED CUCKOO Coccyzus erythropthalmus	- - - -	S - - - - - - - - - - - - - -	CC3;2R
TYTONIDAE			
BARN OWL Tyto alba pratincola	- - R -	R - - - - - - - - U - - U - C	CC3;B;SRM
STRIGIDAE			
SCREECH OWL Otus asio	- - R -	R - - - - - - - - C C - - - U	CC3;B;SRM
FLAMMULATED OWL Otus flammeolus flammeolus	- - - S	- - - - - - - - - U - - - - -	CC3;B;SRM
GREAT HORNED OWL Bubo virginianus	- - R R	- - - - - - C C C - - - U U	CC3;B
SNOWY OWL Nyctea scandiaca	- W W -	W - - - - - - - - r - - - r	CC3;CYCLICAL
BARE OWL Surnia ulula caparoch	- - W U	- - - - - - - - - r - - - -	CC3;SRM
PYGMY OWL Glaucidium gnoma	- - R R	- - - - - - U U - - - - - -	CC3;B
BURROWING OWL Speotyto cunicularis hypugaea	- - W -	S - - - - - - - - - - - - -	CC3;B;SRM;RARE WEST
BARRED OWL Strix varia	- - - -	W - - - - - - - - r - - - -	CC3
SPOTTED OWL Strix occidentalis caurina	- - R -	- - - - - - - - R - - - - -	CC3;B;SRM
GREAT GRAY OWL Strix nebulosa nebulosa	- - R R	- - - - - - - - - - R - - - -	CC3;B7;SRM;STATUS UNCERTAIN
LONG-EARED OWL Asio otus	- - W -	S - - - - - - - - - - U - - -	CC3;B
SHORT-EARED OWL Asio flammeus	- - R -	R - - - - - - - - - - C - - C	CC3;B
BOREAL OWL Aegolius funereus	- - R -	- - - - - - - - - - C - - C	CC3;STATUS UNCERTAIN
SAW-WHET OWL Aegolius acadicus	- - W R	W - - - - - - - - - - C - - U	CC3;B
CAPRIMULGIDAE			
POOR-WILL Phalaenoptilus nuttallii	- - - -	S - - - - - - - - - - C - - U	CC3;B;2RW
COMMON NIGHTHAWK Chordeiles minor	- - - S	S S S - - - - - - - - - - C -	CC3;B
APODIDAE			
BLACK SWIFT Cypseloides niger	- - S S	- - - - - - - - - - - - - - -	CC3;BREEDS AT WATERFALLS;RANGES WIDELY
VAUX'S SWIFT Chaetura vauxi	- - S S	S - - - - - - - - C C C - - -	CC3;B
WHITE-THROATED SWIFT Aeronautes saxatalis	- - - S	- - - - - - - - - - C - - -	CC3;B;INHABITS CLIFF AREAS
TROCHILIDAE			
BLACK-CHINNED HUMMINGBIRD Archilochus alexandri	- - - -	S - - - - - - - - - - U - - -	CC2+3;B
ANNA'S HUMMINGBIRD Calypte anna	- - W -	- - - - - - - - - - - - - - r	CC2+3
BROAD-TAILED HUMMINGBIRD Selasphorus platycercus	- - - S	- - - - - - - - - - - - - - r	CC2+3;B
RUFOUS HUMMINGBIRD Selasphorus rufus	- - S S	- - - - - - - - - - C - - C	CC2+3;B
ALLEN'S HUMMINGBIRD Selasphorus sasin	- - S -	- - - - - - - - - - C - - C	CC2+3;B
CALLIOPE HUMMINGBIRD Scelilata calliope	- - - S	- - - - - - - - - - C - - -	CC2+3;B
ALCEDINIDAE			
BELTED KINGFISHER Megaceryle alcyon	- W R S	R - - - C C - - - - - - - - -	CC3;B
PICIDAE			
COMMON FLICKER Colaptes auratus	- - R R	- - - - - - C C C C - - - u -	CC2+3;B;F7
PILEATED WOODPECKER Dryocopus pileatus	- - R R

WILDLIFE SPECIES LISTS

TAXONOMY	REGIONS (O C W M E)	HABITATS (SW RS SS FW WC DC BF RW DG WM SD ST PG FL)	NOTES
PARULIDAE			
BLACK-AND-WHITE WARBLER Mniotilta varia	- - M - M	- - - - - - r r - - - - r -	CC3
PROTHONOTARY WARBLER Protonotaria citrea	- - - - F	- - - - - - - - - - - - - -	CC3;1R
TENNESSEE WARBLER Vermivora peregrina	- - M - M	- - - - - - - - - - - - - -	CC3;3 OR 4 RECORDS
ORANGE-CROWNED WARBLER Vermivora celata	- - S S M	- - - - - - C - - - - C C -	CC3;B;OWIW
NASHVILLE WARBLER Vermivora ruficapilla	- - M S S	- - - - - C C C - - - C - -	CC3;B;OW
YELLOW WARBLER Dendroica petechia	- - S - S	- - - - - U C C - - - - C -	CC3;B
YELLOW-RUMPED WARBLER Dendroica coronata	- - S S S	- - - - C C u u - - - - c -	CC3;B;F10;FEW WINTER WEST
BLACK-THROATED GRAY WARBLER Dendroica nigrescens	- - S - S	- - - - C C - - - - - - c -	CC3;B
TOWNSEND'S WARBLER Dendroica townsendi	- - S S M	- - - - C - - - - - - - u -	CC3;B;FEW WINTER WEST
HERMIT WARBLER Dendroica occidentalis	- - S S M	- - - - U U - - - - - - - -	CC3;B;LOCAL
CHESTNUT-SIDED WARBLER Dendroica pensylvanica	- - - - M	- - - - - - - - - - - - - -	CC3;1R
PALM WARBLER Dendroica palmarum	- - F - -	- - - - - - - - - - - - - -	CC3;2R
OVENBIRD Seiurus aurocapillus	- - - - F	- - - - - - - - - - - - - -	CC3;1R
NORTHERN WATERTHRUSH Seiurus noveboracensis	- - F - S	- - - - - - R R - - - - - -	CC3;B;1RW;FOUND NE CORNER OF STATE
MACGILLIVRAY'S WARBLER Oporornis tolmiei	- - S S S	- - - - - - C C - - - C u -	CC3;B
COMMON YELLOWTHROAT Geothlypis trichas	- - S - S	- - - C - - - - - - - - - -	CC3;B;FN:YELLOWTHROAT
YELLOW-BREASTED CHAT Icteria virens	- - - - S	- - - - - - - C - - - C - -	CC3;B;FEW RECORDS WEST
WILSON'S WARBLER Wilsonia pusilla	- - S S S	- - - - C - C - - - - C - -	CC3;B
AMERICAN REDSTART Setophaga ruticilla	- - - - S	- - - - - - C U - - - - - -	CC3;B;RW
PLOCEIDAE			
HOUSE SPARROW Passer domesticus	- - R - R	- - - - - - - - - - - - C C	CC2;B
ICTERIDAE			
BOBOLINK Dolichonyx oryzivorus	- - - - S	- - - - - - - - - R - - - -	CC2;B;SRM;VERY LOCAL
WESTERN MEADOWLARK Sturnella neglecta	- - R - R	- - - - - - - - C C C - - C	CC2+3;B;SRM
YELLOW-HEADED BLACKBIRD Xanthocephalus xanthocephalus	- - M - S	- - - C - - - - - - - - - u	CC2+3;BREEDS LOCALLY WEST
RED-WINGED BLACKBIRD Agelaius phoeniceus	- - R - R	- - - C - - - - - - - - c c	CC2+3;B
NORTHERN ORIOLE Icterus galbula bullockii	- - S - S	- - - - - - C C - - - - C -	CC2+3;B;F11
RUSTY BLACKBIRD Euphagus carolinus	- - F - F	- - - - - - - - - - - - - -	CC2+3;3R
BREWER'S BLACKBIRD Euphagus cyanocephalus	- - R M R	- - - - - - - - - C C - C C	CC2+3;B
COMMON GRACKLE Quiscalus quiscula	- - S - F	- - - - - - - - - - - - - -	CC2+3;2R
BROWN-HEADED COWBIRD Molothrus ater	- - S S S	- - - - C C C C - - C C - C	CC2+3;B;FEW WINTER
THRAUPIDAE			
WESTERN TANAGER Piranga ludoviciana	- - S S S	- - - - C C - - - - - - - -	CC2;B
FRINGILLIDAE			
BLACK-HEADED GROSBEAK Pheucticus melanocephalus	- - S - S	- - - - - U C C - - - - - -	CC2;B
BLUE GROSBEAK Guiraca caerulea	- - - - S	- - - - - - - - - - - - - -	CC2;B;1R
INDIGO BUNTING Passerina cyanea	- - S - -	- - - - - - - - - - - - - -	CC2;2R
LAZULI BUNTING Passerina amoena	- - S - S	- - - - - - - C - - - C - -	CC2;B;LOCAL WEST
EVENING GROSBEAK Hesperiphona vespertina	- - R R R	- - - - C U c - - - - - c -	CC2;B
PURPLE FINCH Carpodacus purpureus	- - R - -	- - - - C - C - - - - - C -	CC2;B
CASSIN'S FINCH Carpodacus cassinii	- - - S R	- - - - - C - c - - - - c -	CC2;B
HOUSE FINCH Carpodacus mexicanus	- - R - R	- - - - - - - C - - - - C -	CC2;B
PINE GROSBEAK Pinicola enucleator	- - W R W	- - - - U U - - - - - - r -	CC2;B
GRAY-CROWNED ROSY FINCH Leucosticte tephrocotis	- - W S W	- - - - - - - - u C - - - -	CC2;B-ALPINE;RARE WEST
HOARY REDPOLL Acanthis hornemanni	- - W - -	- - - - - - - - - - - - - -	CC2;1R
COMMON REDPOLL Acanthis flammea	- - W - W	- - - - - - - u u - u - - u	CC2
PINE SISKIN Spinus pinus	- - R R R	- - - - C c c - - - - - c -	CC2;B
AMERICAN GOLDFINCH Spinus tristis	- - R - R	- - - - - - C C - - - - C C	CC2+3;B;FEWER WINTER
LESSER GOLDFINCH Spinus psaltria	- - S - -	- - - - - - - - - - - - - -	CC2+3;B?;SMALL POPULATION IN EXTREME SOUTHWEST
RED CROSSBILL Loxia curvirostra	- - R R R	- - - - C C - - - - - - - -	CC2;B
WHITE-WINGED CROSSBILL Loxia leucoptera	- - W R W	- - - - R R - - - - - - - -	CC2;B
GREEN-TAILED TOWHEE Chlorura chlorura	- - - S -	- - - - - U - - - - - U - -	CC2;B;FOUND IN BLUE MOUNTAINS
RUFOUS-SIDED TOWHEE Pipilo erythrophthalmus	- - R - S	- - - - C C C C - - - C C -	CC2;B
LARK BUNTING Calamospiza melanocorys	- - S - -	- - - - - - - - - - - - - -	CC2;1R
SAVANNAH SPARROW Passerculus sandwichensis	- - S F S	- - - - - - - - C C - - - C	CC2+3;B;SOME WINTER WEST
GRASSHOPPER SPARROW Ammodramus savannarum perpallidus	- - - - S	- - - - - - - - U - - - - -	CC2+3;B;SRM
BAIRD'S SPARROW Ammodramus bairdii	- - M - -	- - - - - - - - - - - - - -	CC2;1R
LE CONTE'S SPARROW Ammospiza leconteii	- - - - S	- - - - - - - - - - - - - -	CC2;1R;FN:Passerherbulus caudacutus
VESPER SPARROW Pooecetes gramineus	- - S - S	- - - - - - - - C C C - - -	CC2+3;B; LOCAL WEST
LARK SPARROW Chondestes grammacus	- - - - S	- - - - - U - - U - U - - -	CC2;B;RECORDED WEST
SAGE SPARROW Amphispiza belli nevadensis	- - - - S	- - - - - - - - - C - - - -	CC2+3;B;SRM;ONE WINTER RECORD WEST
DARK-EYED JUNCO Junco hyemalis	- - R R R	- - - - C U c c - - - C c -	CC2;B;F12
TREE SPARROW Spizella arborea	- - W - W	- - - - - - - u u - u u - u	CC2;RARE WEST
CHIPPING SPARROW Spizella passerina	- - S S S	- - - - - C C - - - - - - -	CC2;B
CLAY-COLORED SPARROW Spizella pallida	- - - - M	- - - - - - - - - - - - - -	CC2;4R
BREWER'S SPARROW Spizella breweri	- - - - S	- - - - - - - - C - C - - -	CC2;B
HARRIS' SPARROW Zonotrichia querula	- - W - W	- - - - - - - - - - - r r -	CC2
WHITE-CROWNED SPARROW Zonotrichia leucophrys	- - R S W	- - - - C c c c c - c C C c	CC2;B
GOLDEN-CROWNED SPARROW Zonotrichia atricapilla	- - W M -	- - - - c - c c - - - c c -	CC2;RECORDS EAST
WHITE-THROATED SPARROW Zonotrichia albicollis	- - W - W	- - - - - - - - - - - r r -	CC2
FOX SPARROW Passerella iliaca	- - R S M	- - - - - - c c - - - U - -	CC2+3;B-LOCAL BREEDER WEST
LINCOLN'S SPARROW Melospiza lincolnii	- - M S M	- - - - - - - - - - - C - -	CC2+3;B;FEW WINTER WEST
SONG SPARROW Melospiza melodia	- - R S R	- - - C C U C C - - - C C -	CC2+3;B
LAPLAND LONGSPUR Calcarius lapponicus	- - W - W	- - u - - - - - u - - - - u	CC2+3
SNOW BUNTING Plectrophenax nivalis	- - W - W	- - u - - - - - u - - - - r	CC2+3;SRM

FOOTNOTES

F1 - The Brant and Black Brant are combined as a single species; the former has been recorded west of the Cascades.
F2 - The Snow Goose and Blue Goose are considered color phases of a single species; there are a few records east of the Cascades of the blue color phase (recognized by AOU 1973).
F3 - The Common Teal and Green-winged Teal are combined as a single species; the former occurs rarely in winter west of the Cascades (recognized by AOU 1973).
F4 - The Red-tailed Hawk and Harlan's Hawk are combined as a single species; there are two fall records east of the Cascades and two winter records west of the latter (recognized by AOU 1973).
F5 - The Upland Sandpiper, Bartramia americana, is the new name now assigned to Upland Plover, Bartramia longicauda, by AOU in 1973.
F6 - Thayer's Gull is considered a distinct species rather than a subspecies of the Herring Gull; it is as easily distinguishable in the field as some of the other species (recognized AOU 1973).
F7 - The Yellow-shafted Flicker and Red-shafted Flicker are combined as a single species; the former is uncommon in winter throughout the state (recognized by AOU 1973).
F8 - The Common Crow and Northwestern Crow are combined as a single species.
F9 - The Common Bushtit and Black-eared Bushtit are combined as a single species (recognized by AOU 1973).
F10- The Myrtle Warbler and Audubon's Warbler are combined as a single species and renamed the Yellow-rumped Warbler. The "Myrtle Warbler" subspecies is a migrant east and west of the Cascades. "Audubon's Warbler" is the common form breeding in the state and the common winter migrant west and east of the mountains. A few winter west of the Cascades (recognized by AOU 1973).
F11- "Bullock's Oriole" is the subspecies occuring in Washington (recognized by AOU 1973).
F12- The "Oregon Junco" and "Slate-colored Junco" are combined as a single species and renamed Dark-eyed Junco. The "Oregon Junco" subspecies is predominant in Washington, while the "Slate-colored Junco" is uncommon during winter east and west (recognized AOU 1973).
F13- One sight record only of the Eastern Woodchuck; questionable if the species occurs in the state.

NOTE: Several authorities consulted on wildlife taxonomy feel that subspecies (races) should not be included in the Atlas due to controversy on accuracy in many questionable cases; they say essentially that "... confining taxonomy to species is safer for authoritative accuracy." These authorities however have left it up to the discretion of the Atlas editors as to final decision on the matter. The editors have elected to include all subspecies, where known, for the following reasons: (1) coordination with the Federal Register and reference documents published by the Office of Endangered Species and International Activities, and other agencies and groups, wherein taxonomy of the wildlife treated is carried out to the subspecific level; (2) the subspecies of many animals are quite accurately known and documented and thus there should be no barrier to such reference in those cases; (3) anticipation of readers' questions and need of information on subspecies to clarify comparison of Atlas information with current literature.

MAMMALS:

TAXONOMY	REGIONS (O C W M E)	HABITATS (SW RS SS FW WC DC BF RW DG WM SD ST PG FL)	NOTES
DIDELPHIDAE (ORDER MARSUPIALIA)			
VIRGINIA OPOSSUM Didelphis virginiana	- R R - R	- - - C - - C C - C - C U C	CC2+3;I;U-WEST;SU-WENATCHEE
SORICIDAE (ORDER INSECTIVORA)			
MASKED SHREW Sorex cinereus hollisteri	- - R - -	- - - - R - - - - - - - - -	CC2+3;R-WEST ONLY
MASKED SHREW Sorex cinereus cinereus	- - - R -	- - - - U - - - - U - - - -	CC2+3;U-CASCADES & EASTERN FORESTS
PREBLE'S SHREW Sorex preblei	- - - - R	- - - - - - - - - - - - - -	CC2+3;R-BLUE MTS
MERRIAM'S SHREW Sorex merriami	- - - - R	- - - - - - - - R - R - - -	CC3
TROWBRIDGE'S SHREW Sorex trowbridgei	- - R R -	- - - - C C C - - - - - - -	CC2+3
VAGRANT SHREW Sorex vagrans	- R R R R	- - - - U - C C U C U - - C	CC2+3
DUSKY SHREW Sorex obscurus	- R R R R	- - - - C C - - - C - - - U	CC2+3;WIDE DISTRIBUTION
NORTHERN WATER SHREW Sorex palustris	- - R R R	- - - C U - - U - U - - - -	CC3
MARSH SHREW Sorex bendirei	- - R - -	- - - C U - - U - U - - - -	CC3
PYGMY SHREW Microsorex hoyi	- - - - R	- - - - - - - - - - - - - -	CC?;1R;R-NORTHEAST
TALPIDAE			
SHREW-MOLE Neurotrichus gibbsi	- - R R -	- - - C C - C C - - - - U U	CC2+3
TOWNSEND'S MOLE Scapanus townsendi	- - R - -	- - - - - - - U - C - - C C	CC2+3
COAST MOLE Scapanus orarius	- - R R R	- - - - C - C U - C - C C C	CC3
VESPERTILIONIDAE (ORDER CHIROPTERA)			LIMITED DATA ON BATS & CONTROVERSY ON SPECIES
LITTLE BROWN BAT Myotis lucifugus	- - R S R	- - - c C C C C C C - - c C	CC3
YUMA MYOTIS Myotis yumanensis	- - S S S	- - - c C C C C C C C - c C	CC3
KEEN'S MYOTIS Myotis keeni	- - S S -	- - - r R - R R - - - - - -	CC3
LONG-EARED MYOTIS Myotis evotis	- - S S -	- - - u U U U u - - - - - -	CC3
FRINGED MYOTIS Myotis thysanodes	- - S S S	- - - r R R - - - - - - - -	CC3
LONG-LEGGED MYOTIS Myotis volans	- - R R -	- - - R R R R R - - - - - R	CC3
CALIFORNIA MYOTIS Myotis californicus	- - R S S	- - - u C u C C - - - - u C	CC3
SMALL-FOOTED MYOTIS Myotis leibi	- - - - S	- - - r - - - R R - u - - -	CC3
SILVER-HAIRED BAT Lasionycteris noctivagans	- - R R R	- - - r u u u - - - - - r R	CC3
WESTERN PIPISTRELLE Pipistrellus hesperus	- - - - S	- - - r - - - R R - u - - -	CC3
BIG BROWN BAT Eptesicus fuscus	- - R R R	- - - u U U U U - - - - c C	CC3
HOARY BAT Lasiurus cinereus	- - S - S	- - - r r r - - - - - r r r	CC3
TOWNSEND'S BIG-EARED BAT Plecotus townsendi	- - R R R	- - - u U U - - - - - - - u	CC3
DESERT PALLID BAT Antrozous pallidus	- - - - S	- - - r - - - R R - R - - -	CC3
OCHOTONIDAE (ORDER LAGOMORPHA)			
PIKA Ochotona princeps	- - - R R	- - - - C C - - - - - - - -	CC1;OF:BELOW 3000 FT;INHABITS ROCKY AREAS
LEPORIDAE			
WHITETAIL JACKRABBIT Lepus townsendi	- - - - R	- - - - - - - - U - U - - -	CC1;SRM
SNOWSHOE HARE Lepus americanus	- - R R R	- - - - C C U C - - - C U U	CC1
BLACKTAIL JACKRABBIT Lepus californicus	- - - - R	- - - - - - u - C - C - U C	CC1;SRM
EASTERN COTTONTAIL Sylvilagus floridanus	- - R - -	- - - C - - - C - - - C C C	CC1;I
NUTTALL'S COTTONTAIL Sylvilagus nuttalli	- - - R R	- - - - - - u C C - C - U C	CC1
PYGMY RABBIT Sylvilagus idahoensis	- - - - R	- - - - - - - - - - R - - -	CC1;SRM;DOUGLAS COUNTY
APLODONTIDAE (ORDER RODENTIA)			
APLODONTIA Aplodontia rufa	- - R R -	- - - u C - C C - U - C U C	CC1;MOUNTAIN BEAVER
SCIURIDAE			
EASTERN WOODCHUCK Marmota monax petrensis	- - - R -	- - - - - - - - - U - - - -	CC1;PEND OREILLE MTS?;RECORDS?;SRM;F13
YELLOWBELLY MARMOT Marmota flaviventris	- - - R R	- - - - - U - - - - C C - C	CC1;INHABITS ROCKY AREAS
HOARY MARMOT Marmota caligata	- - - R -	- - - - U U - - C C - - - -	CC1;FOUND ROCKY AREAS & MEADOWS
OLYMPIC MARMOT Marmota olympus	- - R - -	- - - - - - - - - C - - - -	CC1+2;DRY GRASSY SLOPES OF OLYMPIC MTS ONLY
TOWNSEND'S GROUND SQUIRREL Spermophilus townsendi	- - - - R	- - - - - - - - C - C - - U	CC1+2

TAXONOMY	REGIONS (O C W M E)	HABITATS (SW RS SS FW WC DC BF RW DG WM SD ST PG FL)	NOTES
WASHINGTON GROUND SQUIRREL Spermophilus washingtoni	- - - - R	- - - - - - - - U - U - - u	CC1+2
COLUMBIAN GROUND SQUIRREL Spermophilus columbianus	- - - R R	- - - - - C - - C C - - - U	CC1+2
CASCADE GOLDEN-MANTLED GR. SQ. Spermophilus saturatus	- - - R -	- - - - - C - - - - - C - -	CC1+2;INHABITS ROCKY AREAS CASCADES
GOLDEN-MANTLED GROUND SQUIRREL Spermophilus lateralis	- - - R -	- - - - - C - - - C - - - -	CC1+2;INHABITS ROCKY AREAS
LEAST CHIPMUNK Eutamias minimus	- - - - R	- - - - - - - - - - C U - -	CC2
TOWNSEND'S CHIPMUNK Eutamias townsendi	- R R R -	- - - - C C C C - - - C - -	CC2
YELLOW PINE CHIPMUNK Eutamias amoenus	- - - R R	- - - - - C C C C C - C - -	CC2
REDTAIL CHIPMUNK Eutamias ruficaudus	- - - R R	- - - - C C - - - - - U - -	CC2
WESTERN GRAY SQUIRREL Sciurus griseus	- - R - R	- - - - - - U U - - - - - -	CC2;SRM;INHABITS LOWLAND OAK WOODS EAST & WEST
EASTERN GRAY SQUIRREL Sciurus carolinensis	- - R - -	- - - - - - R - - - - - R -	CC2
FOX SQUIRREL Sciurus niger	- - - - R	- - - - - - - - - - - - - -	CC2;I;U-SOUTHEAST
RED SQUIRREL Tamiasciurus hudsonicus	- - - - R	- - - - C C U C - - - - U -	CC2;FOUND IN CONIFEROUS FOREST ONLY
CHICKAREE Tamiasciurus douglasi	- - R R R	- - - - C C U C - - - U U -	CC2;CONIFEROUS FOREST ONLY;AC:DOUGLAS SQUIRREL
NORTHERN FLYING SQUIRREL Glaucomys sabrinus	- - R R R	- - - - C C U C - - - - - -	CC2+3
GEOMYIDAE			
NORTHERN POCKET GOPHER Thomomys talpoides limosus	- - - R R	- - - - - U U - U - - - - U	CC1+2;SU-KLICKITAT COUNTY;UNIQUE;WHITE SALMON
NORTHERN POCKET GOPHER Thomomys talpoides douglasi	- - R - -	- - - - - U U - U - - U - U	CC1+2;VANCOUVER;SU-CLARK COUNTY;UNIQUE
WESTERN POCKET GOPHER Thomomys mazama couchi	- - R - -	- - - - - U U - U - - U - U	CC1+2;R-MASON COUNTY;UNIQUE
WESTERN POCKET GOPHER Thomomys mazama glacialis	- - R - -	- - - - - U U - U - - U - U	CC1+2;R-PIERCE COUNTY;UNIQUE
WESTERN POCKET GOPHER Thomomys mazama louiei	- - R - -	- - - - - U U - U - - U - -	CC1+2;R-WAHKIAKUM COUNTY;SU;UNIQUE
WESTERN POCKET GOPHER Thomomys mazama melanops	- - R - -	- - - - - U U - U - - U - -	CC1+2;R-OLYMPICS ABOVE 4000FT;UNIQUE
WESTERN POCKET GOPHER Thomomys mazama tacomensis	- - R - -	- - - - - U U - U - - U - U	CC1+2;R-PIERCE COUNTY;UNIQUE
WESTERN POCKET GOPHER Thomomys mazama tumuli	- - R - -	- - - - - U U - U - - U - U	CC1+2;R-THURSTON COUNTY;UNIQUE
HETEROMYIDAE			
GREAT BASIN POCKET MOUSE Perognathus parvus	- - - - R	- - - - - - - - U - C - - -	CC2
ORD'S KANGAROO RAT Dipodomys ordi	- - - - R	- - - - - - - - R - R - - -	CC2;R-WALLA WALLA & FRANKLIN COUNTIES;SRM
CASTORIDAE			
BEAVER Castor canadensis	- - R R R	- - - C C - C C - U - - U C	CC1+2
CRICETIDAE			
WESTERN HARVEST MOUSE Reithrodontomys megalotis	- - - - R	- - - C - - - C C - C - - -	CC2
DEER MOUSE Peromyscus maniculatus	- R R R R	- - - C C C C C C C C C C C	CC2+3
GRASSHOPPER MOUSE Onychomys leucogaster	- - - - R	- - - - - - - - R - R - - -	CC2+3
BUSHYTAIL WOODRAT Neotoma cinerea	- - R R R	- - - - U C C C - - C C - C	CC2;INHABITS BUILDINGS
NORTHERN BOG LEMMING Synaptomys borealis	- - - R -	- - - R R - - R - R - - - -	CC1+2;R-NORTH & NORTHEAST
HEATHER VOLE Phenacomys intermedius	- - R R -	- - - U U U - U - U - - - -	CC1+2
BOREAL REDBACK VOLE Clethrionomys gapperi	- - R R R	- - - - C C C - - u - - - -	CC1+2
MEADOW VOLE Microtus pennsylvanicus	- - - R R	- - - U - - - - - U - - - -	CC1+2;UNIQUE
MOUNTAIN VOLE Microtus montanus	- - - R R	- - - C - U - - C C C - U C	CC1
TOWNSEND VOLE Microtus townsendi	- R R - -	- - - C - - - - U C - - U C	CC1+2
LONGTAIL VOLE Microtus longicaudus	- - R R R	- - - C U U U C U u U U - U	CC1+2
GRAY-TAILED VOLE Microtus canicaudus	- - R - -	- - - - - - - - - - - - - R	CC1+2;ONLY AROUND VANCOUVER IN CLARK CO.
RICHARDSON'S VOLE Microtus richardsoni	- - - R -	- - - C C - - - - C - - - -	CC1+2
OREGON VOLE Microtus oregoni	- - R R -	- - - C C u - C - C - U U C	CC1+2
SAGE VOLE Lagurus curtatus	- - - - R	- - - - - - - - U - U - - -	CC1+2
MUSKRAT Ondatra zibethica	- R R R R	- - - C - - - C - - - - U C	CC1
ZAPODIDAE			
WESTERN JUMPING MOUSE Zapus princeps	- - - R R	- - - C C - C C - C - - - -	CC2
PACIFIC JUMPING MOUSE Zapus trinotatus	- - R R -	- - - C C - C C - C - - - -	CC2
ERETHIZONTIDAE			
PORCUPINE Erethizon dorsatum	- - R R R	- - - C u C C u - - C C - U	CC1;INHABITS COULEES & DRAWS
MYOCASTORIDAE			
NUTRIA Myocastor coypus	- - R - R	- - - U - - - - - - - - - -	CC1
ZIPHIIDAE (ORDER CETACEA)			
BAIRD'S BEAKED WHALE Berardius bairdi	R - - - -	R - - - - - - - - - - - - -	CC3;AC:BOTTLENOSE WHALE
STEJNEGER'S BEAKED WHALE Mesoplodon stejnegeri	R R - - -	R - - - - - - - - - - - - -	CC3
MOORE'S BEAKED WHALE Mesoplodon carlhubbsi	R - - - -	R - - - - - - - - - - - - -	CC3
PHYSETERIDAE			
SPERM WHALE Physeter catodon	R - - - -	u - - - - - - - - - - - - -	CC3
KOGIIDAE			
PYGMY SPERM WHALE Kogia breviceps	R - - - -	R - - - - - - - - - - - - -	CC3
DELPHINIDAE			
STRIPED PORPOISE Stenella caeruleoalba	R - - - -	U - - - - - - - - - - - - -	CC3
COMMON DOLPHIN Delphinus delphis	R - - - -	- - - - - - - - - - - - - -	CC3
RIGHT WHALE DOLPHIN Lissodelphis borealis	R - - - -	U - - - - - - - - - - - - -	CC3
WHITE-SIDED DOLPHIN Lagenorhynchus obliquidens	R - - - -	U - - - - - - - - - - - - -	CC3
KILLER WHALE Orcinus orca	R R - - -	C - - - - - - - - - - - - -	CC3;SRM;AC:BLACKFISH;ALSO IN PUGET SOUND
GRAY GRAMPUS Grampus griseus	R - - - -	U - - - - - - - - - - - - -	CC3
FALSE KILLER WHALE Pseudorca crassidens	R - - - -	U - - - - - - - - - - - - -	CC3
SHORT-FINNED PILOT WHALE Globicephala macrorhyncha	R - - - -	U - - - - - - - - - - - - -	CC3
HARBOR PORPOISE Phocoena phocoena	R R - - -	C - - - - - - - - - - - - -	CC3;ALSO PARTS OF PUGET SOUND
DALL'S PORPOISE Phocoenoides dalli	R - - - -	- - - - - - - - - - - - - -	CC3
ESCHRICHTIIDAE			
GRAY WHALE Eschrichtius robustus	M?- - - -	C - - - - - - - - - - - - -	CC3
BALAENOPTERIDAE			
FIN WHALE Balaenoptera physalus	R R - - -	u - - - - - - - - - - - - -	CC3
SEI WHALE Balaenoptera borealis	R - - - -	u - - - - - - - - - - - - -	CC3
LITTLE PIKED WHALE Balaenoptera acutorostrata	R R - - -	U - - - - - - - - - - - - -	CC3;AC:MINKE WHALE
BLUE WHALE Balaenoptera musculus	R - - - -	R - - - - - - - - - - - - -	CC3
HUMPBACK WHALE Megaptera novaeangliae	R R - - -	u - - - - - - - - - - - - -	CC3
BALAENIDAE			
RIGHT WHALE Balaena glacialis	R - - - -	U - - - - - - - - - - - - -	CC3
URSIDAE (ORDER CARNIVORA)			
BLACK BEAR Ursus americanus	- - R R R	- - - C C C C C - C - C - R	CC1+2+3;SRM
GRIZZLY BEAR Ursus arctos horribilis	- - - R -	- - - - R R - - - - - R - -	CC1+2+3;NORTH CASCADES & SELKIRK MTS;SRM
PROCYONIDAE			
RACOON Procyon lotor	- R R R R	- C - C C U U C - C - C U C	CC2+3;SELDOM ABOVE 2000 FEET
MUSTELIDAE			
MARTEN Martes americana	- - R R R	- - - - U U - - - U - - - -	CC3;SRM
FISHER Martes pennanti	- - R R -	- - - - R R - U - U - - - -	CC3;OLYMPICS & CASCADES;SRM
SHORTTAIL WEASEL Mustela erminea	- - R R R	- - - u U U - - - U - - - u	CC3
LONGTAIL WEASEL Mustela frenata	- R R R R	- - - C C C C C C C C C - C	CC3
MINK Mustela vison	- R R R R	- C - C - - - C - C - - - U	CC3
RIVER OTTER Lutra canadensis	- R R R R	- C C C U - - C - U - - - -	CC3
SEA OTTER Enhydra lutris lutris	R R - - -	r R - - - - - - - - - - - -	CC3;SRM;REINTRODUCED;SUBSPECIES QUESTIONABLE
WOLVERINE Gulo gulo	- - - R -	- - - - R R - - - R R - - -	CC3;FN:Gulo luscus;SRM
BADGER Taxidea taxus	- - - R R	- - - - - U - - C - C - - -	CC3
SPOTTED SKUNK Spilogale putorius	- - R - R	- - - - C - C C - U - C - U	CC2+3
STRIPED SKUNK Mephitis mephitis	- R R - R	- C C C u U U C u C - C - C	CC2+3
CANIDAE			
COYOTE Canis latrans	- - R R R	- - - C C C C C C C C C C C	CC2+3
GRAY WOLF Canis lupus irremotus	- - - R -	- - - R R - - R - R - - - -	CC3;OCCASIONAL-ACCIDENTAL;EXTINCT IN STATE?
COMMON RED FOX Vulpes vulpes fulva	- - R - R	- - - C - - C C - C - c - C	CC2+3;I;CONFINED TO LOWLANDS EAST & WEST
CASCADE RED FOX Vulpes vulpes cascadensis	- - - R -	- - - - U U - - - U - u - -	CC2+3;SRM
FELIDAE			
MOUNTAIN LION Felis concolor	- - R R R	- - - U U U U U - U U - - u	CC3;SRM
LYNX Lynx lynx	- - - R -	- - - - U U - - - U - U - -	CC3;R-NORTHERN WASHINGTON;SRM
BOBCAT Lynx rufus	- - R R R	- - - C C C C C - u C C - U	CC3
OTARIIDAE (ORDER PINNIPEDIA)			
STELLER SEA LION Eumetopias jubatus	S S - - -	u U U r - - - - - - - - - -	CC3;B?;OF:RIVER MOUTHS
CALIFORNIA SEA LION Zalophus californianus	S S - - -	u U - - - - - - - - - - - -	CC3;B?
NORTHERN FUR SEAL Callorhinus ursinus	W - - - -	c - - - - - - - - - - - - -	CC3;RARELY WITHIN 5 MILES OUT
PHOCIDAE			
HARBOR SEAL Phoca vitulina richardi	- R - - -	r U U r - - - - - - - - - -	CC3;B-MCNEIL IS.&COAST;OF:LARGE RIVERS;SRM
ELEPHANT SEAL Mirounga angustirostris	S S - - -	r r - - - - - - - - - - - -	CC3;RARE IN PUGET SOUND
CERVIDAE (ORDER ARTIODACTYLA)			
ROOSEVELT ELK Cervus canadensis roosevelti	- - R S -	- - - C C C C C - C - C - U	CC1;SRM
ROCKY MOUNTAIN ELK Cervus canadensis nelsoni	- - - S R	- - - C U C C C - C - C - U	CC1;SRM;I-PARTS OF W. WASHINGTON
MULE DEER Odocoileus hemionus hemionus	- - - S R	- - - C U C U C C U U C - u	CC1;SRM
COLUMBIA BLACKTAIL DEER O. h. columbianus	- - R S -	- - - C C U C C - C - C C C	CC1;SRM
NORTHWESTERN WHITETAIL DEER Odocoileus virginianus	- - - - R	- - - C - C C C - C - C - C	CC1;SRM;THIS IS O. v. ochorourus
COLUMBIA WHITETAIL DEER O. v. leucurus	- R - - -	- - - U - - - U - - - U - U	CC1;SRM
AMERICAN MOOSE Alces alces andersoni	- - - R R	- - - r - r - - - U - u - -	CC1;SRM;SMALL HERD IN PASAYTEN WILDERNESS
AMERICAN MOOSE Alces alces shirasi	- - - R R	- - - r - r - - - U - u - -	CC1;SRM;SMALL HERD IN SELKIRK MTS
MOUNTAIN CARIBOU Rangifer tarandus montanus	- - - - R	- - - - R - - - - R - - - -	CC1;SMALL RESIDENT HERD IN SELKIRK MTS;SRM
ANTILOCAPRIDAE			
PRONGHORN ANTELOPE Antilocapra americana	- - - - R	- - - - - - - - R - R - - -	CC1;REINTRODUCED;SRM
BOVIDAE			
MOUNTAIN GOAT Oreamnos americanus	- - - R -	- - - - C - - - - C - - - -	CC1;INHABITS ROCKY AREAS;SRM
CALIF.BIGHORN SHEEP Ovis canadensis californiana	- - - R R	- - - - - U - U U U - - - -	CC1;REINTRODUCED;SRM;O. c. canadensis ABSENT



REPTILES:

TAXONOMY	REGIONS (O C W M E)	HABITATS (SW RS SS FW WC DC BF RW DG WM SD ST PG FL)	NOTES
TESTUDINIDAE			
PAINTED TURTLE Chrysemys picta	- - R - R	- - - C - - - - - - - - - -	CC1+3+CARRION;THURSTON CO;I-WEST. WASH.
PACIFIC POND TURTLE Clemmys marmorata	- - R - -	- - - R - - - - - - - - - -	CC1+3+CARRION;SRM
IGUANIDAE			
WESTERN FENCE LIZARD Sceloporus occidentalis	- - R - R	- U - - - C - - C - C R - -	CC3;INHABITS ROCKY & WOODED AREAS
SAGEBRUSH LIZARD Sceloporus graciosus	- - - - R	- - - - - U - - U - C - - -	CC3;INHABITS SANDY AREAS
SIDE-BLOTCHED LIZARD Uta stansburiana	- - - - R	- - - - - U - - U - C - - -	CC3
SHORT-HORNED LIZARD Phrynosoma douglassi	- - - - R	- - - - - R - - R - U - - -	CC3
SCINCIDAE			
WESTERN SKINK Eumeces skiltonianus	- - - - R	- - - R - R - R R - - - - -	CC3;INHABITS ROCKY AREAS
ANGUIDAE			
FOOTHILL ALLIGATOR LIZARD Gerrhonotus multicarinatus	- - - - R	- - - - - R - U - - - U - -	CC3;AC:SOUTHERN ALLIGATOR LIZARD
NORTHERN ALLIGATOR LIZARD Gerrhonotus coeruleus	- - R - R	- - - - C C C C - - - C U U	CC3;SRM;RARELY FOUND ABOVE 3000 FT
BOIDAE			
RUBBER BOA Charina bottae	- - R - R	- - - - U U U U - - - U - -	CC3
COLUBRIDAE			
WESTERN RINGNECK SNAKE Diadophis punctatus	- - R - R	- - - - - - - R - - - R - -	CC3;THIS IS D. p. occidentalis;SRM
SHARP-TAILED SNAKE Contia tenuis	- - R - -	- - - - - - - - - - - R - -	CC3;GRAVELY LAKE,PIERCE;LYLE, KLICKITAT;SRM
RACER Coluber constrictor	- - R - R	- - - - - C C C C - C C - U	CC3
DESERT STRIPED WHIPSNAKE Masticophis taeniatus	- - - - R	- - - - - - - - R - R - - -	CC3;INHABITS ROCKY AREAS
GOPHER SNAKE Pituophis melanoleucus	- - - - R	- - - - - U - C C - C u - C	CC3
CALIFORNIA MOUNTAIN KINGSNAKE Lampropeltis zonata	- - - - R	- - - - - - R - - - - R - -	CC3;SRM
COMMON GARTER SNAKE Thamnophis sirtalis	- R R R R	- - - C U U C C U C - C U C	CC3
WESTERN GARTER SNAKE Thamnophis elegans	- - R - R	- - - C - - - C - C - - U C	CC3
NORTHWESTERN GARTER SNAKE Thamnophis ordinoides	- - R - -	- - - C U - C C U C - C C C	CC3
SPOTTED NIGHT SNAKE Hypsiglena torquata	- - - - R	- - - - - R - - R - R - - -	CC3;INHABITS ROCKY AREAS
VIPERIDAE			
WESTERN RATTLESNAKE Crotalus viridis	- - - - R	- - - - - C - C C - C - U U	CC3

AMPHIBIANS:

TAXONOMY	REGIONS (O C W M E)	HABITATS (SW RS SS FW WC DC BF RW DG WM SD ST PG FL)	NOTES
AMBYSTOMIDAE			
TIGER SALAMANDER Ambystoma tigrinum	- - - - R	- - - C - - - - - - - - - -	CC3;INHABITS ALKALINE PONDS & LAKES
NORTHWESTERN SALAMANDER Ambystoma gracile	- - R R -	- - - C - - c - - c - c - -	CC3
LONG-TOED SALAMANDER Ambystoma macrodactylum	- - R R R	- - - C - c c u c - - c - -	CC3
PACIFIC GIANT SALAMANDER Dicamptodon ensatus	- - R R -	- - - U u - - - - - - - - -	CC3;INHABITS COLD STREAMS & PONDS
OLYMPIC SALAMANDER Rhyacotriton olympicus	- - R R -	- - - C C - - - - - - - - -	CC3;INHABITS COLD STREAMS & MOSSY ROCKS
SALAMANDRIDAE			
ROUGH-SKINNED NEWT Taricha granulosa	- - R R -	- - - C c - c c - - - - - -	CC3
PLETHODONTIDAE			
DUNN'S SALAMANDER Plethodon dunni	- - R - -	- - - - R - R - - - - - - -	CC3;BREEDS IN MOIST WOODS;SRM
WESTERN RED-BACKED SALAMANDER Plethodon vehiculum	- - R - -	- - - - C - c - - - - c - -	CC3;INHABITS MOIST WOODS
VAN DYKE'S SALAMANDER Plethodon vandykei	- - R R -	- - - - U - - u - - - - - -	CC3;SRM
LARCH MOUNTAIN SALAMANDER Plethodon larselli	- - R - -	- - - - R - - - - - - - - -	CC3;INHABITS MOIST WOODS;SRM
ESCHSCHOLTZ'S SALAMANDER Ensatina eschscholtzi	- - R - -	- - - - C - c c - - - - - -	CC3;INHABITS MOIST WOODS
ASCAPHIDAE			
TAILED FROG Ascaphus truei	- - R R -	- - - C u - - c - - - - - -	CC3;INHABITS STREAMS
PELOBATIDAE			
GREAT BASIN SPADEFOOT TOAD Scaphiopus intermontanus	- - - - R	- - - C - r - u c - c - u u	CC3
BUFONIDAE			
WESTERN TOAD Bufo boreas	- - R R R	- - - C c c c c - c - c c c	CC3
WOODHOUSE'S TOAD Bufo woodhousei	- - - - R	- - - U - - - - - - - - - -	CC3
HYLIDAE			
PACIFIC TREEFROG Hyla regilla	- R R R R	- - - C c c c c c c c c c c	CC3;INHABITS SWAMPS
RANIDAE			
RED-LEGGED FROG Rana aurora	- - R - -	- - - C c - c c - - - c - -	CC3;INHABITS SWAMPS & WET WOODLANDS
SPOTTED FROG Rana pretiosa	- - R - -	- - - U - - - - - u - - - -	CC3
CASCADE FROG Rana cascadae	- - - R -	- - - C - - - - - c - - - -	CC3;INHABITS ALPINE PONDS
BULLFROG Rana catesbeiana	- - R - R	- - - C - - - - - - - - u c	CC3;I
LEOPARD FROG Rana pipiens	- - - - R	- - - C - - - - - C - - - -	CC3

SOME NOTES ON AUGMENTING THE SPECIES LISTS. The reader may wish to add more to a compiled list, by use of current wildlife literature, in order to expand on information reflecting the dynamic ecological processes operating within natural systems. It is suggested that the following three subject areas may be explored for increased depth of understanding: (1) niche explanation for each animal listed, (2) daily active periods for each animal during which most intensive foraging for food occurs, and (3) explanation of the kind of foraging behavior in which each animal engages. A fourth subject, concerning mating and nesting habits, may be considered, and a fifth subject may also be of interest: that of discovering trends of population condition by definition of the former abundance and distribution of each species' population, or set of populations, for comparison with current knowledge. It would be of high utility also to include such information in the species lists here in the development of an expanded third Atlas edition.

Information on the niche of each animal listed serves to illustrate its functional role in the operation of the ecosystem which it supports. The ecosystem in turn sustains the species' population at an optimum level within the food-web structure and habitat carrying capacity firmly established in the community. In the overall list compiled, and viewed as a community index, such information assembled for each species serves collectively to represent the niche diversity inherent to the community "organism" as a whole. With the perspective gained, project impacts may be more clearly defined and expressed in terms of alteration of community function.

Information on the time of day in which species forage for food serves to explain how niche diversity in a community is organized, by the operation of specialized animal and plant adaptations, to minimize competition between species. For example, in Washington the Golden Eagle feeds in the afternoon, the Ferruginous Hawk feeds at dusk and the owls feed at night; they are all avian predators and Class III consumers, yet they don't compete for prey and so can coexist in the same habitat.

Information on foraging behavior reflects the need of each species for daily undisturbed conditions which permit it to engage in natural adaptive behavior patterns, behavior patterns which have assured the survivorship of its populations up to the modern age. Some examples of bird foraging behavior: aerial-capture, or "hawking" (Barn Swallow), aerial-diving (Peregrine Falcon), aerial-soaring (Turkey Vulture), aerial-hovering (Rufous Hummingbird), aquatic-surface-skimming (Northern Shoveler), aquatic-diving (Harlequin Duck), aquatic-wading in shallow waters (American Avocet), aquatic-wading in deeper waters (Great Blue Heron), shorelines-probing (Whimbrel and Long-billed Curlew), shorelines-surface (Killdeer), arboreal-climbing along outer branches of trees and woody shrubs (Hermit Thrush), arboreal-climbing up tree trunks only (Brown Creeper), arboreal-climbing both up and down tree trunks (Red-breasted Nuthatch), and arboreal-probing of tree trunks (Downy Woodpecker).

Many forms of wildlife are dependent upon unique habitat elements such as old snags in the forests and along watercourses. Old snags are important and often critical for habitat use in nesting, roosting, defending territory and for the Class III foods afforded vertebrates by the many wood boring insects and other organisms which work to decompose old wood tissues and thereby return them to the ecosystem for recycling. Some species in Washington which are dependent upon snags: Wood Duck, Common Goldeneye, Barrow's Goldeneye, Hooded Merganser, Bufflehead, Turkey Vulture, Goshawk, Sharp-shinned Hawk, Cooper's Hawk, Red-tailed Hawk, Swainson's Hawk, Golden Eagle, Bald Eagle, Osprey, Merlin, American Kestrel, Barn Owl, Flammulated Owl, Great Horned Owl, Pygmy Owl, Spotted Owl, Great Gray Owl, Long-eared Owl, Saw-whet Owl, Vaux's Swift, Belted Kingfisher, Common Flicker (Red-shafted race), Pileated Woodpecker, Lewis' Woodpecker, Yellow-bellied Sapsucker, Williamson's Sapsucker, Hairy Woodpecker, Downy Woodpecker, White-headed Woodpecker, Black-backed Three-toed Woodpecker, Olive-sided Flycatcher, Ash-throated Flycatcher, Violet-green Swallow, Tree Swallow, Purple Martin, Black-capped Chickadee, Mountain Chickadee, Chestnut-backed Chickadee, White-breasted Nuthatch, Red-breasted Nuthatch, Pygmy Nuthatch, Brown Creeper, House Wren, Winter Wren, Bewick's Wren, Western Bluebird, Mountain Bluebird, House Finch, Least Chipmunk, Oppossum, Shrews, Yellow Pine Chipmunk, Townsend's Chipmunk, Western Gray Squirrel, Chickaree, Northern Flying Squirrel, Deer Mouse, Raccoon, Marten, Fisher, Silver-haired Bat, California Myotis, Western Fence Lizard, Sagebrush Lizard, Northern Alligator Lizard and the Gopher Snake. Such information added to a species list serves to further augment understanding of the ecological niche of each of these species.

People most often see wildlife while the animals are actively engaged in foraging for food. Since wildlife increasingly contributes to the enjoyment people gain from their pursuits as recreationists, projects which adversly alter the functions of ecosystems by disturbing the foraging behavior of animals also adversly affect the aesthetic enjoyment sought by a growing number of the nation's citizens.



Tiger lily

BOTANICAL FEATURES

WASHINGTON'S PLANT COMMUNITIES

By

Rexford F. Daubenmire

A little over half of the land area of Washington was forested before the coming of the white man. The remainder was largely steppe, occupying the dry lowlands east of the Cascades, with a small amount of alpine tundra in the highest mountains.

In this varied spectrum of vegetation, several hundred distinctive types of communities may be recognized. It is the hope of many that representative examples of these can be preserved as living museums that will be of as much interest to future generations as are the indoor museums which display fossils, anthropological materials, pioneer relics and so forth.

Aside from the educational and human interest values of natural preserves, there are some practical values, the importance of which is generally recognized. The tremendous impact that man has begun to have on the environment has focused attention on the importance of a deeper understanding of organism-environment interactions. Knowledge in this field is far from complete. If we are to learn the principles that have allowed natural communities to strike relatively stable balances, so that we can apply these principles to the direction of human affairs, natural areas must be kept available to continue scientific study. It is more expedient and more practical to test the validity of new theories in natural communities than in human communities.

Only in natural communities can a rich reservoir of genetic materials be retained for the geneticist to draw upon in maintaining maximum crop production in the face of new diseases continually developing among trees, shrubs and herbaceous plants of economic importance. Only natural communities provide a rich reservoir of insect species which have proven immensely valuable in controlling plant pests like the goatweed of western rangelands, cacti in Hawaii, and the wasps which diminish the case-bearer devastation of western larch. We know that human overpopulation is causing a deterioration in the quality of the earth as an environment for plants, animals and humans alike. Without natural areas for comparison, we have no yardsticks to measure the rate and degree of deterioration or the effectiveness of attempted counter-measures.

The successful management of uncultivated lands for timber, water, forage, wildlife and recreation hinges directly on our understanding of natural communities. With so much at stake, and with so little understanding, we can ill afford to cut off future expansion of useful knowledge in this crucial area. Experience has proven that, once destroyed, these communities cannot be reconstituted. However, if we give protection to an area not too badly damaged, it has the capacity to regenerate. It is imperative, therefore, that we set aside the best remaining examples of each of our natural communities to fulfill our needs and those of future generations.

In one highly developed midwestern state, the suggestion has been made that each county take stock of its natural resources and preserve its own samples of each type of natural vegetation that occurs within its boundaries. Comparing this attitude with the situation in the west shows that as natural vegetation becomes more completely eliminated, its value is appreciated more. While botanical features will be emphasized here, it should be kept in mind that most preserved areas would serve the needs of animal science, or geology as well. In all cases, such preserved items would also have educational and aesthetic values, as well as practical values.

ALPINE ZONE. Areas above upper timberline are of primary importance for recreation. The objectives of summer visitors are vistas of superb scenery, unscarred by cut-and-fill along highways, or by mine dumps, or denuded ski courses with ski lifts, or by power line obstructions. Respect for their objectives demands that such artifacts be segregated from those necessary to satisfy other recreation demands.

In the highest part of the alpine region, glaciers and lichen-covered rock surfaces dominate the landscape. Down next to timberline lush meadows, dominated by lupine (Lupinus), paintbrush (Castilleja), valerian (Valeriana), lousewort (Pedicularis), anemone (Anemone) and other colorful flowers, alternate with shrubby communities of black crowberry (Empetrum nigrum), luetkea (Luetkea pectinata), mountainheath (Phyllodoce), and cassiope (Cassiope). At intermediate elevations are stony fell-fields where plant cover is incomplete. Here there are natural rock gardens containing moss silene (Silene acaulis), and other plants common in the arctic tundra. Without such a natural mosaic of community types, the mountain goat, bighorn sheep and other animals cannot be maintained in their natural states.

In Washington, volcanic ejecta of varying ages and deglaciated areas provide special opportunities to study the rate of development of soil and vegetation. At the upper edge of timber, the dwarfed and deformed individuals and clumps of whitebark pine (Pinus albicaulis), subalpine fir (Abies lasiocarpa), and mountain hemlock (Tsuga mertensiana) are a constant source of interest to visitors. Study of this ecotone, or area of contact between forest and alpine region, has given us unexpected insight into the impact of recent variations in weather. The way subalpine larch (Larix lyallii) remains erect, while its associates in this belt remain as "wind-cripples," is another feature of special interest.

SUBALPINE ZONE. The forests just below upper timberline differ considerably on either side of a line drawn a little east of the divide of the Cascades. East of this line, subalpine fir and Englemann spruce (Picea engelmannii) are the conspicuous species in old-growth stands. Undergrowth plants in this forest are dominated by rustyleaf (Menziesia ferruginea), Cascades azalea (Rhododendron albiflorum), common beargrass (Xerophyllum tenax), and big huckleberry (Vaccinium membranaceum). Following fire or logging, the first generation forests are typically composed of lodgepole pine (Pinus contorta), whitebark pine, western white pine (Pinus monticola), and western larch (Larix occidentalis) in varying proportions. Nearly everywhere, subalpine fir slowly increases at the expense of all other trees until it dominates the climax.

Subalpine fir is also rather well represented in subalpine forests west of the Cascade crest, but Engelmann spruce does not follow into the oceanic climate. Additional climax dominants there are Pacific silver fir (Abies amabilis), mountain hemlock and Alaska-cedar (Chamaecyparis nootkatensis). Undergrowth dominants are not much different from those east of the Cascades. In the initial regeneration that follows deforestation are western larch, Douglas-fir (Pseudotsuga menziesii), noble fir (Abies procera), lodgepole pine, western white pine and whitebark pine.

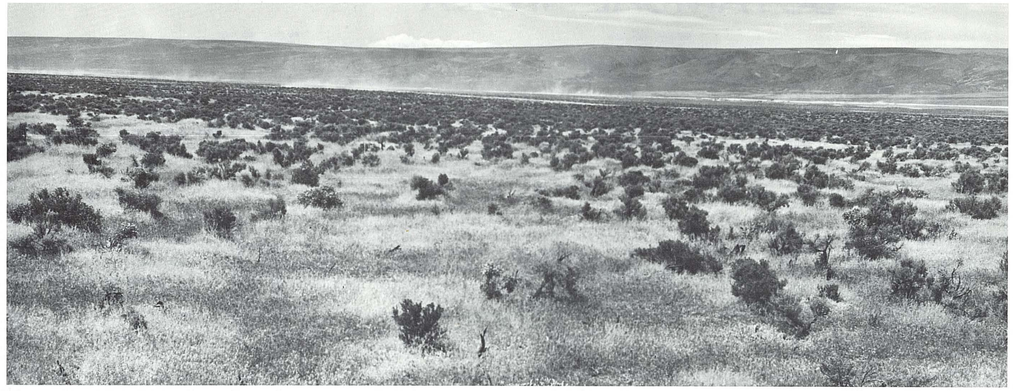
Although good timber is provided by forests at this altitude, perhaps their major import has to do with the capture of snow which melts slowly during the short, cool summers and provides an abundance of high quality water. Aesthetic values are increasing in importance, to judge from complaints being made with increasing frequency, regarding the unsightliness of poorly planned areas or excessively large areas where timber has been harvested. Clear-cutting followed by burning is the only ecologically sound technique we have for harvesting and renewing timber stands in our mountains, but careful planning can minimize brief unsightliness before a new crop of trees restores the green we cherish. At times, places in these burned areas provide desirable huckleberry picking. In fact, some forest land is burned repeatedly to prevent tree invasion and to rejuvenate big huckleberry , the principal berry species.

MONTANE AND LOWLAND FORESTS WEST OF THE CASCADES. Over most of western Washington natural forest succession usually tends toward the dominance of western hemlock (Tsuga heterophylla) on well-drained mineral soil. Vine maple (Acer circinatum), western yew (Taxus brevifolia), and Pacific dogwood (Cornus nuttallii) are common understory trees. Beneath these the two most significant dominants, both evergreen, are swordfern (Polystichum munitum) and salal (Gaultheria shallon). Other common forest floor plants are Oregongrape (Berberis nervosa), queencup beadlily (Clintonia uniflora), bunchberry dogwood (Cornus canadensis), oakfern (Gymnocarpium dryopteris), red flowering current (Ribes sanguineum), and salmonberry (Rubus spectabilis).

In somewhat swampy situations western redcedar (Thuja plicata) maintains dominance indefinitely. The conspicuous undergrowth plants here include devilsclub (Oplopanax horridum), ladyfern (Athyrium filix-femina), and skunkcabbage (Lysichitum americanum). On moist, but not swampy, terraces bigleaf maple (Acer macrophyllum) is quite common. On the windward side of the Olympic Mountains, especially in the Hoh and Quinault Valleys, large gnarled specimens of this tree are especially good hosts for Oregon selaginella (Selaginella oregana) which so copiously festoons their branches. Black cottonwood (Populus trichocarpa), cascara (Rhamnus purshiana) and Oregon ash (Fraxinus latifolia) are other broad-leaved trees common along stream terraces.



A wild rose following a morning shower.



A shrub-steppe community in eastern Washington.

Owing to the high incidence of fires in the past, the uplands are most usually dominated by coastal ecotypes of Douglas-fir which is the most valuable forest tree of the region and the mainstay of forest industry. Old virgin stands of this tree, already established when white man first arrived, but no longer common outside of natural parks, contained individuals up to 127 meters tall with butt diameters up to 7.6 meters. Red alder (Alnus rubra) is another species that is highly aggressive on disturbed land. This is the largest species in its genus and is extensively used for furniture. On recently cutover lands bracken fern (Pteridium aquilinum) or the Scotch broom (Cytisus scoparius) commonly determine physiognomy until the first seral forest is established.

Sitka spruce (Picea sitchensis) is mainly confined to a very narrow strip along the open ocean where it plays a climax role under moderate salt-spray influence. It becomes seral to hemlock on sandy soils slightly farther back from the ocean. The sandy coastline supports such characteristic species as dune wildrye (Elymus mollis) and yellow sandverbena (Abronia latifolia), with silty shores supporting tidewater saltmarsh in which seashore saltgrass (Distichlis spicata) and Virginia glasswort (Salicornia virginica) are the dominants. On dry gravelly flats south of Puget Sound Oregon white oak (Quercus garryana) is a conspicuous seral tree in a type of habitat where Douglas-fir is climax.



Two Fly Amanitas, Amanita muscaria, grace the shore of Lake Quinault amid a patch of wind-blown alder leaves. This genus happens to be deadly poisonous — just admire.

FORESTS EAST OF THE CASCADE DIVIDE. Forest vegetation, as outlined above, extends from near sea level up the mountain sides to the subalpine belt west of the Cascade divide. East of that divide similar forest is restricted to a few moist valleys in regions where the climate is not so dry.

In the eastern part of Washington, the most notable differences are: (1) the substitution of western white pine and western larch as the prevailing seral trees, and (2) the absence of salal and scarcity of fern (Polystichum) in the undergrowth. Also, here in the interior, the major climax dominants are segregated with western hemlock in the most moist situations, western redcedar in less moist places (a transitory tree on hemlock sites) and grand fir (Abies grandis) on soils tending to be droughty. Immediately after fire destroys forests in this group a rich variety of shrubs invade the landscape and, until a new forest canopy develops, provide an abundance of winter browse for deer and elk which are plentiful in the area. Swamps with western redcedar occur here in the eastern part of the State, but the deciduous element in these forests is conspicuously lacking.

FORESTS OF DRY TO MODERATELY DRY CLIMATES. Soils in all forests mentioned in the preceding section remain moist throughout summer, except perhaps in the top 20 centimeters or so of the profile. However, east of the Cascades, in passing from the grand fir areas into land where the soils regularly dry deeper, there is a clear ecologic discontinuity. There, drought-tolerant ecotypes of Douglas-fir, which can play only a transitory role in wetter areas, remain as climax dominants for lack of competition from fir, cedar or hemlock. Forests in the Douglas-fir belt have undergrowth dominated by mallow ninebark (Physocarpus malvaceus), common snowberry (Symphoricarpos albus) or pinegrass (Calamagrostis rubescens). These undergrowth types regenerate immediately after a fire and, since they provide only negligible browse, the land is therefore useful mainly for timber ratner than livestock grazing or game. Following logging or fire, ponderosa pine (Pinus ponderosa) invades the sites vigorously, but it cannot retain its place for more than a single generation in the face of competition from Douglas-fir.

As the severity of soil drought intensifies, Douglas-fir drops out of the zonal sequence leaving ponderosa pine dominant for lack of any competitor. Ecologically distinctive segments of pine forest are recognizable by differences in the undergrowth dominants which may be any of bitterbrush (Purshia tridentata), mallow ninebark, common snowberry, Idaho fescue (Festuca idahoensis), rough fescue (Festuca scabrella), bluebunch wheatgrass (Agropyron spicatum), needle and thread (Stipa comata), or red threeawn (Aristida longiseta). In certain of these types the pine grows slowly and is subject to attack and deformation by the parasitic yellow leafless mistletoe (Arceuthobium campylopodum), but elsewhere it grows rapidly and provides one of our most valuable timbers. The best growth of the tree, however, is in higher zones where other trees are climax.

THE STEPPE. The low-lying unforested area east of the Cascades is often referred to as "desert" by the local populace, but the few months of intensive heat and drought, combined with the occurrence of cacti, rattlesnakes and scorpions that perhaps suggest this classification to the layman, do not impress the plant geographer as strongly as the moderately-heavy to heavy stands of perennial grass that grew nearly everywhere before the era of domestic livestock. The term "steppe" is more appropriate to the biologist.

Despite the low rainfall (median annual values as low as 150 millimeters), nearly all of it falls in winter when evapotranspiration is feeble and much of the water can sink deep enough to get below the reach of direct evaporation into the air. This provides water to sustain a vigorous spurt of vegetative and flowering activity as temperatures rise in the spring. Summer is mostly a period of aestivation with more plants inactive at this season than in mid-winter.

On upland loams, the most characteristic dominants are bluebunch wheatgrass, Idaho fescue and Sandberg's bluegrass (Poa sandbergii). On sandy soils these species are replaced by needle and thread, Indian ricegrass (Oryzopsis hymenoides) and sand dropseed (Sporobolus cryptandrus).

The driest parts of the steppe originally supported shrubs that formed a layer well above the grasses, making the term "shrub-steppe" applicable to those parts. Over most of the shrub-steppe big sagebrush (Artemisia tridentata) or threetip sagebrush (Artemisia tripartita) was the outstanding representative of this shrub layer, with the mockony somewhat relieved locally by other shrubs such as tall green rabbitbrush (Chrysothamnus viscidiflorus), gray horsebrush (Tetradymia canescens), spiny hopsage (Grayia spinosa), bitterbrush and matchbrush (Gutierrezia sarothrae).

Broad-leaved herbs such as arnica (Arnica), balsamroot (Balsamorhiza), paintbrush (Castilleja), hawks beard (Crepis), geranium (Geranium), lupine (Lupinus), and cinquefoil (Potentilla) are conspicuous in inverse ratio to the degree of aridity. They achieve their maximum representation in communities just below the ponderosa pine belt at lower timberline. Over most of the steppe the most aggressive plant to assume dominance, as grazing eliminates native perennials, is the alien cheatgrass brome (Bromus tectorum). In the less arid eastern fringe of the steppe it is locally moist enough for Kentucky bluegrass (Poa pratensis) to take over this role.

Thin stony soils, which are extensive owing to turbulent floods during glacial times, support a wide variety of special communities. In all of these the tiny perennial Sandberg's bluegrass is the chief grass, with one or more species of dwarf shrubs conspicuous. Stiff sagebrush (Artemisia rigida) is the most widespread of these dwarf shrubs, but several species of buckwheat (Eriogonum) are also common.

Other special soil types in the steppe region support communities in which one of the following is the characteristic dominant: winterfat (Eurotia lanata), sage (Salvia dorrii var. carnosa), western juniper (Juniperus occidentalis), black cottonwood (Populus trichocarpa), quaking aspen (Populus tremuloides), blackhawthorn (Crataegus douglasii), hackberry (Celtis reticulata) and common camas (Camassia quamash). Saline basins have communities in which alkali saltgrass (Distichlis stricta), black greasewood (Sarcobatus vermiculatus) and giant wildrye (Elymus cinereus) are the major species.

Very little of the original steppe vegetation remains. Grazing, cultivation and irrigation have affected most of the land, but a recent intensive study of the dwindling fragments remaining in Washington revealed no less than 41 distinctive climax types on the uplands. Marshes, islands, ponds and some types of dune vegetation have not yet been studied in detail. As of today, samples of scarcely half a dozen of these vegetation types are protected.

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BOTANICAL INDEX

BOTANICAL FEATURES

Map Key No.	Map Index Grid Ref.	Feature	County
Tree specimens, Deciduous BD			
1	C-4	Cascara Buckthorn (Rhamnus purshiana)	Skagit
2	B-3	Douglas Maple (Acer glabrum var. douglasii)	Whatcom
3	B-2	Bigleaf Maple (Acer macrophyllum)	San Juan
4	E-3	Pacific Dogwood (Cornus nuttallii)	Pierce
5	E-3	Oregon White Oak (Quercus garryana)	Thurston
Tree specimens, Evergreen BE			
1	F-4	Alaska Cedar (Chamaecyparis nootkatensis)	Pierce
2	C-2	Western Redcedar (Thuja plicata)	Clallam
4	F-4	Grand Fir (Abies grandis)	Pierce
5	F-4	Noble Fir (Abies procera)	Lewis
6	D-2	Pacific Silver Fir (Abies amabilis)	Clallam
7	D-2	Subalpine Fir (Abies lasiocarpa)	Jefferson
8	D-2	Western Hemlock (Tsuga heterophylla)	Jefferson
10	F-3	Pacific Yew (Taxus brevifolia)	Lewis
11	D-1	Sitka Spruce (Picea sitchensis)	Clallam
12	G-4	Ponderosa Pine (Pinus ponderosa)	Yakima
13	G-4	Ponderosa Pine (Pinus ponderosa)	Yakima
14	G-4	Ponderosa Pine (Pinus ponderosa)	Skamania
15	D-2	Douglas-fir (Pseudotsuga menziesii)	Jefferson
16	G-4	Noble Fir (Abies procera)	Lewis
17	D-1	Red Cedar (Thuja plicata)	Jefferson
18	D-1	Clapp Tree (Sitka spruce)	Jefferson
19	D-2	Cougar Creek Spruce	Jefferson
20	D-1	Geodetic Hill - Silver Fir (Abies amabilis)	Jefferson
21	E-2	Van Dykes "Cathedral Cedar" (Thuja plicata)	Grays Harbor
22	D-2	Macy Spruce (Picea sitchensis)	Jefferson
23	D-2	Cream Lake Subalpine Fir (Abies lasiocarpa)	Jefferson
24	D-2	Enchanted Valley Hemlock (Tsuga heterophylla)	Jefferson
25	D-1	Big Cedars (Thuja plicata) Kalaloch site	Jefferson
26	E-2	Big Cedars (Thuja plicata) Quinault site	Jefferson
27	D-1	Sitka Spruce (Picea sitchensis)	Jefferson
28	D-2	Steeple Rock - Alaska Yellow Cedar	Clallam
29	D-1	Pacific Silver Fir (Abies amabilis)	Jefferson
30	D-4	Stevens Pass	Chelan
31	F-4	Meeks Table Natural Research Area	Yakima
32	B-4	Big Beaver Creek Valley	Whatcom
33	B-4	Chilliwack River	Whatcom
Species, stands, or communities BS			
1	G-7	Juniper Forest Area	Franklin
2	D-2	Golden Chinquapin Stand	Mason
3	G-6	Franklin County Dunes	Franklin
4	F-8	Granite Point	Whitman
5	G-8	Clarkston Basaltic Cliffs	Asotin
6	F-5	Moxee Bog Natural Landmark	Yakima
7	F-5	Englehorn Pond	Kittitas
8	G-7	Twin Buttes	Walla Walla
9	E-6	Beasley Hills	Grant
10	B-8	Bunchgrass Meadows	Pend Oreille
11	B-8	Fens and Bogs	Pend Oreille
12	B-8	Marl-bottomed Lakes	Pend Oreille
13	B-8	Shedroof Divide	Pend Oreille
14	B-8	Gypsy Peak	Pend Oreille
15	B-8	Pend Oreille River Gorge	Pend Oreille
16	B-8	Abercrombie Mt.	Stevens
17-18			
19	B-3	Cypress Island	Skagit
20	F-5	Clemons Mountain	Yakima
21	C-4	Fressentin Creek	Skagit
22	G-3	"Blue Lake"	Cowlitz
23	B-4	Big Beaver Valley	Whatcom
24	B-6	Tiffany Mountain	Okanogan
25	C-3	Chinese Gardens Marsh	Jefferson
26	F-3	Glacial Outwash Prairies	Thurston
27	D-5	Tumwater Canyon Botanical Area	Chelan
28	F-3	Hicks Lake	Thurston
29	C-1, D-1	Olympic National Park Coastal Strip	Clallam, Jefferson
30	C-6	Soap Lake Mt. and Soap Lake Area	Okanogan
31	B-4	Little Beaver Creek Valley	Whatcom
32	B-5	Boston Glacier Research Natural Area	Skagit
33	H-3	Blackwater Islands Research Natural Area	Clark
34	F-5	Rocky Prairie	Yakima
35	F-4	Cedar Swamp	Yakima
36	D-5	Coulter Creek and McCue Ridge	Chelan
37	G-1	Lake Willoughby Cedars	Clallam
38	G-2	Long Island	Pacific
39	D-5	25-mile Creek	Chelan
40	F-3	Bald Hills Lake	Thurston
41	E-3	Tacoma Prairies	Pierce
42	B-3	Lilly Lake	Skagit
43	H-4	Mount Brook	Klickitat
44	C-1	Cape Flattery	Clallam
45	D-3	Univ. Wash. Arboretum	King
46	D-3	Hiram Chittenden Gardens	King
47	F-5	Yakima Firing Range	Yakima, Kittitas
48	G-8	Larson Enclosure	Asotin
49	C-8	Weatherly Enclosure	Asotin
50	E-8	Camas Meadow	Spokane
51	E-8	Virgin Forest	Whitman
52	B-2	San Juan Island	San Juan
53	F-5	Naches Canyon	Yakima
54	F-5	Squaw Creek Canyon	Kittitas
55	D-4	Deception Creek Canyon	King
56	F-6	Crab Creek, Lower	Grant
57	E-2	Mt. Colonel Bob	Jefferson
58	D-4	MacIntyre Park	King
59	E-3	Ft. Lewis Area	Pierce
60	D-3	Wild Rhododendron Habitat	Kitsap, Jefferson, Mason
61	F-4	Wild Rhododendron Habitat	Pierce, Lewis
62	F-1	Valley Chalet	Jefferson
63	D-5	Chiwaukum Creek Canyon	Chelan
64	D-5	Swakane Canyon	Chelan
65	F-3	The Little Rockies	Pierce
66	F-6	Rockland/Scabland Community	Grant
67	E-6	Rockland/Scabland Community	Grant
68	F-6	Sand Dune Succession Community	Grant
69	F-6	Sand Dune Succession Community	Grant
70	F-6	Sand Dune Succession Community	Grant
71	F-6	Arid Scrub Community	Grant
72	D-6	Moses Coulee Talus Slopes and Basalt Cliffs	Douglas
73			
74	E-8	Alkali, Saline, and Freshwater Lake Communities	Lincoln
75	E-5, F-5	Cactus Hill	Kittitas
76	F-5	Bitterroot-Umtanum Road	Kittitas
77	F-5	Manashtash Ridge	Kittitas
78	E-3	Squak Mountain	King
79	D-3	Mountaineer's Rhododendron Preserve and Forest Theater	Kitsap
80	E-4	Olallie Meadows	Kittitas
81	F-4	Beljica Rhododendrons	Pierce
82	E-5	Deroux Creek Camp Ground	Kittitas
83	E-1	Cook Creek	Grays Harbor
84	C-1	Lake Ozette	Clallam
85	E-4	Snoqualmie Pass Vicinity	Kittitas
86	H-4	Golden Chinquapin Stand - Moffit Springs	Skamania
87	H-4	Klickatat River	Klickitat
88	C-2	Pat's Prairie	Clallam
		Hufflake Bog	Pend Oreille
		Mt. Lillian and Table Mountain Area	Chelan
		Carlisle Bog	Grays Harbor
		Mount Baker Lava Beds	Whatcom
		Cranberry Lake	Island
		Columbia River Shores	Benton, Franklin, Benton,
		Glade Creek	Yakima, Klickitat
		Dead Canyon	Klickitat, Benton
		Juniper Stand	Benton
		Juniper Stand	Grant
		Golden Chinquapin Stand	Clark
		Ceanothus, Cactus, Oak, & Pine	Clallam, Jefferson
		Dungeness Spit	Clallam
		Lake Aldwell	Clallam
		Tacoma Prairies	Pierce
		Snake River Canyon	Asotin
		Tub Lake	King
		Spider Lake Aspen	King
		East Kittitas Vicinity	Kittitas
		San Juan Oaks	San Juan
		Three Tree Point	King
		Columbia River Canyon	Clark, Skamania,
		Ebey's Landing	Island
		San Juan Island	San Juan
		Naches Canyon	Yakima
		Squaw Creek Canyon	Kittitas
		Iceberg Point	San Juan
		Hood Canal	Kitsap
	B-3	Serpentine Vegetation	Whatcom
	D-4	Vegetation on Serpentine Soils	Chelan
	E-3	Ft. Nisqually Orchard	Pierce
	C-3	Goat Island	Skagit
	E-3	Point Defiance	Pierce
	E-3	Bonds Blueberry Farm	Pierce
	F-3	Bald Hill Lake	Thurston
	D-4	Glacier Basin	Snohomish
	C-4	Big Four Ice Caves Trail	Snohomish
	E-3, F-4, E-4	Oak Woodlands and Prairies	Pierce, Thurston, Clallam
	C-1	Brown Kelp (Postelsia palmaeformis)	Clallam
	G-1	Lake Ozette	Clallam
	B-4	Snoqualmie Pass Vicinity	Kittitas
	D-4	Moffit Springs Golden Chinquapin	Skamania
	E-2	Camp Thunderbird Boy Scout Camp	Thurston
	C-3	Skagit Bay Islands	Skagit
	D-2	Three O'Clock Ridge	Clallam
	D-2	Pat's Prairie	Clallam
	D-2, E-2	Golden Chinquapin Stands	Mason
	E-1	Carlisle Bog	Grays Harbor
	F-6	Juniper Stand	Benton
	F-6	Juniper Stand	Grant
	H-3	Golden Chinquapin Stand	Clark
	C-2,3	Ceanothus, Cactus, Oak, Pine	Clallam, Jefferson
	D-3		Jefferson
	D-1	Dungeness Spit	Clallam
	C-2	Lake Aldwell	Clallam
	E-4	Alaska Yellow Cedar Stands	King, Kittitas
	E-3	Spider Lake Aspen	King
	F-5	East Kittitas Vicinity	Kittitas
	B-7, J-3	San Juan Oak	San Juan
	F-1	Grays Harbor Arboretum	Grays Harbor
	G-5	Bickleton Oak Grove	Klickitat
	D-3	Hicks Lake	Thurston
	G-4	Matthews Beach	King
	G-7	Juniper Forest	Franklin
	D-8	Spokane River, South Banks	Spokane
	D-4	Upper Icicle River Cedars	Chelan
	F-4	Cedar Swamp	Yakima
	F-3	Bald Hills Lake	Thurston
	B-4	Quaking Aspen Stand	Whatcom
	E-3	Tacoma Prairies	Pierce
	F-7	Lily Lake	Skagit
	D-3	Lee-Hall Arboretum	Jefferson
	H-6	Juniper Stand	Klickitat
	D-3	Hiram Chittenden Locks Gardens	King
	D-3	Univ. Wash. Arboretum	King
	F-5	Yakima Firing Range	Yakima, Kittitas
	C-3	Ebey's Landing	Island
	B-3	San Juan Island	San Juan
	B-6	Naches Canyon	Yakima
	D-8	Squaw Creek Canyon	Kittitas
	C-3	Iceberg Point	San Juan
	D-2	Hood Canal	Kitsap
	B-3	Serpentine Vegetation	Whatcom
	D-4	Vegetation on Serpentine Soils	Chelan
	E-3	Ft. Nisqually Orchard	Pierce
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	D-4	Moffit Springs Golden Chinquapin	Skamania
	E-2	Camp Thunderbird Boy Scout Camp	Thurston
	C-3	Skagit Bay Islands	Skagit
	D-2	Three O'Clock Ridge	Clallam
	D-2	Pat's Prairie	Clallam
	D-2, E-2	Golden Chinquapin Stands	Mason
	E-2		
	E-1	Carlisle Bog	Grays Harbor
	F-6	Juniper Stand	Benton
	F-6	Juniper Stand	Grant
	H-3	Golden Chinquapin Stand	Clark
	C-2,3, D-3	Ceanothus, Cactus, Oak, Pine	Clallam,

BOTANICAL INDEX

369	G-3	Goat Marsh Research Natural Area	Coolitz
370	G-7	Twin Sisters Dune Vegetation	Walla Walla
371	F-8	Kamiak Butte	Whitman
372	F-7	Palouse River Canyon	Franklin, Whitman
373	E-6, E-7	Rocky Coulee	Grant, Adams
374	G-8	Asotin Creek Canyon	Asotin
375	G-8	Lower Grande Ronde	Asotin
376	B-5	Washington Pass (Larch)	Chelan, Okanogan
377	B-8	Molten Creek Research Natural Area	Pend Oreille
378	C-2	Thomas T. Adwell Environmental Study Area	Clallam
379	C-2	Hurricane Ridge (Subalpine Fir & Alaska Yellow-cedar)	Clallam
380	C-2	Marymere Falls Natural Area (Grand Fir)	Clallam
381	C-2	Heart O' The Hills Silver Fir Forest	Clallam
382	C-2	Deer Park (Lodgepole Pines)	Clallam
383	E-4	Federation Forest	King
384	C-3	Big Rock Floral Area	Skagit
385	B-3	Washington Park	Skagit
386	E-3	North Sammamay Woods	Pierce
387	B-4	Sauk Mountain	Skagit
388	B-4	Chowder Ridge and Skyline Ridge	Whatcom
389	B-5	Ross Lake, Northeast End	Whatcom
390	B-5	Horseshoe Mountain	Okanogan
391	B-4	Twin Sisters Range	Whatcom
392	B-4	Diablo – Sourdough Mountain Area	Whatcom
393	B-5	Crater Mountain	Whatcom
394	B-5	Hart's Pass	Whatcom, Okanogan
395	B-5	Slate Peak	Okanogan
396	B-5	Robinson Creek Valley	Okanogan
397	B-5	Sweetgrass Butte	Okanogan
398	B-5	Eight Mile Creek Valley	Okanogan
399	C-5	Horseshoe Basin	Chelan
400	C-5	McAlester Lake, Boggy Site	Chelan
401	C-5	Gilbert Vicinity	Okanogan
402	C-5	Lime Creek Drainage	Okanogan
403	C-5	Agnes Creek Drainage and Coon Lake Area	Chelan
404	C-5	Common Creek Drainage	Chelan
405	C-5	Coon Lake Area	Chelan
406	C-5	Star Peak	Chelan
407	C-5	Hoodoo Pass	Chelan
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409	C-4	Miner's Ridge	Snohomish
410	C-4	Mt. Pug	Snohomish
411	C-4	Glacier Peak	Snohomish
412	C-4	Lake 22	Snohomish
413			
414	D-4	Winter's Lake Area	Snohomish
415	D-4	Index Area	Snohomish
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417	D-5	Wenatchee Lake	Chelan
418	D-5	Nason Creek	Chelan
419	E-5	Swauk Pass	Kittitas, Chelan
420	E-3	Sweetgrass Butte	Pierce
421	D-4	Sunday Lake	King
422	D-4	Boulder Creek	Snohomish

Areas of mycological (mushrooms) importance. See also County Discussion

entry	"Fungi Sites," BM		
1	C-1	Soleduck Valley Area	Clallam
2	D-1	Clearwater Vicinity	Jefferson
3	D-2	Quinault Ridge	Grays Harbor
4	E-2	Upper Wishkah Valleys	Grays Harbor
5	E-2	Upper Satsop River Valleys	Mason
6	C-2, D-2	Middle Dungeness River Area	Clallam
7	D-2, D-3	Dosewallips & Duckabush River Valleys	Jefferson
8	F-2	Brooklyn Vicinity	Pacific
9	D-3	Belfair Vicinity	Kitsap, Mason
10	B-3, B-4	Mt. Baker and Nooksack Valley Area	Whatcom
11	B-4, C-4	Skagit and Sauk River Valleys	Skagit
12	C-4	S. Fork of the Stilliguamish Area	Snohomish
13	C-4	Upper Sauk River Valley	Snohomish
14	D-4	N. Fork of the Skykomish Area	Snohomish
15	E-4	Grass and Huckleberry Mountains Vicinity	King, Pierce
16	E-4	Stampede Pass Vicinity	King, Kittitas
17	E-4	Keechelus Area	Kittitas
18	E-4, E-5	Cle Elum River and Upper Teanaway River Valleys	Kittitas
19	C-5, D-5	Upper Wenatchee; White, Chiwawa, and Napeequa Valleys	Chelan
20	E-4, F-4	Carbon Ridge	Pierce
21	E-4	White River Valley	Pierce
22	E-4, F-4	Bumping and Rattlesnake River Valleys	Yakima
23	F-4, F-5	Tieton River Valley	Yakima
24	F-4	Packwood Vicinity	Lewis
25	F-4, G-4	Randle Vicinity	Lewis
26	G-4	Hamilton Buttes Area	Lewis, Skamania
27	G-4	Upper Cispus River Valley	Skamania, Lewis
28	G-4	Sleeping Beauty Peak Area	Skamania
29	G-4, H-4	Glenwood – Trout Lake Vicinity	Klickitat
30	G-4, H-4	Dead Horse Meadows	Skamania
31	H-4	Nestor Peaks	Klickitat
32	H-4, G-4	Central Skamania County	Skamania
33	H-3	Tumtum Mountain Area	Clark
34	G-3	Yale Lake Vicinity	Cowlitz
35	G-3	N. Fork of the Toutle River Area	Cowlitz
36	C-1	Makah Indian Reservation Area	Clallam
37	H-3	Death Angel Mushroom Colony (Amanita virna)	Clark
38	B-8	Northern Pend Oreille County	Pend Oreille

SOILS INFORMATION

The following information is taken from the book, Natural Vegetation of Oregon and Washington, by Jerry F. Franklin and C. T. Dyrness, U.S.D.A. Forest Service General Technical Report PNW-8, published 1973. The Great Soils Groups are included herein as supplemental information integrating the botanical and the Geological maps. The Plant Species List gives scientific and common names for Oregon and Washington plant species. It is hoped the list will be the basis of eventual detailed plant listings in each of the lists developed for the Vertebrate communities. (See pages 19 and 20).

Table 1. Principal great soil groups within Washington

Province	1938 Classification System[1]		1967 Classification System[2]	
	Widespread great soil groups[3]	Less abundant great soil groups	Widespread great groups[3]	Less abundant great groups
Olympic Peninsula	Sols Bruns Acides Reddish Brown Lateritic Lithosol	Podzol Brown Podzolic Alpine Turf Alpine Meadow Humic Gley Alluvial Regosol Rockland[4]	Xerochrepts Dystrochrepts Haplumbrepts	Haplorthods Cryorthods Rocklands[4] Haplohumults Haplaquods Haplaquolls Ochraqualfs

[1] Based largely on "Soils of the Western United States" (Western Land Grant Universities et al. 1961).
[2] Based largely on information in "Columbia – North Pacific Region Comprehensive Framework Study," Appendix IV, "Land and Mineral Resources." (Pacific Northwest River Basins Commission 1969).
[3] Listed in approximate order of importance.
[4] A miscellaneous land type in which rock outcrops or rock rubble dominate the landscape.

Brief Description of Soil Great Groups (1967 Classification System)

Descriptions follow those contained on the soils sheet (No. 86-87) within the National Atlas (Soil Conservation Service 1970). To describe the soil great groups, it is necessary to describe characteristics of the soil orders (names ending with the suffix "sol") and suborders (two syllable words which are suffixes for great group names).

Since great groups defined in the 1967 and 1938 soil classification systems overlap, it is not possible to give equivalents that would apply in every case. However, the 1938 great soil groups shown in parentheses are probably the most commonly occurring equivalents to the great groups as defined in the new classification system.

ALFISOLS

Soils that are medium to high in bases with gray to brown surface horizons and subsurface horizons of clay accumulation. Soils are usually moist but may be dry for a portion of the warm season.

Aqualfs

Seasonally wet Alfisols with mottles, iron-manganese concretions, or gray colors; used for general crops where drained, and pasture and woodland where undrained.

Albaqualfs

Aqualfs with a bleached (white) upper horizon and an abrupt change in texture into an underlying horizon of clay accumulation (formerly Planosols).

Udalfs

Alfisols situated in temperate to tropical regions. Soils are usually moist, but during the warm season may be intermittently dry in some horizons for short periods; used for row crops, small grain, and pasture.

Hapludalfs

Udalfs with a subsurface horizon of clay accumulation that is relatively thin or brownish (formerly Gray-Brown Podzolic soils without fragipans).

Xeralfs

Alfisols that are in climates with rainy winters and dry summers; during the summer, these soils are continuously dry for a long period; used for range, small grain, and irrigated crops.

Haploxeralfs

Xeralfs with a subsurface horizon of clay accumulation that is relatively thin or brownish (formerly Noncalcic Brown soils).

ARIDISOLS

Soils with pedogenic horizons low in organic matter and never moist for as long as 3 consecutive months.

Argids

Aridisols with a horizon in which clay has accumulated with or without alkali (sodium); mostly used for range with some irrigated crops.

Durargids

Argids with a hardpan (duripan) which is cemented with silica (formerly Desert, Red Desert, Sierozem, and some Brown soils, all with hardpan).

Haplargids

Argids with a loamy horizon of clay accumulation with or without alkali (sodium) (formerly Sierozem, Desert, Red Desert, and some Brown soils).

Natrargids

Argids with a horizon of clay and alkali (sodium) accumulation (formerly Solonetz soils).

Orthids

Aridisols with accumulations of calcium carbonate, gypsum, or other salts but no horizon of clay accumulation. They may have horizons from which some materials have been removed or altered; used mostly for range with some irrigated crops.

Camborthids

Orthids with horizons from which some materials have been removed or altered but which have no large accumulations of calcium carbonate or gypsum (formerly Sierozem, Desert, and Red Desert soils).

Durorthids

Orthids with a hardpan (duripan) cemented with silica (formerly Regosols, Calcisols, or Alluvial soils, all with hardpan).

ENTISOLS

Soils that have no pedogenic horizons.

Fluvents

Entisols with organic matter content that decreases irregularly with depth; formed in loamy or clayey alluvial deposits; used for range or irrigated crops in dry regions and for general farming in humid regions.

Udifluvents

Fluvents which are usually moist (formerly Alluvial soils).

Orthents

Loamy or clayey Entisols that have a regular decrease in organic matter content with depth; used for range or irrigated crops in dry regions and for general farming in humid regions.

Haplorthents

Orthents which lack diagnostic horizons due to geologically recent deposition or erosion (formerly Regosols, Lithosols, and Alluvial soils).

Xerorthents

Orthents developed in climates with rainy winters but dry summers; they are continuously dry for a long period during the summer (formerly Regosols, Brown, and Alluvial soils).

Xerorthents (shallow)

Orthents that are shallower than 20 inches to bedrock (formerly Lithosols).

Psamments

Entisols that have textures of loamy fine sand or coarser; used for range, woodland, small grains, and irrigated crops.

Torripsamments

Psamments that contain easily weatherable minerals; they are never moist for as long as 3 consecutive months (formerly Regosols).

Xeropsamments

Psamments in climates with rainy winters but dry summers; they are continuously dry for a long period during the summer (formerly Regosols).

INCEPTISOLS

Soils which have weakly differentiated horizons; materials in the soil have been altered or removed but have not accumulated. These soils are usually moist, but some are dry part of the time during the warm season.

Andepts

Inceptisols that either have formed in volcanic ash materials, or have low bulk density and large amounts of amorphous materials, or both; used for woodland and range or pasture.

Cryandepts

Andepts of cold regions (formerly Brown Podzolic or Gray-Brown Podzolic soils).

Dystrandepts

Andepts with a thick dark-colored surface horizon that is low in bases, or with a light colored surface horizon (formerly Ando soils).

Vitrandepts

Andepts mostly formed in pumice or slightly weathered volcanic ash (formerly Regosols).

Aquepts

Seasonally wet Inceptisols with an organic surface horizon, sodium saturation, and mottles or gray colors; used for woodland and pasture.

Haplaquepts

Aquepts with either a light-colored or a thin black surface horizon (formerly Low-Humic Gley soils).

Ochrepts

Inceptisols formed in materials with crystalline clay minerals, with light-colored surface horizons and altered subsurface horizons that have lost mineral materials; used for woodland and range.

Dystrochrepts

Ochrepts that are usually moist and low in bases and have no free carbonates in the subsurface horizons (formerly Sols Bruns Acides and some Brown Podzolic and Gray-Brown Podzolic soils).

Xerochrepts

Ochrepts that are in climates with rainy winters but dry summers; the soils are continuously dry for a long period during the summer (formerly Regosols).

Umbrepts

Inceptisols with crystalline clay minerals, thick dark-colored surface horizons, and altered subsurface horizons that have lost mineral materials and are low in bases; used for woodland and range.

Cryumbrepts

Umbrepts of cold regions (formerly Tundra soils).

Haplumbrepts

Umbrepts of temperate to warm regions (formerly Western Brown Forest soils).

Xerumbrepts

Umbrepts formed in climates with rainy winters but dry summers; the soils are continuously dry for a long period during the summer (formerly Regosols).

MOLLISOLS

Soils with nearly black, friable, organic-rich surface horizons high in bases; formed mostly in subhumid and semiarid warm to cold climates.

Aquolls

Seasonally wet mollisols with a thick, nearly black surface horizon and gray subsurface horizons; used for pasture.

Haplaquolls

Aquolls with horizons in which materials have been altered or removed, but no clay or calcium carbonate has accumulated (formerly Humic Gley soils).

Udolls

Mollisols of temperate climates. Udolls are usually moist and have no horizon in which calcium carbonate or gypsum has accumulated.

Argiudolls

Udolls with a subsurface horizon in which clay has accumulated (formerly Prairie soils).

Xerolls

Mollisols formed in climates with rainy winters and dry summers; these soils are continuously dry for a long period during the summer; used for wheat, range, and irrigated crops.

Argixerolls

Xerolls with a subsurface horizon of clay accumulation that is relatively thin or brownish (formerly Prairie and Chernozem soils).

Durixerolls

Xerolls with a hardpan (duripan) cemented with silica (formerly Prairie soils with hardpan).

Haploxerolls

Xerolls with a subsurface horizon high in bases but lacking large accumulations of clay, calcium carbonate, or gypsum (formerly Prairie, Chernozem, Chestnut, and Brown soils).

Palexerolls

Xerolls with a hardpan cemented with carbonates or a horizon of clay accumulation that is thick and reddish or is clayey in the upper part and changes abruptly in texture into an overlying horizon (formerly Prairie soils).

SPODOSOLS

Soils with low base supply having in subsurface horizons an accumulation of amorphous materials consisting of organic matter plus compounds of aluminum and usually iron; formed in acid, coarse-textured materials in humid and mostly cool or temperate climates.

Orthods

Spodosols with a horizon in which organic matter plus compounds of iron and aluminum have accumulated; used for woodland, hay, and pasture.

Cryorthods

Orthods of cold regions (formerly Podzols).

Fragiorthods

Orthods with a dense, brittle, but not indurated horizon (fragipan) below a horizon that has an accumulation of organic matter and compounds of iron and aluminum (formerly Podzols and Brown Podzolic soils, both with fragipans).

Haplorthods

Orthods of cool regions with a horizon in which organic matter plus compounds of iron and aluminum have accumulated; they have no dense, brittle, or indurated horizon (fragipan) (formerly Podzols and Brown Podzolic soils).

ULTISOLS

Soils which are low in bases and have subsurface horizons of clay accumulation; they are generally moist, but during the warm season some are dry part of the time.

Humults

Ultisols with a high content of organic matter; formed in temperate or tropical climates typified by a large amount of rainfall throughout the year; used for woodland, pasture, and small grain, truck, and seed crops.

Haplohumults

Humults with either a subsurface horizon of clay accumulation that is relatively thin, or a subsurface horizon with appreciable amounts of weatherable minerals, or both; formed in temperate climates (formerly Reddish Brown Lateritic soils).

Xerults

Ultisols that are relatively low in organic matter in the subsurface horizons; formed in climates with rainy winters and dry summers; these soils are continuously dry for a long period during the summer; used for range and woodland.

Haploxerults

Xerults with either a relatively thin subsurface horizon of clay accumulation, or a subsurface horizon with appreciable amounts of weatherable minerals, or both (formerly Reddish Brown Lateritic soils).

VERTISOLS

Clayey soils with wide, deep cracks when dry; most have distinctive wet and dry periods throughout the year.

Xererts

Vertisols with wide, deep cracks that open and close once each year and remain open continuously for more than 2 months; used for irrigated small grains, hay, and pasture.

Chromoxererts

Xererts with a brownish surface horizon (formerly Grumusols).

Brief Description of Great Soil Groups (1938 Classification System)

Descriptions follow those contained in "Soils of the Western United States" (Western Land Grant Universities et al. 1964). Soil horizon thickness classes are approximately: (1) very thin, less than 3 centimeters; (2) thin, 3 to 10 centimeters; (3) moderately thick, 10 to 20 centimeters; (4) thick, 20 to 40 centimeters; and (5) very thick, over 40 centimeters. All other classes and designations follow the "Soil Survey Manual" and Supplement (U.S. Soil Conservation Service 1951, 1962).

Azonal Soils

Alluvial

Alluvial soils are formed on recent alluvium and, therefore, exhibit very little profile development. A horizons are thin to moderately thick, light to dark in color, with low to moderate amounts of organic matter accumulation. B horizons are lacking, and the C is made up of stratified alluvium which is often stony or gravelly. Soil reaction ranges from moderately alkaline to medium acid.

Lithosols

Lithosols are well drained, shallow, generally stony soils over bedrock. A horizons are very thin to moderately thick, light to dark in color, with low to moderate amounts of incorporated organic matter. B horizons are lacking; a transitional AC horizon may be present. Soil reaction may vary from moderately alkaline to medium acid.

Regosols

Regosols are well to excessively drained, poorly developed soils formed in deep, unconsolidated materials. A horizons are very thin to moderately thick, light to dark colored, with low to moderate organic matter content. B horizons are lacking, and the C is made up of uniform or stratified material. Reaction ranges from slightly acid to moderately alkaline. In dry areas, the soil may be calcareous.

Zonal Soils

Alpine Turf

Alpine Turf soils are formed under alpine grasses and herbs in high mountain areas having a cold, humid climate. These well to imperfectly drained soils have thin to thick black A horizons of moderate to high organic matter content. B horizons are lighter colored, generally stony, and may have noticeable increase in clay. The stony or gravelly C horizon may be layered by solifluction processes. Soil reaction is strongly acid in the surface and medium acid in the B.

Brown

Brown soils are formed under shrub-steppe in cool, semiarid climates. These well-drained soils have moderately thick, dark-brown A horizons of low organic matter content. B horizons typically have more clay and subangular blocky to prismatic structure. Soil reaction is slightly alkaline in the surface, and alkalinity increases with depth. A zone of calcium carbonate accumulation is generally present as a Bca or Cca horizon.

Brown Podzolic

Brown Podzolic soils are formed under forest in cool, humid climates. Soil drainage varies from well to imperfectly drained. 0.1 and 02 horizons are usually present. The A1 horizon is thin and dark grayish-brown in color. A very thin, intermittent A2 horizon may also be present. The brown-colored B horizon gives evidence of iron and humus accumulation but has no appreciable clay increase. Soil reaction is medium to strongly acid.

Chernozem

Chernozem soils are formed under steppe or shrub-steppe in cool, subhumid climates. These moderately well to well drained soils have moderately thick, very dark-brown to black A horizons of moderate organic matter content. B horizons usually contain more clay than the A but may be distinguished solely on the basis of color and structural changes. Soil reaction becomes more alkaline with depth, and a zone of carbonate accumulation is generally present in the lower part of the B.

Chestnut

Chestnut soils are formed under steppe or shrub-steppe in cool, semiarid climates. These well-drained soils have dark-brown, moderately thick A horizons containing moderate amounts of organic matter. B horizons often contain more clay than the A but may be distinguished largely by color and structural changes. Structure in the B may be blocky, subangular blocky, or prismatic. Soil reaction becomes more alkaline with depth, and a zone of carbonate accumulation usually occurs in or below the B horizon.

Desert

Desert soils are formed under shrub-steppe in warm, arid climates. These well-drained soils have thin, light-colored A horizons of low organic matter content. Structure of the A is platy. B horizons typically show increased clay content and are as dark as or darker colored than the A1. Reaction varies from neutral to strongly alkaline. Horizons of calcium enrichment, sometimes cemented with lime or silica, occur in or below the B horizon.

Gray-Brown Podzolic

Gray-Brown Podzolic soils are formed under forest in cool to cold, subhumid climates. They are well to imperfectly drained. A1 horizons are thin to moderately thick and very dark gray. A thin, light-colored A2 horizon occurs beneath the A1. B horizons contain more clay than the A2 and have darker colors. Structure is blocky, subangular blocky, or prismatic. Reaction is medium acid in the surface and medium to slightly acid in the B horizon.

Gray Wooded

Gray Wooded soils are formed under forest in cold, subhumid climates. They are well to imperfectly drained. Thin to moderately thick 01 and 02 horizons are present at the soil surface. A thin A1 horizon is generally present. The A2 horizon is light colored, low in organic matter content, and has platy structure. The B horizon contains more clay than the A2 and has blocky or subangular blocky structure. Surface reaction is slight to medium acid and may approach neutrality with depth.

Noncalcic Brown

Noncalcic Brown soils are formed under shrub communities (e.g., chaparral) in warm, subhumid climates. These well to moderately well drained soils have moderately thick to very thick, brown or reddish-brown, massive A horizons of low organic matter content. B horizons contain more clay and are redder than the A. They may be massive or have blocky or prismatic structure. Hard layers caused by silica cementation commonly occur in the B. In addition, small amounts of carbonate may be present in the lower part of the B horizon.

Podzol

Podzol soils are formed under forest in cool to cold, subhumid climates. They are well to moderately well drained. Thin to thick (5 to 40 centimeters) 01 horizons overlie thin to thick (5 to 25 centimeters) 02 horizons. A2 (bleicherde) horizons are thin to thick, white to very pale brown, and very low in organic matter content. B horizons are much darker and contain accumulations of iron and humus. Structure ranges from very weak blocky to strong blocky or prismatic. Soil reaction is strongly to very strongly acid.

Prairie

Prairie soils are formed under grassland vegetation in cool, subhumid to humid climates. These well to imperfectly drained soils have thick, very dark A horizons generally containing large amounts of organic matter. B horizons typically have more clay but may be differentiated from the A largely by color and structural changes. Prairie soils exhibit decreasing acidity with depth, and accumulations of calcium carbonate may occur in the C horizon.

Reddish Brown Lateritic

Reddish Brown Lateritic soils are formed under forest in warm, humid climates. They are moderately well to well drained. A horizons are moderately thick, reddish brown, and of granular structure. Shotlike iron-magnesium concretions are commonly present. B horizons are red or reddish brown and have more clay than the A. Structure is typically moderate blocky or subangular blocky. Reaction varies from moderately to very strongly acid.

Sierozem

Sierozem soils are formed under shrub-steppe in cool, arid climates. These well-drained soils have thin, light-colored A horizons containing low amounts of organic matter. Soil structure is typically platy, especially in the upper portion. B horizons contain more clay and are often darker than the A. Calcium carbonate accumulations, often cemented, generally occur in the lower part of, or just below, the B horizon. Soil reaction ranges from mildly to strongly alkaline.

Sols Bruns Acides

Sols Bruns Acides soils are formed under coniferous forest vegetation in cool, humid climates. Soil drainage may vary from well to imperfectly drained. Thin 01 and 02 horizons are usually present at the soil surface. A horizons are thick, dark brown to dark reddish brown, and moderate to high in organic matter content. B horizons show no evidence of illuviated clay and are distinguished by color and structure (subangular blocky). Soil acidity generally increases with depth and ranges from medium to very strongly acid.

Western Brown Forest

Western Brown Forest soils are formed under forest in areas of forest-steppe transition and cool, semiarid to subhumid climates. These well or moderately well drained soils have moderately thick, dark-colored granular A horizons containing low to moderate amounts of organic matter. B horizons may show increased clay content but are usually distinguished by color and structural changes. Typical B horizon structure is subangular blocky. Reaction varies from slight to medium acid, and acidity commonly decreases with depth. A zone of calcium carbonate accumulation occurs in the lower B or upper C horizon.

Intrazonal Soils

Alpine Meadow

Alpine Meadow soils are formed under high-elevation meadows in cold to very cold and humid climates. These soils are imperfectly to poorly drained. The A1 horizon is thick, very dark brown to black, moderate to high in organic matter content, and frequently stony. B horizons are lacking. C horizons are stony, mottled, and gleyed. Soil reaction is strongly or very strongly acid.

Grumusols

Grumusols occur under grassland or grass-shrub vegetation in a variety of climatic zones. They are generally well drained except in depressional areas. A horizons are very thick, dark colored, and contain low to moderate amounts of organic matter. Montmorillonitic clay content is usually high. B horizons are lacking. C horizons have wide vertical cracks which typically extend up into the A horizon. Carbonate accumulation may occur in the lower A or upper C horizon. Reaction varies from slightly acid to slightly alkaline.

Humic Gley

Humic Gley soils occur under meadows in virtually all climatic zones. They are poorly to very poorly drained. The A horizon is very dark colored and contains large amounts of organic matter. The B horizon is gleyed or mottled and is higher in clay content. Soluble salts may be present in weak to moderate concentrations. Soil reaction ranges from moderately alkaline to strongly acid.

Planosol

Planosols may occur under steppe, shrub-steppe, or forest and in a wide variety of climatic zones. They are imperfectly to poorly drained. A1 horizons are thick, dark colored, with moderate to high organic matter content. An A2 horizon of variable thickness underlies the A1; it is massive and mottled. B horizons contain appreciably more clay and have blocky or prismatic structure. A cemented layer may be present in the lower solum. Reaction varies from medium to mildly alkaline.

Solonchak

Solonchak soils occur under shrub-steppe in arid to semiarid areas. These poorly drained soils have thin, light-colored A horizons low in organic matter content. Salt crusts are commonly present on the surface. B horizons are lacking.

Solonetz

Solonetz soils occur under steppe or shrub-steppe in arid to semiarid areas. Soil drainage ranges from well to imperfectly drained. A horizons are thin, platy, light-colored, and contain low amounts of organic matter. B horizons contain more clay and have blocky, prismatic, or columnar structure. Portions of the B horizon contain more than 15 percent of exchangeable sodium. A zone of carbonate enrichment, commonly cemented, occurs in the lower part of or below the B horizon. Soil reaction varies from neutral to very strongly alkaline.

Miscellaneous Land Type

Rockland

Rockland designates areas with only sparse vegetation, dominated by rock outcrops, rock rubble, boulders, or stones. Restricted areas of thin soils may be included, but in general, soil development is severely limited.

LIST OF PLANT SPECIES

The major sources for the scientific names of these species are Hitchcock et al. (1955, 1959, 1961, 1964, 1969) for most vascular plants; Little (1953) for trees and some shrubs; and Peck (1961) for the remainder. Mosses follow Lawton (1971), and lichens follow Howard (1950) in most cases. Common names are from a variety of sources, the most important being Garrison et al. (1967), Peck (1961), and Little (1953). Mosses, lichens, and liverworts are marked with an asterisk; no common names are given for these species.

Abies amabilis (Dougl.) Forbes	Pacific silver fir
Abies concolor (Gord. & Glend.) Lindl.	white fir
Abies grandis (Dougl.) Lindl.	grand fir
Abies lasiocarpa (Hook.) Nutt.	subalpine fir
Abies magnifica Murr. var. *shastensis* Lemm.	Shasta red fir
Abies procera Rehd.	noble fir
Abronia latifolia Eschsch.	yellow sandverbena
Acer circinatum Pursh	vine maple
Acer glabrum Torr.	Rocky Mountain maple
Acer glabrum Torr. *douglasii* (Hook.) Dipp.	Rocky Mountain maple
Acer macrophyllum Pursh	bigleaf maple
Achillea millefolium L.	western yarrow
Achillea millefolium var. *lanulosa* Piper	western yarrow
Achlys triphylla (Smith) DC.	deerfoot vanillaleaf
Actaea rubra (Ait.) Willd.	baneberry
Adenocaulon bicolor Hook.	trail plant
Adiantum pedatum L.	western maidenhair-fern
Adiantum pedatum L. var. *aleuticum* Rupr.	western maidenhair-fern
Agastache urticifolia (Benth.) Kuntze	nettle-leaved giant-hyssop
Agoseris glauca (Pursh) Raf.	pale agoseris
Agoseris heterophylla (Nutt.) Greene	annual agoseris
Agoseris hirsuta (Hook.) Greene	woolly agoseris
Agropyron caninum (L.) Beauv.	bearded wheatgrass
Agropyron caninum (L.) Beauv. var. *andinum* (Scribn. & Smith) C. L. Hitchc.	alpine wheatgrass
Agropyron caninum (L.) Beauv. var. *latiglume* (Scribn. & Smith) C. L. Hitchc.	alpine wheatgrass
Agropyron dasystachyum (Hook.) Scribn.	thickspike wheatgrass
Agropyron spicatum (Pursh) Scribn. & Smith	bluebunch wheatgrass
Agrostis hallii Vasey	Hall's bentgrass
Agrostis idahoensis Nash	Idaho bentgrass
Agrostis rossiae	Ross bentgrass
Agrostis thurberiana A. S. Hitchc.	Thurber's bentgrass
Aira caryophyllea L.	silver hairgrass
Aira praecox L.	early hairgrass
Allium cernuiatum Wieg.	Olympic onion
Allium falcifolium H. & A.	sickle-leaved onion
Allotropa virgata T. & G. ex. Gray	sugar stick
Alnus incana (L.) Moench	mountain alder
Alnus rhombifolia Nutt.	white alder
Alnus rubra Bong.	red alder
Alnus sinuata (Reg.) Rydb.	Sitka alder
Alnus viridis (Hehe.) Limpr.*	
Alopecurus geniculatus L.	marsh foxtail
Amelanchier alnifolia Nutt.	Saskatoon serviceberry
Amelanchier pallida Greene	pale serviceberry
Ammophila arenaria (L.) Link	European beachgrass
Anaphalis margaritacea (L.) B. & H.	pearly everlasting
Andreaea nivalis Hook.*	
Anemone deltoidea Hook.	threeleaf anemone
Anemone drummondii Wats.	Drummond anemone
Anemone lyallii Britt.	Lyall anemone
Anemone occidentalis Wats.	western pasqueflower
Anemone oregana Gray	Oregon anemone
Anemone piperi Britt.	Piper anemone
Angelica arguta Nutt.	shining angelica
Angelica lucida L.	sea-watch
Antennaria alpina (L.) Gaertn.	alpine pussytoes
Antennaria corymbosa E. Nels.	flattop pussytoes
Antennaria dimorpha (Nutt.) T. & G.	low pussytoes
Antennaria geyeri Gray	pinewoods everlasting
Antennaria lanata (Hook.) Greene	woolly everlasting
Antennaria racemosa Hook.	slender everlasting
Antennaria rosea Greene	rose pussytoes
Anthoxanthum odoratum L.	sweet vernal grass
Apocynum androsaemifolium L.	spreading dogbane
Apocynum pumilum Greene	low dogbane
Arabis colbrunii M. E. Jones	gray rockcress
Arabis holboellii Hornem.	Holboell rockcress
Arabis holboellii Hornem. var. *pendulocarpa* (A. Nels.) Rollins	Holboell rockcress
Arabis rectissima Greene	bristly-leaved rockcress
Arbutus menziesii Pursh	Pacific madrone
Arceuthobium campylopodum Engelm.	yellow leafless mistletoe
Arctostaphylos canescens Eastw.	hoary manzanita
Arctostaphylos cinerea How.	gray manzanita
Arctostaphylos columbiana Piper	hairy manzanita
Arctostaphylos hispidula How.	Howell manzanita
Arctostaphylos nevadensis Gray	pine-mat manzanita
Arctostaphylos patula Greene	green manzanita
Arctostaphylos uva-ursi (L.) Spreng.	kinnikinnick
Arctostaphylos viscida Parry	white-leaved manzanita
Arenaria capillaris Poir.	mountain sandwort
Arenaria capillaris var. *americana* Davis	fescue sandwort
Arenaria congesta Nutt. in T. & G.	dense-flowered sandwort
Arenaria formosa (Fisch.) Reg.	slender mountain sandwort
Arenaria howellii Wats.	Howell's sandwort
Arenaria macrophylla Hook.	bigleaf sandwort
Arenaria obtusiloba (Rydb.) Fern.	blunt-leaved sandwort
Arenaria paniculata Cov.	Crater Lake sandwort
Arenaria rubella (Wahlenb.) J. E. Smith	varying sandwort
Aristida longiseta Steud.	red threeawn
Armeria maritima (Mill.) Willd.	thrift
Arnica chamissonis Less.	leafy arnica
Arnica cordifolia Hook.	heartleaf arnica
Arnica latifolia Bong.	broadleaf arnica
Arnica rydbergii Greene	Rydberg's arnica
Arnica sororia Greene	sisters' arnica
Arrhenatherum elatius (L.) Pres.	tall oatgrass
Artemisia arbuscula Nutt.	low sagebrush
Artemisia cana Pursh	silver sagebrush
Artemisia douglasiana Bess.	Douglas' wormwood
Artemisia ludoviciana Nutt.	western wormwood
Artemisia norvegica Fries	arctic wormwood
Artemisia rigida (Nutt.) Gray	stiff sagebrush
Artemisia spinescens Eat.	bud sagebrush
Artemisia suksdorfii Piper	Suksdorf sagebrush
Artemisia tilesii Ledeb.	mountain wormwood
Artemisia tridentata Nutt.	big sagebrush
Artemisia trifurcata Steph. ex Spreng.	three-forked wormwood
Artemisia tripartita Rydb.	threetip sagebrush
Asarum caudatum Lindl.	wild ginger
Aster alpigenus (T. & G.) Gray	alpine aster
Aster canescens Pursh	hoary aster
Aster chilensis Nees	Chilian aster
Aster conspicuus Lindl.	showy aster
Aster engelmannii (Eat.) Gray	Engelmann aster
Aster foliaceus Lindl.	leafy aster
Aster ledophyllus Gray	Cascades aster
Aster occidentalis (Nutt.) T. & G.	western aster
Aster radulinus Gray	rough-leaf aster
Aster scopulorum Gray	crag aster
Aster subspicatus Nees	Douglas aster
Astragalus arrectus Gray	hangingpod milkvetch
Astragalus curvicarpus (Sheld.) Macbr.	curvepod milkvetch
Astragalus filipes Torr. ex Gray	threadstalk milkvetch
Astragalus lectulus Wats.	purple woollypod
Astragalus lentiginosus Dougl. ex Hook.	speckledpod loco
Astragalus miser Dougl. ex Hook.	starved milkvetch
Astragalus palousensis Piper	doublepod milkvetch
Astragalus purshii Dougl. ex Hook.	Pursh's milkvetch
Astragalus spaldingii Gray	Spalding's milkvetch
Astragalus stenophyllus T. & G.	hangingpod milkvetch
Athyrium distentifolium Tausch ex Opiz	alpine ladyfern
Athyrium distentifolium Tausch ex Opiz var. *americanum* (Butters) Cronq.	alpine ladyfern
Athyrium filix-femina (L.) Roth	ladyfern
Atriplex confertifolia (Torr. & Frem.) Wats.	shadescale
Atriplex nuttallii Wats.	Nuttall's saltbush
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Avena fatua L.	wild o

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Bromus japonicus Thunb.
Bromus mollis L.
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Bromus rigidus Roth
Bromus sitchensis Trin.
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Bromus vulgaris (Hook.) Shear
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Cornus stolonifera Michx.
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little quaking grass
harvest brodiaea
harvest brodiaea
large-flowered brodiaea
many-flowered brodiaea
rattlesnake grass
California brome
hairy brome
Japanese brome
soft brome
Orcutt's brome
ripgut brome
Alaska brome

Alaska brome
cheatgrass brome
Columbia brome

bluejoint reedgrass
narrow-spiked reedgrass
Pacific reedgrass
pinegrass
elegant mariposa lily
green-banded mariposa lily
big-pod mariposa lily
twinflower marshmarigold
elkslip marshmarigold
calypso
common camas
California harebell
American harebell
Scouler bellflower
alpine bittercress

slender dentaria
Cusick-white-scaled sedge
Columbia sedge
water sedge
Brewer sedge
California sedge
northwestern sedge
Dewey sedge
soft-leaved sedge
Douglas' sedge
thread-leaved sedge
elk sedge
Hood sedge
small-headed sedge
green-fruited sedge
slender beg sedge
Kellogg's sedge
lunula-like sedge
bighead sedge
Alaska long-awned sedge
western stellate sedge
Morrows sedge
Nebraska sedge
black alpine sedge
slough sedge
thick-headed sedge
long-stoloned sedge
mountain hare sedge
clustered field sedge
Pyrenaean sedge
Raynold's sedge
Ross sedge
beaked sedge
western single-spiked sedge
Holm's Rocky Mountain sedge
Sitka sedge
showy sedge
western cassiope
golden chinkapin
small golden chinkapin
mottled paintbrush
cotton paintbrush
Elmer paintbrush
yellow paintbrush
scarlet paintbrush
smallflower paintbrush

white smallflower paintbrush

rosy paintbrush
mountain whitethorn
ceanothus
narrow-leaved buckbrush
deerbrush
squawcarpet
dwarf ceanothus
redstem ceanothus
blueblossom
snowbrush ceanothus
varnishleaf ceanothus

snowbrush ceanothus
buckbrush
field chickweed
hornwort
birchleaf mountainmahogany
curlleaf mountainmahogany
falseyarrow
Thompson falseyarrow
Port-Orford-cedar
Alaska-cedar
lace-fern
podfern
little prune's prune
western prince's pine

western prince's pine
tall gray rabbitbrush

whitestem gray rabbitbrush
tall green rabbitbrush
western waterhemlock
alpine circaea
common thistle

cladothamnus or copper bush
lance-leaved springbeauty
alpine springbeauty

alpine springbeauty
queencup beadlily
littleflower collinsia
large-flowered collomia
varied-leaved collomia
narrow-leaved collomia
diffuse collomia
coast morningglory
boreal goldthread
cutleaf goldthread
western goldthread
spotted coralroot
Mertens' coralroot
bunchberry dogwood
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Pacific dogwood
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California hazel
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Eriogonum filifolius Nutt.
Eriogonum linearis (Hook.) Piper
Eriogonum pergracile (Pursh) Greene
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Eriogonum nudum Dougl. ex Benth.
Eriogonum piperi Greene
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Eriogonum ternatum How.
Eriogonum thymoides Benth. in DC.
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Eriogonum vimineum Dougl.
Eriogonum vimineum Dougl. var *baileyi* (Wats.) Davis
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Erophyllum lanatum (Pursh) Forbes
Erodium circutarium (L.) L'Her.
Erysimum arenicola Wats. var. *torulosum* (Piper) C. L. Hitchc.
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Festuca arundinacea Schreb.
Festuca bromoides L.
Festuca californica Vasey
Festuca idahoensis Elm.
Festuca microstachys Nutt.
Festuca myuros L.
Festuca occidentalis Hook.
Festuca octoflora Walt.
Festuca ovina L.
Festuca pratensis Huds.
Festuca rubra L.
Festuca scabrella Torr.
Festuca viridula Vasey
Fontinalis antipyretica Hedw. var. *gigantea* (Sull.) Sull.*
Fragaria chiloensis (L.) Duchesne
Fragaria vesca L. var. *bracteata* (Heller) Davis
Fragaria vesca L. var. *crinita* (Rydb.) C. L. Hitchc.
Fragaria virginiana Duchesne
Fragaria virginiana Duchesne var. *platypetala* (Rydb.) Hall
Frasseria chamissonis Gaud.
Frasera albicaulis Dougl. ex Griseb.
Fraxinus latifolia Benth.
Frullania nisqualensis Sull.*
Galium aubignon Wight
Galium aparine L.
Galium boreale L.
Galium divaricatum Lam.
Galium aparine Britt.
Galium triflorum Michx.
Garrya buxifolia Gray
Garrya elliptica Dougl.
Garrya fremontii Torr.
Gastridium ventricosum (Gouan) Schinz. & Thell.

Columbia hawthorn
blackhawthorn
long-leaved hawks beard

slender hawks beard
slender cryptantha
obscure cryptantha
Thompson cryptantha
Torrey's cryptantha
parsley-fern
Oregon cliff-brake
salt-marsh dodder
great houndstongue
hedgehog dogtail
Scotch broom
orchardgrass
California danthonia
timber danthonia

few-flowered wild oatgrass
California pitcher-plant
wild carrot
rocksilk larkspur
pale larkspur
Menzies' larkspur
mountain hairgrass
tufted hairgrass

slender hairgrass
pinnate tansymustard

foxglove
common teasel
Hooker's fairybells
Smith's fairybells
seashore saltgrass
alkali saltgrass
broad-leaved shootingstar
tall mountain shootingstar
smooth-leaved douglasia
snow douglasia
great alpine draba
twisted draba
vernal draba

sundew
white mountain avens

mountain woodfern
needle spikesedge
creeping spikesedge
few-flowered spikesedge
elmera
medusahead wildrye
giant wildrye
yellow wildrye
blue wildrye
northern wildrye
dune wildrye
creeping wildrye
black crowberry
alpine willowweed

fireweed
common willowweed
red willowweed
small-flowered willowweed
autumn willowweed
marsh horsetail
giant horsetail
golden fleabane
scabland fleabane
dwarf mountain fleabane

dwarf mountain fleabane
longleaf fleabane
threadleaf fleabane
lineleaf fleabane
peregrine fleabane

shaggy fleabane
showy or Oregon fleabane
yerba santa
northern beckwheat
Douglas buckwheat
Wyeth buckwheat
broad-leaved eriogonum
mountain buckwheat
slenderbush buckwheat

bushy buckwheat
snow eriogonum
naked buckwheat
Piper buckwheat

alpine buckwheat

rock buckwheat
Waldo buckwheat
thyme buckwheat
sulfur buckwheat
broom buckwheat

broom buckwheat
tall cotton-grass
common woolly sunflower
filaree

wallflower
lambstongue fawnlily
avalanche fawnlily

winterfat
alta fescue
six-weeks fescue
California fescue
Idaho fescue
Nuttall's fescue
rattail fescue
western fescue
eight-flowered fescue
sheep fescue
meadow fescue
red fescue
rough fescue
green fescue

coast strawberry

western wood strawberry

California strawberry
Virginia strawberry

broad-petaled strawberry
silver beach-weed
white-stemmed swertia
Oregon ash.

obscure bedstraw
cleavers bedstraw
northern bedstraw
spreading bedstraw
Oregon bedstraw
sweetscented bedstraw
box-leaved garrya
silk tassel bush
bear bush

nit grass

Gaultheria ovatifolia Gray
Gaultheria shallon Pursh
Gayophytum nuttallii T. & G.
Gayophytum ramosissimum Nutt. ex T. & G.
Gentiana calycosa Griseb.
Geranium dissectum L.
Geranium molle L.
Geranium viscosissimum F. & M.
Geum macrophyllum Willd.
Geum triflorum Pursh
Geum triflorum Pursh var. *ciliatum* (Pursh) Fassett
Gilia capitata Sims
Gilia nuttallii Gray
Githopsis specularioides Nutt.
Glaux maritima L.
Glehnia leiocarpa Mathias
Glyceria elata (Nash) M. E. Jones
Goodyera oblongifolia Raf.
Grayia spinosa (Hook.) Moq.
Grindelia stricta DC.
Grossularia velutina
Gymnocarpium dryopteris (L.) Newm.
Gymnosmitrium varians (Lindb.) Schiffn.*
Habenaria dilatata (Pursh) Hook.
Habenaria unalascensis (Spreng.) Wats.
Hakelia jessicae (McGregor) Brand
Haplopappus bloomeri Gray
Haplopappus lianifolrnis (Greene) St. John
Haplopappus stenophyllus Gray in Torr.
Hedysarum occidentale Greene
Helianthella uniflora (Nutt.) T. & G.
Helianthella uniflora (Nutt.) T. & G. var. *douglasii* (T. & G.) Weber
Heracleum lanatum Michx.
Hieracium albertinum Farr
Hieracium albiflorum Hook.
Hieracium cynoglossoides Arv.-Touv.
Hieracium gracile Hook.
Holcus lanatus L.
Holodiscus discolor (Pursh) Maxim.
Holodiscus glabrescens Heller
Holodiscus umbellatus L.
Homalothecium megaptilum (Sull.) Robins.*
Hordeum brachyantherum Nevski
Hulsea nana Gray in Torr.
Hydrophyllum fendleri (Gray) Heller
Hydrophyllum fendleri (Gray) Heller var. *albiflorum* (Heller) Macbr.
Hydrophyllum occidentale (Wats.) Gray
Hylocomium splendens (Hedw.) B.S.G.*
Hymenoppapus filifolius Hook.
Hypericum anagalloides C. & S.
Hypericum perforatum L.
Hypnum circinale Hook.*
Hypnum fertile Sendt.*
Hypochaeris radicata L.
Iris chrysophylla How.
Iris douglasiana Herb. var. *oregonensis* Fost.
Iris missouriensis Nutt.
Iris tenax Dougl.
Isatheciim stoloniferum Brid.*
Ivesia tweedyi Rydb.
Jaumea carnosa (Less.) Gray
Juncus balticus Willd.
Juncus drummondii E. Meyer
Juncus drummondii E. Mey. var. *subtriflorus* (E. Meyer) C. L. Hitchc.
Juncus effusus L.
Juncus ensifolius Wikst. var. *montanus* (Engelm.) C. L. Hitchc.
Juncus falcatus E. Mey.
Juncus hemiendytus Buland.
Juncus mertensianus Bong.
Juncus nevadensis Wats.
Juncus parryi Engelm.
Juniperus communis L.
Juniperus occidentalis Hook.
Juniperus scopulorum Sarg.
Kalmia polifolia Wang.
Kobresia bellardii (Allioni) Degland.
Koeleria cristata Pers.
Lactuca serriola L.
Lagophylla ramosissima Nutt.
Lappula redowskii (Hornem.) Greene
Lariz lyallii Parl
Larix occidentalis Nutt.
Lathyrus bijugatus Webb
Lathyrus littoralis (Nutt.) Endl.
Lathyrus nevadensis Wats.
Lathyrus polyphyllus Nutt. ex T. & G.
Lathyrus sphaericus Retz.
Lecidea atrobrunnea (Ra.) Schaer.*
Lecidea quadricolor (Dicks.) Borr. ex Hook.*
Ledum glandulosum Nutt.
Ledum glandulosum var. *columbianum* (Piper) C. L. Hitchc.
Ledum groenlandicum Hultén
Lepidium perfoliatum L.
Leptarrhena pyrolifolia (D. Don) R. Br.
Leptodactylon pungens (Torr.) Nutt.
Leucolepis menziesii (Hook.) Steere*
Libocedrus decurrens Torr.
Ligusticum apiifolium (Nutt.) Gray
Ligusticum grayi Coult. & Rose
Lilaeopsis occidentalis Coult. & Rose
Linanthus septentrionatis
Linaria dalmatica (L.) Mill.
Linnaea borealis L.
Listera cauriua Piper
Listera convallarioides (Sw.) Nutt.
Lithocarpus densiflorus (Hook. & Arn.) Rehd.
Lithophragma bulbifera Rydb.
Lithophragma parviflora (Hook.) Nutt. ex T. & G.
Lithospermum ruderale Dougl. ex Lehm.
Lolium perenne L.
Lomatium angustatum St. John
Lomatium brandegei (Coult. & Rose) Macbr.
Lomatium cuspidatum Math. & Const.
Lomatium dasycarpa (Nutt.) Math. & Const.
Lomatium dissectum (Nutt.) Math. & Const. var. *multifidum* (Nutt.) Math. & Const.
Lomatium macrocarpum (Nutt.) Coult. & Rose
Lomatium martindalei Coult. & Rose
Lomatium nudicaule (Pursh) Coult. & Rose
Lomatium triternatum (Pursh) C. & T.
Lonicera caerulea L.
Lonicera ciliosa (Pursh) DC.
Lonicera conjugialis Kell.
Lonicera hispidula (Lindl.) Dougl. ex T. & G. var. *vacillans* (Benth.) Gray
Lonicera involucrata (Rich.) Banks
Lotus crassifolius (Benth.) Greene
Lotus nevadensis (Wats.) Greene
Luetkea pectinata (Pursh) Kuntze
Lupinus albifrons Benth.
Lupinus caudatus Kell.
Lupinus latifolius Agardh
Lupinus latifolius Agardh var. *subalpinus* (Piper & Robins.) C. P. Smith
Lupinus lepidus Dougl. ex Lindl.
Lupinus lepidus Dougl. ex Lindl. var. *lobbii* (Gray) Jeps.
Lupinus leucophyllus Dougl. ex Lindl.
Lupinus littoralis Dougl. ex Lindl.
Lupinus nanosus How.
Lupinus sericeus Pursh
Lupinus wyethii Wats.
Luzula glabrata (Hoppe) Desv.
Luzula spicata (L.) DC.
Luzula wahlenbergii Rupr.
Lycopodium sitchense Rupr.

slender gaultheria
salal
Nuttall's gayophytum
hairstem groundsmoke
mountain bog gentian
cut-leaved geranium
dovefoot geranium
sticky geranium
largeleaf avens
three-flowered avens

long-plumed avens
globe gilia
Nuttall gilia
bluecup
sea milkwort
beach silver-top
tall mannagrass
rattlesnake plantain
spiny hopsage
Oregon gum-plant

oakfern

boreal bogorchid
Alaska reinorchid
Jessica's tickweed
Bloomer's haplopappus
Palouse haplopappus
narrow-leaved haplopappus
western helvnarum
false sunflower

false sunflower
common cowparsnip
western hawkweed
white hawkweed
houndstongue hawkweed
slender hawkweed
common velvetgrass
creambush oceanspray
gland oceanspray
jagged chickweed

meadow barley
dwarf lupine
Fendler waterleaf

Fendler waterleaf
western waterleaf

fineleaf hymenopappus
bog St. Johnswort
common St. Johnswort

spotted catsear
slender-tubed iris
Douglas' iris
western iris
Oregon iris

tweedy ivesia
jaumea
Baltic rush
Drummond rush

Drummond rush
common rush

dagger-leaved rush
sickle-leaved rush
salt rush
Merten's rush
Sierra rush
Parry's rush
common juniper
western juniper
Rocky Mountain juniper
pale laurel or bog kalmia
Bellard's kobresia
prairie junegrass
prickly lettuce
slender rabbitleaf
western stickseed
subalpine larch
western larch
pinewoods peavine
beach peavine
Sierra Nevada pea
Pacific peavine
grass pea

mountain Labradortea

mountain Labradortea
bog Labradortea
yellow-flowered peppergrass
false saxifrage
granite gilia

incense-cedar
parsleyleaf licoriceroot
Gray's lovage
western lilaeopsis
northern linanthus
Dalmatian toadflax
twinflower
western twayblade
broad-lipped twayblade

tanoak
slender fringecup

small-flowered fringecup
western gromwell
perennial ryegrass
few-fruited lomatium
Brandege lomatium
pointed-leaved lomatium
lace-leaved leptotaenia

lace-leaved leptotaenia

bigseed lomatium
few-fruited desert parsley
barestem lomatium
nineleaf lomatium
blue fly honeysuckle
orange honeysuckle
purpleflower honeysuckle

California honeysuckle
bearberry honeysuckle
thick-leaved lotus
Douglas' lotus
luetkea
white-leaved lupine
tailcup lupine
broadleaf lupine

arctic lupine
spurred lupine
prairie lupine
velvet lupine
shore lupine
rock lupine
silky lupine
Wyeth's lupine
smooth woodrush
spiked woodrush
Wahlenberg's woodrush
Alaskan clubmoss

Lygodesmia spinosa Nutt.
Lysichitum americanum Hult. & St. John
Madia exigua (J. E. Smith) Gray
Madia glomerata Hook.
Madia gracilis (Smith) Keck
Madia madioides (Nutt.) Greene
Madia minima (Gray) Keck
Maianthemum dilatatum (Wood) Nels. & Macbr.
Marah oreganus (T. & G.) How.
Marsupella brevissima (Dumort.) Grolle*
Melica bulbosa Geyer ex Porter & Coult
Melica geyeri Munro
Melica harfordii Boland.
Melica spectabilis Scribn.
Melica subulata (Grisb.) Scribn.
Mellotus alba Desr.
Mentzelia albicaulis Dougl. ex Hook.
Mentzelia laevicaulis (Dougl.) T. & G. var. *parviflora* (Dougl.) C. L. Hitchc.
Menyanthes trifoliata L.
Mesoxiein fernyginee Smith
Mertensia ciliata (Torr.) G. Don
Mesembryanthemum chilense Molina
Microseris alpestris (Gray) Q. Jones
Microseris troximoides Gray
Microseris gracilis (Hook.) Greene
Mimulus lewisii Pursh
Mimulus suksus H. & A.
Mimulus tilingii Reg.
Mitella breweri Gray
Mitella pentandra Hook.
Mitella stauropetala Piper
Mnerckia blyttii (Morck) Brockm.*
Monardella villosa Benth.
Monotropa hypopitys L.
Montia chamissoi (Dougl.) Greene
Montia perfoliata (Donn) How.
Montia sibirica (L.) How.
Muhlenbergia filiformis (Thurb.) Rydb.
Muhlenbergia richardsonis (Trin.) Rydb.
Myosotis micrantha Pall. ex Lehm.
Myosurus aristatus Benth. ex Hook.
Myrica californica Cham.
Myriophyllum spicatum L.
Navarretia divaricata (Torr.) Greene
Navarretia tagetina Greene
Oenanthe sarmentosa Presl ex DC.
Oligotrichum hercynicum (Hedw.) Lam. & DC.*
Opiopanax horridum (J. E. Smith.) Miq.
Opuntia polyacantha Haw.
Orthocarpus imbricatus Torr. ex Wats.
Oryzopsis hymenoides (R. & S.) Ricker
Osmaronia cerasiformis (T. & G.) Greene
Osmorhiza chilensis H. & A.
Oxalis oregana Nutt. ex T. & G.
Oxyria digyna (L.) Hill
Oxytropis campestris (L.) DC.
Oxytropis campestris (L.) DC. var. *gracilis* (A. Nels.) Barneby
Packeiiiia saginoides (Pursh) Raf.
Paeonia brownii Dougl. ex Hook.
Parmelia Ach.*
Parmelia fuliginata Konig
Pedicularis bracteosa Benth.
Pedicularis contorta Benth.
Pedicularis groenlandica Retz.
Pedicularis ornithorhyncha Benth.
Pellaea glabella Mett. ex Kuhn
Peltigera aphthosa (L.) Willd.*
Penstemon aridus Rydb.
Penstemon cardwellii Howell
Penstemon cusickii Gray
Penstemon davidsonii Greene
Penstemon humilis Nutt. ex Gray
Penstemon procerus Dougl.
Penstemon procerus Dougl. ex R. Grah. var. *tolmiei* (Hook.) Cronq.
Penstemon rydbergii A. Nels.
Penstemon speciosus Dougl. ex Lindl.
Perideridia bolanderi (Gray) Nels & Macbr.
Petasites frigidus (L.) Fries
Petasites frigidus (L.) Fries var. *nivalis* (Greene) Cronq.
Phacelia hastata Dougl. ex Lehm.
Phacelia heterophylla Pursh
Phacelia mutabilis Greene
Philadelphus gordonianus Lindl.
Philadelphus lewisii Pursh
Philonotis americana (Dism.) Dism.*
Philonotis fontana (Hedw.) Brid.*
Phleum alpinum L.
Phlox adsurgens Torr. ex Gray
Phlox diffusa Benth.
Phlox diffusa Benth. var. *longistylis* (Wherry) Peck
Phlox douglasii Hook.
Phlox gracilis (Hook.) Greene
Phlox hoodii Rich.
Phlox longifolia Nutt.
Phyllodoce empetriformis (S.W.) D. Don
Phyllodoce glanduliflora (Hook.) Coville

Physaria oregana Wats.
Physocarpus malvaceus (Greene) Kuntze
Picea engelmannii Parry ex Engelm.
Picea sitchensis (Bong.) Carr.
Pinna albinsis Engelm.
Pinus attenuata Lemm.
Pinus cembra L.
Pinus contorta Dougl. ex Loud.
Pinus jeffreyi Grev. & Balf.
Pinus lambertiana Dougl.
Pinus monticola Dougl. ex D. Don
Pinus ponderosa Dougl. ex Loud.
Pinus pumila Regel
Plagiomnium insigne (Mitt.) Koponen*
Plantago lanceolata L.
Plantago maritima L.
Plantago patagonica Jacq.
Plantago subnuda Pilgr.
Plectritis macrocera T. & G.
Poa alpina L.
Poa ampla Merr.
Poa compressa L.
Poa curtifolia Scribn.
Poa cusickii Vasey
Poa gracillima Vasey
Poa macrantha Vasey
Poa nervosa (Hook.) Vasey
Poa pratensis L.
Poa snudbyensis Vasey
Poa scabrella (Thurb.) Benth. ex Vasey
Poa sukdorfii (Beah) Vasey ex Piper
Poganatum alpinum (Hedw) Roth1*
Poklia ludwigii (Schwaegr.) Broth.*
Poklia nutans (Hedw.) Lindb.*
Polemonium californicum Eastw.
Polemonium elegans Greene
Polemonium micranthum Benth.
Polemonium pulcherrimum Hook.
Polygala californica Nutt.
Polygonum bistortoides Pursh
Polygonum douglasii Greene
Polygonum kellogii Greene
Polygonum majus (Meisn.) Piper
Polygonum newberryi Small
Polygonum paroygchia Cham. & Schlect.
Polygonum phytolaccaefolium Meian. ex Small
Polygonum sawatchense Small
Polypodium vulgare L.
Polystichum mohrioides (Bory) Presl var. *lemmoni* Fern.
Polystichum munitum (Kaulf.) Presl

spiny lygodesmia
skunkcabbage

little tarweed
stinking tarweed
common tarweed
woodland tarweed
least tarweed

false lily-of-the-valley
Oregon wild cucumber

oniongrass
Geyer oniongrass
Harford melic
showy oniongrass
Alaska oniongrass
white sweetclover
white-stemmed mentzelia

great mentzelia
buckbean
rustyleaf
broad-leaved lungwort
sea fig
alpine microseris
false agoseris
pink annual phlox
Lewis monkeyflower
dwarf monkeyflower
clustered monkeyflower
feathery mitrewort
fivepoint mitrewort
sideflower mitrewort

coyote mint
pinesap
narrow-leaved montia
miner's lettuce
western springbeauty
pulipu muhly
short-leaved muhly
smallflower forgetmenot
bristly mousetail
waxmyrtle
western spiked watermilfoil
short-stemmed navarretia
marigold navarretia
water parsley

devilsclub
plains pricklypear
mountain owlclover
Indian ricegrass
Indian plum
mountain sweetroot
Oregon oxalis
alpine mountainsorrel
Cusick's crazyweed

slender crazyweed
Oregon boxwood
western peony

Rocky Mountain parnassia
bracted pedicularis
coiled pedicularis
elephant's head pedicularis
bird-beaked pedicularis
cliffbrake fern

stifflead penstemon
Cardwell's penstemon
Cusick penstemon
Davidson penstemon
lowly penstemon
tinybloom penstemon

alpine penstemon
Rydberg penstemon
royal penstemon
mountain false caraway
alpine coltsfoot

alpine coltsfoot
whiteleaf phacelia
varileaf phacelia
variable phacelia
western mockorange
Lewis mockorange

alpine timothy
woodland phlox
spreading phlox

spreading phlox
tufted phlox
pink annual phlox
Hoods phlox
longleaf phlox
red mountainheath or heather
cream mountainheath or white heather
Oregon double bladderpod
mallow ninebark
Engelmann spruce
Sitka spruce
whitebark pine
knobcone pine
Swiss stone pine
lodgepole pine
Jeffrey pine
sugar pine
western white pine
ponderosa pine
Japanese stone pine

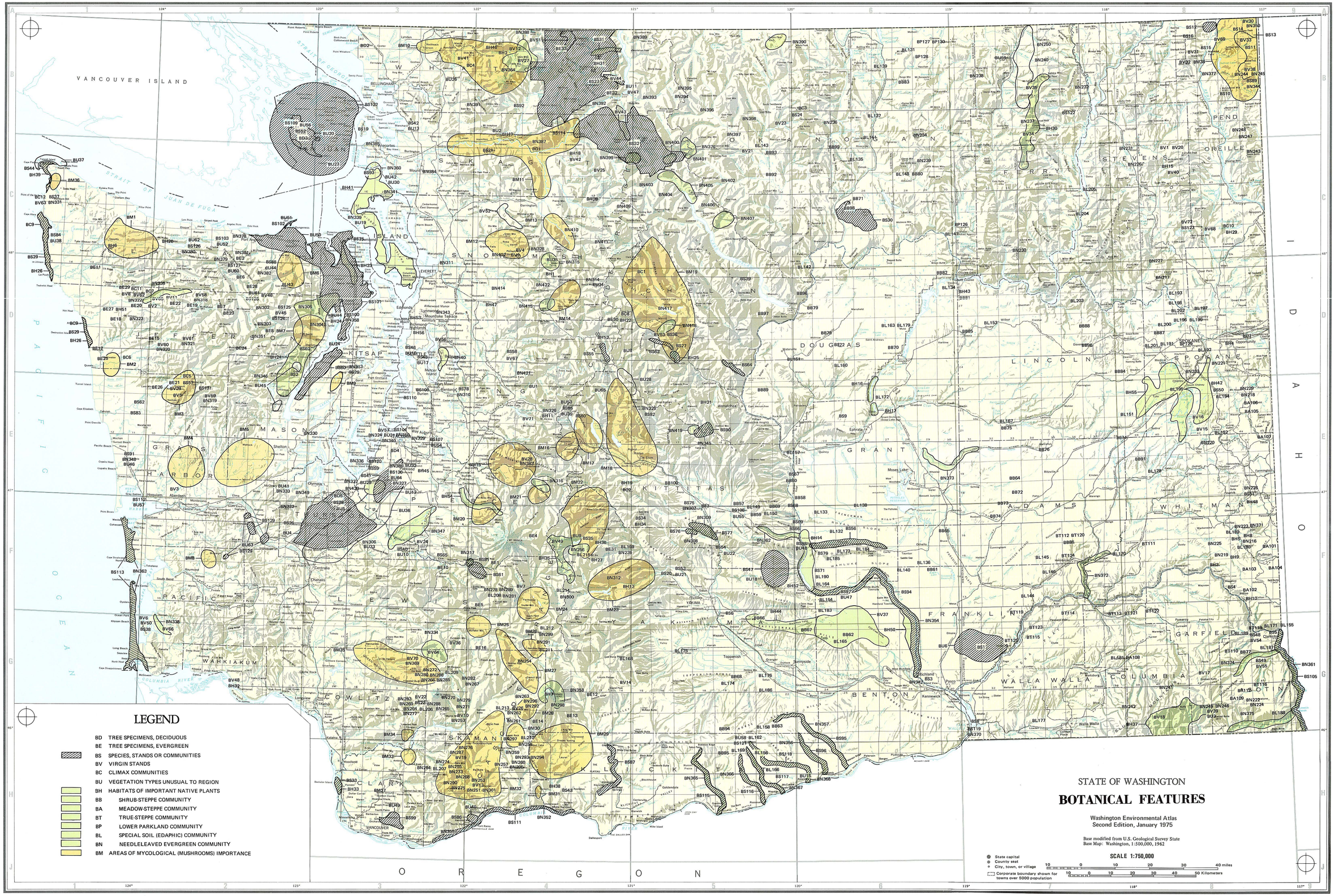
English plantain
seaside plantain
Indianwheat
tall coast plantain
longhorn plectritis
alpine bluegrass
Merrill's bluegrass
Canada bluegrass
Mt. Stuart bluegrass
Cusick bluegrass
Pacific bluegrass
seashore bluegrass
Hooker's bluegrass
Kentucky bluegrass
Sandberg's bluegrass
pine bluegrass
Suksdorf's bluegrass

California polemonium
slender polemonium
littlebells polemonium
showy polemonium
California milkwort
American bistort
Douglas' knotweed
Kellogg's knotweed
wiry knotweed
Newberry fleeceflower
nailwort knotweed

pokeweed fleeceflower
Sawatch knotweed
licorice fern

Lemmon's shieldfern
swordfern

Polystichum munitum (Kaulf.) Presl var. *imbricans* (D.C. Eat.) Maxon
Polytrichadelphus lyellii Mitt.*
Polytrichum juniperinum Hedw.*
Polytrichum norvegicum Hedw.*
Polytrichum piliferum Hedw.*
Populus tremuloides Michx.
Populus trichocarpa Torr. & Gray
Porella navicularis (L. & L.) Lindb.*
Potamogeton pectinatus L.
Potentilla anserina L.
Potentilla diversifolia Lehm.
*Potentilla



LEGEND

- BD TREE SPECIMENS, DECIDUOUS
- BE TREE SPECIMENS, EVERGREEN
- BS SPECIES, STANDS OR COMMUNITIES
- BV VIRGIN STANDS
- BC CLIMAX COMMUNITIES
- BU VEGETATION TYPES UNUSUAL TO REGION
- BH HABITATS OF IMPORTANT NATIVE PLANTS
- BB SHRUB-STEPPE COMMUNITY
- BA MEADOW-STEPPE COMMUNITY
- BT TRUE-STEPPE COMMUNITY
- BP LOWER PARKLAND COMMUNITY
- BL SPECIAL SOIL (EDAPHIC) COMMUNITY
- BN NEEDLELEAVED EVERGREEN COMMUNITY
- BM AREAS OF MYCOLOGICAL (MUSHROOMS) IMPORTANCE

STATE OF WASHINGTON

BOTANICAL FEATURES

Washington Environmental Atlas
Second Edition, January 1975

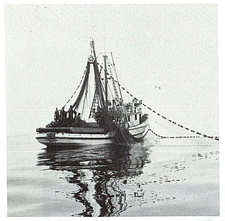
Base modified from U.S. Geological Survey State
Base Map: Washington, 1:500,000, 1962

- State capital
- County seat
- City, town, or village
- Corporate boundary shown for towns over 5000 population

SCALE 1:750,000

10 0 10 20 30 40 miles

10 0 10 20 30 40 50 Kilometers



Purse seiner with power block.

ZOOLOGICAL FEATURES: AQUATIC

MARINE MAMMALS OF WASHINGTON

By

Victor B. Scheffer

WHAT ARE MARINE MAMMALS? The marine mammals of the world include 117 species classifed in four main groups --

The sea otter, the only marine representative of the large order Carnivora, 1 species;

The seals, order Pinnipedia, 33 species;

The sirenians, order Sirenia, 4 species (not further discussed here; all are tropical);

The cetaceans, order Cetacea, suborder Mysticeti, 10 species, and suborder Odontoceti, 69 species.

The cetaceans of the world are divisible into two natural groups derived from two ancestral stocks which independently went to sea -- first, the baleen whales, named for the fibrous baleen plates which serve them in place of teeth; second, the toothed whales, dolphins, and porpoises, all of which have teeth. The larger toothed cetaceans are called whales. In this category are the sperm whale, pygmy sperm whale, killer whale, false killer whale, beaked whales (18 species), white whale or beluga, and narwhal. Of the smaller toothed cetaceans, those which have a long, slender beak set off from the forehead by a depression are usually called dolphins; those which have a rounded snout are called porpoises.

Marine mammals have little in common except their food habits (they feed only on living food gathered beneath the surface of the sea) and their remoteness in time from land ancestors (none can now breed with any land mammal). The true marine mammals are thus set apart from dabblers in the sea like the polar bear, the Cape Horn otter, and the fishing bat of Tiburon Island, Mexico. The polar bear, at least, will interbreed in captivity with the Alaska brown bear and produce fertile young.

A few kinds of marine mammals are known only from fossil records. These extinct forms represent natural experiments, so to speak, which failed. The skull of Kolponomos, a sort of "seagoing raccoon" the size of a bear, was discovered in Miocene Cliffs at Clallam Bay, Washington, by a school teacher.

Among the living seals, sirenians, and cetaceans are species that live the year around in fresh water -- the ringed seal of Lake Baikal and the river dolphins of China and India. Others, like the harbor seal of Lake Iliamna, Alaska, and the manatee of Florida, shuttle between salt water and fresh water with the changing seasons.

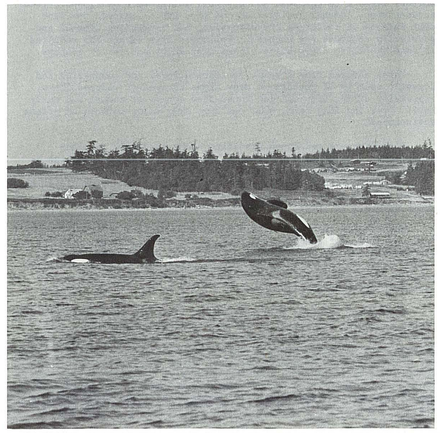
WHO OWNS THE MARINE MAMMALS? As of 20 May 1971, the State of Washington categorized the sea otter and fur seal as "protected wildlife;" the other marine mammals as "managed marine mammals." In 1972, the Federal government passed the Marine Mammal Protection Act, effective 21 December 1972. It is a complicated law; it seems to put primary responsibility for all marine mammals in the hands of the Federal government; its implications for Federal versus state jurisdiction are being studied.

The Federal government recognizes a territorial limit of 3 nautical miles and a fishery limit of 9 nautical miles "from the outer boundary of the territorial sea." The fishery limit became effective 14 October 1966. Marine mammals and their products have been held to be fishery resources, though a newer concept of marine mammals as living resources for appreciative, nonconsumptive use is growing.

THE SEA OTTER IN WASHINGTON. Sea otters (Enhydra lutris) used to breed along rocky, kelp-rich portions of the Washington seacoast from the mouth of the Columbia River to the Strait of Juan de Fuca. They did not enter the Strait beyond Neah Bay. The last native sea otter in Washington was shot by a hunter in Willapa Bay about 1910. On 31 July 1969, the Washington State Game Department released 29 live otters on the beach near Point Grenville. The stock had been flown from Amchitka Island, Alaska. On 16 July 1970, the Department released 30 otters, also from Amchitka, on the beach near LaPush.

THE SEALS OF WASHINGTON STATE. The harbor seal (Phoca vitulina) may be seen anywhere in the enclosed marine waters, along the seacoast, and in the lower Columbia River. Its numbers have been reduced by hunting and disturbance from over 5,000 in the 1920's to about 1,800 today. The harbor seal breeds in secluded coves and on coastal islands difficult of access by man. The pupping season is mid-May to mid-June along the ocean; mid-August to mid-September in lower Puget Sound. The harbor seal is the only pinniped which breeds in Washington.

The northern sea lion, also called Steller sea lion (Eumetopias jubatus), hauls out on Jagged Island and on the outermost Flattery Rocks in numbers which probably do not exceed three hundred. It breeds on seacoastal rocks north and south of Washington in May and June. Stray individuals, easily distinguished by their yellowish, monotone color from the gray spotted harbor seal, are occasionally seen in Puget Sound.



The killer whale is one of Washington's more common and fascinating marine mammals.

The California sea lion (Zalophus californianus) is rarely seen in Washington and, up to early 1973, no specimens from the state had been collected for science. The distinctive "honking" of the old male is occasionally heard from Flattery Rocks, where California and northern sea lions haul out together. There is one sight record from Smith Island, in the Strait of Juan de Fuca.

Northern fur seals (Callorhinus ursinus) which gather, over a million strong, on the Pribilof Islands of Alaska in summer can be seen in migration off the Olympic coast of Washington in autumn (southbound) and in spring (northbound). They rarely come within 5 miles of land. Coastal Indians hunted them by spear from dugout canoes until about 1940. Individual seals, usually emaciated young ones, are occasionally picked up on the ocean beaches. One was taken alive by a fisherman in Elliot Bay.

The elephant seal (Mirounga angustirostris) breeds in Mexico and southern California. Stray individuals are seen in Puget Sound and along the continental shelf of the Washington coast. They have been seen twice near Everett; a stranded dead individual was picked up at Cape Alava.

THE CETACEANS OF WASHINGTON. A commercial whaling station operated at Bay City, near Hoquiam, from 1911 to 1925. Its catcher-boats worked within a radius of 135 miles from the station, from April to October. In order of frequency, the species which they took were humpback whale (Megaptera novaeangliae), fin whale (Balaenoptera physalus), sperm whale (Physeter catodon), sei ("say") whale (Balaenoptera borealis), blue whale (Balaenoptera musculus), "bottlenose whale" (quite certainly Berardius bairdi), and gray whale (Eschrichtius robustus). Humpback and fin whales made up more than ninety percent of the catch.

Gray whales can be seen in winter from coastal viewpoints such as Kalalock and Destruction Island.

The only baleen whale one is apt to see in the enclosed waters of Washington is the little piked whale (Balaenoptera acutorostrata). Commercial whalers of the world call it "minke" whale. Stranded little piked whales have been taken from the north shore of Admiralty Inlet, from a fish trap on Whidbey Island, from the beach of Nisqually Delta, 10 miles up the Snohomish River, from Waadah Island, and from Dungeness Spit.

Of the toothed cetaceans recorded from Washington, the killer whale (Orcinus orca), also called "blackfish", is the most spectacular, traveling in packs of up to a hundred individuals. It is apt to be seen at any season anywhere in the state; several have penetrated the Columbia River to Vancouver. In the summer of 1971, a one-day crude "census" of killer whales in Washington waters produced a figure of 114. The business of catching killer whales alive for display originated in the sheltered waters of Puget Sound and the Strait of Georgia, British Columbia. Shamu, a young female, was netted in Puget Sound in 1965, the first killer whale in the world deliberately "fished", or chased and taken alive. Through 1972, 245 killer whales had been impounded in Washington, of which 30 had been kept for display or sale.

A related species, the false killer whale (Pseudorca crassidens), has been taken once in the state. An individual was shot near Olympia in 1937.

Next to the killer whale, the most common cetacean in Washington is the little harbor porpoise (Phocoena phocoena). It may be seen anywhere in salt water and well inside the mouths of rivers and brackish bays. It rolls quietly at the surface; never plays at the bow of a moving vessel. The calf is born in early summer.

A spectacular, speedy, black-and-white cetacean, the Dall's porpoise (Phocoenoides dalli), ranges from Japan and Alaska to California. It is seen by fishermen in the Strait of Juan de Fuca.

Other common oceanic dolphins which ply the waters off the Washington coast and which have been recorded as stranded specimens on Washington beaches are the gray grampus (Grampus griseus), the white-sided dolphin (Lagenorhynchus obliquidens), and the right whale dolphin (Lissodelphis borealis). The pilot whale (Globicephala macrorhyncha) is more common south of Washington, though an individual was stranded at Queets and a live one was taken by killer-whale hunters. The common dolphin (Delphinus delphis), also a southern species, is recorded once from Washington.

The carcass of a young pygmy sperm whale (Kogia breviceps) was stranded near Grayland in 1942, the only record for the state.

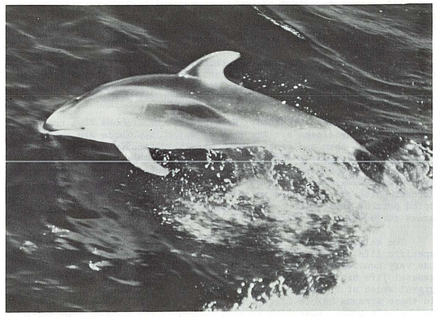
In addition to the "bottlenose whale" of the old whaling station records -- evidently the large Baird's beaked whale -- several carcasses of the smaller Stejneger's beaked whale (Mesoplodon stejnegeri) have been recovered from the Olympic coast.

THE FUTURE OF THE MARINE MAMMALS OF WASHINGTON. The complex of coastal and sheltered waters of Washington is among the finest environments for marine mammals known in North America. Of the twenty-five species of mammals recorded here, the harbor seal, northern sea lion, harbor porpoise, and killer whale, are fairly common. The value of the marine mammals of Washington was reckoned in the past in terms of meat, oil, skin, bone, zoo specimens, and other products of commerce. Their value in the future will be enormously greater in terms of the pleasure which they bring to beast-watchers. At last count, there were 187,000 pleasure boat owners in the state, plus the millions who travel on ferries, hike along the beaches, and live within sight of salt water. The marine mammals must be protected for the richness which they add to the quality of life for those millions.

VICTOR B. SCHEFFER, Ph.D., is a retired biologist of the National Marine Fisheries Service specializing in marine mammals. He is author of several current books, including The Year of the Whale, Year of the Seal, The Seeing Eye, and A Voice for Wildlife. He has been appointed by the President to serve as Chairman of the Marine Mammal Commission.



Northern fur seal bull, female, and pup on Alaskan breeding grounds; in summer their migration route carries them into Washington waters off the Olympic coast.



The Pacific white-sided dolphin is the most common marine mammal in waters off the outer coast.

WASHINGTON'S AQUATIC ENVIRONMENT

By

John S. Thompson

The aquatic resources of Washington are a vital segment in the prosperity of the state, and in making it a desirable place in which to live. The expanding population has placed an increasing demand on aquatic resources, not only on the natural aquatic environment with its food and game fish, but also on water uses for agriculture, industry, domestic supply, navigation, waste, disposal and recreation. Recently there has been a growing interest by other regions for diverting fresh water from state rivers and streams for irrigation. In order to maintain the intergrity of the state's fresh and salt water areas, there is need for overall planning to provide responsible regulation for the various water users.

Washington has an extremely diverse climate controlled by the prevailing atmospheric conditions over the Pacific Ocean, the latitude of the state, and its topographical features. The terrain causes precipitation to vary from west to east. Precipitation is characteristically high in winter and low in summer and varies from moist rain forests on the western slopes of the Olympic Mountains to desert in eastern Washington. These conditions greatly affect the state's streams and stream uses.

This atlas depicts the streams used by anadromous fish, salmon and trout artificial propagation facilities, and fish ladders. Other features which are particularly unique to Washington are also indicated. The Zoological-Aquatic map is in an embryonic state and should be judged more provisional than other categories because it does not fully reflect the unique benthic and pelagic communities or the multitude of areas which produce trout, shellfish or marine fish which are so common and important to this state.

While this atlas is oriented to the environmental resources and amenities that Washington citizens consider of greatest importance, a case must be made that, for Washington State, such criteria quite often reflect the values attached to both sport and commercial fisheries resources.

THE AQUATIC RESOURCES. The more common fish and shellfish used directly by the public quite often determine the value of the natural aquatic environment. The multitude of organisms, including invertebrates, which make up part of the aquatic ecosystem, are of utmost significance in the food chain and are very susceptible to environmental changes. Alterations of these populations affect the overall production of desirable species. This discussion and map tend to show concerns which are directly observable by the public, as for example the state's fisheries, and does not provide information on many of the invertebrate organisms which are also of importance.

ZOOLOGICAL FEATURES: AQUATIC

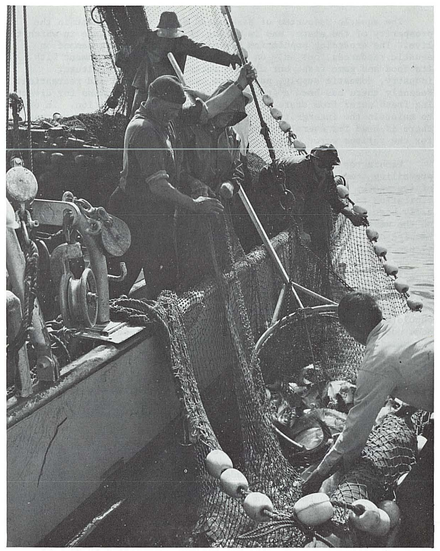
Food fish such as salmon, halibut and crab, and game fish such as steelhead, cutthroat and rainbow trout are managed by the Washington Departments of Fisheries and Game, respectively. The total landings of food fish in 1970 was 136,325,320 pounds, although part of this was caught in waters not immediately adjacent to Washington. These landings consisted of anadromous fish, shellfish, and marine fish taken by commercial fishermen, with sports fishermen also taking sizeable quantities. Game fish are taken entirely by sports fishermen, and in some instances by Indian commercial fisheries. Although some game fish are caught along salt water shorelines, the vast majority are taken in freshwater. Some game fish are reared and sold by privately owned commercial hatchery operations.

Fresh, estuarial and marine waters are all interrelated with many of the valuable aquatic resources. However, to better define the fisheries resources these have been divided into anadromous fisheries, marine and estuarial fisheries, and freshwater fisheries.

ANADROMOUS FISH RESOURCES. Washington's anadromous fish runs are exceeded only by Alaska's. The runs of major importance are chinook, coho, sockeye, chum and pink salmon, steelhead, searun cutthroat and Dolly Varden trout. In addition, the Columbia River has runs of sturgeon, Eulachon smelt and shad. Coastal estuaries support some sturgeon. The following Zoological-Aquatic map depicts the areas in the freshwater streams which are available to anadromous fish populations. These fish spend part of their life cycle in virtually every part of the salt water areas surrounding the state.

The salmon and trout runs enter Washington streams annually. The specific life history characteristics, behavior patterns, and water use vary considerably for each species and different races, but the general life history patterns are similar. Each species spawns in gravel areas of freshwater streams and spends part of its life cycle in these streams before migrating to the ocean. After a period of time in the salt water these fish usually return to the streams from which they originated to repeat the cycle.

The size of the returning spawning runs depends upon the size of watershed, the species of fish, the distance upstream at which spawning occurs, amount and type of spawning and rearing habitat available, flow patterns, fishing intensity, and many other factors. Salmon contribute to the fisheries harvest, not only in Washington ports but along the Pacific Coast from Alaska to northern California. In 1970 nearly 37,600,000 pounds were delivered to Washington ports. The natural production of salmon, augmented by hatcheries, is a major contributor to the salmon fisheries in the North Pacific.



Brailling operation aboard a commercial purse seiner.

The sport fishery is of major economic importance to the state with over 842,000 salmon caught in salt water in 1970 and an additional 136,000 caught in the state's rivers. Sports fishermen averaged 0.56 salmon per fisherman-trip to fishing areas. During 1970 Washington sportsmen caught 218,000 steelhead trout in Washington rivers, with large numbers of searun cutthroat trout also taken.

Other anadromous fish taken in the state's fresh water areas by sport and commercial fishermen are shad, Eulachon smelt, and sturgeon. In 1970 commercial landings were 26,000 pounds of shad, 326,000 pounds of sturgeon, and 1,100,000 pounds of smelt. Steelhead are also landed commercially by Oregon fishermen in the Columbia River although Washington law does not permit their commercial taking.

Considerable effort is expended to supplement the anadromous fish runs in Washington. The Washington Department of Fisheries operates 29 artificial propagation facilities for salmon. The Washington Department of Game operates 31 propagation facilities, in the form of hatcheries and rearing ponds, to produce anadromous trout and resident fish. The U.S. Fish and Wildlife Service operates 10 hatcheries around the state that supply several species of salmonids. These artificial propagation facilities are shown on the following map.

MARINE FISH AND SHELLFISH RESOURCES. The resources in the estuarial and marine areas are of great importance. These waters are unique and unequaled in the United States. The 3,000 miles of Washington shoreline provide large quantities of shore-dwelling marine animals. Deep waters provide habitat for a multitude of benthic and pelagic species. Dungeness crab are caught by commercial and sport fishermen off the Washington coast, in coastal estuaries, and in inland waters, especially near Dungeness and north Puget Sound with approximately 18,400,000 pounds taken in 1970. Six or seven million razor clams are taken from over 50 miles of sandy ocean beaches during 700,000 sport digger-trips per year. Over 2,000,000 pounds of hard-shell clams are taken annually by commercial and sport fishermen from inland waters. An extensive harvest occurs in the tideland areas, and an increasing supply is acquired from the subtidal areas. About 6,506,000 pounds of Pacific oyster meats were produced in 1970 in coastal estuaries and various scattered areas in the inland waters, with the primary commercial production occuring in Willapa Bay, Grays Harbor, south Puget Sound, Hood Canal, and northern Puget Sound waters. About 57,000 pounds of Olympia oyster meats, a local delicacy, were produced in south Puget Sound. Nearly 1,000,000 pounds of shrimp are landed annually in Washington. Other landings in 1970 were 31,200 pounds of crayfish, 18,000 pounds of octopus, 10,500 pounds of scallops, and 500 pounds of squid. The total shellfish landings were 28,733,482 pounds for 1970. A listing of the more important shellfish is included at the end of the map index.

The marine fishery, comprised mainly of ground fish, include those species caught in ocean and inland waters. Large numbers are harvested by vessels based in Puget Sound but caught in other regions. A list of the principal species used as food fish is shown in the index; scrap fish species, harvested for the animal food and fish meal industry, are also included. The total poundage landed in the state in 1970 of the more important ground fish species common in Washington waters was 670,000 pounds of black cod, 415,600 pounds of flounder, 3,000,000 pounds of ling cod, 244,000 pounds of surf perch, 12,600,000 pounds of rockfish, 13,600,000 pounds of Pacific Ocean perch, and 6,300,000 pounds of sole. Other species landed included 8,760,000 pounds of hake, and 4,420,000 pounds of herring, in addition to other species. These poundages delivered to Washington ports do not accurately reflect poundages produced in waters adjacent to the state. The total ground fish landings were about 57,000,000 pounds in 1970. Pelagic species include albacore tuna, anchovies, herring and shad.

Marine sport fishermen are almost exclusively salmon oriented, but a number of bottom fish are desirable to the sport angler. The many miles of protected shoreline are providing a continually expanding industry in sport-caught bottom fish.

The generally excellent water quality of marine areas of the state's coast and Puget Sound is responsible to a large degree for the perpetuation of these fisheries resources.

FRESH WATER RESOURCES. Virtually all the streams and lakes in Washington support resident fish populations. These occur above and below natural and manmade obstructions which prevent upstream movement of anadromous fish. Considerable fishing effort is expended by sport fishermen throughout the state with the more popular lake fish being rainbow, cutthroat, brook trout, kokanee, and coho salmon. Spiny-rayed game fish caught in lakes include bass, perch, crappie, sunfish, and bullhead. Stream fish are primarily rainbow, cutthroat and brook trout, and whitefish. Various species of fish which are part of the natural population but unpopular with sport anglers are sculpins, sticklebacks, suckers, peamouth, and squawfish.

A game fishing survey in 1966 indicated about 4,800,000 fishermen-days were expended catching about 17,800,000 trout (except steelhead) and 5,200,000 spinyray fish. To satisfy the insatiable demand for trout, the Washington Department of Game and U.S. Fish and Wildlife Service are supplementing natural production of resident trout in the lakes and streams under a hatchery rearing program.

PROBLEMS CONFRONTING THE AQUATIC ENVIRONMENT. The aquatic environment has undergone drastic change by man in some streams and estuaries. The public in recent years has indicated the desire to place more emphasis on maintaining the natural aquatic environment. Benthic communities in the ecosystem respond to environmental change at a faster rate than the more visible fish populations, but change is often observed eventually as changes in fisheries.

Natural fish production capacity is affected by conflicting uses of rivers and streams and by general environmental degradation of the streams. Certain land management practices, such as some forms of logging, contribute to stream degradation and result in more rapid runoff and less moisture released during low summer flows. This in turn causes greater and more frequent flooding, greater water temperature fluctuations, sedimentation, and reduced low flows which in turn have impact on aquatic resources. Effluents from industry and agriculture cause both chemical and physical pollution which lower stream productivity. Recent legislation and more public concern has made some inroads on bettering the situation, but increasing demands and population compound the problem. Pollution from sewage has resulted in some shellfish areas being closed near major population centers.

Water removed from streams for agricultural and industrial and domestic uses is of concern in many areas because of reduced flows, especially during critical low water-flow months of summer and early fall. Over the long term, this can have some major effects on stream environments.

Fish barriers and steep gradients occur naturally in headwaters of all streams, but barriers lower in streams such as high waterfalls frequently block entire drainages to migrating fish. Manmade barriers often similarly limit production of fisheries within a stream. Other limitations to fish are stream channel alterations which drastically alter the aquatic environment.

Conflicting interests in fisheries also present some problems. Resident fish must compete with other species in a stream. If anadromous fish are introduced to the stream, the resident species suffer heavy competition and reduced populations. Changes in the environment can increase numbers of less desirable species to the detriment of the desirable fish.

Population problems in the estuarial areas are an ever-threatening factor caused by industrial growth and burgeoning population. Pollution from oil spills occasionally occur, generally on a small scale. However, the recent interest in establishing deep ports in Puget Sound for shipment of oil by supertanker has caused an increased public concern for this problem. A massive oil spill in the inland waters would cause extensive adverse biological, aesthetic, and recreational impact not only in Puget Sound, but along much of the Canadian shoreline.

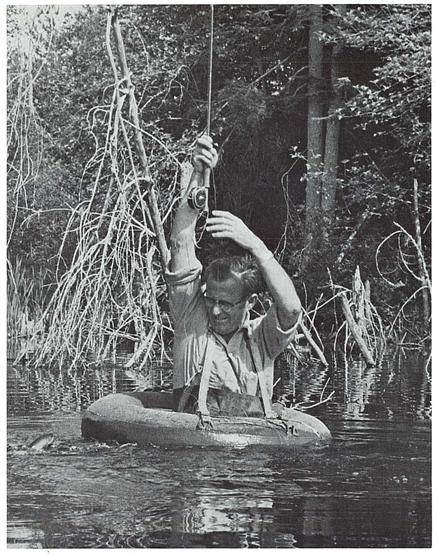
At present, most general pollution stems from domestic sewage and effluent from wood products industries. However, great strides are being made at the insistance of the public to maintain the generally excellent water quality. Areas of greatest concern are those areas adjacent to cities, especially where tidal exchange is restricted. For example, the eastern part of Grays Harbor, Tacoma Harbor, Everett Harbor, and Bellingham Harbor all have local pollution problems.

STATE TRENDS OF WATER RESOURCE USE. The public demand for larger numbers of salmon and game fish has resulted in fish propagation facilities being operated to increase overall production and supplement areas of overutilization. The trend is a planned increase in overall hatchery production as monies permit. An increasing emphasis has been placed on maintaining or improving natural rearing areas.

Manmade barriers require mitigative fish facilities to ameliorate damage caused by new construction. In addition, some new stream areas have been made available to anadromous fish by construction of fish ladders past natural barriers, sometimes to the detriment of resident species.



Recreational clamming is a family affair at this Willapa Bay beach.



Float-fishing for trout on one of the state's numerous beaver ponds brings its own reward.

Many of the fisheries are presently utilized to the maximum extent desirable. The increasing population pressure has necessitated more stringent regulations to maintain size and numbers of fish and shellfish at a desirable level.

The state's fresh and salt water resources are managed or regulated by a number of Federal, state, and local agencies, some of which have conflicting authorities. Those agencies charged with the responsibility of protecting or managing the natural aquatic environment are the State of Washington Departments of Natural Resources, Ecology, Game, and Fisheries. Federal agencies include the Environmental Protection Agency, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Forest Service, National Park Service, Coast Guard, and Corps of Engineers. Local agencies have recently acquired authority to issue shoreline management permits which must consider the environmental impact of any changes. The major problems facing these agencies are the economic requirements dictating use of water versus environmental concerns and increasing population pressure.

The citizens of the State of Washington regard the aquatic resources as a significant factor in their surroundings. The more recent public involvement and governmental concern has reduced the degradation of the waters. Special significance is placed upon the fresh and salt water fisheries, many of which are unique to Washington. Almost any water oriented project will have an impact on these fisheries. It is thus of the utmost importance that the quality of the aquatic environment be considered in all planning.

JOHN S. THOMPSON is a fisheries biologist with 20 years experience in fisheries with private industry and the Washington State Department of Fisheries. He is presently a fisheries biologist for the Environmental Resources Section, Corps of Engineers, Seattle District.

ZOOLOGICAL — AQUATIC INDEX

Important Aquatic Habitats ZI

Aquatic habitats mapped under this heading are all generally important for supporting a wide diversity of aquatic organisms living in complex community associations. Some of the sites have been stressed by contributors as being important aquatic communities with no selective reference to particular species. Where such emphasis was placed, the abbreviation (IAC) for Important Aquatic Community has been entered below. Where emphasis was made as to important habitat for all anadromous fish, a value inherent to many of the important aquatic communities mapped, the abbreviation (ANA) has been used. Where the site mapped was specifically stated to be of high value as habitat for more specific kinds of animals, the following abbreviations have been entered: Marine Mammals (MM), Kokanee (KOK), various Salmon species (S), Steelhead (STE), Sturgeon (STURG), and various Trout species (T). Trout in fact have a much wider distribution throughout the state than this map indicates, inhabiting nearly all of the state's lakes and streams. Where major rivers or long coastal areas are notable in entirety and cover several counties, the text pertaining to it is summarized under one county in the County Discussion Section and indicated "SCD" for "See County Discussion".

Map Key No.	Map Index Grid Ref.	Feature	County
1	C-3	Ada Spit Lagoon (IAC)	Island
2	B-6	Aeneas Lake (T)	Okanogan
3	G-8	Alpowa Creek (STE)	Garfield
4	C-6	Alta Lake (T)	Okanogan
5	E-8	Amber Lake (T)	Spokane
6	E-3	American Lake (KOK)	Pierce
7	F-4	American River (T)	Yakima
8	E-8	Badger Lake (T)	Spokane
9	D-6	Banks Lake (IAC, Walleyed Pike)	Grant
10	D-3	Bear Creek (T)	King
11	C-7	Big and Little Twin Lakes (T)	Ferry
12	B-7,8	Big Sheep Creek (IAC)	Stevens
13	H-4	Big White Salmon River (T)	Klickitat
14	E-6	Billy Clapp Lake (or Long Lake Reservoir) (IAC, Walleyed Pike)	Grant
15	F-2,3	Black River Swamp (IAC)	Thurston
16	B-6	Blue Lake (T)	Okanogan
17	D-1	Bogachiel River (ANA)	Clallam
18	B-6	Bonaparte Lake (T)	Okanogan
19	F-4	Bumping Lake (T)	Yakima
20	F-4	Bumping River (IAC)	Yakima
21	B-8	Bunchgrass Meadows (T)	Pend Oreille
22	D-1	Calawah River (T)	Clallam
23	E-1	Carlisle Bog (IAC)	Grays Harbor
24	E-8	Chapman Lake (T)	Spokane
25	F-2	Chehalis River (ANA, STURG, Olympic Mudminnow)	Grays Harbor, Lewis
26	C,D-5	Chelan Lake (IAC)	Chelan
27	B-5	Chewack River (S)	Okanogan
28	D-5	Chiwawa River (T)	Chelan
29	B-6	Chopaka Lake (T)	Okanogan
30	C,D-1	Clearwater River (IAC)	Jefferson
31	E-3	Cedar River (IAC)	King
32	E-4	Cle Elum River (T)	Kittitas
33	E-2	Cloquallum Creek (T)	Grays Harbor, Mason
34	F-6	Crab Creek (T)	Grant
35	Numerous Grids	Columbia River: 1. Below Bonneville Dam (STURG breeding habitat) 2. Below Chief Joe Dam (STE,T,S, STURG) 3. Entire Length (T)	SCD: Clark
36	F,G-6	Columbia River between McNary Pool and Priest Rapids Dam (STURG, S,STE,T)	SCD: Benton
37	B,C-8	Colville River (IAC)	Stevens
38	B-6	Conconally Lakes (IAC)	Okanogan
39	E-2	Copalis River (ANA)	Grays Harbor
40	G-3	Cowlitz River (ANA)	Cowlitz, Lewis
41	C-2	Crescent Lake (T, Beardsley Trout)	Clallam
42	G-8	Crooked Creek (T)	Columbia, Garfield
43	E-2	Cushman Lake (IAC)	Mason
44	D-3	Dabob Bay (MM)	Jefferson
45	E,F-3	Deschutes River (ANA)	Thurston
46	D-1	Destruction Island (MM)	Jefferson
47	C,D-1	Dickey River and E & W Forks (IAC)	Clallam
48	D-2,3	Dosewallips River and Estuary (ANA)	Jefferson
49	D-2,3	Duckabush River and Estuary (ANA)	Jefferson
50	C,D-2	Dungeness River and Estuary (ANA)	Clallam
51	E-3,4	Duwamish River (S) and Green River (ANA)	King
52	C-2	Eagle Cove Area (IAC)	San Juan
53	D-3	Elliott Bay (STE,S)	King
54	G-2	Elochoman River (ANA)	Wahkiakum
55	C-2	Elwha River and Estuary (ANA)	Clallam
56	C,D-5	Entiat River (T)	Chelan
57	D-5	Fish Lake (T)	Chelan
58	B-6	Fish Lake (T)	Okanogan
59	C-1	Flattery Rocks National Wildlife Area (MM)	Clallam
60	E-7	Fourth of July Lake (T)	Lincoln, Adams
61	G-8	Grande Ronde River (STE)	Asotin
62	D-2	Gray Wolf River (IAC)	Clallam
63	F-1,2, E-1	Grays Harbor Estuary (MM, ANA)	Grays Harbor
64	E-2	Grays Harbor's Northern Drainage (IAC, Olympic Mudminnow)	Grays Harbor
65	G-3	Green River (ANA)	Cowlitz
66	D-2	Hamma Hamma River and Estuary (ANA, IAC)	Mason
67	D-1	Hoh River and Estuary (ANA)	Jefferson
68	C-1	Hoko River (IAC)	Clallam
69	E-2	Hoquiam River (ANA)	Grays Harbor
70	B-3	Hummel Lake (T)	San Juan
71	E-1,2	Humptulips River (ANA)	Grays Harbor
72	D-5	Icicle Creek (River) (T)	Chelan
73	C-3	Indian and Marrowstone Islands (MM)	Jefferson
74	C-1	Jagged Island Vicinity (MM)	Clallam
75	D-6	Jameson Lake (IAC)	Douglas
76	E-3	Johnson's Point(S)	Thurston
77	D-1	Kalaloch Vicinity (MM)	Jefferson
78	B-7	Kettle River, Ferry to Damville (T)	Ferry
79	G,H-4	Klickitat River and Tributaries (ANA)	Klickitat, Yakima
80	H-3	Lacamas Creek (T)	Clark
81	D-1	LaPush Coastal Area (MM)	Clallam
82	B-8	LeClerc River (IAC)	Pend Oreille
83	D,E-6	Lenore Lake (T)	Grant
84	H-3	Lewis River and Tributaries (ANA,T)	Clark, Skamania
85	E-2	Lilliwap River (T)	Mason
86	H-5	Little Klickitat River (T)	Klickitat
87	B,C-8	Little Pend Oreille River (Creek) (IAC)	Stevens
88	D-5	Little Wenatchee River (S)	Chelan
89	H-4	Little White Salmon River (T)	Skamania
90	F-6	Locke Island Area (S)	Benton, Spokane
91	D-8	Long Lake (IAC, Walleyed Pike)	Grant, Spokane, Pend Oreille
92	C-8	Loon Lake (KOK)	Stevens
93	C-2	Lyre River (Beardsley Trout)	Clallam
94	F-3	McIntosh Lake (T)	Thurston
95	H-3	McCurdy Lake (or Lost Lake) (T)	Clark
96	E-3	McNeil Island (MM)	Pierce
97	G-3	Merrill Lake (T)	Cowlitz
98	B,C-5	Methow River (T)	Okanogan
99	G-7	Mill Creek (STE)	Walla Walla
100	C-1	Makah Bay - Waddah Island (IAC)	Clallam
101	F-4,5	Naches River (ANA, T)	Yakima, Kittitas
102	G-2	Naselle River (ANA)	Pacific
103	F,G-2	Nemah River (ANA)	Pacific
104	C-7	Nespelem River (T)	Okanogan
105	F-3	Newaukum River (T)	Lewis
106	E,F-3, F-4	Nisqually River, Delta, Estuary (ANA, IAC)	Thurston, Pierce
107	B-3	Nooksack River Estuary (ANA)	Whatcom
108	F-2	North River (IAC)	Grays Harbor, Pacific
109	B,C-6	Okanogan River (T)	Okanogan
110	C,D-1	Olympic Coastal Strip (MM)	Jefferson, Clallam
111	C-6	Omak Lake (T)	Okanogan
112	B-6	Osoyoos Lake (S)	Okanogan
113	C-1	Ozette Lake (IAC, Olympic Mudminnow)	Clallam
114	B,G-1	Pacific Ocean Coastal Waters (MM)	SCD: Grays Harbor
115	F-4	Packwood Lake (T)	Lewis
116	B-6	Palmer Lake (T)	Okanogan
117	F-7,8	Palouse River (T)	Whitman, Franklin, Adams
118	C-5	Patterson Lake (T)	Okanogan
119	C-5	Perrygin Lake (T)	Okanogan
120	B-8	Pend Oreille River (IAC)	Pend Oreille
121	E-1	Point Grenville (MM)	Grays Harbor
122	E-6	Potholes Reservoir (IAC, Walleyed Pike)	Grant
123	B,C-8	Priest Lake and Priest River with Tributaries (T)	Pend Oreille
124	C,D-3	Puget Sound and Hood Canal (MM)	SCD: Kitsap
125	E,F-3	Puyallup River and Estuary (STE)	Pierce
126	C-1	Pyaht River (IAC)	Clallam
127	D-1,2	Queets River Estuary and Tributaries (ANA)	Jefferson
128	C,D-1	Quillayute Needles National Wildlife Area (MM)	Jefferson
129	D-1	Quillayute River Estuary (ANA)	Clallam
130	E-2	Quinault Lake (ANA, T)	Grays Harbor
131	D-1,2, E-1	Quinault River and Estuary (ANA)	Jefferson, Grays Harbor
132	E-1	Raft River (IAC)	Grays Harbor
133	E-8	Rock Lake (T)	Whitman
134	D,E-8	"Rock Lakes" near Cheney (T)	Spokane
135	D-7,8	Roosevelt, F.D.R., Lake (Spokane Arm) (IAC, Walleyed Pike)	Lincoln, Spokane, Stevens
136	B-8	Salmo River, South Fork (T)	Pend Oreille
137	B-2	Salmon Creek (ANA)	Clark
138	B-3	Samish River (ANA)	Whatcom, Skagit
139	B-2,3	San Juan Islands (MM)	San Juan
140	B,C-7	Sanpoil River (IAC)	Ferry
141	F-2	Satsop River (IAC, Olympic Mudminnow)	Grays Harbor
142	G-3	Silver Lake (IAC)	Cowlitz
143	D-8	Silver Lake (T)	Spokane
144	B-6	Similkameen River (S)	Okanogan
145	C-3,B-3,4	Skagit River and Estuary (ANA)	Skagit, Whatcom
146	E-2	Skokomish River Estuary (ANA)	Mason
147	B-3	Skookum Creek (T)	Whatcom
148	F-3	Skookumchuck River (ANA)	Lewis, Thurston
149	D-4	Skykomish River (ANA)	Snohomish, King
150	G-7,8,9 F-7,8	Snake River (ANA, STURG: Above Clarkston)	Walla Walla Franklin, Columbia, Garfield, Whitman, Asotin
151	D-3,4, C-3	Snohomish River and Estuary (ANA)	Snohomish
152	D,E-4	Snoqualmie River, All Forks (T), Below Snoqualmie Falls (ANA)	Snohomish, King
153	C,D-1	Soleduck River (IAC)	Clallam
154	B-6	Spectacle Lake (T)	Okanogan
155	G-3	Spirit Lake (KOK, S)	Skamania
156	D-7,8	Spokane River (T)	Spokane, Lincoln, Ferry
157	C-3	Stevens Lake (IAC)	Snohomish
158	C-3,4	Stillaguamish River and Estuary (ANA)	Snohomish
159	C-1,2	Strait of Juan de Fuca (MM)	Clallam, Jefferson
160	B-8	Sullivan Creek (T)	Pend Oreille
161	B-8	Sullivan River and Lake (IAC)	Pend Oreille
162	D-2	Summit Lake (KOK)	Thurston
163	B-7	Swan Lakes (T)	Ferry
164	C-1	Tatoosh Island (MM)	Clallam
165	E-5	Teanaway River (T)	Kittitas
166	F-4,5	Tieton River (T)	Yakima
167	G-5	Toppenish Creek (T)	Yakima
168	G-3	Toutle River (ANA)	Cowlitz
169	G-8	Tucannon River (IAC)	Columbia
170	D-5	Twenty-Five Mile Creek (IAC)	Chelan
171	C-5	Twisp River (S,T)	Okanogan
172	F-8	Union Flat Creek (T)	Whitman
173	D-3	Union Marsh (IAC)	King
174	C-4	Upper Granite Lake (IAC, Grayling)	Skagit
175	B-2	Waldron Island (MM)	San Juan
176	G-4	Walupt Lake (T)	Lewis
177	B-6	Wannacut Lake (T)	Okanogan
178	D-3	Washington Lake (IAC)	King
179	H-3	Washougal River (T)	Clark, Skamania
180	G,H-7	Walla Walla River (IAC)	Walla Walla
181	G-8	Wenaha River (T)	Columbia
182	D,E-5	Wenatchee River (T)	Chelan
183	B-3	Whatcom Lake (IAC)	Whatcom
184	D-5	White River (T)	Chelan
185	B-6	Whitestone Lake (T)	Okanogan
186	E-8	Williams Lake (T)	Spokane
187	F-1,2, G-1,2	Willapa Bay (MM) and River (ANA, STURG)	Pacific
188	H-4	Wind River (ANA)	Skamania
189	E-2	Wishkah River (IAC)	Grays Harbor
190	E-3	Woodard Bay and Creek (S)	Thurston
191	E,F-2	Wynoochee River (IAC)	Grays Harbor
192	E-4,5, F-5,G-5,6	Yakima River (ANA)	Kittitas, Yakima, Benton

Hatcheries, rearing ponds, and spawning channels (existing and proposed) ZH

Map Key No.	Map Index Grid Ref.	Feature	County
1	C-5	Winthrop National Fish Hatchery	Okanogan
2	F-2	Aberdeen Fish Hatchery	Grays Harbor
3	C-3	Arlington Fish Hatchery	Snohomish
4	G-2	Beaver Creek Fish Hatchery	Wahkiakum
5	B-3	Bellingham Fish Hatchery	Whatcom
6	D-5	Chelan Fish Hatchery	Chelan
7	E-6	Columbia Basin Fish Hatchery	Grant
8	B-8	Colville Fish Hatchery	Stevens
9	G-3	Cowlitz Trout Hatchery	Lewis
10	H-5	Goldendale Fish Hatchery	Klickitat
11	B-3	Lake Whatcom Fish Hatchery	Whatcom
12	F-3	Mossyrock Trout Hatchery	Lewis
13	F-5	Naches Fish Hatchery	Yakima
14	C-6	Omak Fish Hatchery	Okanogan
15	E-3	Puyallup Fish Hatchery	Pierce
16	D-3	Seward Park Fish Hatchery	King
17	H-3	Shelton Fish Hatchery	Mason
18	H-3	Skamania Trout Hatchery	Clark
19	E-3	South Tacoma and Chambers Creek Fish Hatchery	Pierce
20	D-8	Spokane Fish Hatchery	Spokane
21	D-4	Tokul Creek Fish Hatchery	King
22	G-8	Tucannon Fish Hatchery	Columbia
23	H-3	Vancouver Fish Hatchery	Clark
24	D-6	Wells Fish Hatchery	Chelan
25	F-5	Yakima Fish Hatchery	Yakima
26	C-4	Barnaby and Harrison Slough Rearing Ponds	Skagit
27	D-1	Bogachiel Rearing Pond	Clallam
28	E-4	Green River Rearing Ponds	King
29	F-5	Nelson Bridge Raceways	Yakima
30	F-6	Ringold Springs Rearing Pond	Franklin
31	E-2	Standstill Lake Rearing Pond	Mason
32	F-3	Swafford Lake Steelhead Rearing Pond	Lewis
33	G-6	Washburn Island Rearing Pond	Okanogan
34	C-4	Whitehorse Rearing Pond	Snohomish
35	G-3	Alder Creek Rearing Ponds	Cowlitz
36	D-4	Skykomish Rearing Ponds (Proposed)	Snohomish
37	D-1	Calawah Rearing Ponds (Proposed)	Clallam
38	E-6	Trout Lodge (Proposed)	Grant
39	B-4	Baker Lake Spawning Beach	Whatcom
40	F-3	Cowlitz State Salmon Hatchery	Lewis
41	C-2	Dungeness State Salmon Hatchery	Clallam
42	G-2	Elochoman State Salmon Hatchery	Wahkiakum
43	E-2	George Adams State Salmon Hatchery	Mason
44	G-2	Grays River State Salmon Hatchery	Pacific
45	G-3	Green River State Salmon Hatchery	King
46	E-2	Hood Canal State Salmon Hatchery	Mason
47	D-3	Issaquah State Salmon Hatchery	King
48	G-3	Kalama Falls State Salmon Hatchery	Cowlitz
49	G-4	Klickitat State Salmon Hatchery	Klickitat
50	H-3	Lewis River State Salmon Hatchery	Clark
51	G-3	Lower Kalama State Salmon Hatchery	Cowlitz
52	E-3	Minter Creek State Salmon Hatchery	Pierce
53	F-2	Nemah State Salmon Hatchery	Pacific
54	B-3	Nooksack State Salmon Hatchery	Whatcom
55	F-6	Priest Rapids Spawning Channel	Grant
56	F-3	Puyallup State Salmon Hatchery	Pierce
57	D-5	Rocky Reach Spawning Channel	Douglas, Chelan
58	B-3	Samish State Salmon Hatchery	Skagit
59	H-3	Speelyai State Salmon Hatchery	Cowlitz
60	E-2	Simpson State Salmon Hatchery	Mason
61	B-4	Skagit State Salmon Hatchery	Skagit
62	D-4	Skykomish State Salmon Hatchery	Snohomish
63	G-3	Toutle State Salmon Hatchery	Cowlitz
64	H-3	Washougal Salmon Hatchery	Skamania
65	F-2	Willapa State Salmon Hatchery	Pacific
66	C-1	Soleduck Salmon Hatchery	Clallam
67	H-4	Carson National Salmon & Trout Hatchery	Skamania
68	H-4	Little White Salmon National Fish Hatchery	Skamania
69	H-4	Spring Creek National Fish Hatchery	Skamania
70	H-4	Willard National Fish Hatchery	Skamania
71	G-2	Abernathy National Fish Hatchery	Cowlitz
72	D-5	Entiat National Fish Hatchery	Chelan
73	D-5	Leavenworth National Fish Hatchery	Chelan
74	D-3	Quilcene National Fish Hatchery	Jefferson
75	E-2	Quinault National Fish Hatchery	Grays Harbor
76	G-2	Abernathy Incubation Channel	Cowlitz
77	B-3	Sprague Lake	Whatcom
78	B-4	Newhalem Pond	Whatcom
79	C-1	Clallam Pond	Clallam
80	D-6	Wells Spawning Channel	Chelan
81	D-3	Alexander Lake	Kitsap
82	D-3	Little Clam Bay	Kitsap
83	C-8	Kings Lake Rearing Pond	Pend Oreille
84	D-8	Ford Trout Hatchery	Stevens
85	B-3	Lummi Indian Fish Hatchery	Whatcom
86	C-7	Big & Little Twin Lakes	Ferry
87	E-2	Humptulips River Hatchery (Proposed)	Grays Harbor
88	C-8	Loon Lake Salmon Fishery	Stevens
89	F-3	Deschutes River Fish Hatchery	Thurston

Fish ladders and passage facilities ZL

Map Key No.	Map Index Grid Ref.	Feature	County
1	G-7	Ice Harbor Dam Fish Ladder	Walla Walla
2	G-7	Lower Monumental Dam Fish Ladder	Walla Walla
3	F-7	Little Goose Dam Fish Ladder	Columbia
4	F-8	Lower Granite Dam Fish Ladder	Garfield
5	H-4	Bonneville Dam Fish Ladder	Skamania
6	H-4	The Dalles Dam Fish Ladder	Klickitat
7	H-6	McNary Dam Fish Ladder	Benton
8	F-6	Priest Rapids Dam Fish Ladder	Yakima
9	F-6	Wanapum Dam Fish Ladder	Kittitas
10	E-5	Rock Island Dam Fish Ladder	Chelan
11	D-5	Rocky Reach Dam Fish Ladder	Chelan
12	D-6	Wells Dam Fish Ladder	Chelan
13	B-4	Baker Dam Fish Ladder	Skagit
14-16			
17	B-3	Anderson Creek Fish Passage Facility	Whatcom
18	B-3	Hutchinson Creek Fish Passage Facility	Whatcom
19	D-3	Lake Washington Ship Canal Fish Ladder	King
20	E-3	Lake Sawyer Fish Passage Facility	King
21	E-3	Chambers Creek Fish Passage Facility	Pierce
22	E-4	White River Fish Passage Facility	Pierce
23	E-3	Deschutes River Fish Passage Facility	Thurston
24-26			
27	D-3	Big Beef Creek Fish Passage Facility	Kitsap
28	E-3	Tahuya River Fish Passage Facility	Mason
29	E-3	Deer Creek Fish Passage Facility	Mason
30			
31	E-2	Goldsborough Creek Fish Passage Facility	Mason
32	E-2	Falls Creek Fish Ladder	Grays Harbor
33	E-2	E. Fork Humptulips Fish Ladder	Grays Harbor
34	C-4	Granite Falls Fish Ladder	Snohomish
35	G-6	Prosser Fishway	Benton
36	F-5	Wapato Fishway	Yakima
37	G-5	Sunnyside Fishway	Yakima
38	F-5	Roza Fishway	Yakima
39	H-4	Wind River Fishway (Shippard Falls Bypass)	Skamania
40	G-4	Castile Falls Fishway	Yakima
41	H-4	Klickitat Falls Fishway	Klickitat
42	H-3	Salmon Falls Fishway	Skamania
43	H-3	Cedar Creek Falls Fishway	Clark
44	G-3	Kalama Falls Fishway	Cowlitz
45	G-2	Gray River Falls Fishway	Wahkiakum
46	F-3	Skookumchuck Fish Passage Facility	Thurston
47	H-4	Trout Creek Fishway	Skamania
48	H-4	Falls Creek Fishway	Skamania
49	H-5	John Day Dam Fish Ladder	Klickitat
50	F-2	Willapa River Ladder (Proposed)	Pacific
51	F-2	Upper Fall River Ladder (Proposed)	Pacific
52	F-3	N. Fork Newaukum River Fishway	Lewis
53	E-2	Wynoochee Fish Passage Facility	Grays Harbor

Aquaculture and/or Mariculture Operations ZA

Map Key No.	Map Index Grid Ref.	Feature	County
1	B-3	Lummi Indian Reservation	Whatcom
2	D-3	Suquamish Indian Reservation	Kitsap
3	E-1	Quinault Indian Reservation	Grays Harbor
4	E-3	Squaxin Indian Reservation and Trotten Inlet	Thurston

Dams HD

Map Key No.	Map Index Grid Ref.	Feature	County
1	F-5	Roza Diversion Dam	Kittitas
2	F-5	Wapato Diversion Dam	Yakima
3	F-5	Sunnyside Diversion Dam	Yakima
4	G-6	Prosser Diversion Dam (also known as Chandler Dam)	Benton
5	H-4	Bonneville Dam	Skamania
6	H-4	The Dalles Dam	Klickitat
7	H-5	John Day Dam	Klickitat
8	H-6	McNary Dam	Benton
9	F-6	Priest Rapids Dam	Grant, Yakima
10	F-6	Wanapum Dam	Grant, Kittitas
11	D-5	Rock Island Dam	Chelan, Douglas
12	D-5	Rocky Reach Dam	Chelan, Douglas
13	D-5	Chelan Dam	Chelan
14	D-6	Wells Dam	Douglas, Chelan
15	D-6	Chief Joseph Dam	Douglas, Okanogan,
16	D-7	Grand Coulee Dam	Douglas, Okanogan, Grant
17	F-3	Mossyrock Dam	Lewis
18	F-3	Mayfield Dam	Lewis
19	H-3	Merwin Dam	Clark, Cowlitz
20	H-3	Yale Dam	Clark, Cowlitz
21	G-3	Swift Dam	Clark, Cowlitz
22	D-2	Wynoochee Dam	Grays Harbor
23	B-4	Gorge Dam	Whatcom
24	B-4	Diablo Dam	Whatcom
25	B-4	Ross Dam	Whatcom
26	F-3	La Grande Dam	Thurston, Pierce
27	F-3	Alder Dam	Thurston, Pierce
28	G-7	Ice Harbor Dam	Walla Walla, Franklin
29	F-7	Lower Monumental Dam	Walla Walla, Franklin
30	F-7	Little Goose Dam	Columbia, Whitman
31	F-8	Lower Granite Dam	Garfield, Whitman
32	C-2	Elwha Dam	Clallam
33	C-2	Glines Canyon Dam	Clallam
34	E-2	Cushman No. 1 Dam	Mason
35	F-3	Skookumchuck Dam	Thruston
36	F-4	Tieton Dam	Yakima
37	F-4	Packwood Dam	Lewis
38	E-4	Mud Mountain Dam	King
39	D-4	Howard Hanson Dam	King
40	E-4	Selleck Diversion Dam	King
41	E-4	Cedar Falls Dam	King
42	E-4	Chester Morse Dam	King
43	E-4	Keechelus Dam	Kittitas
44	E-4	Kachess Dam	Kittitas
45	D-4	Tolt Dam	King
46	B-4	Lower Baker or Baker Dam	Skagit
47	B-4	Upper Baker Dam	Whatcom
48	B-4	Nooksack Dam	Whatcom
49	F-4	Clear Creek Dam	Yakima
50	B-6	Conconully Dam	Okanogan
51	B-6	Blue Lake Dam	Okanogan
52	E-6	O'Sullivan Dam	Grant
53	D-6	Dry Falls Dam	Grant
54	D-6	North Dam	Grant
55	B-8	Box Canyon Dam	Pend Oreille
56	B-8	Sullivan Creek Dam	Pend Oreille
57	B-8	Boundary Dam	Pend Oreille
58	D-4	Chaplain Dam	Snohomish
59	D-4	George Culmback Dam	Snohomish
60	E-4	Cle Elum Dam	Kittitas
61	F-4	Bumping Lake Dam	Yakima
62	B-6	Salmon Lake Dam	Okanogan
63	C-8	Calispell Creek Dam	Pend Oreille
64	C-7	Oehi Dam	Okanogan
65	E-6	Pinto or Long Lake Dam	Grant
66	F-6	Scootenay Dam	Franklin
67	C-7	Twin Lakes Dam	Ferry
68	D-8	Little Falls Dam	Lincoln, Stevens
69	D-8	Long Lake Dam	Lincoln, Stevens
70	D-8	Ninemile Falls Dam	Spokane
71	D-8	Monroe Street Dam	Spokane
72	D-8	Upper Falls Dam	Spokane
73	B-6	Similkameen Dam	Okanogan
74	E-2	Cushman No. 2 Dam	Mason
75	B-8	Spokane Dam	Spokane
76	D-5	Dryden Dam	Chelan
77	F-5	Naches Dams	Yakima
78	H-4	Condit Dam	Skamania, Klickitat
79	E-2	Quinalut Dam	Grays Harbor
80	F-3	Electron Dam	Pierce
81	F-3	Yelm Dam	Thurston, Pierce
82	D-4	Snoqualmie Falls Dams	King
83	E-4	White River Dam	Pierce
84	B-4	Newhalem Dam	Whatcom
85	B-4	Bear Creek Dam	Skagit
86	B-6	Spectacle Dam	Okanogan
87	D-5	Antilon Dam	Chelan
88	B-7	Meyers Falls Dam	Stevens
89	G-3	Swift No. 2 Dam	Skamania

Watersheds or Water Resource Inventory Areas WRIA

The following named drainage basins are in common use today by agencies engaged in resource planning in Washington.

Basin No.	Basin Name
1	Nooksack
2	San Juan
3	Lower Skagit
4	Upper Skagit
5	Stillaguamish
6	Island
7	Snohomish
8	Cedar
9	Green
10	Puyallup-White
11	Nisqually
12	Chambers-Clover
13	Deschutes
14	Kennedy-Goldsburough
15	Kitsap
16	Skokomish-Dosewallups
17	Quilcend-Snow
18	Elwha-Dungeness
19	Lyre-Hoko
20	Soleduck-Hoh
21	Queets-Quinalt
22	Lower Chehalis
23	Upper Chehalis
24	Willapa
25	Grays-Elochoman
26	Cowlitz
27	Lewis
28	Salmon-Washougal
29	Wind-White Salmon
30	Klickitat
31	Rock-Glade
32	Walla Walla
33	Lower Snake
34	Palouse
35	Middle Snake
36	Esquatzel Coulee
37	Lower Yakima
38	Naches
39	Upper Yakima
40	Alkali-Squilchuck
41	Lower Crab
42	Grand Coulee
43	Upper Crab-Wilson
44	Moses Coulee
45	Wenatchee
46	Entiat
47	Chelan
48	Methow
49	Okanogan
50	Foster
51	Nespelem
52	Sanpoil
53	Lower Lake Roosevelt
54	Lower Spokane
55	Little Spokane
56	Hangman
57	Middle Spokane
58	Middle Lake Roosevelt
59	Colville
60	Kettle
61	Upper Lake Roosevelt
62	Pend Oreille

WASHINGTON FISH AND SHELLFISH

Fish and shellfish found in Washington aquatic environments are listed below. Only those species in the aquatic environment which are of direct value or more readily observed by the public are included.

ANADROMOUS FISH

Chinook salmon (Oncorhynchus tshawytscha)
Coho salmon (Oncorhynchus kisutch)
Pink salmon (Oncorhynchus gorbuscha)
Chum salmon (Oncorhynchus keta)
Sockeye salmon (Oncorhynchus nerka)
Steelhead trout (Salmo gairdneri)
Searun cutthroat trout (Salmo clarki)
Searun Dolly Varden (Salvelinus malma)
White sturgeon (Acipenser transmontanus)
Lampreys (Lampetra spp.)
Eulachon (Thaleichthys pacificus)
American shad (Alosa sapidissima)

RESIDENT FISH

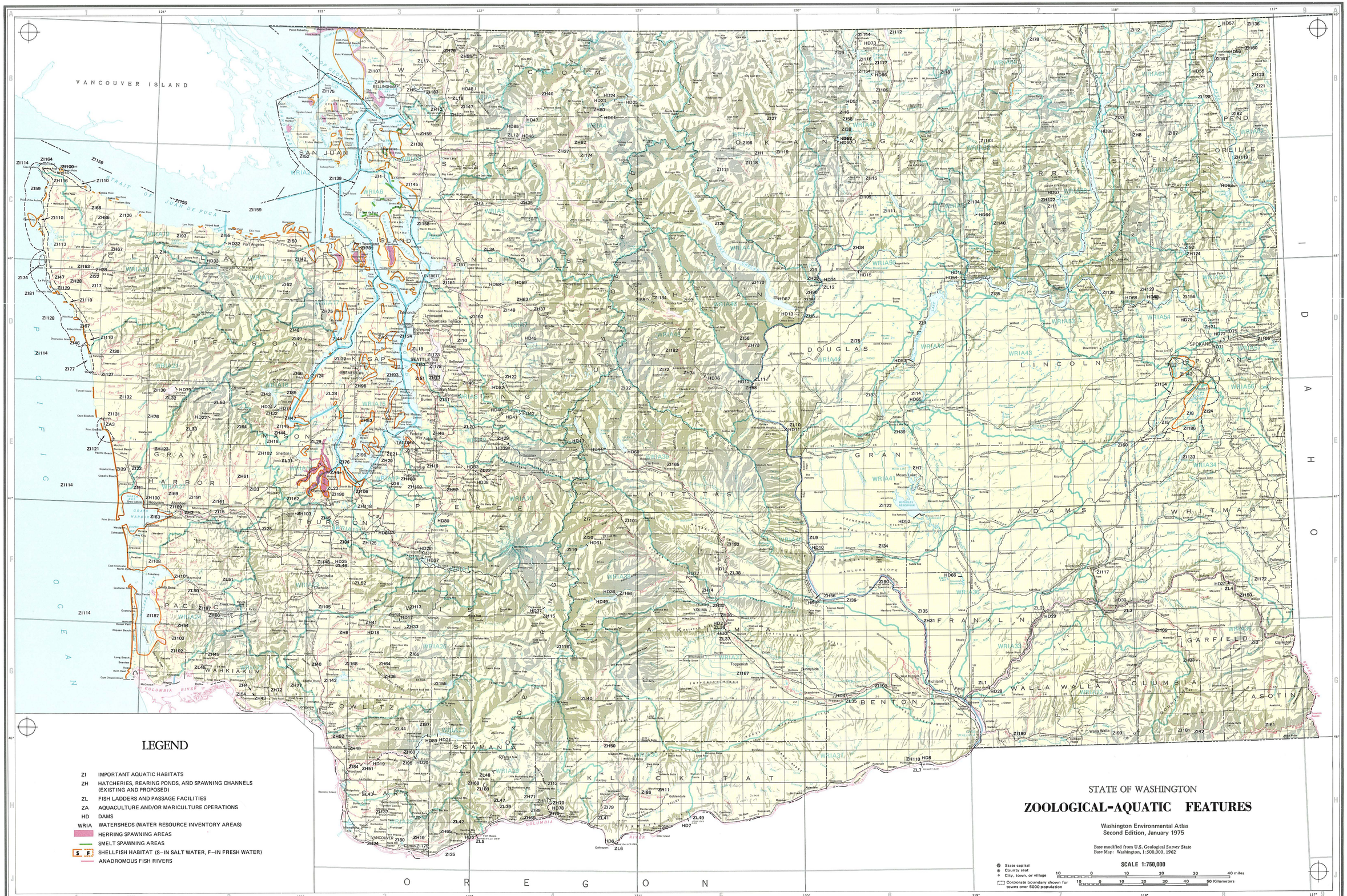
Kokanee (Oncorhynchus nerka kennerlyi)
Rainbow trout (Salmo gairdneri)
Cutthroat trout (Salmo clarki)
Brown trout (Salmo trutta)
Golden trout (Salmo aquabonita)
Dolly Varden (Salvelinus malma)
Brook trout (Salvelinus fontinalis)
Lake trout (Salvelinus namaycush)
Arctic grayling (Thymallus articus)
Mountain whitefish (Prosopium williamsoni)
Suckers (Catastomus spp.)
Sculpins (Cottus spp.)
Rock bass (Ambloplites rupestris)
Warmouth (Chaenobryttus gulosus)
Yellow perch (Perca flavescens)
Brown bullhead (Ictalurus nebulosus)
Bluegill (Lepomis macrochirus)
Pumpkinseed (Lepomis gibbosus)

MARINE FISH

Pacific cod (Gadus macrocephalus)
Other codfishes (Gaddae family)
Pacific hake (Merluccius productus)
Lingcod (Ophiodon elongatus)
Greenlings (Hexagrammidae family)
Flounders (Pleuronectidae)
English sole (Parophrys vetulus)
Other soles (Pleuronectidae family)
Surfperches (Embiotocidae family)
Black rockfish (Sebastodes melanops)
Rockfishes (Scorpaenidae family)
Pacific herring (Clupea harengus pallasi)
Spingy dogfish (Squalus acanthias)
Sixgill shark (Hexanchus griseum)
Soupfin shark (Galeorhinus zyopterus)
Ratfish (Hydrolagus colliei)
Skates (Rajidae family)
Surf smelt (Hypomesus pretiosus)
Sablefish (Anoplopoma fimbria)
Albacore (Thunnus alalunga)
Pacific halibut (Hippoglossus stenolepus)
Pacific Ocean perch (Sebastodes alutus)
Sculpins (Cottidae family)

SHELLFISH

Razor clam (Siliqua patula)
Dungeness crab (Cancer magister)
Red crab (Cancer productus)
Box crab (Lopholithodes foraminatus)
Pacific oyster (Crassostrea gigas)
Olympia oyster (Ostrea lurida)
Kumamoto oyster (Crassostrea gigas kumamoto)
Littleneck or rock clam (Protothaca staminea)
Butter clam (Saxidomus giganteus)
Horse clam (Schizothaerus nuttali)
Manila or Japanese littleneck clam (Venerupis japonica)
Geoduck (Panope generosa)
Softshell or



LEGEND

- ZI — IMPORTANT AQUATIC HABITATS
- ZH — HATCHERIES, REARING PONDS, AND SPAWNING CHANNELS (EXISTING AND PROPOSED)
- ZL — FISH LADDERS AND PASSAGE FACILITIES
- ZA — AQUACULTURE AND/OR MARICULTURE OPERATIONS
- HD — DAMS
- WRIA — WATERSHEDS (WATER RESOURCE INVENTORY AREAS)
- HERRING SPAWNING AREAS
- SMELT SPAWNING AREAS
- S F — SHELLFISH HABITAT (S—IN SALT WATER, F—IN FRESH WATER)
- ANADROMOUS FISH RIVERS

STATE OF WASHINGTON

ZOOLOGICAL-AQUATIC FEATURES

Washington Environmental Atlas
Second Edition, January 1975

Base modified from U.S. Geological Survey State
Base Map: Washington, 1:500,000, 1962

State capital
County seat
City, town, or village
Corporate boundary shown for towns over 5000 population

SCALE 1:750,000

10 0 10 20 30 40 miles

10 0 10 20 30 40 50 Kilometers



Black-tailed doe.

ZOOLOGICAL FEATURES: TERRESTRIAL AND ORNITHOLOGICAL

WASHINGTON: THE AVIFAUNAL STATE

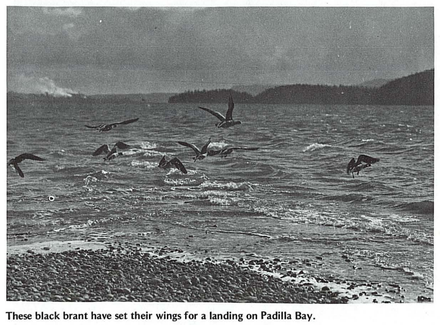
By

Gordon D. Alcorn

The State of Washington has a varied and complex geography, being divided into eastern and western halves by the Cascade range extending from the Columbia River to the Canadian border. The prevailing westerly winds, heavily laden with moisture, provide abundant rainfall when their clouds strike the cold mountains. The rainfall is, therefore, restricted in eastern Washington, but in the rain forests of the western side of the state it may reach 200 inches or more. Consequently, the Columbia Plateau of the eastern side is largely typified by the Upper Sonoran Life Zone. Much of western Washington is Humid Transition Life Zone. These conditions, as a result of habitats related to rainfall, sharply influence avifaunal types.

Geographically, Washington can be roughly divided into the following areas: (1) the mountains, (2) Puget Sound Basin in the west, (3) the Okanogan Highlands in the northeast, and (4) the Columbia Plateau in the east central portion. The mountains are the Olympics in the northwest, the Cascade Range in the center, and the Blue Mountains in the extreme southeast corner. There is a unique meteorological condition in western Washington known as the "rain shadow." This is the result of the cold Olympic Mountains precipitating vapor from the wet west winds into rain on the west coast. The result is the rain forest. The resulting dry "fan," on the northeast slopes of the Olympics, extends from the Strait of Juan de Fuca at Sequim to Port Townsend and northeastward into the San Juan Islands. As a result, there are Upper Sonoran examples of flora and avifauna in the San Juan Islands.

All of the diverse geographical features over long periods of time have modified and established typical populations of birds, all interrelated in their ecological and habitat types within the various areas. Some generalities can be noted as a result of the geography. For example, many but not all seabirds, shorebirds, and waterfowl inhabiting the ocean beaches make their way into Puget Sound. The Potholes, Rock and Sprague Lake areas and the bottomlands of the Columbia, Yakima, and Snake River valleys of eastern Washington supply habitats for abundant waterfowl. A few species of seabirds and shorebirds are also found at suitable water localities in eastern Washington. There are many typical habitats in the lowlands and brush borders in western Washington and in the highlands and plateaus of eastern Washington used for cover, food and nesting by many Passerine birds. However, the increase in rural living, highways and other destructive influences have sharply curtailed and destroyed these compatible habitats.



These black brant have set their wings for a landing on Padilla Bay.

The mountains have their typical avifaunal types. The ptarmigan, rosy finch, nutcracker, pipit and threetoed woodpeckers are typical of the high mountains and have suffered least in recent years from the inroads of civilization. There are typical birds in the Columbia Plateau living in dry sagebrush areas or around the desert lakes and rivers. Here are a number of waterfowl, shorebirds, and such Passerine birds as the magpie, rock wren (found also in restricted areas in the San Juan Islands) and kingbird. The prairie falcon, golden eagle, and rough-legged hawks are here although now in diminished numbers. Typical birds of the Okanogan Highlands are the pine grosbeaks, the redstart, and a good series of woodpeckers. The Blue Mountains, in the southeast corner, produce a few peripheral forms coming up from Oregon on the south. The common egret and a species of horned lark are typical here.

GENERAL DISTRIBUTION OF BIRDS. In broad terms, the avifauna of the State can be divided into those birds that are migratory and those that are nonmigratory. The Galliform birds, the woodpeckers, owls, seabirds, most predatory birds, and many songbirds are not migratory. These generally stay within the confines of the State and thus are greatly influenced by changes in the environment since these environments are naturally, and often radically, modified by seasonal changes.

The migratory birds are the shorebirds, many songbirds, and a number of smaller groups such as swifts, hummingbirds and night hawks. Thus, migratory birds are influenced by environmental changes affecting the habitats that they use in the single season they spend within the confines of the State. For example, the large and colorful shorebirds touch our shores for a few short days during their northward, and again in their southward flights. Thus, any influential modification of their environment would eliminate large populations along our shores. We have witnessed this unfortunate phenomenon in viewing the decreased flocks of knots, plover, curlews, and some sandpipers. Winter bird visitors to our shores and bays are affected much like our transient birds. Environmental changes, including pollution, have decreased our winter populations of saltwater birds.

SIGNIFICANT AVIFAUNAL HABITATS. Approximately 470 species and subspecies of birds are found in Washington. Of these, well over half are spring and summer residents and therefore nest within our limits. The habitats for successful nesting are chosen by every species by genetic tradition. Within the boundaries of the State these habitats are of all types. There are those birds that nest in the ground. The petrels, puffins and some auklets along the coast, the kingfishers and some swallows along the riverbanks, and the burrowing owl go underground. The ground-level nesting species vary from the gulls and terns on the open sand or dunes, through the Gallinacious birds, and to the many songbirds with their elaborate nests in open fields and meadows. All ground environments are used by some birds, from the bare sand to the forest floor. Many birds occupy low bushes, tree limbs and dead tree trunks. A few go high in old growth evergreen trees. The rocky cliff sides along the coast are used by seabirds, and the basaltic river breaks in eastern Washington are favorites of some predators. Thus, no environment is completely without some nesting birds. In summary, these environments include beaches, meadows, swamps, prairies, low bushes, high trees, cliff sides and available underground areas.

Birds will settle into suitable habitats involving sufficient food, cover and favorable nesting areas. Should these habitats be altered, even minimally, adaptation becomes impossible. Modifications of an environment may destroy the food cycle by eliminating one small link in that cycle. For example, if an herbicide destroys one plant that produces the seed on which a field mouse feeds, the field mouse is removed from the environment and consequently the predator whose staple item of diet is the mouse, is likewise removed. Removal is synonymous with death. A comparative and relatively minor link in the entire chain affects all links upward in the chain.

GORDON D. ALCORN, Ph.D., is Director of Graduate Studies and Professor of Biology at the University of Puget Sound. He is an ornithologist of long experience and has authored 100 articles on Pacific Northwest birdlife and pioneer history.



Merriam's turkey have been introduced into several eastern and western Washington counties.

STATUS OF THE LAND MAMMALS OF WASHINGTON

By

Earl J. Larrison

This report summarizes the current status of some 112 species of land mammals presently known to occur in Washington. Reference is made to particular species where necessary, but in some instances comments will be applied to a group of species. Obviously many, if not most, forms are common in some habitats, in some localities, while others may be rare or absent in other areas. The remarks on status therefore usually concern various mammals treated on a statewide basis. Accordingly, if a species is considered rare or endangered it is in such condition in the state as a whole and not necessarily in just one particular location.

It should be realized also that an endangered form may be in critically low numbers due either to direct persecution by man or indirectly from his activities - such as habitat alteration or destruction. An attempt will be made to assess the extent of each of these manifestations in the following discussions. Attention will also be directed to particular sites or environmental types which contain significant or relict populations or those which could function as convenient and necessary havens for endangered or threatened species of mammals.

Greater detail on habits, identification and ranges may be obtained from the author's WASHINGTON MAMMALS: THEIR HABITS, IDENTIFICATION AND DISTRIBUTION, 243 pp., illustrated, published in 1970 by the Seattle Audubon Society. Preparation of reviews such as that book or the present paper reveal only too well the imperfect state of our knowledge of Washington mammals. This may account for some seemingly contradictory evaluations of certain species in earlier literature. This situation certainly points out the great and imperative need for an adequate and still more detailed inventory of these as well as other animals in the state for proper management or enhancement.

REVIEW OF SPECIES AND SPECIES GROUPS

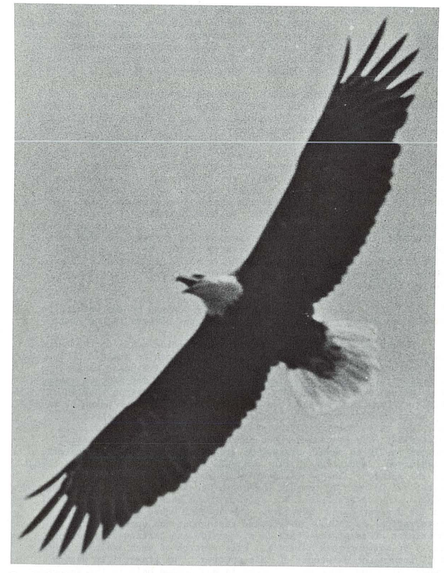
OPOSSUMS. The American opossum (Didelphis marsupialis) is a recent invader of the state and has spread into a number of areas, particularly in western Washington. Due to its great ecologic tolerance and adaptability, it will probably continue to increase its range and numbers.

SHREWS. Most of the state's nine species of shrews reside in forested areas and, considering the large extent of this vegetational type in the state, are not in danger of extirpation as long as reasonable management of State and Federal forest lands is maintained. Several species however, due to their rarity, should be given special treatment. The Preble's shrew (Sorex preblei) has been found in marshes, bogs, spring seeps and streamsides in open coniferous growth in the Blue Mountains. Special consideration should be given in that region to the preservation of swampy habitats for this highly restricted species. The marsh shrew (Sorex bendirei) has been strongly reduced in western Washington because of the "reclamation" of numerous sphagnum bogs to which this species is strongly restricted. The presence of this shrew, as well as of a number of ecologically unique insects and plants, requires careful management and preservation of sphagnum bog areas. Merriam's shrew (Sorex merriami) is practically restricted to the sagebrush-grass type habitat in eastern Washington. While it apparently occurs widely in this association, the great reduction of sagebrush areas has reduced its numbers, as well as those of other species, and careful consideration must be given to retention of adequate extents of this vegetational type which now represents one of the most threatened habitats in the state. The pygmy shrew (Microsorex hoyi) is known from a single specimen from the dry pine woods of northeastern Washington. There are adequate extents of this forest type in that area. The exact ecologic nature of this species requires considerably more study to properly evaluate it.

MOLES. The three species of Washington moles are widely distributed within their ranges. While there have been significant reductions in numbers of the lowland forms, adequate retention of woodland and forest habitats will maintain them in good numbers - at least on a statewide basis. Extention of "urban sprawl" into open meadowland and river bottoms in the Puget Sound area poses a threat to the Townsend's mole (Scapanus townsendi) in such places.

BATS. The bats of Washington are so imperfectly known that it is impossible to properly evaluate them, at least by species. Some general considerations will be in order, however. Those species using caves for hibernation or cover havens may face problems in the destruction or exploitation of such facilities. It is strongly urged that all caves, crevices, tunnels, mine shafts and other such chambers be preserved, where possible, for these winged wanderers of the night.

RABBITS. Pikas (Ochotona princeps) are almost entirely restricted in this state to montane or subalpine rockslides. The fact that the species is protected by law, and that most of its habitat lies within



Soaring bald eagles are common sights in many areas.

Forest Service or National Park reserves, should offer adequate protection for this very interesting mammal. Cottontails (Sylvilagus sp.) are in good condition statewide as is, unfortunately, the introduced European rabbit (Oryctolagus cuniculus) which is a pest in the San Juan Islands. The little pygmy rabbit (Brachylagus idahoensis), while legally protected, suffers from reduction of dense sagebrush which provides its preferred habitat. Good numbers are to be found in the Bureau of Land Management's Juniper Forest Preserve in southern Franklin County an 8-1/2 square mile tract deserving of strong protection, not only for the pygmy rabbits, but for other species to be noted later. Snowshoe hares (Lepus americanus) are abundant in the coniferous forests of the state. The whitetail jackrabbit (Lepus townsendi) and blacktail jackrabbit (Lepus californicus) are threatened in a number of places due to the reduction of grassland and sagebrush areas respectively. Strong attempts must be made to preserve adequate extents of both these vegetational types. Again, the Juniper Forest Preserve of Franklin County contains a population of the whitetail jackrabbit which is sufficiently threatened to have received legal protection in Washington.

SQUIRRELS. The four species of Washington chipmunks enjoy large distributions in Washington. Most forms occur in wide expanses of forest or subalpine habitat which are adequately protected. One species, the least chipmunk (Eutamias minimus), exists in the state only in its sagebrush varieties and has, with the reduction of this vegetation, suffered extensive loss of numbers. This is another reason for maintaining adequate extents of sagebrush-grass habitat. The eastern woodchuck (Marmota monax) is scarce and imperfectly known from the extreme northeastern corner of the state. It is too rare to be evaluated properly, but apparently most of its range in Washington occurs in high subalpine country on Forest Service land. The yellow-bellied marmot (Marmota flaviventris) is present in good numbers in rocky areas, but suffers extensively from unjustified "target shooting." It is not the pest that some persons think it is. The hoary marmot (Marmota caligata) is legally protected and occurs in high subalpine or alpine rocky areas, many of which are in National Park or Forest Service reserves. It is not to be considered as threatened or endangered. Of the ground squirrels, only the Townsend's ground squirrel (Citellus townsendi) and the Washington's ground squirrel (Citellus washingtoni) are being reduced due to shrinking of the sagebrush-grass habitat. These species are quite adaptable however and seem to be maintaining adequate numbers. The tree squirrels are in good shape in the state,

ZOOLOGICAL FEATURES: TERRESTRIAL AND ORNITHOLOGICAL

either because of adequate habitat or legal protection. An exception may be the western gray squirrel (Sciurus griseus) which is found mostly in pine and oak woods such as in the area southeast of Puget Sound in Klickitat County, and along the southeastern slopes of the Cascades. It is strongly urged that as much of the oak woods in the state be preserved as possible, not only to insure the continued existence of this beautiful squirrel, but for an interesting and unique community of birds and mammals.

POCKET GOPHERS. These animals are abundant in suitable habitats in the state. Certain subspecies may be endangered through human development of prairie country around the southern end of Puget Sound. Care should be taken to consult with local mammalogists when alteration of such habitat is contemplated. The Mima Mound area south of Olympia is a unique phenomenon and should be preserved by all means.

POCKET MICE. These animals are abundant throughout much of the Columbia Basin and as a whole are in adequate numbers. More intensive farming and the extension of agriculture into currently natural areas will reduce their numbers accordingly.

KANGAROO RATS. The Ord's kangaroo rat, a beautiful and delicate creature, occurs in Washington mostly around the Wallula-Pasco area in sandy soil and dunes. The largest population, probably accounting for over 90 percent of the state's supply of this rodent, occurs in the Juniper Forest Preserve of Franklin County - an excellent place for the study of its habits and behavior. In fact, a number of scientific studies are now being carried on at that location on the kangaroo rat and other juniper-dune species. The probable strong reduction of most of the kangaroo rat population elsewhere in the state, due to reclamation, highway construction and intensive human occupation, will probably restrict Washington's supply of these animals to the Juniper Forest Preserve.

BEAVERS. These animals are carefully managed by the Washington State Game Department and are present in good numbers in the state.

NATIVE RATS AND MICE. This group of species makes up the largest single part of the state's mammal population both in numbers of species and individuals. Unlike the admittedly destructive house mouse (Mus musculus, brown rat (Rattus norvegious) and black rat (Rattus rattus), the native forms are not only attractive and interesting species but very important as the food base for the carnivorous mammals, many of which are of economic or esthetic value. Only those species of mice and rats that are potentially or actually threatened will be discussed. The western harvest mouse (Reithrodontomys megalotis) occurs mostly in dense, dry grassy areas in the lowlands of eastern Washington. Reduction of this ecologic type could pose a future threat to the species. The grasshopper mouse (Onychomys leucogyster) is scattered uncommonly through the sagebrush-grass habitat, an endangered vegetational association, but appears to be more numerous than usual in the Juniper Forest Preserve. The heather mouse (Phenacomys intermedius) is widely distributed throughout the upper montane and subalpine areas of the state in streamside and particularly grassy-rocky or heather-rock habitats. Preservation of such ecologic types will insure the existence of this species. The gray-tailed meadow mouse (Microtus canicaudus) occurs in Washington only in the Vancouver area. Further study of this species is indicated so that it may be properly managed in the small part of the state in which it has so far been found. The sagebrush mouse (Lagurus curtatus) is apparently restricted to the sagebrush-grass habitat where it has been widely found in eastern Washington. Serious reduction of sagebrush and grassland associations would affect the numbers of this palest of North American voles. The northern bog lemming (Synaptomys borealis) is found mostly in extreme northeastern Washington where suitable spring-bank and wet-meadow habitats occur in mountainous areas. While it has been taken in perhaps a half dozen localities in that region, the largest population has been found along the banks of the east fork of Gold Creek in northeastern Pend Oreille County. Logging should be restricted in this drainage to preserve the principal population of bog lemmings in the state. Another variety of the bog lemming has been found in the Mount Baker area, but the existence of National Park and Forest Service reserves in that locality will offer sufficient protection to this population of lemmings.



Mature mule deer buck.

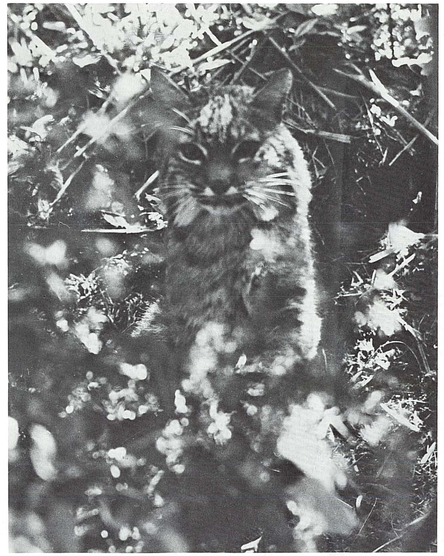
DOGS. Although far from being threatened with extirpation, the coyote (Canis latrans) is at present so controversial that detailed and careful studies are needed of its relations to man and his property. The other native dogs in the state are not in such fortunate shape as regards numbers. The exact status of the gray wolf (Canis lupus) is unknown, but reliable sightings and a few specimens indicate that it may not be as rare as recently thought. The author has recorded a number of them in a study area in Pend Oreille County where one or even two individuals were found on the average of at least every other winter. Probably, wolves are not ecologically threatened but should not be killed by humans. Their destructive qualities have been greatly overplayed. They are currently legally protected in the state. The red fox (Vulpes vulpes) occurs scattered throughout the state in one or another of several subspecies and color phases. Foxes seem best represented in numbers in the lowlands of western Washington where the eastern form has been introduced, but those populations in the mountains are less numerous and are protected by being designated as furbearers and so managed by the State Game Department. They are not to be considered an endangered or threatened species at present.

BEARS. The grizzly bear (Ursus arctos) occurs rarely in the northern mountains of the state, probably mostly in Pend Oreille County and the extreme northern Cascade and Okanogan regions. Records are few, but indications are that it is not absent from the state as is often thought. The preservation of the grizzly bear is more of a legal rather than ecological proposition. It is currently completely protected in the state.

WEASELS AND RELATIVES. The mustelids are present in reasonable numbers and are maintaining an unthreatened condition in the state as a whole, with perhaps two or three exceptions. The fisher (Martes pennanti) is one of the least common mammals in Washington. It apparently occurs rarely throughout the montane coniferous forested areas, being probably best represented in the Olympic Peninsula. Completely protected by law and not threatened by habitat elimination, it is threatened only by poaching or illegal destruction. It is to be doubted whether it was ever present in more than an uncommon or rare condition in the state. Another rare, or at least uncommon, species in this group is the wolverine (Gulo gulo). A few apparently occur in the coniferous forests and subalpine areas throughout the state, though most of the recent records have been from the eastern and northeastern portions of Washington. Secretive in habits, a great wanderer, and living in areas not commonly visited by man (especially in winter when tracks could be identified by a qualified person), this species' status is unknown and probably not easily determined. This again points up an earlier statement in this report regarding the need of exhaustive field surveys, old-fashioned as this kind of research may seem to some, to inventory the exact status of various animals in Washington so that their proper management may be effected. The wolverine is not threatened ecologically and is completely protected by law so that either a natural sparseness or occasional poaching more likely determines its numbers. The river otter (Lutra canadensis) is widely distributed throughout the state, preferring the vicinity of rivers and large streams. The greatest threat to its existence would be widespread stream channelization. Needless to say numerous other animals, particularly songbirds, would be endangered by this activity. The other members of the mustelid family, the weasels, skunks, badgers and mink are in good shape around the state and, while their populations have been reduced in some areas, they do occur in sufficient numbers in other parts of Washington to avoid the classification of being in danger as far as the area covered in this appraisal is concerned.

CATS. Direct persecution from man through hunting or poaching seems to be more important in the management of the native cats of Washington than does environmental destruction or alteration. Adequate "wild" country exists and probably will remain to insure the safety of the various native cats in the state. The cougar (Felis concolor), bobcat (Lynx rufus) and lynx (Lynx lynx) are currently managed by the State Game Department as either game or furbearing species. The uncommon Canada lynx probably should be completely protected as its numbers do not warrant exploitation for pelts. In spite of considerable emotional animosity toward it, the cougar is a potentially threatened species and is now more or less protected by being put in the category of a game animal.

HOOFED MAMMALS. Members of this group, with a few exceptions, are in good shape in population numbers in Washington as they are carefully managed by the State Game Department. The problems that some of them have seem more of an environmental nature. While the elk (Cervus canadensis) and two species of deer (Odocoileus hemionus and Odocoileus virginianus) are common in many of the forested or semi-forested parts of the state, there are a few trouble spots. The most important of these is the Columbia whitetail deer (O. virginianus leucurus) on islands and riverbank areas in the lower Columbia river area in Wahkiakum County. Probably never abundant in that area, water impoundment and human occupation have reduced the ecological complex needed by these animals to where they exist in a very precarious state. Any further alteration of their habitat and range must be seriously evaluated.



One of Washington's least seen mammals, bobcat range throughout the state's "wild" forestlands.

The largest of the state's hoofed mammals is also one of its least common, namely the moose (Alces alces). One and possibly two subspecies occur in limited areas in the Okanogan highlands and Pend Oreille County, where proper habitat occurs, most preferably of the swampy or marshy type in coniferous forests. Moose are particular about where they live. The proper types of habitats, mostly swampy-boggy areas and brushy areas, must be preserved to enable them to practice their preferred type of feeding. Although currently listed by the State Game Department as a game animal, it is doubtful if the small numbers of this species so warrant such a classification. Rather, their small numbers and spectacular appearance would seem to justify its complete protection. The caribou (Rangifer tarandus) likewise occurs in a restricted range in Washington mostly in the extreme northern part of Pend Oreille County where a small group moves back and forth between the United States and Canada. Individuals have been found throughout the year on the American side of the boundary. Completely protected from legal hunting this group, representing the only remnant of the species south of the Canadian line in the contiguous United States, should be carefully preserved. Even more narrowly ecologically restricted than the moose, the caribou is currently being intensively studied by both American and Canadian research teams. Extreme care must be given to possible future development by man of high mountain areas in northern Pend Oreille County in order that the caribou not be extirpated from Washington.

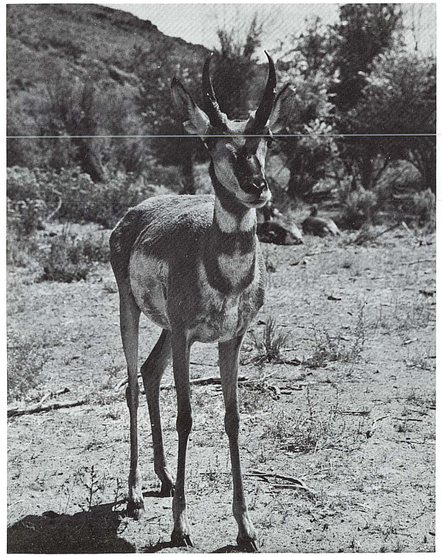
Probably never common in eastern Washington, a relatively few pronghorns (Antilocapra americana) occur in the state, mostly on the Yakima Firing Range in parts of Yakima and Kittitas counties, as well as a few scattered elsewhere. What with the intense agriculture in most parts of the Columbia Basin these animals are restricted to remaining wild areas and, in the firing range at least, enjoy almost complete protection. Increase in their numbers is doubtful. Constituting therefore more of a curiosity than anything else, they probably should be removed from the game animal status and given complete protection. Again, they depend on the sagebrush-grass habitat.

The range of the mountain goat (Oreamnos americanus) is likely not to receive too much ecologic alteration, as most of it occurs within National Forest or National Park boundaries. Excessive visitation by humans to their rocky habitat may cause them to move out of some areas. Montain goat will not long tolerate the continued presence of humans. Due to this characteristic behavior of goat, populations that are frequently disturbed and forced to move will suffer decline in numbers. Goat inhabiting the Cascade Mountains are presently being adversely affected by high visitor use from the large metropolitan areas close by. On the other hand the beneficial effects of low visitor use, coupled with good habitat, have recently been demonstrated by the introduction of goat and their subsequent spread in the Olympic Mountains.

The mountain sheep (Ovis canadensis) has had a somewhat less successful history in the state. Originally present in small numbers in a few places, it was extirpated from Washington. Subsequently reintroduced into the state the population has grown to where it supports a small cropping through hunting, though again the esthetic values of the animal and its small numbers probably warrant complete protection from trophy hunters in order that the public in general may enjoy them. Apparently some cropping is necessary to prevent parts of the mountain sheeps' range from being overutilized.

In the above essay an attempt was made to review the status of the land mammals of Washington with particular attention paid to those species whose existence in the state is either endangered or threatened. Most of the species are as yet in good shape as regards extent of range and numbers, but if the rapid growth of human population and ecologic alteration of recent years continues into the future, some concern must be felt for a number of our mammals. Certain habitat types are already threatened because of their small size; witness the dense lichen-draped forests of the high mountains of northern Pend Oreille County or the sagebrush-grass areas of the Columbia Basin which suffer from expanding agriculture. Many mammals of the Puget lowlands have suffered from the urban sprawl of that expanding megalopolis. Since we cannot turn back the clock and prevent all further human activity, it will be necessary to set aside areas of suitable size and ecology to preserve samples of the various species now existing in the state. Islands of the sagebrush-grass type should be set aside, as well as other areas of fast-disappearing vegetation, so that not only the plants but the animals therein may be preserved at least in part. Further national park development as well as the setting aside of additional natural and wilderness areas in national forests will help. Unique areas occurring in only one location in the state, and not duplicated elsewhere, should receive top priority in environmental preservation. An excellent example of this latter type is the Juniper Forest Preserve in southeastern Franklin County which has recently been set aside by the Bureau of Land Management to preserve the only biotic community of its type in the state. After the various samples of habitats, faunas and floras have been noted and set aside they must be carefully evaluated when any human development is planned either in or near their locations. In this way, we will be able to preserve the various species of land mammals now known to occur within the State of Washington.

EARL J. LARRISON, Associate Professor of Biology at the University of Idaho, has authored 12 books on the birds and mammals of the Pacific Northwest including Washington Mammals: Their Habits, Identification, and Distribution; Washington Birds: Their Location and Identification, and a new book recently published by the Audubon Society entitled Washington Wildflowers.



An unique species, eastern Washington supports a few scattered bands of pronghorn.

ZOOLOGICAL — TERRESTRIAL INDEX

The major emphasis of the Zoological-Terrestrial map is to show areas of Washington that are significant as critical wildlife habitats. Most of the sites mapped have explanatory text in the County Discussion Section. As the text will indicate, these areas (and the refuges) are important for a number of reasons, for example, as unique habitat for a single restricted species, as critical winter range needed to sustain a population of highly mobile game animals, or as an area notable for its pristine nature and integration of many diverse ecological factors and thus considered an important natural community worthy of special emphasis and protection. Where no text exists for a site, consider that area important for its attributes as a natural community. In conjunction with this map, refer also to the wildlife range maps in the section entitled "Some Important Wildlife Of Washington."

Also mapped are most of the State Game Farms, Wildlife Recreation Areas, National Wildlife Refuges and several proposed refuges. Some very small National Wildlife Refuges may have been overlooked in this atlas edition.

Map Key No.	Map Index Grid Ref.	Feature	County
Critical Wildlife Habitats WH			
1	G-8	The Blue Mountains	Walla Walla, Columbia, Garfield, Asotin
2	G-8	Lower Grande Ronde River and Canyon	Asotin
3	G-8	Asotin Canyon and Creek	Asotin
4	G-7	Upper Mill Creek	Walla Walla
5	G-7	Walla Walla River	Walla Walla
6	G-7	Wallula Lake and Surrounding Cliffs	Walla Walla, Benton
7	G-7,8 F-7,8	Snake River and Snake River Islands	Walla Walla, Whitman, Franklin, Columbia, Garfield, Asotin
	C-1	Small Lakes of the Long Beach Peninsula	Pacific
8	F-7, G-8	Tucannon River	Columbia
9	F-7	Lower Palouse River Canyon	Franklin, Whitman
10	F-8	Almota Canyon and Creek	Whitman
11	F-8	Upper Union Flat Creek	Whitman
12	F-8	Palouse River, South Fork	Whitman
13	F-7	Twelve-mile Slough	Adams
14	E-8	Rock Lake and Hole in the Ground	Whitman
15	E-7	Sprague Lake	Lincoln, Adams
16	E-8	Southern Spokane County Lakes	Spokane
17	D-8	Mica Peak	Spokane
18	D-8	Medical Lake and Vicinity	Spokane
19	D-8	Reardan Slough	Lincoln
20	D-8	Spokane River	Spokane
21	D-8	Little Spokane River	Spokane
22	E-7	Sylvan Lake	Lincoln
23	E-7	Rocky Coulee	Adams
24	H-6	Blalock Island	Benton
25	H-6,5	Columbia River Islands	Klickitat
26	H-5	Rock Creek Canyon	Klickitat
27	H-5	Wood Gulch	Klickitat
28	H-5	Pine Creek Canyon	Klickitat
29	H-5	Alder Creek Canyon	Klickitat
30	H-6	Dead Canyon	Klickitat, Benton
31	G-6, H-6	Glade Creek Canyon	Benton, Yakima
32	G-5	Yakima River Ponds and Sloughs	Yakima
33	G-6	Sunnyside Vicinity	Yakima, Benton
34	G-5	Toppenish Marsh	Yakima
35	G-5	White Swan Vicinity	Yakima
36	G-5	Yakima River (Green Valley Area)	Yakima
37	G-5,6 F-6	Rattlesnake Hills	Yakima, Benton
38	G-6	Yakima River Delta and Flood Plain	Benton
39	F-6, G-6	Columbia River, Richland to Priest Rapids Dam	Benton, Grant
40	F-6	Eagle Lake	Franklin
41	F-6	Scooteney Lakes	Franklin
42	F-6	Wahluke Slope Area	Grant
43	F-5	The Yakima Firing Range and Squaw Creek Area	Kittitas, Yakima
44	F-5	Moxee Bog	Yakima
45	F-5	Naches River Valley	Yakima
46	E-5, F-5	The Wenas, Nanastash, Untanum, Taneum, and Meeks Table Areas	Yakima, Kittitas
47	F-5	Yakima Canyon	Yakima, Kittitas
48	E-5, F-5	The Colockum	Kittitas, Chelan
49	F-6	Royal Slope Region	Grant
50	F-6	Crab Creek	Grant
51	E-6	Beezley Hills	Grant
52	D-6, E-6	Moses Coulee and Jameson Lake	Grant, Douglas
53	D-6	Sun Lakes Grant	Grant
54	D-6	St. Andrews Area	Douglas
55	D-7	Seaton Coulee	Lincoln
56	D-5	Entiat and Swakane Canyons	Chelan
57	D-5	Lake Wenatchee and Fish Lake	Chelan
58	C-5	Stehekin River Marsh	Chelan
59	B-5, C-5	Methow River Valley	Okanogan
60	C-5	Badger Mountain Lookout	Okanogan
61	C-5	Pearrygin Lake	Okanogan
62	C-6	Brewster and Bridgeport Bars	Douglas
63	B-6, C-6	Okanogan River Valley	Okanogan
64	B-6	Sinlahekin River	Okanogan
65	B-6	Similkameen River	Okanogan
66	C-7	Sandpoil River Valley	Ferry
67	B-7	Vulcan Mountain, Little Vulcan Mountain, and Kettle River Valley Area	Ferry
68	B-7, C-7	Kettle River Mountains	Ferry
69	B-7	Sherman Creek	Ferry
70	B-7	Kettle River	Ferry, Stevens
71	B-8, C-8	Colville River	Stevens
72	B-8, C-8	Narcisse Creek	Stevens
73	B-8, C-8	Pend Oreille Creek	Stevens
74	B-8, C-8	Little Pend Oreille Area	Stevens, Pend Oreille
75	C-8	Calispell Lake Area	Pend Oreille
76	B-8,	Pend Oreille River	Pend Oreille
77	B-8	Sullivan Lake	Pend Oreille
78	B-8	Northeastern Pend Oreille County	Pend Oreille
79	H-5	Miller Island	Klickitat
80	G-4, H-4	Klickitat River Canyon	Klickitat, Yakima
81	H-4	Major Creek Canyon	Klickitat
82	H-4,	White Salmon River	Klickitat, Skamania
83	H-4, G-4	Trout Lake Bat Cave Area	Klickitat

Map Key No.	Map Index Grid Ref.	Feature	County
	H-4	Little White Salmon River	Skamania
84	H-4,	Islands of the Columbia River	Klickitat, Skamania,
85	H-3,		
	G-2,		Clark,
	G-3		Cowlitz, Wahkiakum
	H-4	Big Lava Beds	Skamania
86	H-4	Wind River Gorge	Skamania
87	H-4	Columbia River Flood Plain	Skamania
88	H-4	Columbia River Gorge Cliffs	Skamania
89	H-3	Lacamas Lake	Clark
90	H-3	Columbia River Flood Plain	Skamania, Clark
91	H-3,		
	G-3,2		
92	H-3	Arnold Park	Clark
93	H-3	East Fork of the Lewis River	Clark
94	G-3	Pigeon Springs Vicinity	Cowlitz
95	G-3	Coweeman Mineral Springs	Cowlitz
96	G-3	Mt. St. Helens Bat Cave Area	Skamania
97	G-3,4	Cedar Flats Research Natural Area	Skamania
98	G-3	Mt. St. Helens	Skamania
99	G-3	Spirit Lake	Skamania
100	G-3	Upper Green River and Mt. Margaret Area	Skamania, Cowlitz
101	F-3, G-3	Davisson Lake	Lewis
102	G-3	Swofford Valley	Lewis
103	F-3	Lake Mayfield	Lewis
104	G-3	Silver Lake	Cowlitz
105	F-4,	Goat Rocks Wildnerness Area	Lewis, Yakima
	G-4		Yakima
106	F-4	Clear Lake	Yakima
107	F-4	Tieton Reservoir (Rimrock Lake)	Yakima
108	F-4	Mount Rainier National Park	Pierce, Lewis
109	F-4	Cougar Lakes Area	Yakima
110	F-4	Bumping Lake	Yakima
111	F-4	Castle Mountain	Pierce
112	G-2	Puget Island	Wahkiakum
113	G-2	Wilson Creek Area	Wahkiakum
114	G-2	Elochoman River and North Hunting Island Research Natural Area	Wahkiakum
115	C-1	Small Lakes of the Long Beach Peninsula	Pacific
116	F-2, G-2	Willapa Bay and Long Island Area	Pacific
117	G-2	Naselle Valley Ponds and Sloughs	Pacific
118	G-2	Naselle River	Pacific
119	F-2	Falls River Tidelands	Pacific
120	F-1	Leadbetter Point	Pacific
121	F-1	Cape Shoalwater and Willapa Island	Pacific
122	F-1	Point Chehalis to Cape Shoalwater	Pacific, Grays Harbor
123	F-1	South Bay	Grays Harbor
124	F-2	Johns River	Grays Harbor
125	F-2	South Shores of Grays Harbor	Grays Harbor
126	F-2	Chehalis River Estuary	Grays Harbor
127	F-2	Small Lakes and Sloughs Near Elma	Grays Harbor
128	F-1,	North Shores of Grays Harbor, Goose and Sand Islands	Grays Harbor
129	F-1,	Ocean Shores, Point Brown to Copalis Beach	Grays Harbor
	E-1	Sheltered Small Lakes and Ponds	Grays Harbor
131	E-1	Carlisle Lakes	Grays Harbor
132	E-2	West Fork of the Satsop River	Grays Harbor
133	E-2	Mount Colonel Bob Area	Grays Harbor
134	D-2	Lake Quinault and the Quinault Valley	Jefferson
135	D-1	Coast near La Push	Clallam
136	D-2	Mount Angeles	Clallam, Jefferson
137	D-2	Tyler Peak	Clallam
138	D-2	Mount Constance	Jefferson
139	E-2	Lower Hood Canal	Mason
140	E-2	Skokomish River Estuary	Mason
141	E-2	Mill Creek	Mason
142	E-3	Eld Inlet	Thurston
143	C-2	Dungeness Spit and Bay	Clallam
144	C-2	Sequim Bay	Clallam
145	C-3	Protection Island	Jefferson
146	C-3	Discovery Bay	Jefferson
147	D-3	Crocker Lake	Jefferson
148	D-3	Quilcene Bay	Jefferson
149	D-3	Dabob Bay	Jefferson
150	D-3	Shine Bay	Jefferson
151	E-3	North Bay	Mason
152	E-3	Henderson Inlet	Thurston
153	E-3	Nisqually Reach	Thurston
154	E-3	The Nisqually Delta	Thurston, Pierce
155	F-3	Yelm Vicinity	Thurston, Pierce
156	E-3	McNeil and Elizabeth Islands	Pierce
157	E-3	Fox Island Vicinity	Pierce
158	E-3	Hale Passage	Pierce
159	E-3	Commencement Bay	Pierce
160	E-3	Henderson Bay and Raft Island	Pierce
161	E-3	Burley Lagoon	Pierce
162	E-3	Quartermaster Harbor	King
163	D-3	Yukon Harbor	Kitsap
164	D-3	Sinclair Inlet	Kitsap
165	D-3	Rich Passage	Kitsap
166	D-3	Elliott Bay	King
167	D-3	Rolling Bay	Kitsap
168	D-3	Port Madison and Fay Bainbridge State Park	Kitsap
169	D-3	Shilshole Bay	King
170	D-3	Union Bay	King
171	D-3	Useless Bay	Island
172	C-3	Port Gardner Bay and the Snohomish River Estuary	Snohomish
173	C-3	Holmes Harbor	Island
174	C-3	Indian and Marrowstone Islands	Jefferson
175	C-3	Chinese Gardens Marsh	Jefferson
176	C-3	Keystone Bay	Island
177	C-3	Saratoga Passage	Island
178	C-3	Camano Island Bays	Island
179	C-3	Port Susan	Island, Snohomish
180	C-3	Stillaguamish River Delta	Snohomish
181	C-3	Crocketts Lake Marsh	Island
182	C-3	Penn Cove	Island
183	C-3	Oak Harbor Vicinity	Island
184	C-3	Skagit Bay, Skagit Bay Islands and the Skagit Flats	Skagit
185	C-3	Deception Pass, Pass and Cranberry Lakes, and Ada Spit	Island, Skagit
186	C-3	Similk Bay	Skagit
187	C-3	Barney Lake	Skagit
188	C-3	Clear Lake	Skagit
189	C-3	Debay Slough	Skagit
190	B-3,4	Lower Skagit River	Skagit
191	B-4	Upper Skagit and Lower Sauk River	Skagit
192	B-4	Mt. Baker Lava Beds	Whatcom
193	B-4	The North Cascades, including the Chilliwack Valley	Whatcom
194	B-4	Big and Little Beaver Creek Valleys	Whatcom
195	B-5	The Pasayten Wilderness Area	Whatcom, Okanogan
196	B-3	Skookum Creek Area	Whatcom
197	B-3,	Padilla Bay	Skagit
	C-3		
198	B-3	Samish Bay and Samish Island	Skagit
199	B-3	Chuckanut Mountain	Whatcom, Skagit
200	B-3	Lummi and Bellingham Bays and Point Frances	Whatcom
201	B-3	Birch Bay	Whatcom
202	B-3	Semiahmoo Bay	Whatcom
203	B-2	Point Roberts	Whatcom
204	B-3	Tennant Lake	Whatcom

Map Key No.	Map Index Grid Ref.	Feature	County
205	B-3	Wiser Lake	Whatcom
206	B-4,3	Nooksack River and North Fork Research Natural Area	Whatcom
207	B-2,3 C-3	The San Juan Islands	San Juan
208	B-3	Turn Island	San Juan
209	C-2	San Juan Island Bluffs	San Juan
210	B-3	Washington Park	Skagit
211	C-3	Fidalgo Bay	Skagit
212	E-1	Point Grenville Area	Grays Harbor
213	D-1	Destruction Island	Jefferson
214	D-1	Kalaloch Vicinity	Jefferson
215	C-1	Jagged Island Vicinity	Clallam
216	H-3	Larch Mountain	Clark, Skamania
217	C-5	Sawtooth Ridge	Pacific, Cowlitz
218	H-4	Mount Brook	Clark
219	C-1, D-1	Olympic Coastal Strip	Clallam, Jefferson
220	D-3	Thorndyke Bay Salt Marsh	Jefferson
221	D-3	Northern Kitsap County	Kitsap
222	B-3	Nooksack River Delta	Whatcom
223	C-3	Lakes Shannon and Ten	Skagit
224	B-3, C-3	Lopez Island	San Juan
225	E-2	Higley Creek Research Natural Area	Grays Harbor
226	E-3	Case Inlet	Pierce
227	E-3	Lake Tapps	Pierce
228	F-3	Ohop Lakes	Thurston, Pierce
229	G-4	Signal Peak	Yakima
230	B-1 to G-1	Pacific Ocean Coastal Waters	Pacific, Grays Harbor, Jefferson, Clallam
231	B-8	Hall Mountain	Pend Oreille
232	B-8	Linton and Sweet Creeks Region	Pend Oreille
233	B-7	Lake Sherry Vicinity	Stevens
234	D-7	Creston Vicinity	Lincoln
235	C-1	Tatoosh Island	Clallam
236	C-3	Kah Tai Lagoon	Jefferson
237	F-6	Calliche Lakes	Grant
238	C-4	Cascade Pass Area	Skagit
239	F-6	Upper Gold Creek Area	Benton, Yakima
240	B-4	Ptarmigan Ridge	Whatcom
241	B-4	Skyline Ridge	Whatcom
242	E-3,4	Green River	King
243	F-2	Black River Swamp	Thurston
244	B-8	Abercrombie-Hookinose-Mt. Baldy Area	Stevens, Pend Oreille
245	H-3	Washougal River Bottoms	Clark, Skamania
246	B-4,5 C-4,5	North Cascades National Park (Southern Unit)	Skagit, Whatcom
247	C-3	Whidbey Island	Island
248	D-4	Mt. Si	King
249	B-3	Sandy Point	Whatcom
250	E-5,	Whiskey Dick - Boylston Mtn.	Kittitas
	F-5		
251	B-3	Hartstene Island	Mason
252	C-2	Aldwell Environmental Study Area	Clallam
253	F-2	Willapa Hills	Grays Harbor, Pacific, Lewis
254	E-3	Upper Puyallup River Valley	Pierce
255	B-1, C-1	Olympic Mountains and Foothills	Clallam, Jefferson, Grays Harbor
256	E-2	Upper Humptulips Valley	Grays Harbor
257	C-1,2	Strait of Juan De Fuca and Shores	Clallam
258	C-3, D-3,	Puget Sound Waters	
	E-3		
259	D-4	N. F. Tolt River and N. F. Snoqualmie River	King
260	F-4	Butter Creek Research Natural Area	Lewis
261	C-4	Lake Twenty Two Research Natural Area	Snohomish
262	C-4	Long Creek Research Natural Area	Snohomish
263	G-8	Rainbow Creek Research Natural Area	Columbia
264	E-7	Crab Creek Valley	Lincoln
265	D-1	Twin Creek Research Natural Area	Jefferson
266	G-6	Snively Road Area	Benton
267	D-8	Newman Lake	Spokane

Wildlife refuges, state game farms, and state wildlife recreation areas WR

1	C-1	(Cape) Flattery Rocks National Wildlife Refuge	Clallam
2	D-1	Quillayute Needles National Wildlife Refuge	Clallam, Jefferson
3	E-1	Copalis National Wildlife Refuge	Grays Harbor
4	G-2,F-1	Willapa National Wildlife Refuge	Pacific
5	H-3	Ridgefield National Wildlife Refuge	Clark
6	H-6	Umatilla National Wildlife Refuge	Benton
7	G-6	McNary National Wildlife Refuge	Walla Walla, Franklin, Benton
8	F-6	Columbia National Wildlife Refuge	Adams, Grant
9	G-5	Toppenish National Wildlife Refuge	Yakima
10	H-4	Conboy Lake National Wildlife Refuge	Klickitat
11	C-2	Dungeness National Wildlife Refuge	Clallam
12	B-3	Matia Island National Wildlife Refuge	San Juan
13	B-2	Jones Island National Wildlife Refuge	San Juan
14	C-3	Smith Island National Wildlife Refuge	Island
15	B-2	San Juan National Wildlife Refuge	San Juan
16	E-8	Turnbull National Wildlife Refuge and Pine Creek Natural Area	Spokane
17	G-2	Columbian White-Tailed Deer National Wildlife Refuge	Wahkiakum
18	C-3	False Bay and Kanaka Bay State Marine Preserves	San Juan
19	D-6	Banks Lake State Wildlife Recreation Area	Grant
20	E-6	Gloyd Seeps State Wildlife Recreation Area	Grant
21	F-1	Oyhut State Wildlife Recreation Area	Grays Harbor
22	F-2	John's River State Wildlife Recreation Area	Grays Harbor
23	E-2	Olympic State Wildlife Recreation Area	Grays Harbor
24	F-6	Crab Creek State Wildlife Recreation Area	Grant
25	F-6	Priest Rapids State Wildlife Recreation Area	Gra..*
26	E-6	Lenore Lake State Wildlife Recreation Area	Grant
27	E-6	Long Lake State Wildlife Recreation Area	Grant
28	B-7	Sherman Creek State Wildlife Recreation Area	Ferry
29	B-6	Sinlahekin State Wildlife Recreation Area	Okanogan
30	H-3	Shillapoo - Vancouver Lake State Wildlife Recreation Area	Clark
31	H-4	Klickitat State Wildlife Recreation Area	Klickitat

Map Key No.	Map Index Grid Ref.	Feature	County
33	C-8	Little Pend Oreille State Wildlife Recreation Area	Pend Oreille
34	G-8	W.T. Wooten State Wildlife Recreation Area	Columbia, Garfield
35	G-8	Asotin Creek State Wildlife Recreation Area	Asotin
36	G-8	Grouse Flats State Wildlife Recreation Area	Garfield
37	E-6	Quincy State Wildlife Recreation Area	Grant
38	E-5	Colockum State Wildlife Recreation Area	Kittitas
39	C-3	Skagit State Wildlife Recreation Area	Skagit
40	D-4	Stillwater State Wildlife Recreation Area	King
41	G-7	McNary State Wildlife Recreation Area	Walla Walla
42	G-5,6	Sumyside State Wildlife Recreation Area	Yakima
43	D-5	Entiat State Wildlife Recreation Area	Chelan
44	D-5	Swakane State Wildlife Recreation Area	Chelan
45	B,C-5	Methow State Wildlife Recreation Area	Okanogan
46	D-5	Chelan Butte State Wildlife Recreation Area	.helan
47	E-3	Nisqually Delta State Wildlife Recreation Area	Thurston
48	E-6	Desert Potholes and Winchester Wasteway State Wildlife Recreation Area	Grant
49	F-2,3	Scatter Creek State Wildlife Recreation Area	Thurston
50	F-5	Oak Creek, Wenas, and L.T. Murray State Wildlife Recreation Area	Kittitas, Yakima
51	B-3	Lake Terrell State Wildlife Recreation Area	Whatcom
52	G-6	Rattlesnake Slope State Wildlife Recreation Area	Benton
53	F-6	Wahluke Slope State Wildlife Recreation Area	Grant, Franklin
54-56		Cascade Pass Area	Skagit
57	D-3	Ebey Island Game Farm	Snohomish
58	E-3	Auburn State Game Farm	King
59	E-3	South Tacoma State Game Farm	Pierce
60	E-3	Union River State Waterfowl Range	Mason
61	C-3	Marrowstone Island State Waterfowl Range	Jefferson
62	F-5	Ellensburg State Game Farm	Kittitas
63	G-6	Kennewick State Game Farm	Benton
64	G-7	Walla Walla State Game Farm	Walla Walla
65	F-2,3	Lewis County Game Farm	Lewis
66	C-3	Whidbey Island State Game Farm	Island
67	B-8	LeClerc Creek State Wildlife Recreation Area	Pend Oreille
68	D-8	Spokane Game Farm	Spokane

Proposed Wildlife refuges WP

1	E-3	Fort Lewis Reservation	Pierce Thurston
2	G-7	Walla Walla River Valley	Walla Walla
3	G-7	Touchet River Valley	Walla Walla
4	G-8	Tucannon River Valley	Columbia
5	F-7	River Port and Wildlife Site	Walla Walla
6	B-2	Gull Island	San Juan
7	B-6	Chopaka Mountain	Okanogan
8	D-4	Bob Pepper's Wild Bird Sanctuary (Private)	King
9	E-3	Owens Beach	Pierce
10	D-3	Quartermaster Harbor	King
11	D-3	Lincoln Beach	King
12	D-3	Golden Gardens to North Beach	King
13	B-3	Sucia Island	San Juan
14	B-3	Parkers Reef	San Juan
15	C-1	Waddah Island	Clallam
16	B-8	Molten Creek	Pend Oreille
17	B-8	Salmo-Priest	Pend Oreille
18	B-3	Cypress Island	Skagit
19	F-1	Cape Shoalwater waterfowl area	Pacific

Watersheds or Water Resource Inventory Areas WRIA

The following named drainage basins are in common use today by agencies engaged in resource planning in Washington.

Basin No.	Basin Name
1	Nooksack
2	San Juan
3	Lower Skagit
4	Upper Skagit
5	Stillaguamish
6	Island
7	Snohomish
8	Cedar
9	Green
10	Puyallup-White
11	Nisqually
12	Chambers-Clover
13	Deschutes
14	Kennedy-Goldsburough
15	Kitsap
16	Skokomish-Dosewallups
17	Quilcend-Snow
18	Elwha-Dungeness
19	Lyre-Hoko
20	Soleduck-Hoh
21	Queets-Quinalt
22	Lower Chehalis
23	Upper Chehalis
24	Willapa
25	Grays-Elochoman
26	Cowlitz
27	Lewis
28	Salmon-Washougal
29	Wind-White Salmon
30	Klickitat
31	Rock-Glade
32	Walla Walla
33	Lower Snake
34	Palouse
35	Middle Snake
36	Esquatzel Coulee
37	Lower Yakima
38	Naches
39	Upper Yakima
40	Alkali-Squilchuck
41	Lower Crab
42	Grand Coulee
43	Upper Crab-Wilson
44	Moses Coulee
45	Wenatchee
46	Entiat
47	Chelan
48	Methow
49	Okanogan
50	Foster
51	Nespelem
52	Sanpoil
53	Lower Lake Roosevelt
54	Lower Spokane
55	Little Spokane
56	Hangman
57	Middle Spokane
58	Middle Lake Roosevelt
59	Colville
60	Kettle
61	Upper Lake Roosevelt
62	Pend Oreille

LIFE ZONE — HABITAT CHECKPOINTS

The following 64 mapped sites are provided to serve as specific "ground truth" information about Life Zones and habitats recorded at locations across the state by 19 independent field naturalists. The information has been adapted, by permission of the principal author, from the book: A Guide to Bird Finding in Washington by Terence R. Wahl and Dennis R. Paulson, 1973, Whatcom Museum Press, 121 Prospect Street, Bellingham, WA 98225.

The observers recording the field data are as follows, their names are abbreviated and entered under each checkpoint below: Terence R. Wahl (TW); Dennis R. Paulson (DRP); Gordon D. Alcorn (GA); Wayne Deane (WD); James Dummel (JD); Bob and Pat Evans (B & PE); Robert K. Furrer (RF); Gary Garrison (GG); Gary Koehler (GK); Richard Lindstrom (RL); Anthony Mendoza (AM); David L. Pearson (DLP); Rusty and Jeannette Rathfelder (R & JR); Frank Richardson (FR); Edmund W. Stiles (ES); Harold B. Stout (HS); Robert E. Woodley (RW). Their addresses and telephone numbers are entered in Wahl and Paulson's book.

This checkpoint information is included in the atlas for two purposes. The first purpose is to assist the reader in analyzing the kinds of habitats present on any site in the state by use of the various atlas materials. The reader may wish to use these sites as a statewide representative sample of known base data to serve as cross reference and substantiation of how well his own analysis of habitats correlates with recorded observation. Another advantage to listing these checkpoints is that the field workers used the same working definitions of the 14 habitats used in the atlas due to the fact that they contributed the basic data compiled in Wahl and Paulson's book. Thus, these checkpoints become a base reference kept within the definitions of habitats used in the species lists. Also, in initially establishing familiarity with usage and methodology of habitat analysts from study of the atlas graphics and texts, some practice with these sites first will benefit interpretation of any site one wishes to consider.

The second purpose served in including these checkpoints is to afford an objective cross-check of the accuracy of the Life Zone Overlay. John Garcia, who prepared the overlay, and explains his methods in a paper prefacing the ERTS photograph, worked independently from the 19 field observers. No attempt has been made to alter the Life Zone Overlay to conform to the stated Life Zones recorded by these field workers. A check for accuracy by the editors, and consistencies found, serves to suggest that the Life Zone Overlay has a generally high degree of reliability. There may still be room for improvement in the overlay which reviewers of this second Atlas edition may suggest.

The check points mapped and indexed below are fairly evenly spread over the state and include every Life Zone and habitat type presented in the atlas. Of the state's 39 counties however the total is 29, omitting the following ten: Clark, Ferry, Franklin, Garfield, Mason, Snohomish, Stevens, Thurston, Wahkiakum, and Walla Walla counties.

Wahl and Paulson's book contains very detailed descriptions of how to get to the specific localities mapped, describes habitat features of the areas, and lists typical birdlife one may observe in season. In addition, 7 sites in British Columbia are described. Ideally, it would be best if professional botanists could visit these sites, record their observations, review the checkpoints here listed, correct any errors, and supply more such data about different locations to augment atlas accuracy.

LIFE ZONE — HABITAT CHECKPOINTS. WC

WC1 C-1 Cape Flattery — Clallam

Area including Makah Indian Reservation, Mukkaw Bay, and Cape Flattery.
Elevation: Sea level
Life Zone: Humid Transition
Habitats: SW, RS, SS, WC
Observer: DRP

WC2 D-1 Olympic National Park Ocean Beaches — Clallam, Jefferson

Area including the beaches on the Pacific Ocean from the Hoh River to Cape Alava in the Olympic National Park.
Elevation: Sea level
Life Zone: Humid Transition
Habitats: SW, RS, SS, WC
Observer: TW

WC3 D-1 Kalaloch, Ruby Beach — Jefferson

Olympic National Park Ocean Strip along U.S. 101.
Elevation: Sea level
Life Zone: Humid Transition
Habitats: SW, RS, SS, FW, WC
Observer: TW

WC4 F-1 Grays Harbor — Grays Harbor

Area including north and south shores of harbor, Westport and jetty extending out from Port Chehalis.
Elevation: Sea level
Life Zone: Humid Transition
Habitats: SW, RS, SS, FW, WC, BF, WM, ST, FL
Observers: GA, TW

WC5 F-1,2 Willapa Bay, Leadbetter Point — Pacific

Area including Bay, Leadbetter Point, Coast Guard Station at Tokeland, Bruceport Park, Willapa National Wildlife Refuge, Long Beach Peninsula and Ocean Park.
Elevation: Sea level
Life Zone: Humid Transition
Habitats: SW, RS, SS, FW, WC, WM, ST, FL
Observers: GA, TW

WC6 G-1 North Jetty, Ilwaco — Pacific

The rock jetty protecting the mouth of the Columbia River, near Ilwaco. Area also includes Ft. Canby Campground.
Elevation: Sea level
Life Zone: Humid Transition
Habitats: SW, RS, SS, FW, WC, ST
Observer: TW

WC7 C-2 Dungeness — Clallam

North Coast of the Olympic Peninsula.
Elevation: Sea level
Life Zone: Humid Transition
Habitats: SW, SS, FW, WC, WM, FL
Observer: DRP

WC8 D-2 Hurricane Ridge — Clallam

Entire road distance from Park Headquarters to Obstruction Point.
Elevation: 200 feet at Park Headquarters to 6450 feet at Obstruction Point
Life Zones: Humid Transition, Canadian, Hudsonian, Arctic-Alpine
Habitats: WC, WM
Observer: TW

WC9 D-3 Kingston, Port Gamble, Poulsbo — Kitsap

Area including Kingston Ferry Dock, Kitsap Memorial State Park, Poulsbo waterfront, Puget Sound shorelines west of Seattle.
Elevation: Sea level
Life Zone: Humid Transition
Habitats: SW, SS, FW, WC, BF, ST, PG, FL
Observers: B & PE

WC10 C,D-2 San Juan Island — San Juan

An area including American Camp, Eagle Cove and Cattle Point.
Elevation: Sea level
Life Zone: Humid Transition (but relatively dry - in rain shadow)
Habitats: SW, RS, SS, WC, DG, WM, ST, FL
Observer: TW

WC11 B-2 Point Roberts — Whatcom

Southwest tip of Point Roberts.
Elevation: Sea level
Life Zone: Humid Transition
Habitats: SW, RS, SS, WC, ST, FL
Observer: TW

WC12 B-3 Drayton Harbor, Birch Bay, Lake Terrell, Lake Tennant — Whatcom

Lowlands west of Interstate 5.
Elevation: Sea level to 200 feet
Life Zone: Humid Transition
Habitats: SW, RS, SS, WC, ST, FL
Observer: TW

WC13 B-3 Lummi River Delta Areas — Whatcom

Area including the Lummi Indian Reservation and Sandy Point.
Elevation: Sea level
Life Zone: Humid Transition
Habitats: SW, RS, SS, FW, WC, BF, RW, FL
Observer: TW

WC14 B-3 Wiser Lake — Whatcom

Area including Wiser Lake and the Nooksack River bottom 1 mile north of the lake.
Elevation: 50 feet
Life Zone: Humid Transition
Habitats: FW, BF, RW, ST, FL
Observer: TW

WC15 B-3 Bellingham — Whatcom

Area including Cornwall Park, Sehome Hill, Whatcom Falls Park, Bayview Cemetary, Lake Whatcom and the Bellingham Waterfront.
Elevation: Sea level to 600 feet
Life Zone: Humid Transition
Habitats: SW, RS, FW, WC, BF, RW, ST, FG
Observer: TW

WC16 B-3 Larrabee State Park, Chuckanut Mountain — Whatcom

Elevation: Sea level to 1800 feet
Life Zone: Humid Transition
Habitats: SW, RS, WC, BF, ST
Observer: TW

WC17 B,C-3 Northwest Skagit Lowlands — Skagit

Area including Samish Bay, Padilla Bay, Swinomish and March Point.
Elevation: Sea level
Life Zone: Humid Transition
Habitats: SW, RS, SS, FW, WC, BF, RW, ST, FL
Observer: TW

WC18 C-3 Clear Lake — Skagit

Area including Clear Lake and De Bay Slough.
Elevation: Sea level
Life Zone: Humid Transition
Habitats: FW, BF, RW, WM, ST, FL
Observer: RL

WC19 B-4 Skagit River Valley — Skagit

Route from Skagit Flood Plain up to Diablo Lake and North Cascades National Park.
Elevation: Sea level to 5400 feet
Life Zone: Humid Transition
Habitats: SW, SS, FW, BW, ST, PG,FL
Observer: TW

WC20 C-3 Skagit Wildlife Recreation Area — Skagit

Area including Skagit Bay, Skagit Game Range, Skagit Flats.
Elevation: Sea level
Life Zone: Humid Transition
Habitats: SW, RS, SS, FW, WC, BF, RW, ST, FL
Observers: GG, TW

WC21 C-3 Deception Pass — Skagit, Island

Area includes Deception Pass, Rosario Beach and Cranberry Lake.
Elevation: Sea level
Life Zone: Humid

ZOOLOGICAL — TERRESTRIAL INDEX

WC27 D-4 **Snoqualmie Valley Loop** — King

Area includes Fall City, Carnation, Tolt River, Snoqualmie River.
Elevation: Sea level
Life Zone: Humid Transition
Habitats: FW, WC, RW, WM, ST, FL
Observer: B & PE

WC28 D-4 **North Fork Snoqualmie River** — King

A generally logged-off area in the River Valley.
Elevation: 100 feet to 1600 feet
Life Zone: Humid Transition
Habitats: FW, WC, RW, ST, FL
Observer: B & PE

WC29 E-3 **Puget Sound Shoreline** — King, Pierce

Area from Des Moines to Tacoma, including Saltwater State Park, Dumas Bay and Dash Point State Park.
Elevation: Sea level
Life Zone: Humid Transition
Habitats: SW, BS, SS, FW, WC, BF, ST
Observer: R & JR

WC30 G-3 **Foot of Mount St. Helen's** — Cowlitz, Clark, Skamania

A drive of about 75 miles from farmland near the Columbia River to the Canadian Life Zone east of Mount St. Helen's.
Elevation: Sea level to 3000 feet.
Life Zone: Humid Transition, Canadian
Habitats: FW, WC, RW, WM, ST, FL
Observer: R & JR

WC31 B-4 **Yellow Aster Meadows** — Whatcom

Area of alpine meadows with tarns north of Mt. Baker in the Mt. Baker National Forest (now included in the Snoqualmie National Forest).
Elevation: 3000 feet to 5500 feet
Life Zones: Canadian, Hudsonian
Habitats: WC, WM
Observers: JD, GK

WC32 B-4 **Copper Ridge** — Whatcom

Scenic alpine area northeast of Mt. Baker Recreation Area - a 7 mile hike.
Elevation: up to 6000 feet
Life Zones: Canadian, Hudsonian, Arctic-Alpine
Habitats: WC, RW, WM
Observer: GK

WC33 B-4 **Ptarmigan Ridge** — Whatcom

Meadows, scree and snowfields east of Bellingham on the northeast slopes of Mt. Baker.
Elevation: 5200 feet to 5800 feet
Life Zones: Hudsonian, Arctic-Alpine
Habitat: WM
Observer: JD

WC34 B-4 **Ross Lake** — Whatcom

A transition area between the humid west coast forest and the drier eastern coniferous forest.
Elevation: 1600 feet
Life Zone: Humid Transition
Habitats: FW, WC, DC, BF, RW
Observer: GK

WC35 B-5 **Cascade Crest Trail** — Okanogan, Whatcom, British Columbia

High mountain country reached by hiking between Manning Park, B.C. and Hart's Pass.
Elevation: 5000 feet to 6000 feet
Life Zones: Canadian, Hudsonian, Arctic-Alpine
Habitats: WC, DC, RW, WM
Observer: GK

WC36 B-5 **Hart's Pass** — Okanogan

Alpine forests, meadows and relatively dry mountain slopes on the eastern slopes of the Cascades, reached from the east through Twisp.
Elevation: 6200 feet
Life Zone: Hudsonian
Habitats: WC, WM
Observer: JD

WC37 C-4 **Cascade Pass** — Skagit

A 3 mile hike from Cascade Pass parking lot to Cascade Pass.
Elevation: 5200 feet
Life Zone: Hudsonian, Arctic-Alpine
Habitats: WC, WM
Observer: GK

WC38 F-4 **Mount Rainier National Park** — Pierce, Lewis

Elevation: Sea level to 14,400 feet
Life zones: Humid Transition, Canadian, Hudsonian, Arctic-Alpine
Habitats: WC, BF, WM, ST
Observer: DRP

WC39 D-5 **Lake Wenatchee** — Chelan

Area surrounding the Lake and 10 miles up Little Wenatchee or White River - both with roads running along side them.
Elevation: 1900 feet and up
Life Zone: Arid Transition, Canadian
Habitats: FW, DC, WC, BF, RW, ST
Observer: WD

WC40 D-5 **Route from Leavenworth to Plain** — Chelan

A region alongside State Route 209 for a distance of about 16 miles between Leavenworth and Plain, Washington.
Elevation: approximately 1200 feet
Life Zone: Arid Transition
Habitats: DC, RW, ST, FL
Observer: FR

WC41 E-5 **Mission Creek** — Chelan

A 25 mile stretch from Cashmere to Wenatchee on Mission Creek Road running parallel to Mission Creek.
Elevation: 700 feet to 4000 feet
Life Zones: Arid Transition, Canadian
Habitats: DC, BF, RW, ST, FL
Observer: WD

WC42 E-5 **Cle Elum Hills** — Kittitas

A coal mining area, known as "The Slags," immediately north of the town of Cle Elum.
Elevation: 1900 feet
Life Zone: Arid Transition (timbered)
Habitats: DC, RW, DG, WM, ST
Observer: R & JR

WC43 F-5 **Wenas Creek Region** — Yakima

Elevation: 1500 feet at Ellensburg to 2500 feet at Wenas Creek
Life Zones: Upper Sonoran, Arid Transition
Habitats: DC, RW, SD, ST
Observer: DRP

WC44 H-4 **Klickitat Wildlife Recreation Area** — Klickitat

Elevation: 1000 feet to 3000 feet
Life Zone: Upper Sonoran
Habitats: DC, BF, RW, ST, FL
Observer: GG

WC45 C-6 **Loup Loup** — Okanogan

A 17 mile route through a pine forest from Highway 20 to Conconully.
Elevation: 2300 feet to 5500 feet
Life Zones: Arid Transition, Canadian
Habitats: DC, BF, RW, WM, ST
Observer: TW

WC46 C-6 **Omak** — Okanogan

An area about 4 miles southeast of Omak.
Elevation: 900 feet
Life Zone: Upper Sonoran
Habitats: FW, DG, SD
Observer: DRP

WC47 C-5 **Methow Valley** — Okanogan

A 25 mile stretch of road between Pateros and Winthrop.
Elevation: 700 to 1700 feet
Life Zone: Arid Transition
Habitats: WC, DC, BF, RW, ST, FL
Observer: DRP

WC48 C-6 **Brewster Area and Okanogan River** — Okanogan

An area within about a 10 mile radius of Brewster.
Elevation: 1000 feet to 2000 feet
Life Zones: Upper Sonoran, Arid Transition
Habitats: FW, DC, RW, DG, SD, ST, FL
Observers: HS, TW

WC49 D-5 **Chelan Butte** — Chelan

A high hill area adjacent to the town of Chelan, overlooking Lake Chelan, near Chelan Butte Wildlife Recreation Area.
Elevation: 1200 feet to 3892 feet
Life Zone: Arid Transition
Habitats: DC, DG, ST
Observer: RW

WC50 D-6 **The Grand Coulee** — Grant

An area of the Grand Coulee between the town of Grand Coulee and Soap Lake.
Elevation: 1200 feet to 1600 feet
Life Zone: Upper Sonoran
Habitats: FW, RW, DG, SD, ST, FL
Observer: TW

WC51 D-6 **Corbally Canyon to Jameson Lake** — Douglas

Elevation: 700 feet to 3000 feet
Life Zones: Upper Sonoran, Arid Transition
Habitats: FW, DC, BF, RW, DG, SD, ST, FL
Observer: TW

WC52 D-7 **Creston** — Lincoln

An area about 10 miles south of Creston.
Elevation: around 2000 feet
Life Zone: Arid Transition
Habitats: FW, RW, DG, SD
Observer: DRP

WC53 D-8 **Reardan Ponds** — Lincoln

Some ponds just north of Reardon on Washington Highway 231.
Elevation: 2500 feet
Life Zone: Arid Transition
Habitats: FW, RW, FL

WC54 E-6 **Moses Lake Area** — Grant

The 3 locations: Desert Potholes and Gloyd Seeps WRA; Winchester Wasteway WRA and Quincy WRA.
Elevation: 500 feet to 1000 feet
Life Zone: Upper Sonoran
Habitats: FW, RW, SD
Observer: GG

WC55 E-6 **Potholes** — Grant, Adams

Area including the Columbia National Wildlife Refuge, surrounding land, desert and small lakes.
Elevation: 700 feet to 1100 feet
Life Zone: Upper Sonoran
Habitats: FW, RW, SD, FL
Observer: RF

WC56 F-6 **Lower Crab Creek** — Grant

Valley area near Corfu.
Elevation: 500 feet
Life Zone: Upper Sonoran
Habitats: FW, DG, SD, FL
Observer: DRP

WC57 G-6 **Snively and Grosscup Roads** — Benton

An area about 2-4 miles west of Richland.
Elevation: Approximately 380 feet
Life Zone: Upper Sonoran
Habitats: FW, DG, WM, FL
Observer: RW

WC58 G-6 **Tri-City Shorelines** — Benton

Area including Columbia River Shore, Yakima River Delta in Richland, Columbia Park in Kennewick, Sacajawea State Park in Pasco.
Elevation: approximately 380 feet
Life Zone: Upper Sonoran
Habitats: FW, ST, PG
Observer: RW

WC59 B-8 **Sullivan Lake Area** — Pend Oreille

Elevation: 1900 feet to 6000 feet
Life Zones: Arid Transition, Canadian
Habitats: FW, WC, DC, BF, RW, WM, ST
Observer: DLP, DRP, TW

WC60 C-8 **Diamond Lake, Cusick, Calispell Peak** — Pend Oreille

Elevation: 1500 feet to 6000 feet
Life Zones: Arid Transition, Canadian, Hudsonian
Habitats: FW, DC, BF, RW, ST, FL
Observer: DLP, TW

WC61 D-8 **Newman Lake Area** — Spokane

Farm areas east of Spokane, just west of the Idaho Border.
Elevation: 2000 feet
Life Zone: Arid Transition
Habitats: RW, DG, ST, FL
Observer: TW

WC62 E-8 **Turnbull National Wildlife Refuge** — Spokane

Elevation: 2000 feet
Life Zone: Arid Transition
Habitats: FW, DC, BF, DG, ST
Observer: DRP

WC63 F-8 **Kamiak Butte** — Whitman

At Kamiak Butte State Park.
Elevation: 3650 feet
Life Zone: Arid Transition
Habitats: DC, BF
Observer: DLP

WC64 G-8 **Blue Mountains** — Asotin, Columbia

Area including Stayawhile Springs, Godman Springs Ranger Station, Wenatchee Guard Station and Wickiup Campground.
Elevation: 1900 feet to 6000 feet
Life Zones: Arid Transition, Canadian, Hudsonian
Habitats: DC, RW, ST
Observer: DLP

SUMMARY OF OFFICIAL STATUS OF WASHINGTON'S WILDLIFE

The following lists, together with the legend of terms on page 40 and wildlife texts on pages 41 through 53, summarize the official status of wildlife in Washington according to several sources.

CLASSIFICATIONS BY THE WASHINGTON DEPARTMENT OF GAME (as of April, 1973):

Migratory Game Birds

Ducks
Geese
Swans
Mergansers
Rails
Coots (Mudhens)
Wilson Snipe (Jacksnipe)
Mourning Dove
Band-tailed Pigeon

Upland Game Birds

Chinese Pheasant (all races)
Hungarian, Chuckar, Red-legged and other partridge
Quail: California, Mountain, Scaled, Bobwhite & Gambel's
Blue Grouse
Ruffed Grouse
Spruce Grouse
Sharp-tailed Grouse
Sage Grouse
Wild Turkey
Ptarmigan
Francolins

Game Animals

Deer (native species)
Elk
Black Bear
Mountain Goat
Mountain Sheep
Antelope
Moose
Cougar
Bobcat
Racoon
Snowshoe Rabbit (Hare)
Washington Hare
Cottontail Rabbit
Yellow-bellied Marmot (Rock Chuck)
Bullfrog

Furbearing Animals

Muskrat
Mink
Beaver
River Otter
Marten
Bobcat
Canada Lynx
Raccoon
Badger
Mountain Fox
Weasels

Protected Wildlife
(cannot be hunted at any time)

Grizzly Bear
Caribou
Sea Otter
Fur Seal
Fisher
Wolverine
Timber Wolf
Gray Squirrel
Douglas Squirrel
Red Squirrel
Flying Squirrel
Golden-mantled Ground Squirrel
Chipmunk
Cony or Pika
Hoary Marmot
White-tailed Jackrabbit
Pygmy Rabbit
Fox Squirrel
Western Washington Turtles
Olympic Marmot

Protected Marine Mammals
(cannot be hunted or killed at any time)

Whales - all species
Porpoises - all species
Dolphins - all species
Seals - all species
Sea Lions - all species

Protected Birds
(cannot be hunted at any time)

This classification includes all species not listed as game or non-protected birds; it includes eagles, hawks, owls and songbirds.

Non-protected Birds

English Sparrow
Starling

Non-protected Animals

Coyote
Lowland Fox
Porcupine
Skunk
Civet Cat (Spotted Skunk)
Mountain Beaver
Ground Squirrels
Rats
Mice
San Juan Rabbit
Other non-listed Mammals, Reptiles and Amphibians

Seasons are set yearly for the hunting of game animals and game birds and for trapping of furbearing animals.

CLASSIFICATIONS IN THE FEDERAL REGISTER:

Endangered Species

Gray Wolf
Columbia Whitetail Deer
Aleutian Canada Goose
American Peregrine Falcon
Brown Pelican

Threatened Species

There are as yet no species listed in this new (set up in 1973) official category in the Federal Register. Future review, by the Office of Endangered Species and International Activites, of all species' status will result in the compilation of the Threatened Species List and updating of the Endangered Species List. Five Washington species discussed in the Redbook (1973 edition), some of which MIGHT be shifted into the Endangered or Threatened list, are:

Grizzly Bear
California Bighorn Sheep
Prairie Falcon
Spotted Owl
Olympic Mudminnow

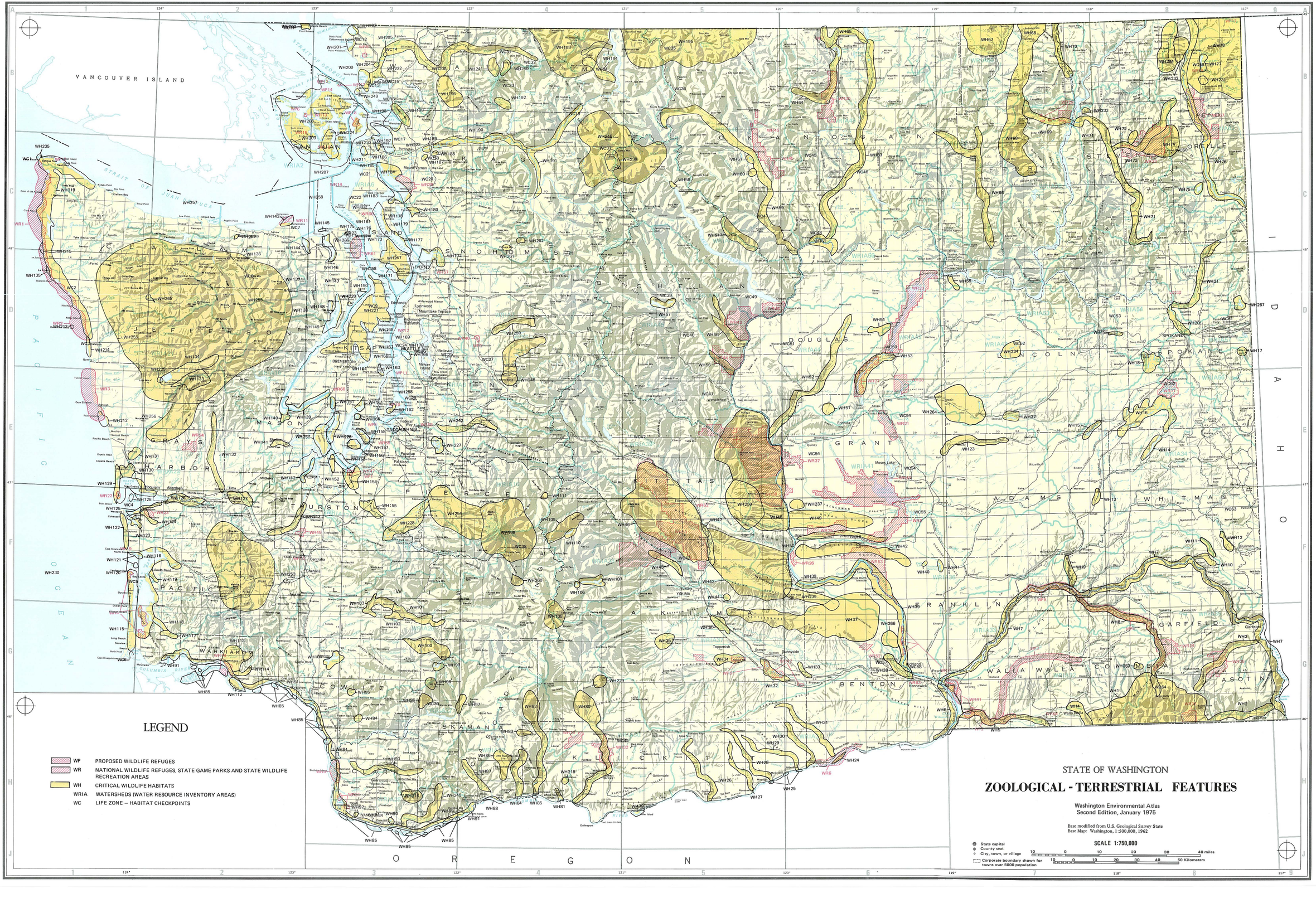
CLASSIFICATIONS IN THE REDBOOK:

Peripheral Species

Mountain Caribou
Blue Grouse

Status Undetermined Species

Fisher
Marten
Wolverine
Lynx
Larch Mountain Salamander
Elephant Seal
Ferruginous Hawk
Osprey
Merlin
Sharp-tailed Grouse
Snowy Plover
Long-billed Curlew
Burrowing Owl



LEGEND

- WP — PROPOSED WILDLIFE REFUGES
- WR — NATIONAL WILDLIFE REFUGES, STATE GAME PARKS AND STATE WILDLIFE RECREATION AREAS
- WH — CRITICAL WILDLIFE HABITATS
- WRIA — WATERSHEDS (WATER RESOURCE INVENTORY AREAS)
- WC — LIFE ZONE – HABITAT CHECKPOINTS

STATE OF WASHINGTON

ZOOLOGICAL - TERRESTRIAL FEATURES

Washington Environmental Atlas
Second Edition, January 1975

Base modified from U.S. Geological Survey State Base Map: Washington, 1:500,000, 1962

SCALE 1:750,000

- State capital
- County seat
- City, town, or village
- Corporate boundary shown for towns over 5000 population

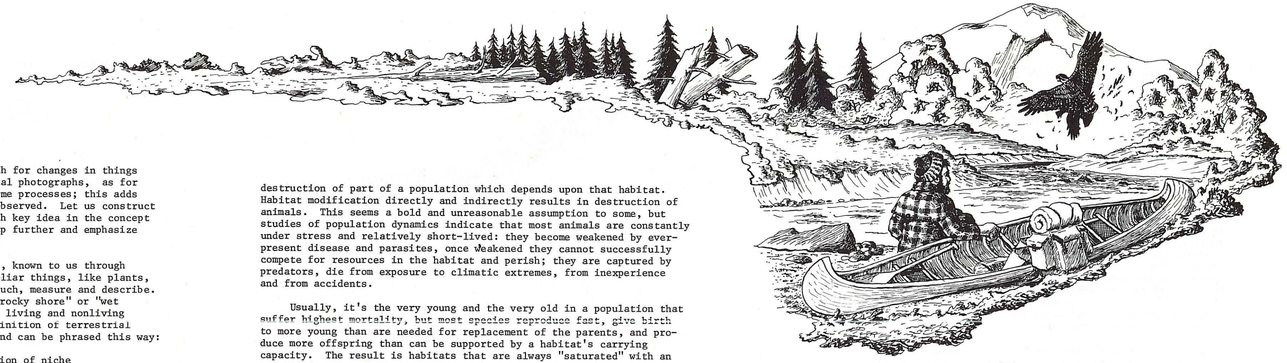
10 0 10 20 30 40 miles

10 0 10 20 30 40 50 Kilometers



Marten

SOME IMPORTANT WILDLIFE OF WASHINGTON



OF HABITATS AND ENDANGERED SPECIES

By
Robert A. Mowrey

All wildlife is important to the support of Earth's biosphere, and hence to support of man; the major intent of this paper is to show why this is true. The present status of wildlife in Washington is, to a large extent, a reflection of what has happened to habitat over the last 100 years. Human activity has altered much of the State's wildlife habitat and caused reduction of many populations to levels for concern. The purpose of this atlas section is to discuss more than 100 selected species and to emphasize the importance of all wildlife, whether they be game or nongame species and whether they be eminently threatened or not.

The values assigned to wildlife by experts and the public indicate that animals are important in a number of ways. Whether hunted for sport, watched for pleasure or photographed, animals have recreational and aesthetic significance. In economic terms, the presence of fish and wildlife is important to many business enterprises based on fishing and hunting, and on diverse recreation and tourist industries. In addition, all animals have particular value in supporting the functioning of ecological systems.

Two principal criteria were used to select animals for emphasis in this section. Under the first criterion, when a species was considered to be in some way threatened in all or a portion of its range in Washington, then it was included. Under the second criterion, when one was considered of economic importance as a game or furbearing species, then it too was included. Of the more than 100 animals discussed, 36 birds and mammals are game species and 2 mammals are furbearers. The majority, about 70 animals, are deserving of emphasis because their populations are threatened by further habitat alteration, are presently low in numbers and are probably still declining. These 70 animals in particular also share a common denominator: our lack of understanding of their critical needs and of their ecological roles in the biosphere.

ECOLOGICAL CONCEPTS. Ecological concepts are basic to our understanding of the environment, and our knowledge of animals is directly related to the clarity of concepts we define and use in our reasoning about the values and roles of wildlife. In the logic we apply to analysis of problems in environmental planning, ecological concepts work together as interrelating premises in our reasoning; these concepts form our basic assumptions about what we believe to be fact in our experience with the environment. The accuracy of our conclusions about the "environmental impacts" of any project is therefore dependent upon the validity of our premises: how accurately concepts correspond to ecological fact. A case in point is the habitat concept conveyed by atlas contributors in their writings about Washington's wildlife.

In reading contributors' information under the range maps following, we are inclined to use concepts that define terrestrial habitat as an arrangement of things like "water," "cover" and "food" of importance to an animal's survival. Such concepts emphasize ideas about structural things in the environment, like a bush, a tree, a lake or an animal. These are obvious ideas, basic and necessary, but of equal significance are considerations about how all things interrelate through the operation of ecological processes. We tend to confine our understanding of habitat to things within our common experience and overlook the presence of processes that continually work to support the existence of things that we see.

COMMUNITY STRUCTURE VS. ECOLOGICAL PROCESS. Structure and process are interrelated and inseparable. By "structure" is meant the arrangements of things in the environment, like plants, animals, soils, rocks, lakes, rivers and mountains; these are tangible objects that we readily recognize and within our common experience. When we enter a natural community and observe the things which comprise it, we may define its structural dimensions in terms of plant and animal species diversity, population number, and the arrangement of populations distributed in space. We can measure these objects and their patterns of arrangement, and count them. A single photograph, for example, can illustrate some community structure as a static scene or picture. When the scene also depicts motion, or change over time, then it may illustrate some elements of ecological process.

By "process" is meant the actions of things in the environment, like predator-prey interactions in food chains, population growth and decline, interspecies competition for resources, water and nutrient transport and utilization in ecological cycles, soil formation and erosion, rate of energy fixation by plant photosynthesis, primary productivity and plant succession. These are perhaps less obviously tangible activities occurring in the environment, and not easily recognized except by sophisticated measurements of ecological change.

When we enter a natural community and seek to observe the ecological processes which support it, we have to look for activities, motion, the movement of things through space, and watch for changes in things within time's dimension. A series of sequential photographs, as for example in a moving picture, can illustrate some processes; this adds time and motion to our perspective of things observed. Let us construct a working definition of "habitat," examine each key idea in the concept and see what difference it makes to go the step further and emphasize ideas relating to ecological process.

THE HABITAT CONCEPT. Habitat is tangible, known to us through our direct experience of its structure in familiar things, like plants, animals and soils, that we can readily see, touch, measure and describe. At a glance, we can identify the habitats of "rocky shore" or "wet coniferous forest" and describe each habitat's living and nonliving parts in many ways. One somewhat standard definition of terrestrial habitat is based on ideas about the tangible and can be phrased this way:

> Habitat for an animal is the interspersion of niche elements of water, cover and food in enough quantity, quality and space for maintenance of its population at an optimum level, governed by its reproductive potential and the carrying capacity of the ecological niche to which the species is genetically adapted.

Change niche elements, and the definition can apply to other animals and habitat types such as those in aquatic systems or even microorganisms living in soil which may need only a trace of a chemical as a niche element. In any case, ideas conveyed by this definition tend to emphasize familiar things arranged in familiar patterns that we know as specific habitats. Primarily, these key ideas constitute our working understanding of "habitat," but we usually do not incorporate ideas about ecological process in our understanding. All the key ideas in the definition, however, contain extended meanings which recognize the constant operation of ecological processes.

By "ecological niche" in the definition is meant the animal's "role" or "profession" within its community, like "eater of small birds" for a goshawk, or "eater of all small birds and mammals" for a marten. The animal's role in the community is to cause some ecological process to happen, but food consumption is only a part of an animal's total niche requirements. By "niche element" is meant any resource available for utilization in the animal's ecological niche, like food, water, cover and space for territorial occupation.

To more completely define the goshawk's niche, one must also consider ecological processes, like the bird's actions in obtaining its water requirements, its cover requirements, and its territorial and nesting requirements. Description of an animal's niche also involves considerations of energy expenditure in hunting for food, size of prey and its suitability for balancing energy spent in hunting and capturing it, the animal's behavioral and physical adaptations, its population dynamics, competition between individuals in the same population, and competition between different species for limited resources in a habitat they share. "Ecological niche" involves everything a population needs to successfully occupy a habitat, be a member of a community, and be a part of an ecosystem.

By "interspersion" is meant the arrangement, distance and easy accessibility of an animal's living requirements, permitting it to get all it needs without overexpending its limited energy budget. Also a function of interspersion, "carrying capacity" means the amount of resources of good quality available to a population or several competing populations; it means that there exists a finite capacity of the habitat to support a specific number of animals in the community, and no more.

Every niche element is a resource that is part of a habitat's total carrying capacity. If any resource falls short of supplying critical needs, such as diminished water supply in a year of drought, that part of the species' ecological niche is said to become "the limiting factor" and animals die. The population then declines until it adjusts to the reduced carrying capacity. Due to limiting factors operating in communities, destruction of just one obscure niche element can be as deadly to a population as wiping out its total habitat. Man's projects often alter wildlife habitats by suddenly creating new limiting factors which put populations under stress. When a species is threatened by diminished supply of a limiting factor in its range, it is said to depend upon "critical habitat," and greater stress for survival is imposed upon its population in ensuing competition for the resource in short supply.

By "critical habitat" is meant that portion of a species' range which contains one or more threatened limiting factors that place a population in jeopardy of reduction in numbers below the optimum level. By "optimum level" is meant the population size and combination of sex and age groups which maintains a relatively stable population structure in balance with the carrying capacity of the species' total range. The problem is we may not recognize critical limiting factors, and the significance of carrying capacity, if we fail to understand how things are linked together and controlled by ecological processes.

It is an ecological axiom that the carrying capacity of a habitat is always utilized to its fullest by animal populations present, and that destruction or modification of habitat is directly related to destruction of part of a population which depends upon that habitat. Habitat modification directly and indirectly results in destruction of animals. This seems a bold and unreasonable assumption to some, but studies of population dynamics indicate that most animals are constantly under stress and relatively short-lived: they become weakened by ever-present disease and parasites, once weakened they cannot successfully compete for resources in the habitat and perish; they are captured by predators, die from exposure to climatic extremes, from inexperience and from accidents.

Usually, it's the very young and the very old in a population that suffer highest mortality, but most species reproduce fast, give birth to more young than are needed for replacement of the parents, and produce more offspring than can be supported by a habitat's carrying capacity. The result is habitats that are always "saturated" with an excess of animals that are under constant stress to survive in competitive situations. When we consider the ecological effects of modifying a habitat, we therefore are not justified in assuming that the animals displaced "just move over" into an adjoining habitat because that habitat will be saturated too, and competition for limited resources will quickly act to eliminate the poorest competitors.

When we look at an animal in its habitat, we increase our understanding of it if we look at how it must always take action to survive according to its "genetic adaptations." It must act to minimize stress by avoiding predators, staying comfortable and by finding food, water and protective cover. It has a physiological system that must constantly act to metabolize food to generate body heat and maintain a normal temperature. When an animal acts, whether automatically through its metabolism or overtly as a predator, it becomes coupled to its nonliving physical environment and to the living members of its community. In fact, there is no instant in an animal's life when it is not coupled in some way to its environment. The primary "force" that creates this union of things in the biosphere is the basic transference of materials and energy.

Transfer may take place in many ways, like transfer of nutrients in food consumption, by gas exchange with the atmosphere in breathing, and by transfer of water in breathing and excretion; all these exemplify the transfer of materials. Examples of energy transfer are: use of the sun's energy in plant photosynthesis, release of heat energy by food metabolism, and use of the sun's energy for plant transpiration and for water evaporation from soil. Until exchange occurs between community members and their environments, each member is a "reservoir" of stored materials and energy awaiting transfer throughout the ecosystem.

What an animal is, what it looks like and what it does in a community are products of the actions of basic genetic material: the genes. All species, as we see them today, are the products of countless years of evolution which has determined the genetic constitution of every living form. These genes, embodied in populations of species, are essentially reservoirs of unique "genetic information" which control numerous transfer activities in ecological processes.

What are these actions we need to recognize, and where do we look for them? When we look at an animal in its habitat, where are the "processes," "the ecological mechanisms," and the "linkages;" where do we look to see "how things interrelate," and what is meant by the "balance of nature" that holds the "web of life" together? These terms are essentially synonymous in that they contain common ideas about how ecological processes work to transfer materials and energy throughout communities.

A food chain in a community reflects ecological process: consuming food transfers materials and energy from prey to predator. The sparrow eats a seed, the goshawk eats the sparrow, soil bacteria alter and partially consume dead goshawk flesh, a wild rose absorbs chemical nutrients released by bacteria and grows a flower which is pollinated and produces another seed. The wildlife species lists in the atlas, for example, permit one to work out some community food webs typical of Washington habitats.

Whether plant, animal, microbe or man, all community members must continually ingest, metabolize and release materials and energy to survive; all must continually balance energy loss with energy gain. The goshawk must catch enough small birds to balance energy lost in the hard work of flying, hunting, and killing of prey. A doe must eat high quality food to store up enough fat for winter to give birth to healthy fawns in spring and nurse them on rich milk. In so doing, she helps ensure optimum size of the herd kept in balance with the carrying capacity of the population's range. A warbler must sing and fight to defend territory with sufficient carrying capacity of the insect niche element to support itself, its mate, and future offspring.

Flying, hunting, killing, singing, fighting, giving birth and nursing the newly born; all these are examples of processes and ways that nature has of linking species together in community organizations through the transfer of materials and energy. Genes ultimately control such processes, and populations of interacting community members are essentially reservoirs or "genetic pools" which cause these processes to take place. If a species becomes extinct, therefore, a unique genetic pool disappears and some ecological processes vanish - forever.

THE ENDANGERED SPECIES CONCEPT. Any form of life, and thus any genetically-determined process, can become extinct. Any animal population that is endangered by extinction can be viewed as a unique group of genes which maintains control over numerous ecological processes, no matter how small or hidden from us. Whether plant, animal or microbe, every species' population is a kind of "memory" that "knows how" to perform parts of processes that are important to the support of Earth's biosphere, and hence to support of man.

An endangered species can mean an endangered process, an endangered community, an endangered ecosystem, an endangered mankind. These are unavoidable conclusions using concepts which strive to recognize and define the basic dual nature of our environment as structure joined with process. What we arrive at is an ecological perspective, a way of looking at our world, and of "seeing" or inferring what it is that is really there when we watch a distant goshawk in the sky or ourselves at work within Earth's life-sustaining biosphere.

THE ECOLOGICAL PERSPECTIVE. In our reasoning, we require concepts that integrate ideas about ecological process with ideas about community structure. Improved planning decisions take place in step with increased recognition of processes operating, and with clarification of ecological principles used in the conceptual framework of our language and thought. Structure and process cannot be separated in defining the real world, and so the concepts we use must retain this union of ideas if we are to clearly reason out problems concerning the ecological impacts of man's actions. For example, limiting understanding of habitat to only considerations of structure, but omitting considerations of process, restricts our facility to clearly reason and predict the true ecological effects of implemented planning decisions. We need this ecological perspective for increased awareness and sensitivity.

Wherever possible, the atlas has been developed with information basic to description and explanation of ecological processes to provide the reader with integrated background for improved environmental analysis. Many authors of papers in the Biological Section consider the importance of ecological processes; the species lists reflect processes inherent to communities by emphasis of food webs; the Zoological-Terrestrial map records critical wildlife habitats and emphasizes the need for paying particular attention to processes operating in the areas mapped; the following pages in this section discuss the requirements of over 100 animals and, through many diverse contributor statements, stress the importance of community dynamics and the vital role of ecological processes to the survival of populations.

Artist Hal Street has adopted the ecological perspective in his preparation of the wildlife drawings for this section. All sketches emphasize identifiable field characteristics of the species and show the animals as active in their habitats. In their portrayal of behavior patterns of food foraging and consumer roles, the reader may view these scenes as small "ecosystem vignettes," illustrating part of the ecological niche of each species. In the activities represented, the scenes provide brief graphic examples of some processes that work to transfer materials and energy throughout communities by the actions of animals. While working within the atlas format, adopt the ecological perspective and consider how all information relates to communities; none of it, in fact, can stand outside and independent from community processes.

As we think, we act; the products of our thoughts too often return full-circle in the form of damaged habitats, altered ecosystems, endangered species and our own vital resources threatened. Community structure and ecological process need to be increasingly considered as two inseparable and complementary viewpoints on the same subject: our sustaining environment. To maintain this integrated ecological perspective in the conceptual realm of our thoughts and plans is to ultimately gain a higher quality of life for all of Earth's inhabitants.

ROBERT A. MOWREY is a naturalist and writer on subjects about the wildlife and ecology of the Pacific Northwest. He holds a B.A. in Zoology and an M.S. in Wildlife Ecology, both from the University of Washington, and has worked as assistant editor of Pacific Search magazine in Seattle. He is temporarily a writer-editor and wildlife ecologist on the staff of the Environmental Resources Section in the Seattle District Office of the Corps.

SOME IMPORTANT WILDLIFE OF WASHINGTON

SOME OF WASHINGTON'S CRITICAL BIRD HABITATS

By

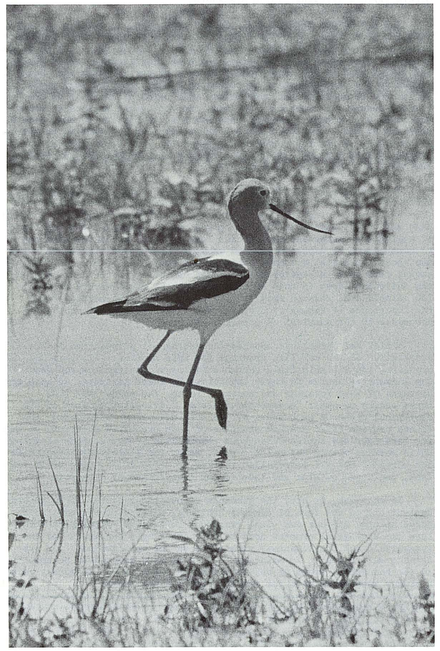
Terence R. Wahl

Washington, with its varied geography and climatic conditions, has an impressive variety of bird life. Over 400 species have now been recorded in the state with about 325 species playing regular, if not uniformly significant, roles in the environment.

THE NATIONAL AUDUBON SOCIETY'S BLUE-LISTED BIRDS FOR WASHINGTON. In 1971, in keeping with trends discernible to field observers in North America, data from Christmas Bird Counts, breeding censuses and other studies, the National Audubon Society compiled the "Blue List of North American Birds." These species are in addition to officially "endangered" species and are defined as "... species more common and often more widespread which for any number of reasons known or unknown appear to be suffering in all or part of their range from non-cyclical decline." The 23 species listed here appear on the current 1973 Blue List for Washington; any change in their status should be carefully noted:

Red-throated Loon	Osprey
Western Grebe	Prairie Falcon
Fork-tailed Storm Petrel	Merlin
White Pelican	American Kestrel
Double-crested Cormorant	Sage Grouse
Great Blue Heron	Snowy Plover
Black-crowned Night Heron	Ancient Murrelet
Sharp-shinned Hawk	Barn Owl
Cooper's Hawk	Burrowing Owl
Swainson's Hawk	Bewick's Wren
Ferruginous Hawk	Loggerhead Shrike
Marsh Hawk	

All of these blue-listed birds, except the Double-crested Cormorant and the Bewick's Wren are mapped and discussed on the range maps following in this section. Further information on their distributions, seasonality and unique habitat requirements is provided in the species lists.



American Avocet



Sea Gull

In addition to officially designated rare, endangered and blue-listed species, there are at least 26 species discussed in the texts following which occur regularly but are quite rare or of relatively unknown status, or very localized and vulnerable to local habitat alteration, or to other hazards which could imperil their presence in the state. These birds include some absolutely dependent on extensive, specialized habitat types. Some of them have been recognized as vulnerable by the Washington Department of Game; others have been called to our attention by competent field ornithologists. These species might be classified as unique, as species of concern, or of special significance in Washington and deserving of study and surveillance.

Washington's wildlife, its variety and quantity, is only as good as its habitat. Its birdlife especially has been affected by human activity, very minimally in some areas, very greatly in others. In the Humid Transition Life Zone of western Washington and the Upper Sonoran Life Zone of eastern Washington especially there are now certain habitat types which could be classed as "critical" in their importance to wildlife. These critical habitat types today include: salt marsh, tidal zones, shorelines and estuaries, undeveloped sand and gravel spits, undeveloped sand flats and dunes, shallow salt water bays, fresh water marsh and swamp, climax wet coniferous forest, sagebrush, and bunch-grass prairies. These habitats are critical to birds and to all the wildlife species that share these natural communities.

SOME CRITICAL HABITATS FOR BIRDS IN THE STATE. Listed here are some specific habitats in Washington that are critical to wildlife and especially to birds; the grid references and indexed numbers refer to their locations on the Zoological-Terrestrial map. These areas are under immediate threat, either wholly or in part, to the extent of being fragmented beyond use to wildlife due to developments, eradication programs and other disturbance through human activity:

SALT MARSH:

- Birch Bay, small remnant (B-3; WH201)
- Bellingham Bay, very small remnant (B-3; WH200)
- Samish Bay (B-3; WH198)
- Swinomish, north (C-3)
- Skagit Delta (C-3; WH184)
- Stanwood (C-3)
- Crockett's Lake (C-3; WH181)
- Dungeness (C-2; WH143)
- Nisqually Delta (E-3; WH154)
- Grays Harbor (E,F-1; WH128 & F-2; WH125)
- Willapa Bay (F,G-2; WH116)
- Leadbetter Point (F-1; WH120)
- Point Brown (E,F-1; WH129)

UNDEVELOPED SAND & GRAVEL SPITS:

- Semiahmoo Bay (B-3; WH202)
- Point Francis or Brant Point (B-3; WH200)
- Leadbetter Point (F-1; WH120)
- Protection Island (C-3; WH145)
- Dungeness (C-2; WH143)
- Swinomish Dredge Spoil Island (C-3)

UNDEVELOPED SAND FLATS & DUNES:

- Westport (F-1; WH125)
- Leadbetter Point (F-1; WH120)

It should be noted that much is still unknown about Washington ornithology. The occurrence and distribution of many species is still incomplete; their ecologies are virtually unknown, and early research is to be encouraged. There are birds which are of special concern in Washington today because of lack of concern or knowledge in the past. At present rates of habitat alteration, there may well be more "species of concern" before sufficient knowledge is available.

TERENCE R. WAHL is an ornithologist with a long-standing interest and expertise in the distribution of birds in Washington. He is past President of the Western Bird-banding Association and a member of several ornithological and environmental organizations. He has contributed to many ornithological publications and has co-authored, with Dennis R. Paulson, A Guide To Bird Finding In Washington which is quoted extensively in the Atlas.

LEGEND OF OFFICIAL SPECIES STATUS TERMS

The following range maps have texts concluding with terms pertaining to the species' official status according to several sources. These sources are abbreviated in the texts as follows:

FWS - U. S. Fish and Wildlife Service
WDG - Washington Department of Game
NAS - National Audubon Society
WS - Wildlife Society
MBTA - Migratory Bird Treaty Act
MMPA - Marine Mammal Protection Act
IUCN - International Union for the Conservation of Nature

FWS: U. S. Fish and Wildlife Service

Four official terms are presently used by the Office of Endangered Species and International Activities, U. S. Fish and Wildlife Service, Department of the Interior, in their publication entitled Threatened Wildlife of the United States, 1973 edition. This source is often called "The Redbook." Definitions for the terms presented here were drawn from The Redbook and consulation with the Endangered Species Coordinator, Fish and Wildlife Service, Portland, Oregon. The explanations reflect comments that will be basic to future planned redefinition of the terms in the next edition of The Redbook. This source is abbreviated in the texts following as "FWS," the four official status terms are as follows:

ENDANGERED-FWS

A native endangered species is any species or subspecies of vertebrate, mollusk, or crustacean which the Secretary of Interior, after consultation with appropriate effected states or other knowledgeable person, determines to be in danger of extinction within the territory of the United States. The name of a species whose status is said to be endangered has been entered in the Federal Register.

THREATENED-FWS

A native threatened species is any species or subspecies of vertebrate, mollusk, or crustacean which the Secretary of Interior determines is likely to become an endangered species. Such a species may have once been considered endangered, has recovered to some degree, but still has not yet recovered enough to become a viable component of the ecosystem. The name of a species whose status is said to be threatened will be entered in the Federal Register.

NOTE: However, as this Atlas edition goes to press, there are as yet no threatened species in the Federal Register. While the title of The Redbook contains the term "threatened" that document lists no officially threatened species as provided for in the Endangered Species Conservation Act of 1973. Publication of the 1973 Redbook edition preceded enactment of the law, and it is happenstance rather than design that the title coincides with the new threatened classification. Thus, at this time, any references to "endangered" or "threatened" species should apply only to those published in the Federal Register; use The Redbook only as a reference. In the status notations concluding the wildlife texts that follow, there will therefore be no "THREATENED" classification entered at this time in conformity with the law and current issues of the Federal Register. Under this new Act, there will eventually be two lists published: one for endangered species and one for threatened species. Only those species whose names are published in the Federal Register are eligible for Federal funds for research and purchase of habitats as provided for in the Endangered Species Conservation Act of 1973.

STATUS UNDETERMINED-FWS

Any species or subspecies of vertebrate, mollusk or crustacean whose status is considered to be "undetermined" has been suggested by the Secretary of Interior as possibly endangered. There is not enough information on hand to determine the status of a species so classified and more information is needed.

PERIPHERAL-FWS

A peripheral species or subspecies is one whose occurrence in the United States is at the edge of its natural range and which is threatened with extinction within the United States although not in its range as a whole. Special attention is necessary to assure retention in our nation's fauna.

REDBOOK-FWS

This is not an official status classification, but a reference notation. Five of the species mapped are discussed in The Redbook, but no official status has yet been assigned to them. Updating of the official "Endangered Species List" and development of the new "Threatened Species List" currently being conducted by the Office of Endangered Species may include one or more of them on the lists.

MBTA: Migratory Bird Treaty Act

PROTECTED-MBTA

All of the birds, except upland gamebirds, mapped on the following pages, are protected by the Migratory Bird Treaty Act of 1918 under International Conventions with Great Britian (acting on behalf of Canada), with Mexico and, in the near future, with Japan. However, Snipe, which are upland gamebirds, are protected by the Act with taking permitted in accordance with annual Federal regulation, the same as for waterfowl. Under the Act's articles: "... no person may take from the wild, otherwise acquire, posses, sell, purchase, transport, import, export, or dispose of any protected birds, alive or dead, or their parts, nests or eggs, except in accordance with .." Federal regulations. In addition, the amendments now give the U. S. Government the authority to arrest individuals caught taking the following endangered species: American Peregrine Falcon, Brown Pelican and Aleutian Canada Goose. Some species among the protected families, such as crows, may require population control in certain nuisance situations. Provision is also made for use of certain raptors in the field sport of falconry.

MMPA: Marine Mammal Proection Act

PROTECTED-MMPA

The Marine Mammal Protection Act of 1972 established the Marine Mammal Commission and set up a program for the conservation and protection of all marine mammals. The term "marine mammal" under this Act means any mammal which is morphologically adapted to the marine environment, including sea otters and members of the orders Sirenia, Pinnipedia and Cetacea, or primarily inhabits the marine environment - such as the polar bear; and, for the purposes of the Act, includes any part of any such marine mammal, including its raw, dressed, or dyed fur or skin. Further information on agencies responsible for the management of marine mammals is provided on page 52.

WDG: Washington Department of Game

Four terms are used by the Washington Department of Game in their list entitled "Classification of Wildlife in Washington." Lists of Washington's wildlife under these three general categories are provided at the end of the Zoological-Terrestrial map index on page 36. The terms are as follows:

GAME or FURBEARER-WDG

A game or furbearing species is subject to protection and regulation by the Department. It may be taken at certain times.

PROTECTED-WDG

A protected species is one which may not be taken at any time unless it threatens human life or seriously damages private property.

NOT PROTECTED-WDG

A species not protected is one for which no license is required to take it, and which may be taken at any time.

WS: Wildlife Society

One term is used by the Washington Chapter of the Wildlife Society in its brochure entitled "Rare Mammals of Washington" authored by J. Burton Lauckhart.

RARE-WS

A rare mammal is one that has always been present but in very low numbers. Although there is no immediate crisis, it is important that rare forms be observed closely and, where possible, steps be initiated to preserve specialized habitats for some species.

NAS: National Audubon Society

One term is used by the National Audubon Society in its "Blue List of North American Birds." A complete list of Washington's 23 blue-listed birds is provided by Terry Wahl in his paper on this page. All of these birds, except the Double-crested Cormorant and the Bewick's Wren, are treated in the maps and texts that follow in this Atlas section.

BLUE-LISTED-NAS

A blue-listed species is one more common and often more widespread which for any number of reasons, known or unknown, appears to be suffering in all or part of its range from non-cyclical decline.

IUCN: International Union for the Conservation of Nature

Four terms are used in the source Red Data Book published by the International Union for Conservation of Nature and Natural Resources, Survival Service Commission, located in Morges, Switzerland. This is a set of five looseleaf volumes and is revised periodically by species. The 1971 revised edition was used for the definitions here.

ENDANGERED-IUCN

In immediate danger of extinction: continued survival unlikely without the implementation of special protective measures.

RARE-IUCN

Not under immediate threat of extinction, but occuring in such small numbers and/or in such a restricted or specialized habitat that it could quickly disappear.

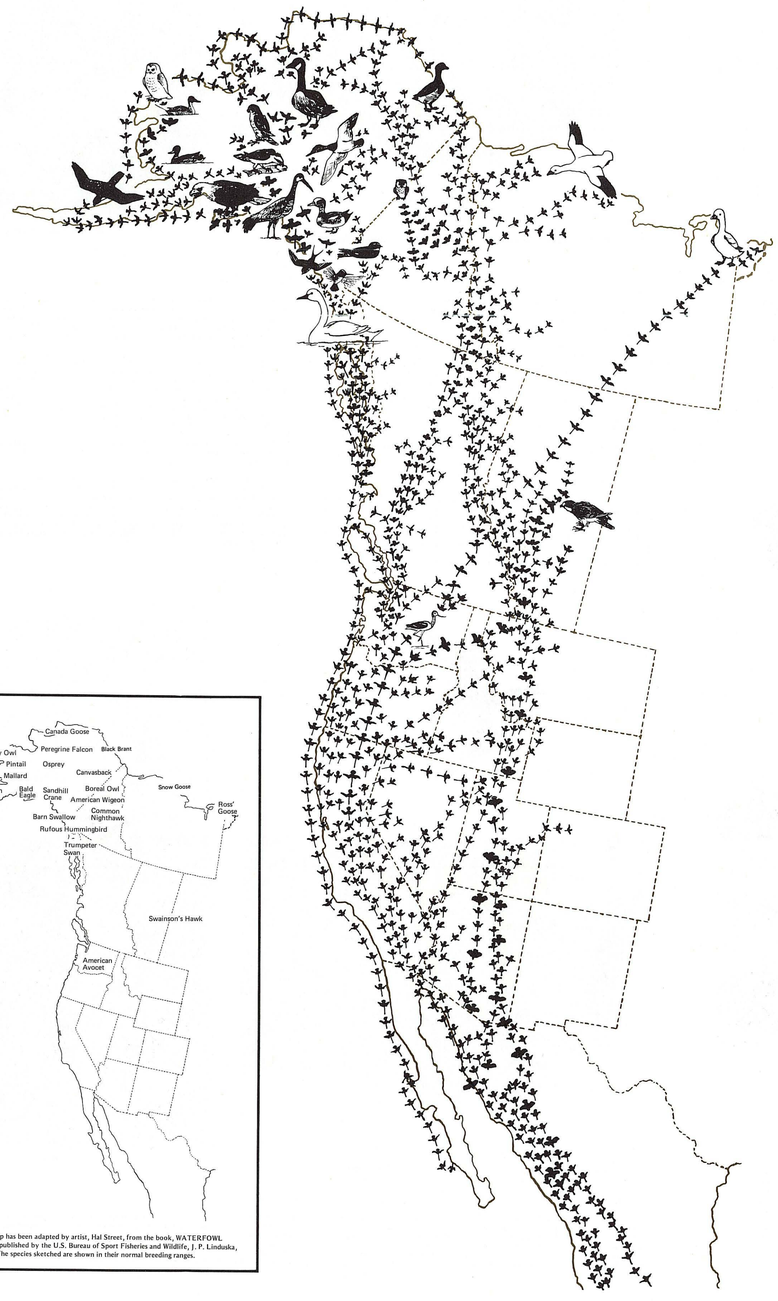
DEPLETED-IUCN

Although still occurring in numbers adequate for survival, the species has been heavily depleted and continues to decline at a rate which gives cause for serious concern.

INDETERMINATE-IUCN

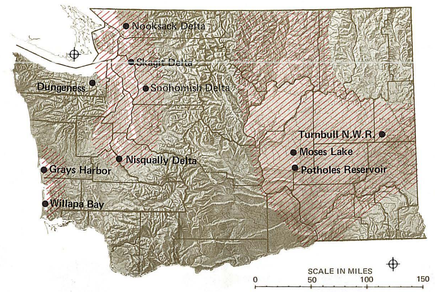
Apparently in danger, but insufficient data currently available on which to base a reliable assessment of status. Needs further study.

SOME IMPORTANT WILDLIFE OF WASHINGTON



This flyway map has been adapted by artist, Hal Street, from the book, WATERFOWL TOMORROW, published by the U.S. Bureau of Sport Fisheries and Wildlife, J. P. Linduska, editor, 1964. The species sketched are shown in their normal breeding ranges.

EDITORS' NOTE: The wildlife maps in this section show areas of the State where animal populations are known to occur in appropriate habitats; the maps thus represent the range of available habitat remaining in Washington as well as the range of the animals requiring this habitat. The ranges and texts are based upon the current knowledge of many contributors and of reviewers contacted in Federal and State resource agencies and in local colleges and universities, and by contact with private individuals who have expert knowledge of these species. Any range or text may be changed in a future edition as more knowledge is gained. The objective of this range depiction is to show the total primary statewide areas needed by populations at all times of the year and to emphasize areas which afford critical habitat. The ranges presented may include all, or one, or a combination of the following range types for a species: breeding range, summer range, fall range, winter range, migratory range and the species' resident range where it is present all year. Refer to the wildlife species lists on pages 19 and 20 for more information.



IMPORTANT MIGRATORY WATERFOWL AREAS

PACIFIC FLYWAY

Washington is a unique part of the Pacific Flyway. Because of the state's geographic location, its varied seasonal climate and abundance of diverse habitats, it has become an important sustaining element in the ranges of many migratory birds. Two main concepts serve to define the Pacific Flyway and Washington's place in it: one is administrative, the other is biological.

The existence of the flyway system in North America was discovered in the 1920's and 1930's during a period of intensive national waterfowl research and management aimed at stopping the serious decline of waterfowl populations caused by destruction of habitat through man's drainage of wetlands, and by periods of severe drought. From east to west across the United States, four main flyways were discovered: the Atlantic Flyway, the Mississippi Flyway, the Central Flyway and the Pacific Flyway. In 1948, the Pacific Flyway was set up jointly by state and Federal agencies into an administrative program for the purposes of waterfowl management. The maps here illustrate how Washington fits into the Pacific Flyway and emphasize some important areas for waterfowl. The state is not merely a "route" from north to south, but an ecological necessity within the total ranges of migrating birds. As can be seen in the notations on seasonality in the bird lists in the Biological Section, many migrants stop over for varying lengths of time and occupy many kinds of habitats. Regardless of the time spent here, the species' individual adaptations dictate specific habitat requirements.

During migration birds expend a great deal of energy and require food, rest and protection from predators. Mortality increases due to numerous natural and man-induced causes. In perspective, migration is a period of increased vulnerability for bird populations and therefore condition of the habitats they find in Washington becomes a critical matter, ultimately governing to an important degree overall species populations. As can be seen by study of the bird lists, 51 of the 60 total bird families represented in Washington, or 85 percent, contain a majority of migrants that are seasonally vulnerable to habitat conditions. Man's use of the land therefore affects the welfare of migrating birds. All of these seasonal species are products of habitat conditions throughout ranges beginning in western Canada and Alaska and extending to other states and nations. Their traditional travel routes lead migrants to Washington every year. Any of the major migration routes may be used by members of many bird families simultaneously or at different times. Most is known about the movements of waterfowl and shorebirds, due to intensive research and management over the years. Information on those families forms most of the basis for discussion of migratory routes and generally important regions of the state illustrated here. "Waterfowl" is a collective term usually meaning birds in the Anatidae family - swans, geese and ducks. "Shorebirds" is a term referring mainly to eight Washington families including: Charadriidae (plovers and turnstones), Scolopacidae (sandpipers), Recurvirostridae (avocet), Phalaropodidae (phalaropes), and Laridae (gulls and terns). Refer to the species lists for further detail on other birds that migrate into the state.

Many migrants start to arrive in late August, some pausing only briefly to rest and forage for food. Most enter Washington from late September to mid-November, as do the geese and ducks for example. Waterfowl and shorebirds typically fly down Washington's coast and into Puget Sound. They rest, forage and may spend the winter in such important areas as: Dungeness, Grays Harbor, Willapa Bay, Skagit Flats, Nooksack, Snohomish and Nisqually River Deltas and associated river valleys, and in appropriate habitats throughout the Humid Transition Life Zone. Some fly across the Cascades to winter in eastern Washington. Another stream of migrants comes into northeastern Washington via northwestern Montana and Idaho, flying along the broad valleys of the Columbia, Okanogan and Snake River drainages, stopping occasionally to rest and feed. In central Washington, waterfowl find a multitude of reservoirs, wetlands, rich farmland, mixed with grass, shrub and arid forest habitats. There is a tendency for waterfowl to stay the winter in that part of the state. Species from east of the mountains may reach the milder climate on the coast by traveling south around the Cascades, down the Columbia River valley, or go directly over the mountains.

In late winter and early spring when snowmelt and heavy rains enlarge surface waters and spring growth increases habitat quality, the broad coastal and Puget Sound valleys teem with wintering or northbound birds. Each spring, resident waterfowl seek places to breed, nest and rear their young. Any small puddle having sufficient cover and available food may be utilized. Stable water, which affords long-lasting food sources, is the critical factor for survival of the growing young. In western Washington, extensive tidal flats at the mouths of major rivers provide extremely important habitat for waterfowl and shorebirds. Throughout the Life Zones of the state, riparian habitat along watercourses, freshwater marshes, irrigation canals and seeps, water storage impoundments, beaver ponds and forest swamp, rural and urban lakes and ponds of any size all provide important habitats for migrants of many of the families listed, but especially for waterfowl. With additional preservation and management of more diverse habitats all birds which include Washington in their traditional migratory movements would gain significant benefits, as would every person who comes into contact with Washington's wildlife.

by Curtis W. Erickson

CURTIS W. ERICKSON, M.S. Wildlife Biology, University of Washington, has done field studies on trumpeter swans at the Turnbull National Wildlife Refuge in eastern Washington. He is presently a wildlife biologist for Ebasco Services.

MAP KEY

Birds	Map
American Kestrel	21
American Peregrine Falcon	19
Ancient Murrelet	38
Bald Eagle	14
Band-tailed Pigeon	40
Barn Owl	42
Black-crowned Night Heron	5
Blue Grouse	22
Bobolink	49
Bobwhite	27
Brant	8
Brown Pelican	3
Burrowing Owl	44
California Quail	28
Canada Goose	7-8
Caspian Tern	37
Chuckar	32
Common Snipe	35
Cooper's Hawk	10
Ferruginous Hawk	12
Flammulated Owl	43
Fork-tailed Storm Petrel	2
Golden Eagle	13
Goshawk	9
Grasshopper Sparrow	50
Gray Partridge	33
Great Blue Heron	4
Great Grey Owl	45
Green Heron	5
Gyrfalcon	17
Hawk Owl	44

Birds	Map
Loggerhead Shrike	48
Long-billed Curlew	36
Marsh Hawk	15
Merlin	20
Merriam's Turkey	31
Mountain Bluebird	47
Mountain Quail	29
Mourning Dove	41
Osprey	16
Peale's Peregrine Falcon	19
Prairie Falcon	18
Purple Martin	46
Red Knot	36
Red-throated Loon	1
Rhinoceros Auklet	39
Ring-necked Pheasant	30
Rough-legged Hawk	12
Ruffed Grouse	24
Sage Grouse	26
Sage Sparrow	50
Sage Thrasher	46
Sandhill Crane	34
Scaled Quail	27
Sharp-shinned Hawk	10
Sharp-tailed Grouse	26
Sharp-tailed Sandpiper	36
Snow Bunting	51
Snowy Plover	34
Spotted Owl	43
Spruce Grouse	23
Swainson's Hawk	11
Trumpeter Swan	6

Birds	Map
Upland Sandpiper	35
Western Bluebird	47
Western Grebe	1
Western Meadowlark	49
Whistling Swan	6
White Pelican	3
White-tailed Ptarmigan	25
Mammals	
Black Bear	52
Blacktail Deer	65
Blacktail Jackrabbit	62
California Bighorn Sheep	67
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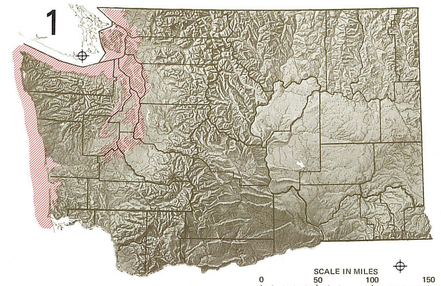
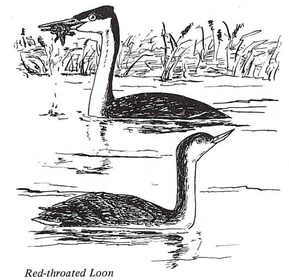
BIRDS



Western Grebe



Red-throated Loon winter plumage

Red-throated Loon & Western Grebe (winter range)

RED-THROATED LOON

The Red-throated Loon is about the size of a Snow Goose and its sharp, thin, upturned bill is a good field mark. The tail is short and stiff and the wings are short and somewhat pointed, although once airborne, loons are strong fliers. Its short legs are located to the rear of the body, making walking on land extremely difficult. Loons must be in water in order to take off, as they run along the surface to become airborne. Unlike other loons, the Red-throated Loon takes flight rather than diving when escaping intruders. The streamlined body and dense plumage adapt the bird to its aquatic habitat. The Red-throated Loon is a common winter resident on the saltwater bays of western Washington and occasionally on lowland freshwater lakes. The species is also occasional as a nonbreeder on saltwater during the summer. Much is made in literature of the Loon's loud crazy laughter however in Washington, off its normal breeding grounds, the species is usually silent. PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-MBTA.

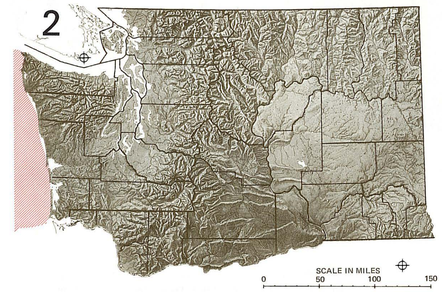
Gavia stellata

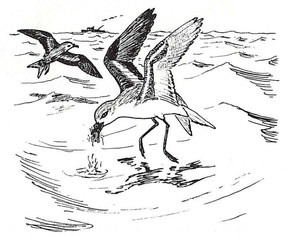
WESTERN GREBE

Grebes are duck-sized birds with slender pointed bills, small heads and inconspicuous tails. Most of their lives are spent on water where they are expert and graceful swimmers and divers, although they fly and walk with difficulty. Western Grebe populations in Washington appear to be in excellent condition, while declining in other parts of their North American range. The species is apparently vulnerable to chemical buildup in the environment. A large die-off was reported years ago caused by pollution. Perhaps the species could be watched as an indicator of marine environmental quality.

Aechmophorus occidentalis

The Western Grebe may usually be seen during the winter on salt water bays and lagoons where flocks may number in the thousands. It is a striking bird with its slender swan-like neck, long yellow bill and dense black-and-white plumage. Nesting takes place during summer in cattail or tule-covered margins of larger or remote freshwater lakes. It is common in the summer in the eastern part of the state. Some nonbreeders may be observed during this season in coastal regions. PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-MBTA.





Fork-tailed Storm Petrel

Fork-tailed Storm Petrel

FORKED-TAILED STORM PETREL

This pearl-gray seabird is slightly smaller than a Robin. It is confined to offshore islands along the outer coast of the Olympic peninsula. It builds its nest by burrowing into the island turf. Occasionally it wanders into the Straits of Juan de Fuca. It is fairly common offshore, in this local area, otherwise it is rare. PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-MBTA.

Oceanodroma furcata

SOME IMPORTANT WILDLIFE OF WASHINGTON





Brown Pelican
summer plumage

White Pelican

Brown Pelican

WHITE PELICAN

This bird is entirely white with the exception of black on the rear half and tips of the wings and a large yellow-orange bill. In former years the White Pelican bred along the shores of Moses Lake in Grant County. However, the incursion of civilization has all but eliminated this species from the state. On occasion, a rare straggler can be seen in Puget Sound. The species has also been seen summers at McNary Wildlife Recreation Area. It prefers large freshwater lakes with safe roosting places on isolated islands. Special attention must be paid to the welfare of pelicans, and where possible, suitable nesting sites must be made available. PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-WBTA.

BROWN PELICAN

This pelican is a marine species, feeding by plunging into the water for its fish prey. Like the White Pelican, the Brown is not common in Washington. Besides color and habitat preference, the Brown Pelican is smaller than its freshwater relative. The wingspans of both birds are a huge 9 feet for the White and 6-7 feet for the Brown. This species is an occasional fall migrant along the bays and harbors of the southwestern ocean coast, where it might be seen on outer beaches. Its increasing rarity in Washington is partly due to the fact that because of pollution its breeding populations in southern California have declined rapidly. There were no records of sightings for 1973.

During the summers of 1970-71, some 3000 young brown pelicans were banded and color-marked on their breeding grounds in the Gulf of California. Plastic tags were used of 6 colors: white, lavender, orange, pink, chartreuse, and dark green; these represent pelicans banded and marked at Bahia, Paballon, San Pedro Martir, San Lorenzo Norte, Pioju, Puerto Refugio, and San Luis, respectively. The white, dark green, orange, and lavender markers are 1/2 by 7-inch streamers attached to leather pieces which are in turn attached to aluminum leg bands. In spotting, the leather piece is usually observed first as a dark area or object on the bird's leg. The pink and chartreuse streamers are simply knotted to the band, requiring closer observation.

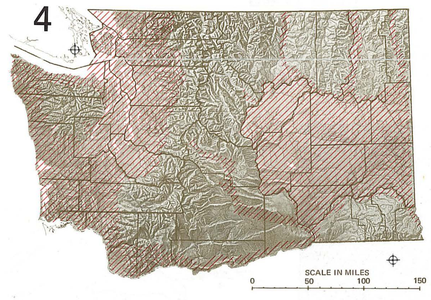
Pelecanus erythrorhynchos

Pelecanus occidentalis californicus

If any marked birds are seen, a sighting report would be appreciated. Information requested is: date of sighting, color(s) seen, number of birds of each color, location, and approximate flock-size the marked birds were in. For the ambitious, additional information of interest would be the number of adult birds (white on head, dark on belly) and juvenile birds (dark or brown head, light colored belly) present. Even fragmentary reports may prove to be extremely valuable.

In addition, any dead birds found along the coast should be reported as well. If possible, the bird should be frozen and will be picked up by U.S. Fish and Wildlife personnel for autopsy and residue analysis. Even accidental and oil-spill deaths are requested in order to determine all causes of death for pelicans. Hopefully, information from this effort will provide valuable data concerning year-round movements, add basic ecological data to existing literature, and determine areas of possible pesticide contamination. Sightings and any other pelican information should be reported to: Dr. D. W. Anderson, U.S. Fish and Wildlife Service, P.O. Box C, Davis, California 95616. Reports will be acknowledged. ENDANGERED-FWS; PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-WBTA.







Great Blue Heron
breeding plumage

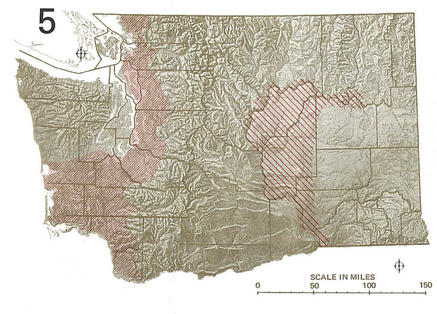
Great Blue Heron

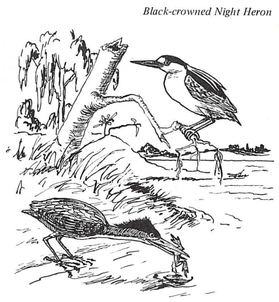
GREAT BLUE HERON

This is the commonest of Washington's heron species and is frequently seen fishing along open, shallow, fresh or salt waters, and along rivers and streams. Often miscalled "Crane," or more commonly in Washington, "Shitepoke," this tall, grayish-blue bird stands 42-50 inches. The long legs and neck, the dagger bill, and in sustained flight, folded neck and trailing legs mark it a heron. When at rest, the neck may be erect or folded. It may have plumes when breeding. Its food mainly consists of fish, frogs, crayfish and other aquatic life, but sometimes includes mice or insects.

Ardea herodias

Three races of Blue Herons exist in Washington. The two eastern races, A. h. herodias and A. h. treganza, might be placed in a peripheral category, and their habitat is in some danger. Breeding colonies do exist though. The other race, A. h. fannini, in western Washington is fairly common throughout that portion of the state. All races require swamp areas with trees suitable for nesting. Although the western race is common, alteration of habitat through pollution or extensive development could seriously threaten its continuation in Washington. PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-WBTA.





Black-crowned Night Heron

Green Heron

Green Heron

Black-crowned Night Heron

GREEN HERON

This is a small green-colored heron with a chestnut-colored neck and a black crest. The back and wing-tips are a greenish-blue, and the legs are orange to greenish-yellow. The Green Heron has always been abundant in the Willamette Valley in Oregon. Only in the last 25 years has it found its way across the Columbia into southwest Washington. It now ranges along the coast as far north as Grays Harbor and King County and is rapidly extending this range. It has been seen as far north as Bellingham. It is an expanding species in this state, and there are nesting records in most of its western Washington range. The Green Heron inhabits marshes and freshwater sloughs adjacent to marine estuaries. Filling or draining of these marshes would limit this species, as it needs undisturbed water to carry on its fishing activities. The various activities of man - especially wetland modification - could keep the species from becoming more numerous. PROTECTED-WDG; PROTECTED-WBTA.

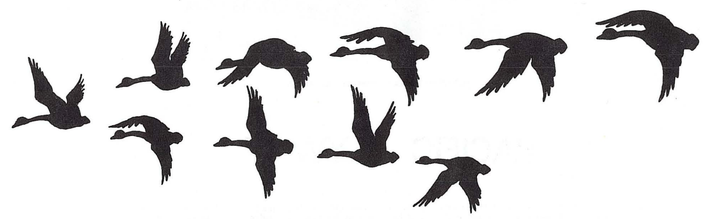
Butorides virescens anthonyi

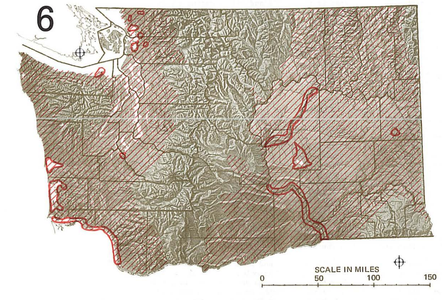
BLACK-CROWNED NIGHT HERON

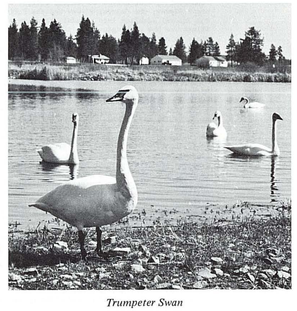
This heron is widely distributed, but it never seems to be common in Washington. It is only rarely seen in Puget Sound although it is a summer resident in eastern Washington. It commonly breeds in suitable areas in that portion of the state, notably Douglas County. It nests in small groups in dense riparian woods, and is mainly found along lakes and sluggish rivers and streams.

Nycticorax nycticorax hoactli

It is a chunky, short-legged heron with a black crown and back, gray wings and tail, and with whitish forehead, cheeks and underparts. The bill is black, the eyes red, and the legs are yellow or pink. The heron stands 23 to 27 inches tall. PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-WBTA.







Trumpeter Swan
Turnbull National Wildlife Refuge

Whistling & Trumpeter Swans

WHISTLING SWAN

TRUMPETER SWAN

These swans are completely white with black bills and feet, and are seldom seen away from water. Swans feed by dipping head and neck under water and tipping up their bodies. They are occasionally mistaken for Snow Geese, but their larger size and longer necks distinguish them from geese.

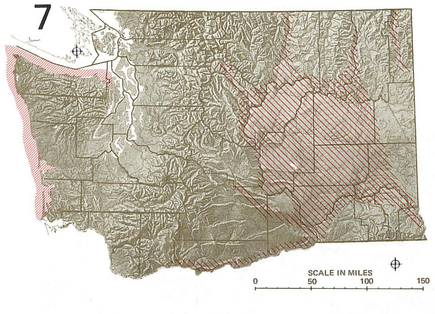
Their essential habitat elements include marshy ponds shallow enough for tipping. They forage for submerged tubers of pondweeds and other aquatic plants. When available, they favor small islands in the marshes for resting to avoid predators.

The Whistling Swan and Trumpeter Swan are found in suitable habitats on both sides of the Cascades. The Whistling Swan tends to be more common in the west however. This species is distinguished from the rarer Trumpeter by its smaller size. Also, the Whistling Swan's bill may have a yellow spot at its base while the Trumpeter's bill is all black.

Olor columbianus

Olor buccinator

The Whistling Swan is a regular migrant and occasionally is a winter resident on larger bodies of water. The Trumpeter Swan was once thought to be on the verge of extinction, but it is making a comeback, spreading out of its former range into lower Puget Sound and along the lower Columbia River. The lowlands of Skagit County serve as an important winter feeding area for Trumpeters. Also of vital importance to wintering swans is the lower stretch of the Columbia River from the coast to 50 miles upstream on both Washington and Oregon shores. The range map here highlights in outline important winter and migration areas. Both species are also found in many other spots in small numbers or for very short periods. GAMEBIRDS-WDG; PROTECTED-WBTA.





Western Canada Goose

Western Canada Goose

Dusky Canada Goose

CANADA GOOSE

The distribution and classification of the medium-sized geese in Washington is unclear. The matter is currently under study by ornithologists. Formerly, the Aleutian Canada Goose, B. c. leucopareia, was the race of goose recognized throughout the state during migration. However, recent revision of the races of Canada Geese has classified this race as endangered and confined it to the Aleutian Islands. The more common "small" Canada Goose moving through western Washington is B. c. minima, the Cackling Canada Goose. The Lesser Canada Goose, B. c. taverneri, sometimes called Taverner's Canada Goose, has been established by this new revision and is believed to migrate south from Canada to the vicinity of the Skagit River, then crossing the Cascades into eastern Washington. Many Lesser Canadas winter in south central Washington and eastern Oregon in the vicinity of Boardman, Oregon.

The Aleutian Canada Goose is smaller, closer to "cackler size," than the Lesser Canada. The critical situation that has led directly to marked decrease in population size of the Aleutian Canada Goose has been nest destruction in its prime breeding areas on many Aleutian Islands by Arctic foxes introduced by man for purposes of establishing a fur pelt industry. Presently, breeding is confined to only Buldir Island in the Aleutians. The Fish and Wildlife Service is working toward reintroduction of breeding pairs to other islands, following fox elimination programs.

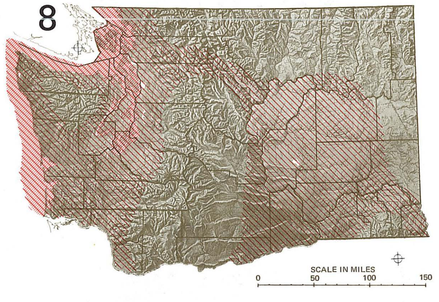
If these new classifications are accurate, then particular attention must be paid to critical habitats all along Washington's coast. The abundant flocks migrating north along the coast would be B. c. taverneri. Also, strict attention should be paid to the critical habitats and range of all south-migrating Lesser Canadas, as some Aleutian Canadas may be co-migrants in these flocks. The problem of the distribution of all races of Canada Geese in Washington is further complicated by the migration through the western part of the State of large, dark, Dusky Canada Geese, B. c. occidentalis, and some Vancouver Canada Geese, B. c. fulva. The Dusky Canada Goose is the darkest race occuring in Washington. It is a migrant and winter visitor inhabiting a narrow strip along the coast and winters in the Willamette Valley of Oregon. The mudflats and islands in sheltered bays, as for example on the **Willapa National Wildlife Refuge**, comprise this race's critical Washington habitat.

Branta canadensis

In western Washington, the critical habitats of all geese are the many mudflats and adjacent grassy fields along the coast and in Puget Sound. In eastern Washington, the Lesser Canada Goose mingles with a resident population of the larger Western Canada Goose, or also called the Greater Canada Goose, or the Great Basin Canada Goose, or just "Honker," B. c. moffitti. In eastern Washington, this Great Basin race only nests naturally on cliff ledges and sand-and-gravel islands. It is a common nester along suitable rivers and is increasing its range in the Columbia Basin. The main nesting grounds of Western Canadas are still along the free-flowing stretches of the Columbia and Snake Rivers. Also, due to local efforts to provide more nesting sites, Western Canadas have become established along the Pend Oreille, Okanogan and Yakima Rivers.

In Washington, it is imperative that critical habitats for all Canada Geese be protected. Specifically, no more destruction of nesting sites in eastern Washington should be permitted and all resting and feeding areas for geese in the Pacific Flyway should be protected. NOTE: A good review of the distribution of the races of Canada Geese in Washington and nationwide is available in the book Waterfowl Tomorrow, published by the Fish and Wildlife Service. ALEUTIAN CANADA GOOSE: ENDANGERED-FWS; ALL GAMEBIRDS-WDG; ALL PROTECTED-WBTA.







Black Brant

Lesser Canada Goose
(see text under map 7)

Black Brant

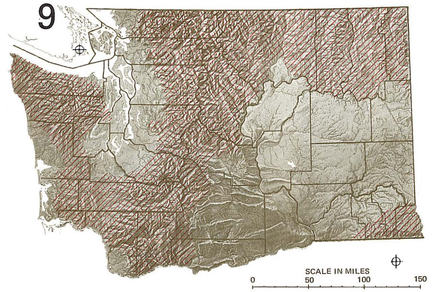
BLACK BRANT

The Brant is entirely a marine goose. It is somewhat larger than a Mallard with a black head, neck and breast, with a conspicuous white fleck on its neck. The bird travels in large irregular flocks along the west coast and Puget Sound. It is a common winter resident in the rocky eelgrass bays of western Washington. Padilla Bay south of Bellingham is the largest Brant wintering area in the state. This bird is shy and nervous, and usually remains some distance out from shore as the species is easily disturbed. Brant require gravel spits for preening and "graveling-up," and eelgrass beds for food. The loss of this habitat to residential and industrial development has reduced its numbers. Already the species has been eradicated from many traditional Washington wintering grounds. GAMEBIRD-WDG; PROTECTED-WBTA.

Branta nigricans

SOME IMPORTANT WILDLIFE OF WASHINGTON

9





Goshawk

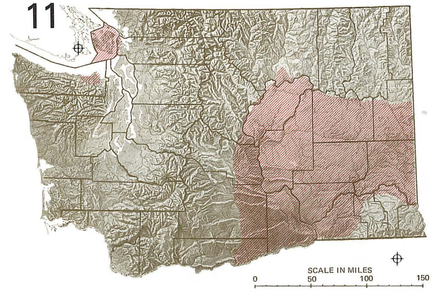
Goshawk

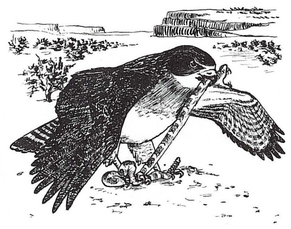
GOSHAWK

The Goshawk is the largest of the accipiters, feeding mostly on small birds. Two subspecies of Goshawks occur in Washington. One race called by some the Western Goshawk, is largely confined to Olympic peninsula forests, ranging north to Vancouver Island and the Queen Charlotte Islands. This race (A.g. laingi) is smaller and darker than the other, the Eastern Goshawk, (A.g. atricapillus) which is found throughout the remainder of Washington's high forested areas, especially on the eastern side of the Cascades. It is a large hawk with short rounded wings and a long rounded tail. In adults, the back is bluish-gray with light marbled underparts and a white line over the eye. Both subspecies breed and nest in stream-bottome with large acreages of old growth Douglas-fir. The Goshawk is almost never found below 2,500 feet elevation in its breeding range. It is a subcanopy predator whose diet usually consists of Ruffed and Blue Grouse although it frequently eats small mammals. PROTECTED-WDG; PROTECTED-MBTA.

Accipiter gentilis

11





Swainson's Hawk

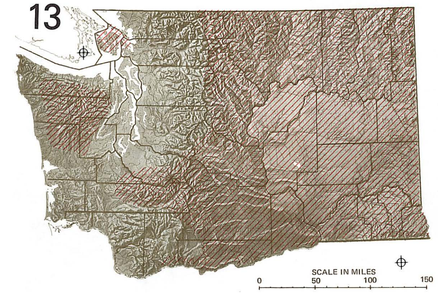
Swainson's Hawk

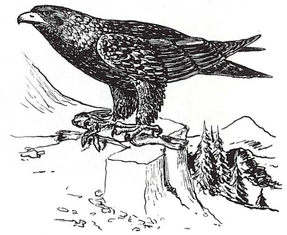
SWAINSON'S HAWK

Swainson's is primarily a hawk of the plains, preferring open habitat for hunting and trees or cliffs for nesting. It is a dark breasted bird, with the dark head, back, primaries and chest contrasting with a light belly in the light adult phase. It is proportioned like the Red-tailed Hawk, but the wings are slightly more pointed. The species may be found in the Olympic and Cascade Mountains during migration, but it is not abundant anywhere in its range. It is thought that changes in habitat of sagebrush and grasslands due to the spread of agriculture, has contributed to reduced populations. It occupies a variety of habitat from the irrigated meadows through the dry country in eastern Washington and to some extent in the humid areas west of the mountains. Since it nests in trees or cliff sides, special attention should be paid to nesting sites, especially in western Washington where a small breeding population is known. PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-MBTA.

Buteo swainsoni

13





Golden Eagle
adult plumage

Golden Eagle

GOLDEN EAGLE

This bird is a permanent resident in the cliff country of eastern Washington. It traditionally inhabits terrain within striking distance of open country where food is available. It is normally found from the Canadian border to the Blue Mountains where it is quite common. Its populations in recent years have declined, perhaps due to pollution, civilization, and indiscriminate shooting. With the steady increase of the rabbit population on San Juan Island, an encouraging number of Golden Eagles are now resident on the island.

Aquila chrysaetos canadensis

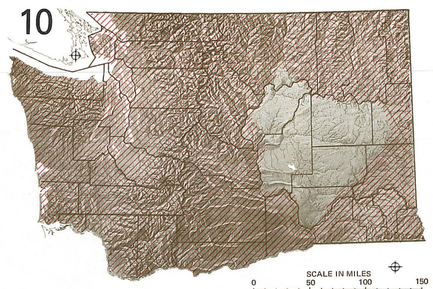
Golden Eagles on San Juan Island are increasing in numbers along with resident Bald Eagles and Red-tailed Hawks. Competitively, these forms seem to have no difficulty in living together. There are also recorded sightings of Golden Eagles on the western foothills and prairie lands of Pierce, Thurston and Lewis Counties. The species appears to be spreading more and more to the western side of the Cascades. PROTECTED-WDG; PROTECTED-MBTA.







10





Cooper's Hawk

Cooper's & Sharp-shinned Hawks

COOPER'S HAWK

This short-winged, long-tailed hawk is about the size of a Crow. The adults have a grayish back with rusty streaking on the breast. It is told from the Sharp-shinned Hawk by its somewhat larger rounded tail and slower wingbeat. Resident throughout the state, both Cooper's and Sharp-shinned Hawks are thought to be decreasing in numbers. Indiscriminate shooting is the probable cause of their decline, since it is only in recent years that they have been protected. Both species are now nearly absent from the Columbia Basin. This hawk prefers broken woodlands, canyons and river groves. PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-MBTA.

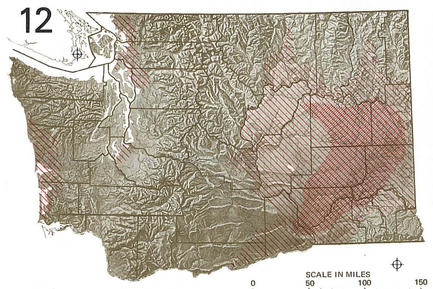
Accipiter cooperii

SHARP-SHINNED HAWK

This small, woodland hawk is physically similar in appearance to the Cooper's Hawk. The tail is long, wings short and rounded, with the coloration also similar to Cooper's. The two species differ in that the Sharp-shinned Hawk is slightly smaller in size and has a squared or slightly notched tail. Like the Cooper's, the Sharp-shinned is thought to be decreasing in Washington. Both species are now nearly absent from the central portion of the state. The Sharp-shinned Hawk's habitat is forests and thickets where it preys on small birds up to pigeon-size. PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-MBTA.

Accipiter striatus

12





Rough-legged Hawk (immature)

Rough-legged Hawk

Ferruginous Hawk

ROUGH-LEGGED HAWK

While this bird does not nest in the state, it can be regarded as a significant part of the avifauna. It is normally found in the open valleys and sagebrush plains of eastern Washington, but has been sighted on the coast during winter from the San Juan Islands to Willapa Bay. It is called "rough-legged" because the legs are feathered from the body down almost to the toes. These featherings are called "pantaloons" in falconer's terminology. This hawk may be seen hovering in the air searching for prey and is the only buteo in the state with this habit. Its critical habitat is cliff breaks, snags and ledges near remote prairie lands in eastern Washington. It is strictly a winter visitor in the eastern part of the state, depending upon the severity of the winters in the northern part of its range. In western Washington it is a regular winter visitor to northern Puget Sound river deltas, although it is sometimes found near dune prairies. PROTECTED-WDG; PROTECTED-MBTA.

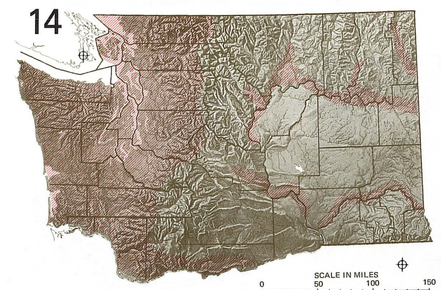
Buteo lagopus sanctijohannis

FERRUGINOUS HAWK

The Ferruginous is the other "rough-legged" hawk found in the state. It is large and broad-winged with white underparts. Its back and pantaloons are a reddish-brown. The hawk is a summer resident in eastern Washington sagebrush lands and numbers appear to be declining in much of its North American range. Its critical habitat is cliffs, ledges and trees adjacent to prairies and farmlands. It is an uncommon breeder in eastern Washington. This species is very vulnerable to disturbance during nesting season. Parents frequently abandon their nests entirely, even with growing nestlings present, if disturbed by humans. Of the buteos, this hawk is the largest and the only one that preys exclusively on small mammals. STATUS UNDETERMINED-FWS; PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-MBTA.

Buteo regalis

14





Bald Eagle
adult plumage

Bald Eagle

BALD EAGLE

The Bald Eagle is easily the most famous member of the hawklike soaring family. Adult birds possess the better known dark brown plumage with white heads and tails. The immature eagles are brown, blotched with white all over having a mottled effect, and are often mistaken for hawks. This northern race of the Bald Eagle is a resident throughout western Washington, especially throughout the San Juan Islands. There is one confirmed nesting pair in eastern Washington although other unconfirmed nestings may occur. Large numbers may be found along rivers and river deltas during the winter months. The upper Skagit River holds the largest wintering concentration, although nearly all the state's river systems attract wintering birds. Washington presently supports a large proportion of the total United States' population wintering below Alaska. Encroachment on their habitat, indiscriminate shooting, and use of hard pesticides have contributed to this species' decline in numbers. Continuation of these conditions and the disturbance of existing nesting sites are the greatest dangers to eagles. The Redbook lists the endangered southern race H. l. leucocephalus which does not enter the state except on very rare occasions. PROTECTED-WDG; PROTECTED-MBTA.

Haliaeetus leucocephalus alascanus

SOME IMPORTANT WILDLIFE OF WASHINGTON

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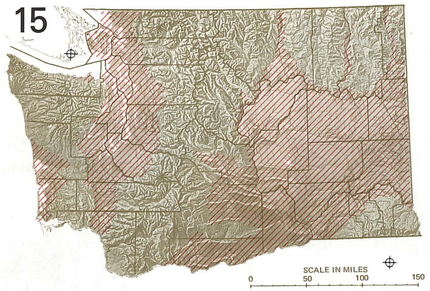




Marsh Hawk
male

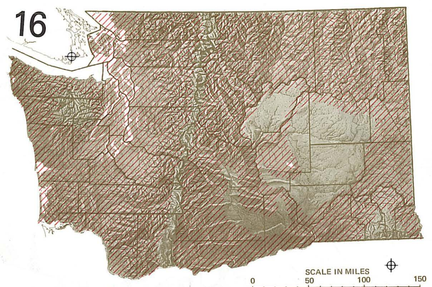
Marsh Hawk

MARSH HAWK

Circus cyaneus hudsonius

This species, also called the Harrier, is well known to many bird students because of its wide distribution and low-level flight habits. It is a medium-sized hawk with long, blunt, black-tipped wings and a long rounded tail. Its white rump is its main identifying mark. The Marsh Hawk is one of the most wide-ranging birds, occuring in both the Old and New Worlds. It is common throughout the state even in high mountains during migration, but prefers broad open fields, marshlands, damp meadows and grasslands, salt marshes and tide flats. Its nests are placed in brush or tall grass bordering more open areas. Mice constitute a large part of its diet. PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-MBTA.

16







Osprey: on nest below in flight above

Osprey

OSPREY

Pandion haliaetus carolinensis

The Osprey is a large white-headed hawk with long pointed wings and a short pointed tail. Called the Fish-hawk, it is a fairly common summer resident in suitable habitat on both sides of the mountains, although its numbers have decreased greatly throughout most of North America. It is found statewide except for those areas without water suitable for fishing. A high concentration of nesting osprey are found along the Pend Oreille River. The removal of nesting snags adjacent to water courses and high concentrations of pesticides probably account for much of the reduction of its populations. STATUS UNDETERMINED-FWS; PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-MBTA.

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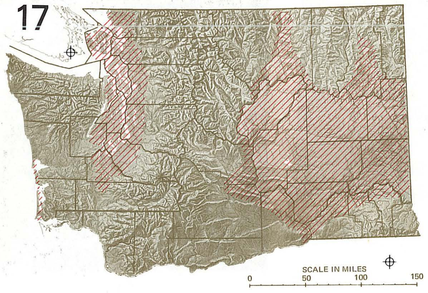




Gyrfalcon

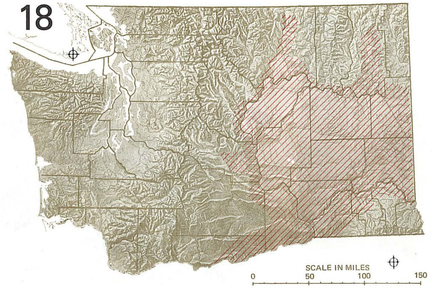
Gyrfalcon

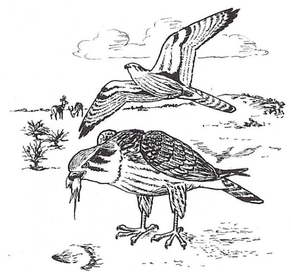
GYRFALCON

Falco rusticolus obsoletus

The Gyrfalcon is the largest and most powerful of the falcon family and is essentially a hawk of subarctic areas. As with many northern species, the Gyrfalcon has more than one color phase: black, gray, or white. This species is one of the more uncommon raptors regularly occuring in the state, ranging throughout the Puget Sound region, the San Juans and the Columbia Basin. A greater concentration of Gyrfalcons winter in the Columbia Basin than in Puget Sound. Peale's Peregrine Falcon and Gyrfalcons frequent the same kind of habitats in western Washington and can sometimes be seen in the same area. PROTECTED-WDG; PROTECTED-MBTA.

18





Prairie Falcon

Prairie Falcon

PRAIRIE FALCON

Falco mexicanus

The Prairie Falcon is a medium-sized raptor with long pointed wings and a long tail. It is generally a pale greyish-brown, lighter on its underparts, and has conspicuous black patches on the wing armpits. It flies with shallow, rapid wingbeats. This falcon is presently confined largely to the eastern side of the Cascades in the Upper Sonoran Life Zone, which comprises its main breeding range, but it is sometimes a winter and fall migrant in Puget Sound and the San Juan Islands. It normally nests along cliff breaks, and the Snake River area holds the largest population of nesting Prairie Falcons. This species may be presently increasing near farmland, but in the western United States, it is not as common as it once was. Due to the fact that it preys largely upon Columbian Ground Squirrels which inhabit dry grassland habitat in eastern Washington, pesticides used in agriculture are not as great a factor in the species' survival as elsewhere in America. Excessive disturbance by man and his works however appears to be contributing significantly to nesting failure. REDBOOK-FWS; PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-MBTA.

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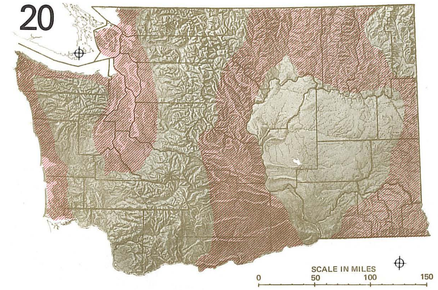
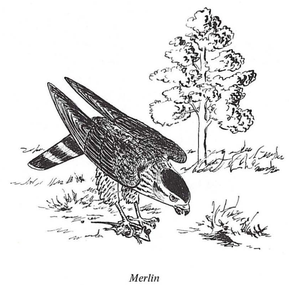




Merlin

Merlin

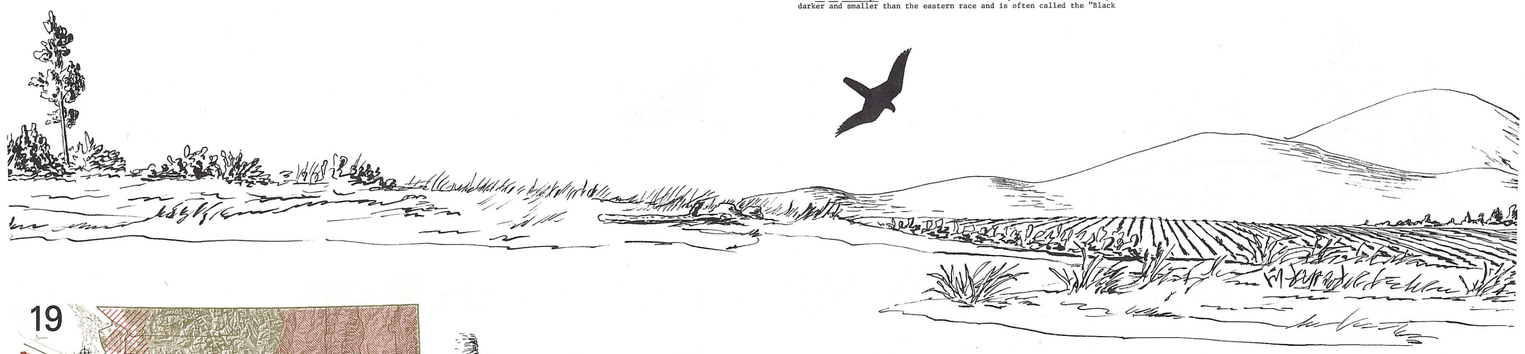
MERLIN

Falco columbarius

This raptor is about the size of a Pigeon, with long pointed wings and a long narrow square-tipped tail. Its back is dark brown, blue-gray or black, depending on the race, the tail heavily barred, and underparts of light brown streaked with dark brown or black.

Two races of Merlin, or Pigeon Hawk as it is often called, exist in Washington, with the Cascades serving as the division between their ranges. Falco columbarius richardsonii is confined to eastern Washington, and F. c. suckleyi inhabits the western vicinity. The western variety is darker and smaller than the eastern race and is often called the "Black Merlin." Both subspecies commonly nest in the Cascade range and forested areas of eastern and western Washington above 2,000 feet.

Merlins are cavity-nesters, but will nest anywhere from the ground to the treetops. They are fairly common in the state, but because the bird is highly secretive they are not commonly seen. Their nests are seldom located because the bird's sphere of influence is so small. (F. c. richardsonii: STATUS UNDETERMINED-FWS); PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-MBTA.



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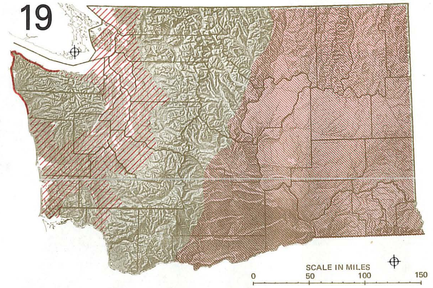



Peregrine Falcon

Peale's Peregrine

American Peregrine

PEALE'S PEREGRINE FALCON

Falco peregrinus pealei

Peale's Peregrine is the coastal race of the endangered Peregrine and may often be found wintering along Washington's shores. The two races are approximately the same size and similar in appearance, although Peale's is darker, being more gray than red. It is one of the last of the world's Peregrine races showing reproductive ability to maintain its numbers. Like the American Peregrine, Peale's also requires preservation of habitat and freedom from chemical pollution. Peale's may be found in the same habitat as the Gyrfalcon when in western Washington, preferring river delta flatlands and uninhabited rocky ocean coastlines during winter. Peale's is the only maritime Peregrine and the largest of the many species found world-wide. PROTECTED-WDG; PROTECTED-MBTA.

AMERICAN PEREGRINE FALCON

Falco peregrinus anatum

This raptor is traditionally considered the noblest of the falcons. The Peregrine is medium-sized with long pointed wings and a long tail. The adult bird is slate-gray above, white and reddish buffy below, with a white throat. The wings, tail feathers and flanks are barred with black and the belly and underparts are extensively spotted with black. The Peregrine flies with rapid shallow wingbeats and has been clocked at speeds above 60 miles per hour in level flight. It kills prey by diving, or "stooping" as it is called by falconers, on victims at speeds of up to 200 miles per hour. The dead bird is usually plucked before eaten. Another name for the Peregrine is "Duck Hawk" but while it will take ducks and can be trained to kill geese it prefers pigeon-sized game.

The American Peregrine is believed to nest in eastern Washington and in the high Cascades, but can be considered rare in the state. No exact figures exist on the number of birds either nationally or statewide. Critical declines in population have apparently been caused by the cumulative effects of chlorinated pesticides. These chemicals harm the reproductive organs and cause production of thin-shelled eggs which are unable to support their own weight. Habitat destruction and over-collection have also contributed to the species' decline. Its critical habitats are ledges and cliffs in open country with adequate food supplies. Recently, a few American Peregrines have been reported wintering in the San Juans where Peale's Peregrine Falcon can be seen commonly wintering. ENDANGERED-FWS; PROTECTED-WDG; RARE-IUCN; PROTECTED-MBTA.

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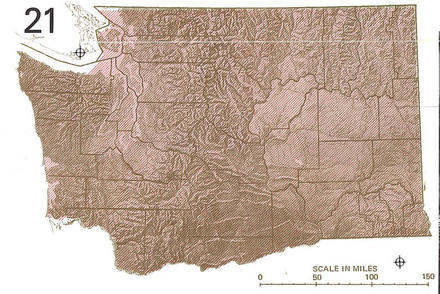
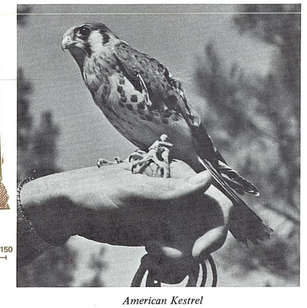




American Kestrel
male

American Kestrel

AMERICAN KESTREL

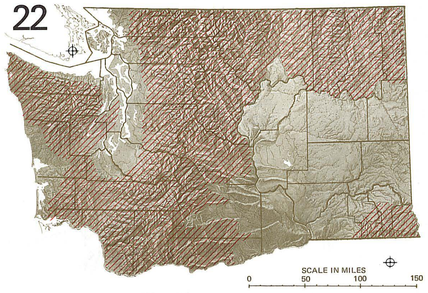
Falco sparverius sparverius

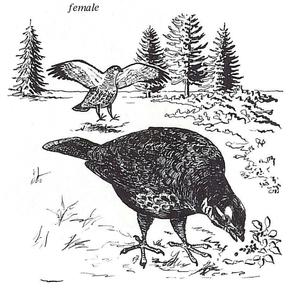
The Kestrel, or Sparrow Hawk, is one of the most widespread of the state's hawks. Perhaps somewhat more abundant in eastern Washington, the species may be found statewide. Its preferred habitat is open fields, prairies and meadows where it can forage for grasshoppers on which it largely feeds. During winter, Kestrel numbers are much reduced although some are permanent residents.

The Kestrel is the smallest of American hawks, with long pointed wings and a long square-tipped tail. Its plumage is quite colorful. The wings are a blue-gray in the male (brown in the female) and the back is red with black bars. The tail is also red and tipped with a black bar. The underparts in both sexes are light, with darkish spots in the male, and buffy streaks in the female. PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-MBTA.

SOME IMPORTANT WILDLIFE OF WASHINGTON

22





female

Blue Grouse
male

Blue Grouse

BLUE GROUSE

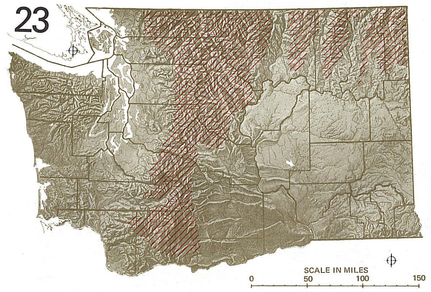
Dendragapus obscurus

The Blue Grouse is nearly all dark gray with slate blue underparts. The sides of the neck and flanks in the male show white and a light gray band borders the tip of the black tail. It lacks the Ruffed's crest. The female is smaller and more mottled in color. Like the Ruffed Grouse, the Blue Grouse occurs in two different color phases depending on which side of the Cascades it is found. Grouse on the eastern side tend to be lighter.

The Blue Grouse is one of five resident grouse species in the state and together with the Ruffed makes up the majority of grouse in Washington.

Its range is nearly as extensive as the Ruffed's, although it tends to be above the other's range. The Blue prefers elevated slopes, migrating to higher elevations in the fall and nesting in the lower elevations during spring and early summer. It is likely to be found in cutover land, barren ridges, dense dry forests and especially in the burns, brush and meadows of the upper Canadian and Hudsonian Life Zones. Of the four subspecies of Blue Grouse in Washington, Richardson's Blue Grouse, D. o. richardsonii, has a status of PERIPHERAL-FNS. This race is resident in northeastern Washington, inhabiting grasslands and low brushy areas. GAMEBIRD-WDG.

23





Spruce Grouse
male

Spruce Grouse

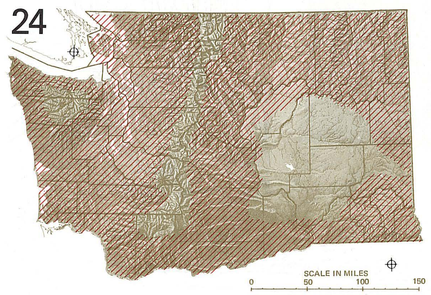
SPRUCE GROUSE

Canachites canadensis franklinii

The Spruce, or Franklin's Grouse, is smaller than the Blue Grouse, but is considerably more colorful. Sometimes called the "Fool Hen," because of its apparent absence of fear of humans, this grouse can often be seen sitting in trees along a trail or on the trail itself. The Spruce Grouse inhabits lodgepole pine, sub-alpine fir and Engelmann spruce regions of the Cascades, Olympics, and mountainous areas of northeastern Washington.

The male Spruce Grouse has brown upper parts heavily barred with black and a tail with white spots at its base. The back sides are strikingly barred with white and an orange patch is visible over the eyes. As with all forest grouse, the female is smaller, more brownish, and has some barring in blackish-brown tones. GAMEBIRD-WDG.

24





Ruffed Grouse
female

Ruffed Grouse

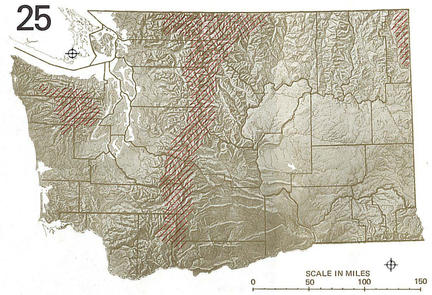
RUFFED GROUSE

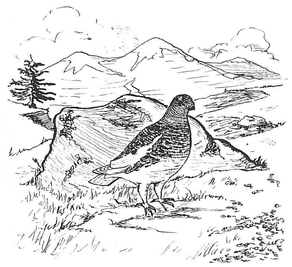
Bonasa umbellus

In western Washington, the race of Ruffed Grouse is reddish-brown in appearance with a black band at the end of the tail. In the eastern Washington race, some brown tones are variously replaced with gray. All the males sport a head crest and black ruff on either side of the neck.

The Ruffed Grouse is one of the most popular and challenging of the upland birds. Known as "Partridge" to New Englanders, it is often called "the native pheasant" by many Washington residents. This grouse prefers lowland regions and may be found in timber along old logging roads, in alder thickets, and along brushy stream-bottoms. Many hunters and hikers are suddenly startled by the loud whir of a departing grouse which seems to spring up at their feet. The Ruffed is smaller than the Blue Grouse and larger than the Spruce. It generally occurs below the ranges of both Blue and Spruce Grouse. GAMEBIRD-WDG.

25





White-tailed Ptarmigan
summer plumage

White-tailed Ptarmigan

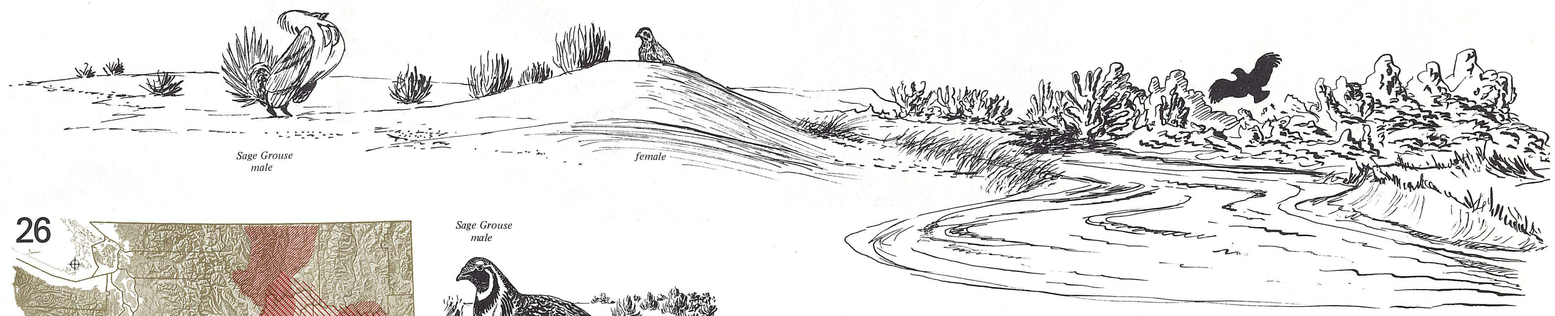
WHITE-TAILED PTARMIGAN

Lagopus leucurus rainierensis

Although classed as a gamebird, the Ptarmigan is not hunted due to its limited numbers and general inaccessibility of its home range. It is a unique species in the state and found only in the high Cascades. Olympics, and the Selkirk Range, particularly around Calispell Peak. Along the northern border of the state, L. l. rainierensis intergrades with the Canadian race L. l. leucurus. The Ptarmigan is about the size of the more familiar Ruffed Grouse. It is one of the handsomest and most approachable bird species found at higher elevations and is often seen by summer hikers.

The Ptarmigan is the only Washington bird to undergo a complete color change annually, enabling it to adapt to changing habitat conditions. In summer both male and female are colored variegated black, white and buff, while in winter they sport a pure white coat. As with all grouse species, the legs and feet are completely feathered.

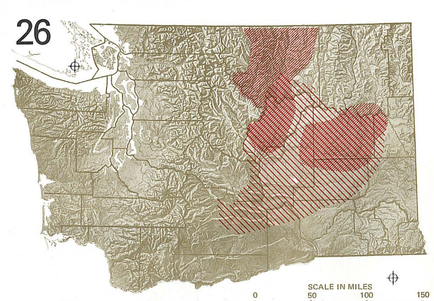
These birds remain at the highest elevations year-round. High mountain meadows and rocky slopes are preferred for foraging and nesting. In winter, Ptarmigan descend to just the upper reaches of timber for protection from winter storms. GAMEBIRD-WDG.



Sage Grouse
male

female

26





Sage Grouse
male

Sharp-tailed Grouse
male

Sharp-tailed Grouse **Sage Grouse**

SHARP-TAILED GROUSE

Pedioecetes phasianellus columbianus

In the years before the Palouse Hills and Columbia Basin were plowed and planted, there were vast areas of bunchgrass prairies and plains. It was home to great numbers of Columbian Sharp-tailed Grouse. Stories relate how it was nothing to fill a wagon in a day's hunting. However, today their numbers are small and these grouse are found primarily in remnant grassland regions of Lincoln, Okanogan and northern Douglas counties. Primarily a prairie bird, Sharp-tails are not found at higher elevations. Cattle grazing poses the greatest threat to this species' habitat at present.

The Sharp-tail is a pale, gray-and-brown grouse, heavily spotted with dark browns and blacks. The pale brown breast is covered with dark V-shaped markings. As its name implies, the short tail is pointed. STATUS UNDETERMINED-FWS; GAMEBIRD-WDG; BLUE-LISTED-NAS.

SAGE GROUSE

Centrocercus urophasianus phaios

The Sage Grouse is the largest of the grouse and ranks second only to wild turkeys in size of Washington's upland birds. It is a flatland bird, co-existent with the sagebrushed, semi-arid regions of the state. With the destruction of so much of its sagebrush habitat, the range of this grouse has been severely reduced. It is now confined largely to Columbia, eastern Kittitas, eastern Yakima, Grant, Douglas and Lincoln Counties. Encroaching agricultural seeds and sagebrush removal projects spell the greatest danger to these impressive gamebirds.

While different species of grouse display variations in mannerisms they are generally noted for the strutting and show-off antics performed during mating season. Male grouse have inflatable air sacks which are prominently displayed on each side of their necks during the courtship ritual. The male Sage Grouse spread their plummage, bow, dance and strut around the waiting females. Traditional strutting grounds are important to the survival of this species and when destroyed, local populations seldom find new areas.

The male Sage Grouse is a speckled grayish-brown with whitish throat and breast. It has long spike-like tail feathers which are black tipped with white. The female is smaller and has a shorter tail. The sex of the grouse can be identified in flight, even from a distance, as the male flies with a rocking motion. The female cruises in level flight. GAMEBIRD-WDG; BLUE-LISTED-NAS.

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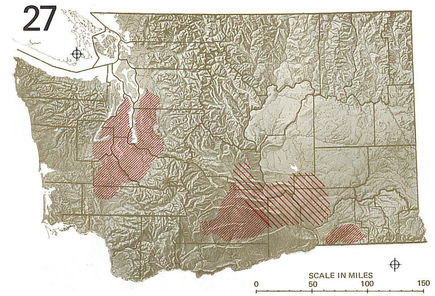




Bobwhite
male

Scaled Quail
male

Bobwhite **Scaled Quail**

BOBWHITE

Colinus virginianus virginianus

The Bobwhite Quail has been repeatedly introduced to Washington for nearly one hundred years. In 1933 these birds were one of the three most important game species in the state. Today, as a result of drastic changes in agricultural practices, the Bobwhite is found wild only in scattered coveys in the lower Yakima valley, southeastern Washington, and in some Puget Sound residential areas.

The Bobwhite is known for its distinctive call. It has a rich brown color mottled with buff, black and white. Males have a white cheek patch and dark black heads, while the females have brown heads and buff cheek patches. GAMEBIRD-WDG.

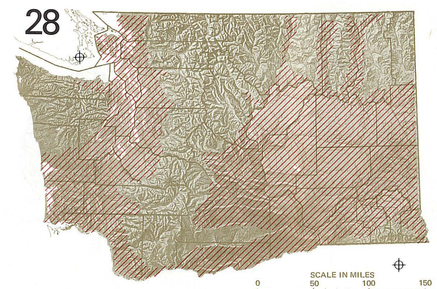
SCALED QUAIL

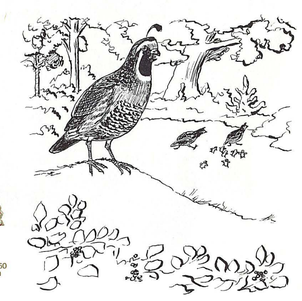
Callipepla squamata pallida

Like the Mountain Quail, this introduced species is also rare in Washington due to lack of appropriate habitat. Nicknamed "Cottontop," it prefers the driest parts of eastern Washington and small highly scattered flocks exist in the Hanford area, extreme eastern portions of the Yakima Firing Range and the Potholes country of Grant County.

In keeping with its name, the Scaled Quail gives the appearance of heavy scaling or barring on the sides, underparts, neck and upper back. It sports a white crest rather than a topknot, hence its nickname. GAMEBIRD-WDG.

28





California Quail
male

California Quail

CALIFORNIA QUAIL

Lophortyx californicus

California, or Valley Quail, are found throughout agricultural, semi-agricultural and residential areas on both sides of the Cascades and are the most abundant quail species in Washington. The Yakima Valley, Okanogan Valley and farming country of the Snake River and its drainages contain most of the State's quail population. Introductions of this species into Washington evidently included more than one race, and present populations are regarded as mixed stock.

Long a favorite of many upland bird hunters, the California Quail is a striking bird. The male is blue-gray and brown with a wide necklace of black and white spots. The males' most distinctive feature is the long forward-curving topknot which is made up of several feathers. The female has more brown tones and a smaller straighter topknot. GAMEBIRD-WDG.

SOME IMPORTANT WILDLIFE OF WASHINGTON

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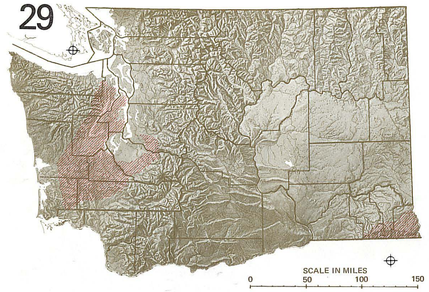



Mountain Quail
male

Mountain Quail

MOUNTAIN QUAIL

Oreortyx pictus

The Mountain Quail is the largest member of the quail family. In Washington it is found in the logged-off areas of Kitsap, Thurston and Pierce Counties on the westside, and in the river drainages of southeast Washington. It is fairly rare due to scarcity of appropriate habitat.

The Mountain Quail can easily be distinguished by the long backward-pointing plume on its head and the vertical barring on its sides, similar to Chukar. The two sexes are nearly identical in appearance. Coveys seldom number more than a dozen. The race in western Washington is O. p. palmeri, the eastern race is O. p. pictus. GAMEBIRD-WDG.

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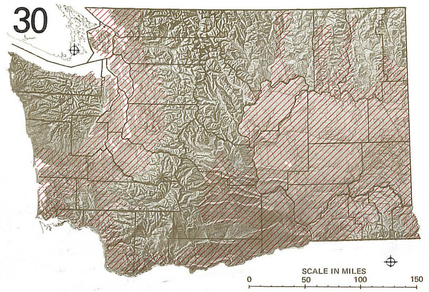



Ring-necked Pheasant

Ring-necked Pheasant

RING-NECKED PHEASANT

Phasianus colchicus

The Ring-necked, or Chinese Pheasant, is the best known and most popular of Washington's upland gamebirds. The male is easily recognized by its white collar, greenish-blue head and long sweeping tail. The female is smaller and brown, with a shorter, pointed tail.

It is now common throughout much of the state, having been introduced over a hundred years ago. It prefers open fields, bushy areas, tall grass swales, thickets, marshes and open woods in western Washington. It is most numerous in the Columbia Basin in eastern Washington. The present methods of "efficient" farming, which eliminate weedy-farmland interfaces and fencerows, have adversely affected pheasant populations. GAMEBIRD-WDG.

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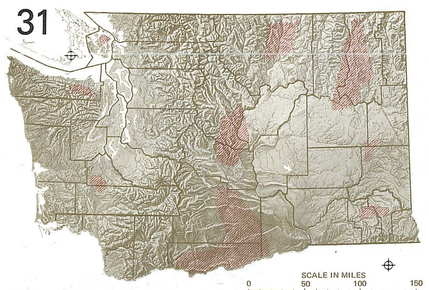

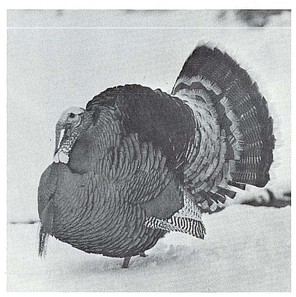

Merriam's Turkey

Merriam's Turkey

MERRIAM'S TURKEY

Meleagris gallopavo merriami

This wild species is distinguished from the domestic species by a lighter build, less weight, longer neck and legs, smaller and flatter head, and jet-black body feathers in the male. There were many attempts to introduce wild turkeys to the state before 1960, mostly with the eastern race. All these attempts were apparently without success. The Merriam's subspecies was introduced to Washington from Arizona and New Mexico in the 1960's and its populations are now considered to be stable in 2 to 3 eastern Washington counties, but very limited in many other counties. The Merriam's subspecies differs from the eastern variety by having white to cream-colored tips on tail and rump feathers and by an ability to exist on a wider range of food. The turkey is a highly intelligent and wary creature and was once nominated by Ben Franklin as our national bird. It is a popular and challenging gamebird which can survive and apparently even increase in proximity with humans. Its critical habitat must contain adequate feeding areas of grain, mast and pine or fir seeds. GAMEBIRD-WDG.

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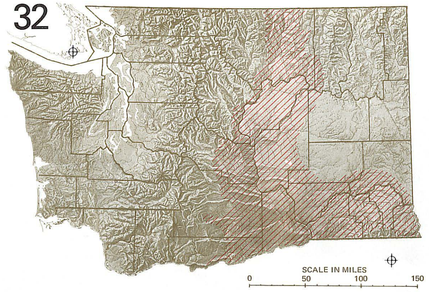



Chukar

Chukar

CHUKAR

Alectoris chukar

Related to the Rock Partridge, (A. graeca), native to Asia, Egypt and southern Europe, the Chukar found in Washington is a result of reproduction from pairs received from California in the early 1930's. Today the Chukar is a highly prized gamebird, being found principally along the Columbia, Okanogan, Snake, Yakima, Palouse and Grande Ronde River breaks. The species prefers steep rugged habitats and broken terrain in more or less arid locations.

The Chukar is easy to identify and both sexes have a similar appearance. Crow-sized or slightly smaller, the body is slate gray. The bird sports a black line through the eye and down the neck, bordering a black V-shaped vest outlined in white. It has a dull red bill and legs, and its flanks are barred with about a dozen black stripes. GAMEBIRD-WDG.

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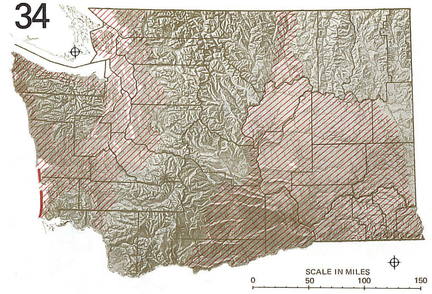
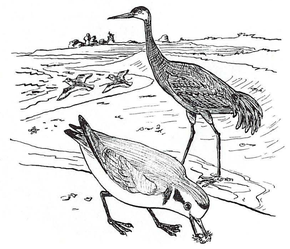


Sandhill Crane



Snowy Plover

Sandhill Crane **Snowy Plover**

SANDHILL CRANE

Grus canadensis

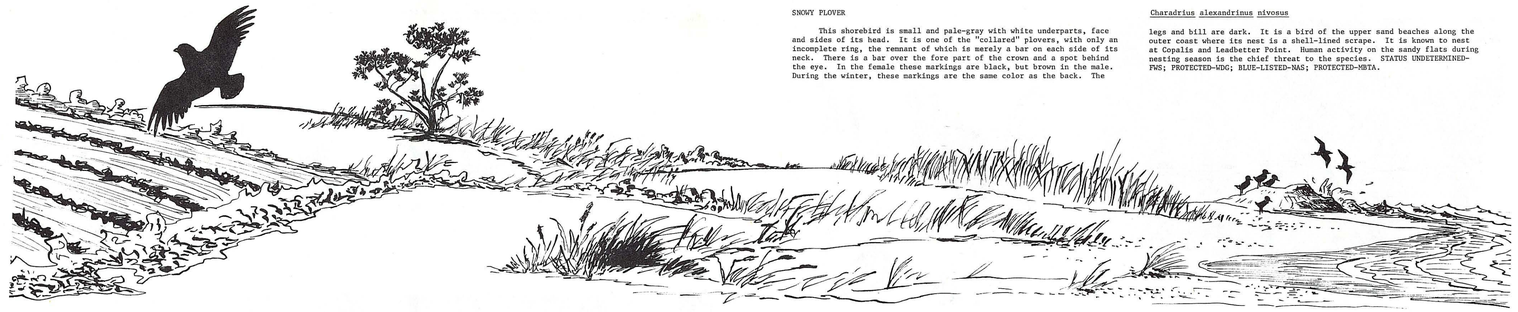
A large gray heron-like bird with a bald red forehead, the Sandhill Crane flies with its head and neck out-stretched, in contrast with the Great Blue Heron which flies with its neck folded back. Being large and slow-flying, the Sandhill presents an easy target for indiscriminate shooting. It is a shy bird and does not permit close approach in the open habitat it prefers. It forages over grasslands and farmlands and along shorelines, marshes and shallow edges of freshwater lakes, ponds and rivers. Its range extends throughout the state's lowland areas, although it is not common except along its main migration route through the Potholes, Grand Coulee and adjacent lands of eastern Washington. A few nests have been recorded in Yakima County. In western Washington the Sandhill Crane is very sparse, but widespread.

The predominant race in Washington is believed to be the Lesser Sandhill Crane, G. c. canadensis. Lesser Sandhills are a common over-head migrant, but do not commonly stop off in western Washington. The much rarer Greater Sandhill Crane, G. c. tabida is thought to also enter Washington but generally confines itself to a more southerly range. PROTECTED-WDG; PROTECTED-MBTA.

SNOWY PLOVER

Charadrius alexandrinus nivosus

This shorebird is small and pale-gray with white underparts, face and sides of its head. It is one of the "collared" plovers, with only an incomplete ring, the remnant of which is merely a bar on each side of its neck. There is a bar over the fore part of the crown and a spot behind the eye. In the female these markings are black, but brown in the male. During the winter, these markings are the same color as the back. The legs and bill are dark. It is a bird of the upper sand beaches along the outer coast where its nest is a shell-lined scrape. It is known to nest at Copalis and Leadbetter Point. Human activity on the sandy flats during nesting season is the chief threat to the species. STATUS UNDETERMINED-FWS; PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-MBTA.



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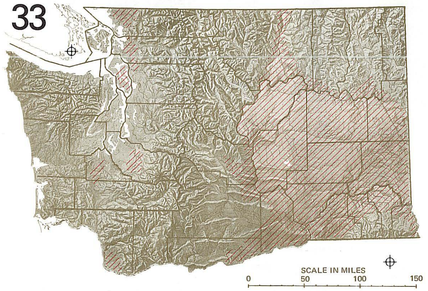

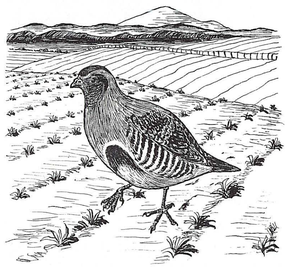

Gray Partridge

Gray Partridge

GRAY PARTRIDGE

Perdix perdix perdix

The Gray Partridge, known to hunters as the Hungarian Partridge, is another introduced bird. At one time, when western Skagit and Whatcom Counties and southern Thurston County contained predominantly small, grain-raising farms, they supported very large populations of "huns." Changes in agricultural methods have subsequently reduced the Hun's available habitat. Today it can be found in western Washington only in areas of prairie grasslands where flocks are small and scattered. These are essentially confined to Skagit, Island, Thurston, Pierce and upper Snohomish counties. In eastern Washington large populations still exist, especially along grassy benches bordering wheat fields in Whitman, Garfield, Columbia, and Asotin counties.

The Gray Partridge is a plump gray-and-tan bird with a reddish-brown tail; the underparts are gray, and the male sports a black horse-shoe on the abdominal region. The female has slightly duller tones. GAMEBIRD-WDG.

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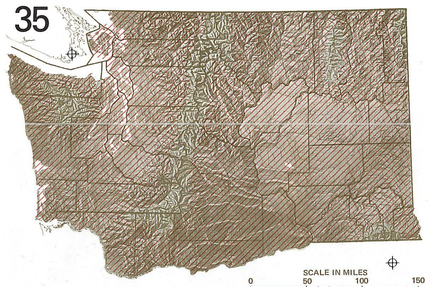



Common Snipe

Common Snipe

COMMON SNIPE

Capella gallinago delicata

Sometimes called "Jacksnipe" or "Wilson's Snipe," this species is a familiar sight throughout Washington's wet lowlands. This long-billed, brown-striped bird has a red tail and is about the size of a quail. Snipe are commonly heard in the spring in these wetlands when their mating songs fill the evenings. This sound is produced by air rushing through its tail feathers as the bird flies. It is found in a variety of places, but all are generally low with plenty of moisture and soft moist earth for the Snipe to probe in for food with its long bill. It may also be found in salt marshes and flats, and occasionally in sub-alpine meadows. Although usually considered an upland species, Snipe are migratory. GAMEBIRD-WDG; PROTECTED-MBTA.

SOME IMPORTANT WILDLIFE OF WASHINGTON

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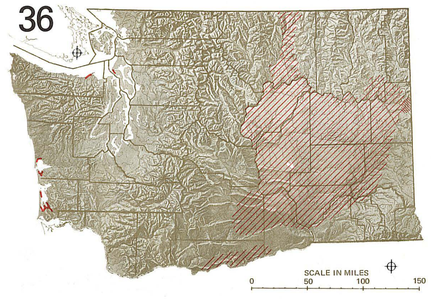
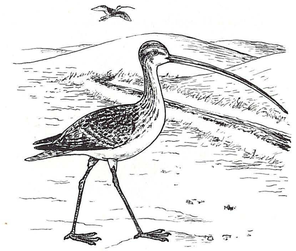


Red Knot & Sharp-tailed Sandpiper

Long-billed Curlew

Upland Sandpiper



Long-billed Curlew

LONG-BILLED CURLEW

This is the largest of Washington's shorebirds and the species with the longest bill. It breeds on grassy slopes, sagebrush flats, and below timbered areas. The species also prefers coastal regions with available water areas or marshes. A few years ago this bird was a common nester in the dry coulee areas of eastern Washington. It is

Numenius americanus parvus

an uncommon migrant and summer resident in eastern Washington, being rarely seen in the west. This very large brown shorebird has an unstriped head and a long downward-curving bill more than four inches long. The body is cinnamon brown speckled with black. STATUS UNDETERMINED-FWS; PROTECTED-WDG; PROTECTED-MBTA.

RED KNOT

The Knot is one of Washington's more colorful shorebirds. It is medium-sized and chunky with a rather short beak, and has greenish legs. In the spring it has a pale red breast and mottled gray and black back. In the fall this red breast turns white, with a light gray upperpart and whitish rump. It is found mostly on sandy beaches and mud flats, and occasionally on isolated rocks covered by seaweed. It is most often

Calidris canutus

seen in Washington at Willapa Bay and Grays Harbor in the spring and fall. It has been seen on mud flats in the northern Puget Sound region. Its flocks are seldom recorded in other western states. The species nests farther north than do most other shorebirds, and it migrates to the southern hemisphere in winter. PROTECTED-WDG; PROTECTED-MBTA.

SHARP-TAILED SANDPIPER

This Asiatic species is found in small numbers along the Pacific coast. In Washington, it is almost exclusively restricted to the salicornia salt marsh at Leadbetter Point in Pacific County. Occasionally it is seen around Grays Harbor and has been noted in the north Puget Sound region. Preservation of salt marsh habitat is vitally important to this species.

Calidris acuminata

This is a slender, brownish sandpiper. Its back is rusty and streaked with black. The back and breast are washed with buff and the belly is whitish. PROTECTED-WDG; PROTECTED-MBTA.

UPLAND SANDPIPER

Many years ago this species was called the Bartramian Sandpiper, after an early botanist and naturalist. As the new name indicates, these birds can be found on grassy uplands. A medium-sized shorebird, it has a short straight bill about as long as its head. The upper parts are heavily mottled and the underparts are whitish with dark-brown mottling on the lower throat and dark V's on the breast. The tail is long for a sandpiper and the species presents a short-legged, round-headed, long-necked appearance. A buffy splash appears on the wings and sides of the

Bartramia americana

tail. This bird is a rare summer resident in Washington. It is known to nest around Cheney and near Newman Lake in Spokane County. Its numbers are largely confined to eastern Washington, and it is only very rarely seen in western Washington. Its critical habitat is its nesting sites in grassy swales around the city of Spokane. In 1973 the American Ornithologists' Union reclassified the Upland Plover, Bartramia longicauda, as Upland Sandpiper. PROTECTED-WDG; PROTECTED-MBTA.



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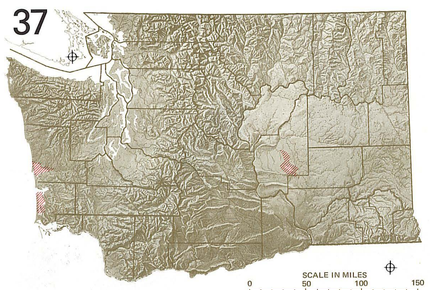
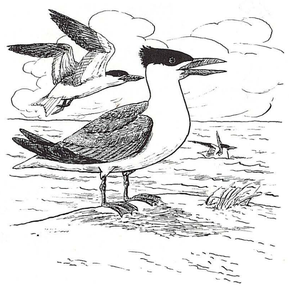


Caspian Tern



Caspian Tern breeding plumage

CASPIAN TERN

This species is the largest of North American terns, and is widely distributed around the world. The Caspian Tern entered the Washington inventory in the late 1920's when a nesting colony appeared at Moses Lake in eastern Washington. There was also a small nesting colony established near Pasco and another in the Potholes Reservoir. With increased air traffic at Moses Lake Air Base, the birds apparently moved to a more favorable location. An early colony on an island in Grays Harbor numbered about 20 pairs, which has built up to about a thousand pairs at present. The colony is flourishing and recovered birds show members' origins to be in southern California. While the tern is in no danger of extinction, it

Hydroprogne caspia

is a significant member of the state's avifauna. Disturbance or destruction of the present limited nesting sites could easily remove it from the state. It nests on open sand near water. Following nesting, this tern may be found in many parts of western Washington.

The Caspian Tern is a gull-sized bird with a black cap, grayish upperparts and white underparts. The forehead is black streaked with white during winter, the bill large and red. The under surface of the wing tips show much black, and its tail is slightly forked. PROTECTED-WDG; PROTECTED-MBTA.

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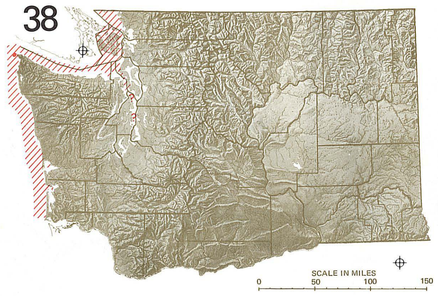
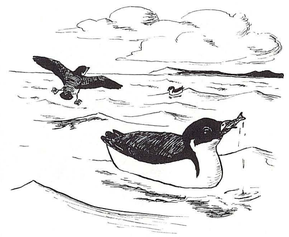


Ancient Murrelet



Ancient Murrelet winter plumage

ANCIENT MURRELET

A few of these pelagic birds have been seen wintering on the interior waters of Puget Sound and Hood Canal. Their nesting status in the state is unknown, but it is generally considered to be a rare breeder in the northeastern portion of the Olympic Peninsula (dot on map). It is an uncommon winter resident in northern Puget Sound and littoral waters along the coast. Its upper parts are a dark gray in

Synthliboramphus antiquus

summer with a white streak above the eye set off from the white underparts. The bird derives its name "Ancient" from the white streaks on the nape of the summer plumage. In winter the white streaks are absent, the upper parts becoming a medium gray contrasting with a black cap. PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-MBTA.

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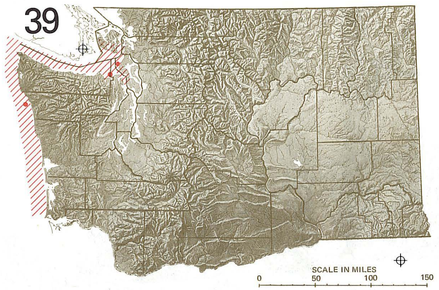
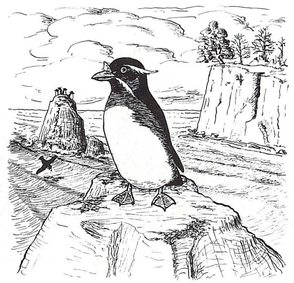


Rhinoceros Auklet



Rhinoceros Auklet breeding plumage

RHINOCEROS AUKLET

This auklet is chunky and about 14 inches in length. In the winter it has a dark head, neck and upperparts, with the remainder a dirty white. In the summer, it adds to this lackluster plumage with breeding plumage of white mustaches and eye plumes and a rhinoceros-like projection on its yellowish bill. This bird nests in large colonies in underground burrows which require special soil, slope and drainage conditions. Washington is one of the southernmost areas of their breeding range (dots on map), and

Cerorhinca monocerata

only two significant nesting colonies are known in the State: Destruction Island off the Washington coast and Protection Island off Discovery Bay. However, other smaller colonies have recently been found. Approximately 10,000 pairs (1972 records) are threatened by real estate development on Protection Island. Some of their habitat has been destroyed already. Destruction of this colony may eliminate the species from the inside waters of the State and from parts of British Columbia; it is occasionally found on other offshore islands, including Tatoosh. PROTECTED-WDG; PROTECTED-MBTA.

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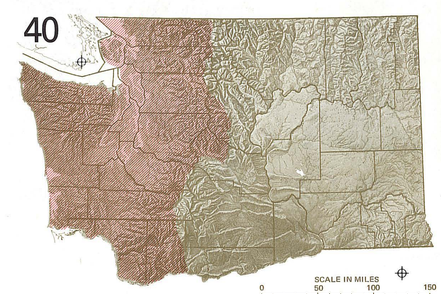

Band-tailed Pigeon



Band-tailed Pigeon

BAND-TAILED PIGEON

The Band-tailed Pigeon is another popular resident and migratory gamebird. The Bandtail is found largely in western Washington in wooded areas, either coniferous or hardwood. A few birds may also be found on the eastern slopes of the Cascades around Cle Elum.

It is about the size of a Crow, larger than the Dove and more grayish. The bird takes its name from the pale, broad blackish band across the end of its fan-like tail. The Bandtail also has a white crescent on the back of the neck and yellow feet and bill. Domestic pigeons have red feet.

Columba fasciata monilis

Bandtails usually arrive in western Washington in March or April and begin nesting soon after. Like Doves, their nests are built in trees, with one or two eggs laid. Hatching occurs anytime from May to July and like the Dove there are indications that more than one brood is produced per season.

Migrating Bandtails are associated with mineral spring water, the autumn migration starting in August and September. These birds winter mainly in Oregon and California, although some remain in southern Puget Sound and southwestern Washington. GAMEBIRD-WDG; PROTECTED-MBTA.

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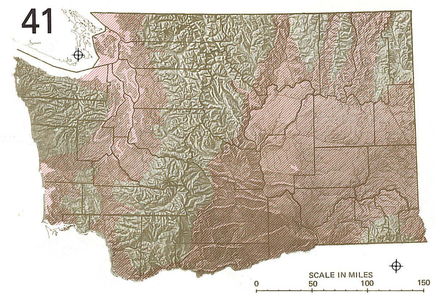
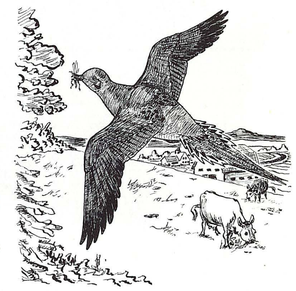


Mourning Dove



Mourning Dove

MOURNING DOVE

This popular resident and migratory gamebird is found statewide, but is especially plentiful in the Okanogan and Yakima Valleys. Although the dove is primarily a migrant, rearing its young (sometimes up to four broods per season of two each) and leaving Washington by the middle of September, a wintering population can be found in the Yakima Valley and along the lower elevations of the Snake River and its tributaries.

Zenaida macroura marginella

Doves are most common in farmland areas with grainfields and orchards, but because of their flying ability they could be found anywhere in the state, except in the high mountains. They are built for speed and range and are streamlined in shape with long pointed wings and a long tail. About the size of a Robin, its brownish blue-gray color seems iridescent - taking on beautiful pastel tones in the sunlight. Both sexes are similar in appearance. GAMEBIRD-WDG; PROTECTED-MBTA.



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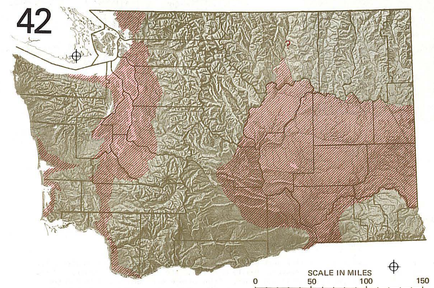
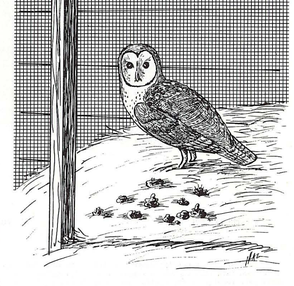


Barn Owl



Barn Owl

BARN OWL

This medium-sized, long-legged earless owl with its heart-shaped, monkeyish face and white underparts is a common "ghost" of old barns, church steeples or abandoned buildings. Many people have had their wits scared out of them when the pale silent form sails over them near such spooky structures, only to learn later it was just an old owl foraging.

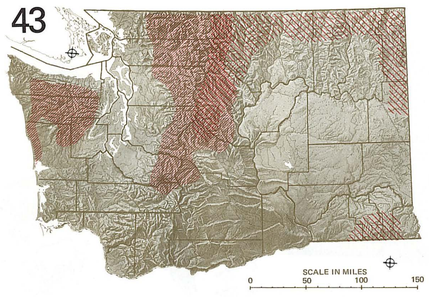
This species is fairly common mostly in western Washington within its specialized habitat. The Barn Owl requires fields or meadows for foraging, dense cover for daytime roosting and old buildings for nesting. It seems to prefer farming areas in the lower river valleys of the Humid

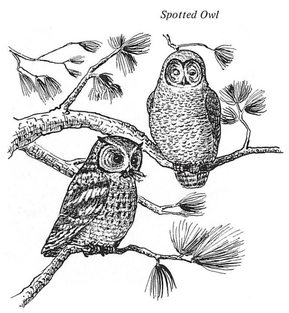
Tyto alba pratincola

Transition Life Zone, although it is not uncommon around buildings in cities.

Its eastern Washington range is uncertain at present. The species has apparently expanded its range over the last few decades, likely due to the extensive changes in habitat brought about by irrigation and agriculture. Their populations are strong in this state, although the species seems on the decline in other states. PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-MBTA.

SOME IMPORTANT WILDLIFE OF WASHINGTON





Spotted Owl

Flammulated Owl

Spotted Owl **Flammulated Owl**

FLAMMULATED OWL

Only a little is known about this tiny light-gray owl. Delination of its range is speculative, although records show very limited numbers in the Spokane and Blue Mountain areas. It is smaller than a Screech Owl, averaging about 6-7 inches, with dark eyes and heavily mottled plumage. Its ear tufts are inconspicuous. This owl feeds on insects and

Otus flammeolus flammeolus

seldom ventures from its dense cover. Open yellow pine and Douglas-fir forests in the mountains of eastern Washington make up this species' critical habitat. It is a summer resident, nesting in old woodpecker holes. PROTECTED-WDG; PROTECTED-MBTA.

SPOTTED OWL

The Spotted Owl is a medium-sized woods owl, about 18 inches high (between Barn and Great Horned Owl in size), dark brown with light spots, round-headed (no "horns") with dark eyes. It has been known for decades that the species resides in Washington, but they are seldom reported and practically unknown. Today the species would have to be classified as rare, and even threatened in parts of its range. This state of affairs is critical because recent studies in Oregon show these sedentary birds have environmental requirements difficult to find now. Some of the habitat features found in nesting territories of western Oregon Spotted Owls (studied by Oregon State University and the U.S. Forest Service) include climax coniferous forest stands with dense canopy and understory, nest sites in a cavity atop a 4-to-7 foot diameter Douglas-fir with lightning-struck top, perhaps 100 feet or more above ground level. Nest sites are on or near a slope near water. Birds are year-round residents in a rather small territory, feeding primarily on flying squirrels and tree mice. The latter are absent from Washington. Preliminary information indicates each nesting pair may occupy and require 300 to 600 acres of old-growth timber.

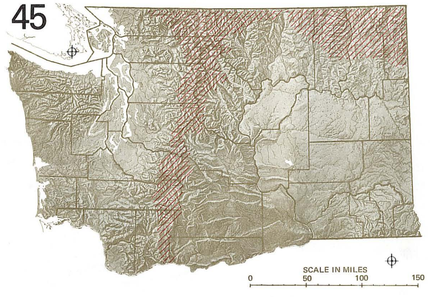
These owls no longer reside where Kirkland now stands, where early naturalists collected them. Forestry practices have pushed the birds into limited areas - the uncut forests in National Parks and in isolated stands unfeasible economically for logging. Small populations were known

Strix occidentalis caurina

to exist in the Wenatchee-Leavenworth-Cle Elum areas and around Blewett Pass in eastern Washington, as well as the heavily wooded areas of the Humid Transition Life Zone in the northwestern part of the state. The range delineation mapped here is mainly speculative, and perhaps over-ambitious due to lack of current data.

Information is wanted on this species, and if hiking in suitable country, persons are requested to keep an eye and an ear out for Spotted Owls. They have a varied vocabulary with the phrase "how, how-how, how" frequently used. They call chiefly in early evening or at dusk but will answer an imitation of even just passable quality. During warm weather the owls may be found roosting in vine maples alongside trails or streams where it is cooler than up on the slopes.

Recent sightings over the last decade or so are reported from the Olympic Peninsula, Mount Baker and Ross Lake areas. No nest has yet been reported in Washington. Please report any finds to Phil Mattocks, 10109 NE 24th, Bellevue, 98004 (455-2154) or to Terry Wahl, 3041 Eldridge, Bellingham, 98225 (733-8255). Records will be forwarded to the Washington State Game Department so landowners and agencies can be informed and formal protection measures established. REDBOOK-FWS; PROTECTED-WDG; PROTECTED-MBTA.





Great Gray Owl

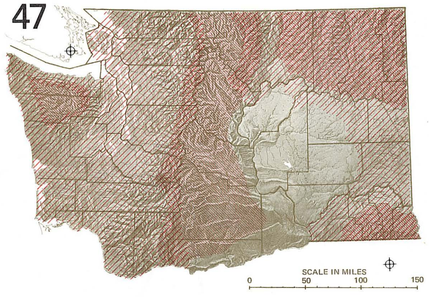
Great Gray Owl

GREAT GRAY OWL

This is a large, earless, yellow-eyed owl with heavily striped and mottled plumage. It is distinguished by prominent gray concentric circles around the eyes and a long tail. It is rare in Washington, mainly confined to the dense forests of the Canadian and Humid Transistion Life Zones. Common only in the far north, it is however thought to be a resi-

Strix nebulosa nebulosa

dent in Washington. The species is known to nest in Yosemite National Park, south central Oregon, and mid-northern British Columbia. No nesting records exist for Washington. Old winter records exist from the Westport-Willapa Bay area. PROTECTED-WDG; PROTECTED-MBTA.





Western Bluebird

Western Bluebird **Mountain Bluebird**

WESTERN BLUEBIRD

This bluebird is found over the entire state except for high mountain areas and the dry sagebrush country of eastern Washington. These are small birds, the size of sparrows, with much blue plumage. The Western Bluebird has been depleted across North America due in part to a reduction in its nesting sites. They are cavity nesters and with the cleaning up of old or partially rotted trees, combined with loss of much

Sialia mexicana occidentalis

of its natural habitat in Washington, they are being forced to compete with Starlings for limited nesting holes. They will accept nest boxes. The environmental requirements of this species are strict, which partially accounts for its relative scarcity in this state. PROTECTED-WDG; PROTECTED-MBTA.

MOUNTAIN BLUEBIRD

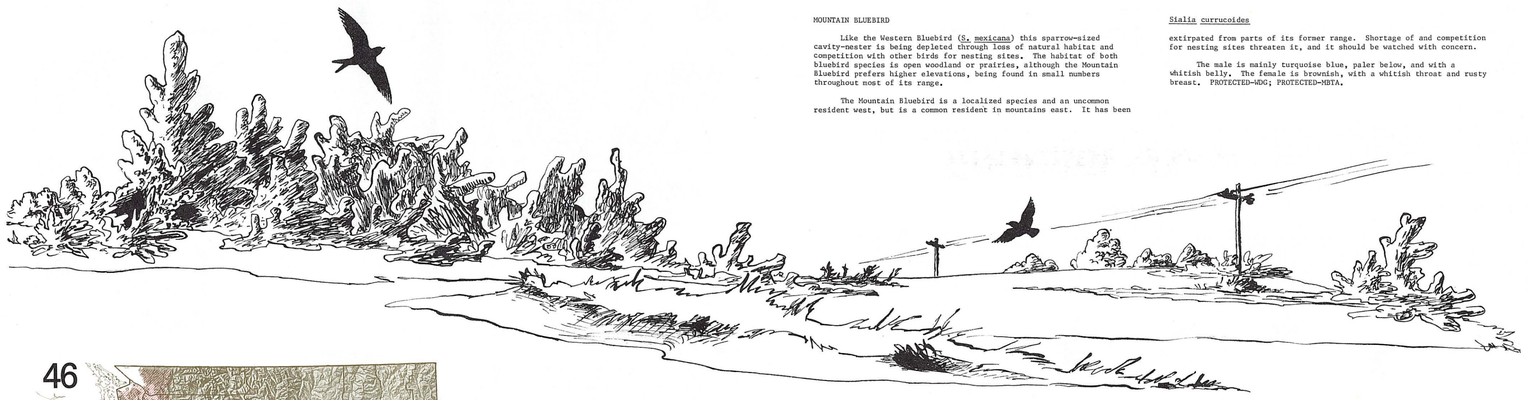
Like the Western Bluebird (S. mexicana) this sparrow-sized cavity-nester is being depleted through loss of natural habitat and competition with other birds for nesting sites. The habitat of both bluebird species is open woodland or prairies, although the Mountain Bluebird prefers higher elevations, being found in small numbers throughout most of its range.

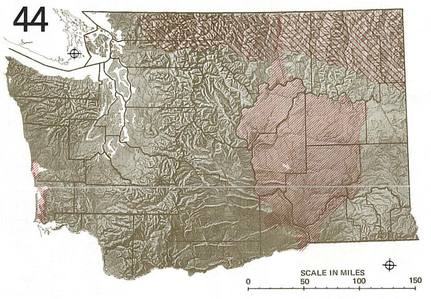
The Mountain Bluebird is a localized species and an uncommon resident west, but is a common resident in mountains east. It has been

Sialia currucoides

extirpated from parts of its former range. Shortage of and competition for nesting sites threaten it, and it should be watched with concern.

The male is mainly turquoise blue, paler below, and with a whitish belly. The female is brownish, with a whitish throat and rusty breast. PROTECTED-WDG; PROTECTED-MBTA.







Hawk Owl

Burrowing Owl

Hawk Owl **Burrowing Owl**

HAWK OWL

This species generally ranges farther north than Washington and comes down into this region in winter in very few numbers. It is apparently more regular in its visits east of the Cascades, but even so it remains fairly confined to timbered areas along the Canadian border. A medium-sized long-tailed owl, it looks like a brown falcon with grayish streaks over the eyes and along the sides of the back. It sits rather inclined, without some of the erectness of most owls. Its upperparts are blackish, spotted with white. The underparts are whitish and barred

Surnia ulula caparoch

with brown with a dark band across the breast. Its face is grayish-white with black sideburns. Unlike most owls, the Hawk Owl is diurnal, and its flight is straight and rapid, flying seldom more than a few feet above the brush tops. The bird is usually seen in open broken woodlands such as burns or logged patches. Most Washington records of the species come from the Sullivan Lake region of Pend Oreille County. PROTECTED-WDG; PROTECTED-MBTA.

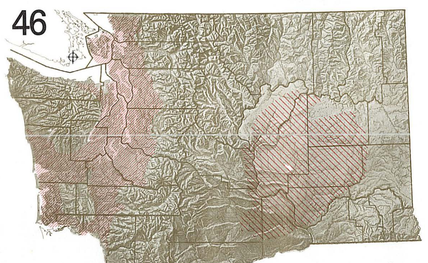
BURROWING OWL

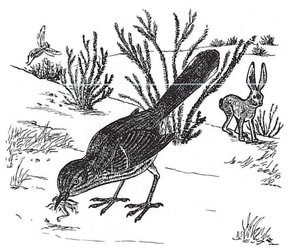
The Burrowing Owl population is declining in its normal dry range in eastern Washington due to the "reclamation" of many sagebrush areas. Populations still exist on the Yakima Indian Reservation near White Swan, Brewster, and south of Creston. Burrowing Owls have recently been noted in eastern Klickitat County. For many years there has been a small population living in a localized area along the ocean coast. The bird is occasionally seen along outer shore reaches of the Strait of Juan de Fuca and small populations are also known to exist on several islands in Grays Harbor and along the dune areas of Willapa Bay. This coastal form is probably a separate race, but cannot be legitimately described as such until its nesting status is determined. The Grays Harbor population is

Speotyto cunicularia hypugaea

endangered by dredged material disposal and airport development in the near vicinity. Since this small group may prove to be a separate race, efforts should be made to protect it.

The Burrowing Owl is small, long-legged, round-headed and earless. The upperparts are brownish-tan, heavily dotted with white and having white underparts spotted and barred with brown. There is a white line over the eye and its tail is short. Its critical habitat in the east is sagebrush lands and in the west, coastal dunes. STATUS UNDETERMINED-FWS; BLUE-LISTED-NAS; PROTECTED-WDG; PROTECTED-MBTA.





Sage Thrasher

Purple Martin **Sage Thrasher**

PURPLE MARTIN

The Purple Martin is the largest of Washington's swallows. The male is entirely blue-black; the female is similar, but more grayish-brown above and white below. Formerly it was very common throughout western Washington. Its status today is of some concern since its numbers are declining due to habitat destruction and competition for nesting

Progne subis subis

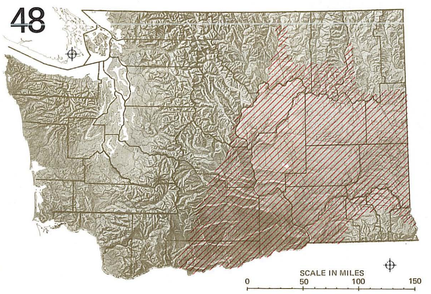
sites with Starlings. The Martin still occurs in Washington widely in migration, but is only a sporadic nester. Here, its critical habitat for nesting sites include tree cavities, stumps or similar structures. PROTECTED-WDG; PROTECTED-MBTA.

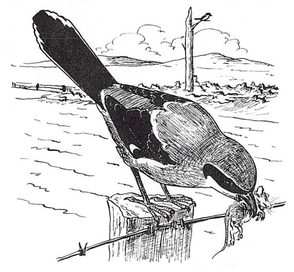
SAGE THRASHER

This species is a common summer resident in the sagebrush region of eastern Washington. About the size and shape of a Robin, it is gray-ish-brown with a white line over the eye and narrow dark streaks on its buffy face. The throat is white and the underparts are more buffy and streaked with brown. Its eyes are a pale yellow. It is primarily a

Oreoscoptes montanus

ground-forager and prefers dry well-covered slopes, but may often be found along brushy streams. It builds a twiggy nest in heavy brush, laying blue, spotted eggs. Its numbers have been reduced because of elimination of its sagebrush habitat. PROTECTED-WDG; PROTECTED-MBTA.





Loggerhead Shrike

Loggerhead Shrike

LOGGERHEAD SHRIKE

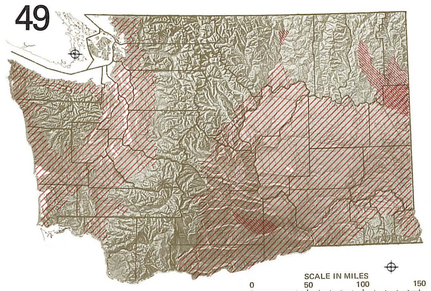
This big-headed, slim-tailed bird is slightly smaller than a Robin. In color it is gray above and white below. The Loggerhead inhabits open sagebrush areas and cultivated fields in eastern Washington utilizing scattered lookout perches to watch for the large insects, small mammals

Lanius ludovicianus gambeli

and birds on which it preys. Densely-folaged trees and shrubs are required for nesting sites. The Loggerhead is primarily a summer resident east, and occasional resident in winter both east and west of the Cascades. PROTECTED-WDG; BLUE-LISTED-NAS; PROTECTED-MBTA.

SOME IMPORTANT WILDLIFE OF WASHINGTON

49





Western Meadowlark

Bobolink

Western Meadowlark

BOBOLINK

This interesting bird is present in very small numbers during the summer in eastern Washington. It prefers low-lying open meadows with considerable acreage, such as the Cusick Prairie in Pend Oreille County, and the prairies south of Oroville in Okanogan County. Farmed areas in the Yakima Valley are also a favorite range. Fields of hay, alfalfa or wild grass are ideal for this species.

Dolichonyx oryzivorus

The male is black-and-white, the nape is yellow, and underparts entirely black. The female is buffy colored and streaked with black except underneath. The female also has black stripes on the crown. PROTECTED-WDG; PROTECTED-WBTA.

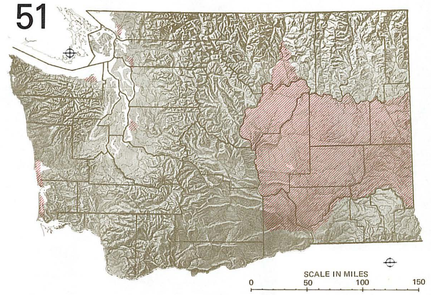
WESTERN MEADOWLARK

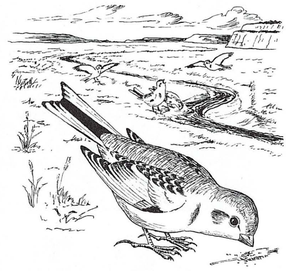
The Meadowlark is one of Washington's best known species. It is found throughout the state's lowlands where tall grass, sagebrush, or similar vegetation offers concealment and sufficient singing posts. The Meadowlark is a ground forager, eating insects and other invertebrates. Most of the Meadowlark population lives in eastern Washington, but they are widely distributed in open fields and prairies west of the Cascades.

Sturnella neglecta

The Meadowlark is a chunky bird, barely larger than a Robin, with a short tail. Its back is brown-streaked, with black and yellow on its breast and a black breast stripe. PROTECTED-WDG; PROTECTED-WBTA.

51





Snow Bunting
winter plumage

Snow Bunting

SNOW BUNTING

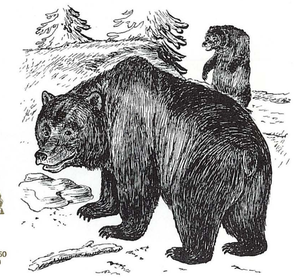
This bird is a migrant and winter visitor in Washington. It is mostly white, with crown, sides of the breast and back brownish, and wings and tail of white and black. The bunting breeds during the summer in the tundra, spreading southward after the breeding season. Its preferred habitat is open areas such as beaches, sand dunes, sagebrush or

Plectrophenax nivalis

large fields. In western Washington it can be found along the coast from Clallam Bay to Willapa Bay and occasionally on Puget Sound. In the Lummi Bay area, Whatcom County, the species is regular in numbers up to 200. In eastern Washington where it is most numerous, it frequents stubble fields, open benchlands and prairies. PROTECTED-WDG; PROTECTED-WBTA.

53





Grizzly Bear

Grizzly Bear

GRIZZLY BEAR

Prior to the coming of white men with their guns, the Grizzly's size, strength and fearless aggressiveness made him a formidable beast fearing nothing on this continent. While primarily carnivorous, the Grizzly also feeds on vegetation. These bears may weigh half a ton, although the average is 400 to 700 pounds. Their shaggy yellow-to-black fur is tipped with white, giving rise to the nickname "Silver-tip." The Grizzly has a shoulder hump and long front claws.

Available evidence indicates that about ten bears range in Washington, peripheral in their main range in British Columbia. One

Ursus arctos horribilis

family group lives in the North Cascades within the new North Cascades National Park boundary, and another group occupies the extreme northeast corner of Pend Oreille County.

Grizzlies are now protected, but prior to 1969 they were legal game. The earliest historical records indicate that the Grizzly was always relatively rare in Washington. Montana, Idaho and British Columbia contain much larger and remote wilderness areas suitable for these animals. REDBOOK-PWS; PROTECTED-WDG; RARE-WS.



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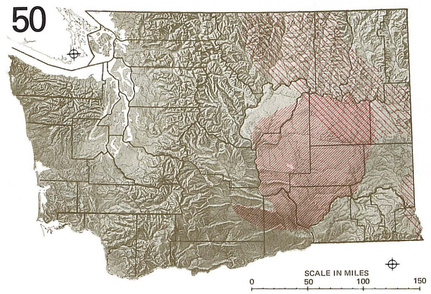




Sage Sparrow

Grasshopper Sparrow

Sage Sparrow

GRASSHOPPER SPARROW

This sparrow prefers the bunchgrass areas in eastern Washington, especially those lying throughout the northern channeled scablands. The Grasshopper Sparrow is a short-tailed and flat-headed little bird. Its crown has a pale median stripe and the back is striped with chestnut and black. The adults have an unstreaked buffy breast, although in late summer the young birds' breasts are streaked. It is an uncommon summer resident in the state, found mainly in the foothills of northeastern Washington. Its nest is usually a grassy cup in grass, where it lays 4-5 spotted eggs. PROTECTED-WDG; PROTECTED-WBTA.

Ammodramus savannarum perpallidus

SAGE SPARROW

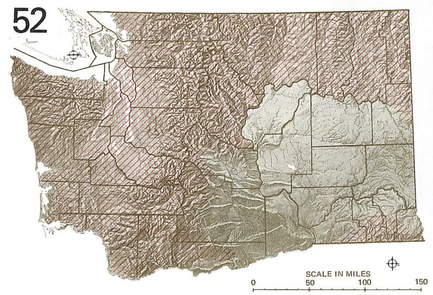
This is another sagebrush-inhabiting species. It forages on the ground or in the lower branches of the sage and is seldom seen. This species has also suffered due to man's reclamation attempts involving sagebrush removal. The species is very much restricted to this specialized habitat, rarely moving into bunchgrass areas above the sagebrush.

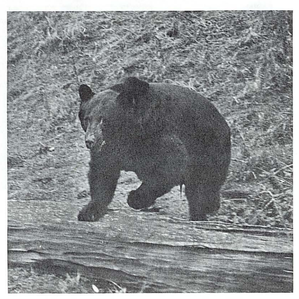
Amphispiza belli nevadensis

This sparrow is identified by the black spot in the middle of its breast and a gray head marked with black-and-white bars. The rest of it is brown streaked with black, and with a white belly. PROTECTED-WDG; PROTECTED-WBTA.

MAMMALS

52





Black Bear

Black Bear

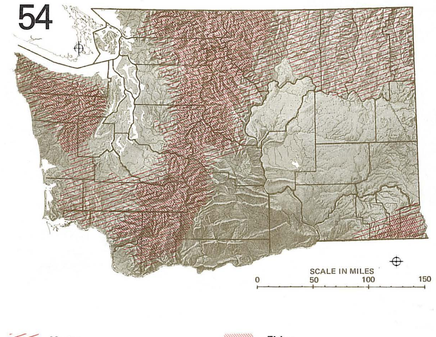
BLACK BEAR

Widely distributed throughout the Pacific Northwest, the Black Bear is the smallest of the North American bears. The average adult weighs between 150-250 pounds. Widely spread in Washington, the bear is absent only from the open prairie country. Its fur is relatively long and shaggy and its claws are short and black. Black bears lack

Ursus americanus

the prominent shoulder hump found in the Grizzly. They occur in two color phases in Washington, the black phase being most common in western Washington. A somewhat larger proportion of brown animals occur in the east. The bear is omniverous, and its diet is controlled by the available variety of items on which it feeds. GAME-WDG.

54





Marten

Fisher

Marten

Fisher

MARTEN

The Marten and Fisher are members of the weasel family. Both are animals of high forested areas and alike in many respects. Marten may be termed "the treetop weasel." It can weigh up to 2-1/2 pounds and be 2 feet long. While Marten are not common, they can sometimes be seen by mountain hikers. It is chiefly nocturnal, which contributes to infrequent sightings.

Both animals are swift and efficient in pursuing such prey as squirrels, mice, chipmunks, birds and other small prey. Much time

Martes americana

is spent in trees, but foraging is also done on the ground. Both commonly den in hollow trees some distance above the ground.

The Marten, also known as Sable, is a rich golden-brown over most of its body. Tail, wrists, feet and muzzle are slightly darker, while the throat sports an orange patch. Marten mate in summer, and 1 to 5 young are born during March or April of the following year. STATUS UNDETERMINED-FWS; FURBEARER-WDG.

FISHER

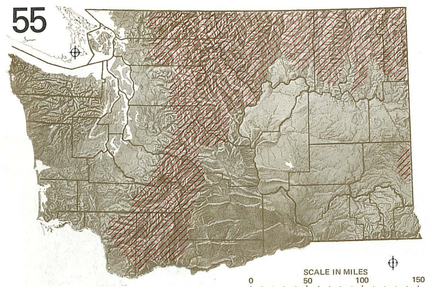
The Fisher is apparently a very solitary animal, active day and night both on ground and in trees. It is rare in all areas of the state, although it ranges throughout the Olympic Peninsula, the Cascades and parts of the Blue Mountains. Little information is available on its former abundance. The Fisher has been protected for many years, although a few have been taken accidently in traps. One of the few predators that feeds on porcupines, the Fisher weighs

Martes pennanti

up to 10 pounds and one-third of its 3-1/2 foot length is tail. They are an ashy, brownish-gray with white spots on the chest and an overwash of black; the head is slightly paler than the body with other extremities having the darkest color. Its toes are webbed at the base and the feet are fully furred in winter. The state's national parks and managed forests should remain a stronghold for these rare furbearers. STATUS UNDETERMINED-FWS; PROTECTED-WDG; RARE-WS.

SOME IMPORTANT WILDLIFE OF WASHINGTON

55





Wolverine

Wolverine

WOLVERINE

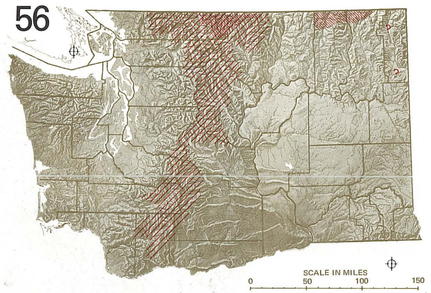
Gulo gulo

Few mammal species in North America possess such an aura of myth as does the Wolverine. Known to early fur trappers as "Skunk Bear" and "Carcajou," it was looked upon as an animal demon. In reality it is nothing more than a huge shaggy member of the weasel family, although it is more bear-like than weasel-like in appearance, its gait is that of a weasel's. It is dark brownish-black with a skunk-like pattern of yellow stripes extending along the upper sides from shoulder to rump and out along the tail. The animal is about 2-1/2 feet long, including head and body. It seems to be a great wanderer and is showing a marked increase in Washington in recent years. From 1930 to 1960, records comfirm the taking of only one animal in the state. Between 1960 and 1968, six specimens were taken. This may indicate a southward movement of Wolverines from Canada. One individual was seen near Grandview, Yakima County. Laws were adopted in 1964 to protect this fabulous animal. STATUS UNDETERMINED-FWS; PROTECTED-WDG; RARE-WS.



Gray Wolf

56





Cascade Red Fox

Cascade Red Fox

Gray Wolf

CASCADE RED FOX

Vulpes vulpes cascadensis

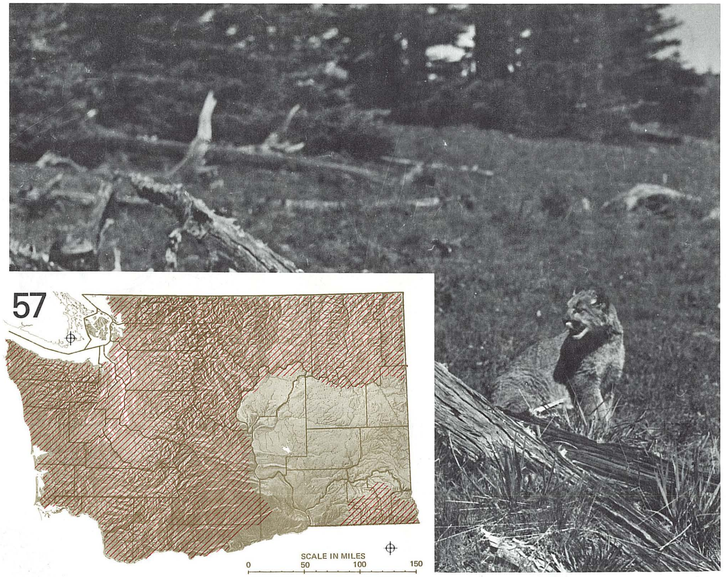
This race of fox is native to Washington and ranges through the Cascade Mountains where it is most likely to be in the Hudsonian Life Zone in meadows and near rockslides. Their range also extends south into Oregon and California. It is smaller than the more common Red Fox (V. v. fulva) which was introduced throughout much of western and eastern Washington where it has become quite common. The Cascade fox is a pale, yellowish-red, being darkest across the shoulders, with a shorter tail, which is always white-tipped. The cross and silver color phases are quite common to this race. The lowland fox is unprotected, while the Cascade Red Fox is classed as a furbearer and is protected. The ranges of the two species do not overlap. FURBEARER-WDG; RARE-WS.

GRAY WOLF

Canis lupus irremotus

In spite of all the grim legends and stories, the wolf is a remarkable animal. The largest of the canine family, it is intelligent, powerful and gregarious. Weighing between 100-150 pounds when fully grown, the wolf is almost the perfect hunter. Its long throaty howl is one of nature's finest melodies. The last authentic record of a wolf in Washington was of one killed near Sherman Pass in Ferry County, in 1950. Previously, the last wolf was said to have been taken about 1920. The Gray Wolf of Washington is also known as the Northern Rocky Mountain Wolf and is listed in the Redbook by that name. Including the head and body, the wolf is about 3-1/2 to 4 feet long; its color is variable. The tail is carried nearly horizontal when the animal is running.

Wolves were apparently never abundant in this state, but early settlers did report small packs on the Olympic peninsula, at several other points in western Washington and in Okanogan County. In most areas the wolf had vanished by 1910. There have been recent reports of tracks and sightings in the areas mapped. Since wolf habitat in Canada borders Washington, stray animals probably do enter the state. ENDANGERED-FWS; PROTECTED-WDG; RARE-WS.



Cougar

57

Cougar

COUGAR

Felis concolor

The Washington Game Department is undertaking a study on these great cats and is finding them to be more numerous than formerly believed. Cougar, or Mountain Lion, range over nearly all the forested areas of Washington. Their nocturnal habits and extremely shy nature have probably contributed to previous low estimates of their numbers. Preying on deer, these cats may grow to weigh as much as 180-200 pounds although they average about 150. Cougar are tawny to grayish on the back and lighter underneath. Including just head and body, the adult animal measures from 4-1/2 to 5-1/2 feet. The fur is short; the tail is about 3 feet long and tipped with dark brown or black. They are an extremely powerful animal, creeping within a few feet of their prey before springing with leaps that have been measured out to 30 feet on level ground.

In Washington, the Cougar was given big game status in 1966 and a bag limit of one per year per hunter is in effect. All bounty payments on this cat were halted in 1961. Although present studies are incomplete, observations indicate Cougar populations are increasing in many areas. GAME-WDG; RARE-WS.

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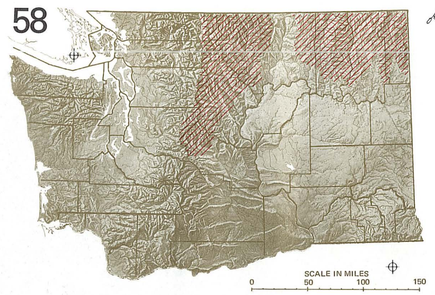
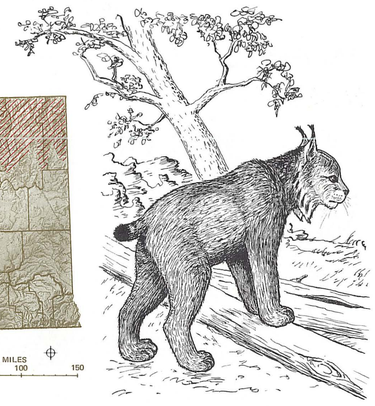




Lynx

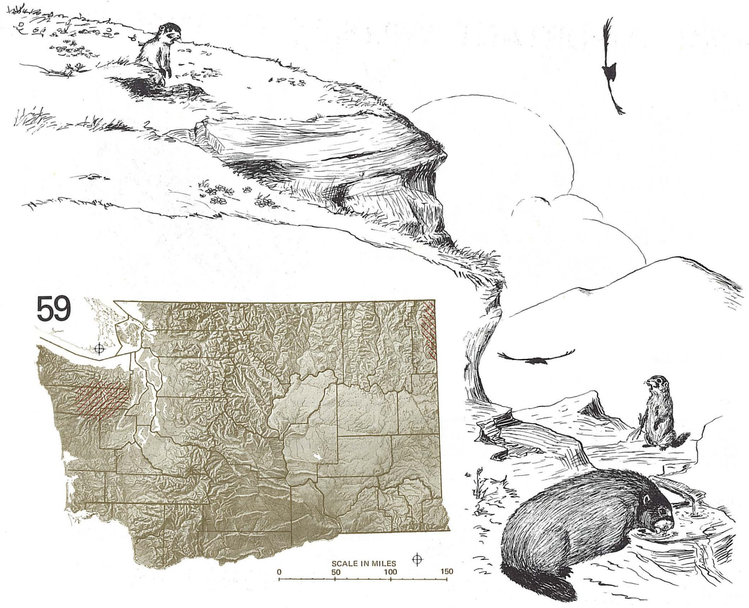
Lynx

LYNX

Lynx lynx

This wild cat is one of the least observed of Washington's mammals. It is widely distributed in mountain forests in the Cascades and in northeastern portions of the state. A highly specialized hunter, it concentrates on Snowshoe Hares with other animals and birds in the minority of its diet. Its numbers fluctuate greatly in relationship to this principal food. A conservative estimate places Washington's lynx population at 300 animals, a census which appears to have changed little in recent years.

The Lynx is a medium-sized bob-tailed cat, largely gray in color with shades of yellow and has short tufts of hair standing erect on the tips of its ears. Its black-tipped gray tail, long unspotted legs, silky fur and oversized feet distinguish it from the Bobcat. It has been classified as a furbearing animal for many years, with short open seasons. STATUS UNDETERMINED-FWS; FURBEARER-WDG; RARE-WS.



Olympic Marmot

59

Eastern Woodchuck

Olympic Marmot

EASTERN WOODCHUCK

Marmota monax petrensis

This is the smallest of the marmot species in the State. Known in Washington only from an old unconfirmed sight record, it may inhabit the northeastern corner of Pend Oreille County. It can be considered peripheral to the State. The Woodchuck is cinnamon-brown with reddish-brown underparts and densely frosted with white-tipped hairs. NOT PROTECTED-WDG.

OLYMPIC MARMOT

Marmota olympus

This species of marmot lives exclusively in the alpine meadows of the Olympic mountains. Between 22 and 31 inches in overall length, it is uniformly brown, becoming yellowish on the shoulders and back. It is similar to the Hoary Marmot in habitat preference and habits. PROTECTED-WDG.

60





Ord's Kangaroo Rat

Western Gray Squirrel

Ord's Kangaroo Rat

WESTERN GRAY SQUIRREL

Sciurus griseus

Also known as the "Silver Gray," this native squirrel was prevalent in the state prior to 1940. In the western half of the state their range followed habitat provided by the oak-prairie association that grew from Tacoma, in Pierce County, south and east to the Columbia River. In eastern Washington, these animals inhabited Garry oak forests (Oregon white oak, Quercus garryana) from the Naches River to the Columbia. During the 1940's, these native populations suffered severe reductions caused by an infestation of mange mite. The disease caused loss of hair, and death resulted from exposure. Present populations of this native species are largely confined to remnant oak groves in Pierce, Thurston and Klickitat Counties, although rarely individuals may be seen elsewhere.

The Eastern Gray Squirrel was introduced after the infestation and is now well established in many Washington cities. The Western Gray apparently does not do well in close proximity to urban centers. PROTECTED-WDG; RARE-WS.

ORD'S KANGAROO RAT

Dipodomys ordi

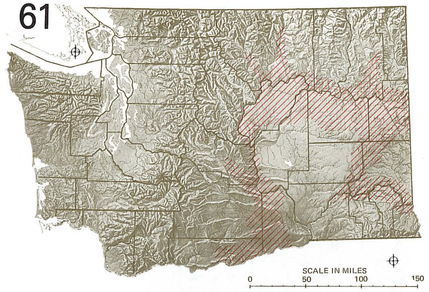
As the name implies, these rats are bipedal and hop about on large hind legs. Their much smaller forefeet are used mostly for feeding. Nocturnal animals, they may be easily seen by flashlight. Their diet is composed mainly of seeds.

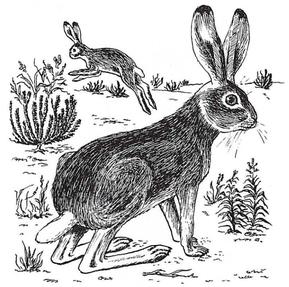
Kangaroo rats occupy great expanses of desert in the southwestern United States. In Washington, although they presently occupy a limited area, they are expanding their range. The Burbank and Wallula areas in Walla Walla County, south of the Snake River, hold good populations of these animals. Blalock Island in Benton County did also before the 1968 flooding of John Day pool.

Prior to the early 1950's there were no Ord's Kangaroo Rats north of the Snake or east of the Columbia. By 1956, probably because of the bridge on U.S. Highway 12, the species was occupying a range near Pasco and apparently are now expanding at the rate of about 1 mile per year. NOT PROTECTED-WDG; RARE-WS.

SOME IMPORTANT WILDLIFE OF WASHINGTON

61





Whitetail Jackrabbit

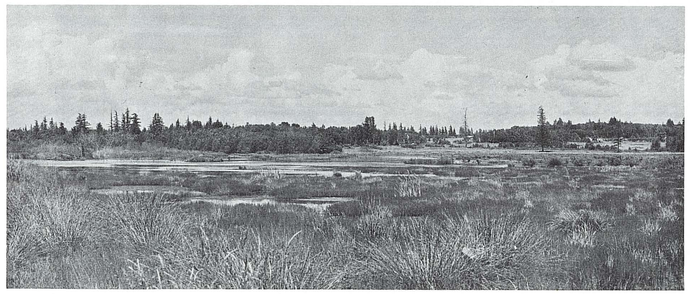
Whitetail Jackrabbit

WHITETAIL JACKRABBIT

One of two resident jackrabbits, the Whitetail is the largest rabbit in the state with adults measuring 24 inches or more in length. Its body is more bulky than the blacktail's. During summer the pelage of the upper parts is dark gray. It is white or pale buffy in winter. The Whitetail prefers hilly bunchgrass areas, descending in winter to the lower sagebrush valleys. The Okanogan Valley, Lincoln and Whitman Counties, and the edge of the Blue Mountains are prime habitat for these rabbits. They were formerly very abundant, but with the spread of Blacktails and reduction of native bunchgrass due to overgrazing by livestock, this animal is becoming scarce.

Lepus townsendi

The Whitetail Jackrabbit is seldom hunted, but it is exposed to poison programs designed to control ground squirrels. Orchard sprays also limit their numbers in some regions. The present trend toward better range management, with less overgrazing, should benefit this species. However, the expansion of the Blacktail Jackrabbit is apparently driving this species from former ranges. PROTECTED-WDG.



Lake Terrell Wildlife Recreation Area

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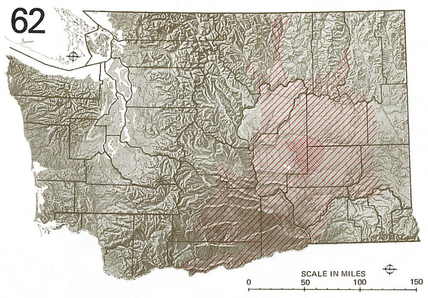



Pygmy Rabbit

Blacktail Jackrabbit **Pygmy Rabbit**

BLACKTAIL JACKRABBIT

The other resident jackrabbit, the Blacktail is the most common jackrabbit in the west. It is larger than the domestic rabbit, and its long ears and gangling legs make it appear even larger than it is. Iron-gray in color with black tail and eartips, it readily blends into its sagebrush habitat.

Lepus californicus

This rabbit is highly competitive, ranging throughout central Washington. In recent years it has expanded its range northward through Okanogan County into Canada, driving the Whitetail Jackrabbit from its range. GAME-WDG.

PYGMY RABBIT

The Pygmy Rabbit looks like an immature Cottontail, although noting the absence of white on the tail will distinguish the two. This is the only rabbit species making and using extensive burrow systems and as a result, deep rather loosely-packed soil is a primary habitat requirement.

Sylvilagus idahoensis

Peripheral in Washington, their range is limited to a small portion of the Columbia Basin, although their contiguous range extends through eastern Oregon, southern Idaho, Nevada and eastern California. PROTECTED-WDG; RARE-WS.

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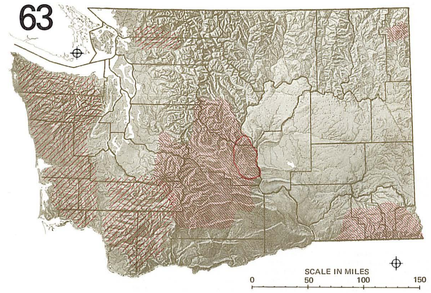
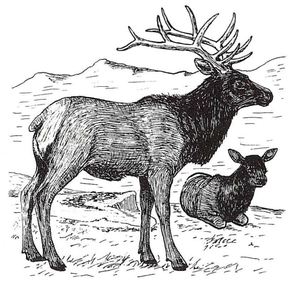




Rocky Mountain Elk

Roosevelt Elk **Rocky Mountain Elk**

ROOSEVELT ELK

This elk subspecies inhabits the western side of the Cascades. Their numbers were drastically reduced during the last century when large numbers of them were killed for their meat and teeth. Their populations have increased since then and the state now supports healthy herds. The heaviest concentrations of Roosevelt Elk are now found in the Olympic Peninsula's rain forests and in southwestern Washington. They are generally somewhat larger and darker than the Rocky Mountain Elk and have shorter, heavier antlers that are cupped at the tips. GAME-WDG.

Cervus canadensis roosevelti

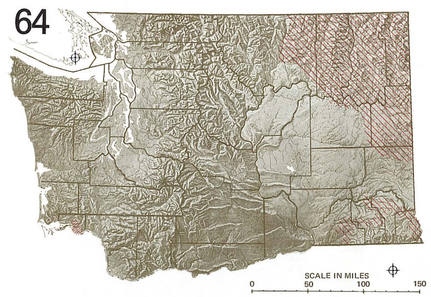
ROCKY MOUNTAIN ELK

This elk subspecies mainly inhabits the foothills of the eastern Cascades and the Blue Mountains. Originally native only to the extreme eastern edge of the State, it was introduced to central Washington from the Rocky Mountains in the early 1900's by the old county game commissions before the creation of the Washington Department of Game in 1933. In January of 1913, 50 Rocky Mountain Elk were transported from the Yellowstone area of Montana and released along the Naches River in Yakima County by the Yakima County Game Commission. In January of 1915, another 45 elk were released near Vantage by the Kittitas County Game Commission and formed the original stock for the present Colockum herd. The encircled area on the map defines the prime winter range of the Rocky Mountain Elk in the eastern Cascades.

Cervus canadensis nelsoni

The Rocky Mountain Elk is brown to reddish-brown with a large yellow rump. The males have brown manes and, in late summer and fall, carry the familiar spread of antlers. Rocky Mountain Elk are thought to be, on the average, somewhat smaller than Roosevelt Elk and are lighter in color. However, the antlers of Rocky Mountain Elk are larger, more slender and graceful, and are not cupped at the tips. GAME-WDG.

64





Columbia Whitetail Deer

Columbia Whitetail Deer **Northwestern Whitetail Deer**

NORTHWESTERN WHITETAIL DEER

The most abundant of the two Whitetail Deer subspecies in Washington, this subspecies occupies a range distinct from the rare Columbia Whitetail. The Northwestern Whitetail is most numerous in Washington's northeastern counties, although it has expanded its range into Okanogan County and along the river bottoms of the Blue Mountains. The Whitetail seeks more thickly grown lands than the Mule Deer and shows a marked tendency to range close to water. It gallops rather than bounds as Mule Deer do, showing a "rocking-horse" gait as hindfeet are placed ahead of forefeet.

Odocoileus virginianus ochrourus

This deer is a gray-brown during winter and is a red-tan in summer. Like all Whitetails the antlers do not fork, but the tines rise from a single main beam. This deer is also distinguished by its large flag-like tail, the underside of which is white. This tail is the largest of all the deer and is raised when the deer runs. GAME-WDG.

COLUMBIA WHITETAIL DEER

This distinctive subspecies formerly occupied the lowland flood plain on both sides of the Columbia River from The Dalles, Oregon out to the Pacific Ocean. Lewis and Clark reported many of them in their travels in 1803 and the British naturalist David Douglas, in an 1829 paper describing his biological surveys of the region, gave this species its scientific name. Since 1875, the clearing of land in the flood plain for agriculture has forced these deer into ever smaller habitat areas, reducing carrying capacity, and forcing their population level to the brink of extinction. Their precarious condition has just recently been much improved by the creation of a National Wildlife Refuge by the U.S. Fish and Wildlife Service.

Known as the Columbian Whitetail Deer National Wildlife Refuge, the sanctuary is just west of Cathlamet, Washington on some islands in the Columbia River and mainland on the Washington shore. The main islands of the refuge are Tenasillahe Island (in Oregon), and Price Island and the two Hunting Islands (all three in Washington). The present area is 4,582 acres, with an additional 649 acres planned for future acquisition. Total herd size of this rare subspecies is at present only about 350 animals, in Washington's Wahkiakum County and Oregon's Clatsop County, with just 200-230 of them using the refuge

Odocoileus virginianus leucurus

range. The authority for creation of this refuge comes from the Endangered Species Conservation Act of 1966 (as amended in 1969), with monies used for purchase of habitat coming from the Land and Water Conservation Fund.

The Columbia Whitetail is unique among Washington deer in appearance and habits. Slightly larger than the Florida Key Deer, which is also a subspecies of Whitetail, and also endangered, the Columbian race is the smallest deer found in Washington. These Whitetail have unique habitat requirements that fit them into a special niche in the flood plain's wildlife community and keep them from competing with Blacktail Deer occupying the same general range. The Whitetails are grazers, foraging in open lowland pastures interspersed with wooded areas for cover. They are very selective in what they eat, prefering clover and succulent new grasses. Blacktails are browsers, foraging in the more enclosed upland woodlands on shrubby vegetation. They are more generalized in food preferences and eat a wider variety of plants. The Whitetails seldom venture into the uplands of the Blacktails. Together, these two deer species exemplify one clear facet of niche diversity in the community dynamics of the Columbia flood plain. ENDANGERED-FWS & IUCN; GAME-WDG; RARE-WS.

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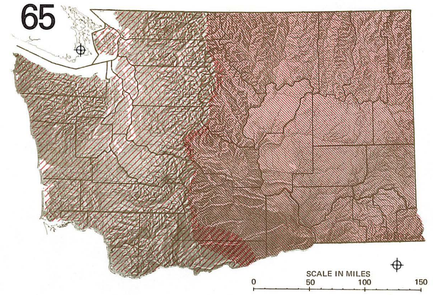

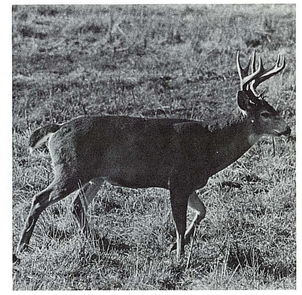

Mule Deer

Columbia Blacktail Deer **Mule Deer**

COLUMBIA BLACKTAIL DEER

This race of mule deer is common throughout the forested areas of western Washington, ranging to the crest of the Cascades. Blacktails make up approximately 50 percent of the state's total deer population.

This race stands about 3-1/2 feet at the back and averages about 150 pounds. In winter the coat is a red-brown or gray-brown mixed with black, being more of a buff in summer. The antlers are dichotomous (two-branching) like eastern Washington's Mule Deer, although not as massive. The upper surface of the tail is completely brown to black, and is rarely held erect when running. When running away, the deer bounds, and one can often see a flash of white belly - leading to the mistaken idea that this animal has a white tail. GAME-WDG.

MULE DEER

This deer is so named because of its large ears. The Mule Deer ranges along the eastern slopes of the Cascades and most of the remainder of eastern Washington. Its heaviest concentrations are found in Chelan, Okanogan and Ferry Counties. These deer are popular game animals because of the relatively open country they inhabit and receive the heaviest hunting pressure of any deer species.

Description of this subspecies is generally the same as for the Blacktail. The Mule Deer is gray in winter and a pale buffy-red during the summer. Its antlers are also two-branching, but are generally larger. Its distinguishing features from the Blacktail are its narrow rope-like white tail with a black tip and a prominent white rump surrounding the black tail tip. Also, the Mule Deer is generally somewhat larger, averaging about 175 pounds. Mule Deer and Blacktail interbreed in the high Cascades. GAME-WDG.

Odocoileus hemionus columbianus

Odocoileus hemionus hemionus

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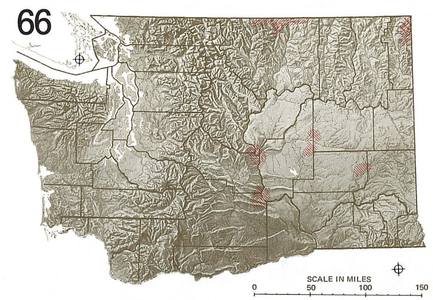




Moose *Pronghorn Antelope*

Mountain Caribou

Pronghorn Antelope **Moose** **Mountain Caribou**

MOOSE

Moose are the largest deer in the world, often weighing in excess of 1,000 pounds. They appear regularly in Washington only in the northern edge of the state east of the Cascades and in the extreme northeastern corner. Two small Moose herds are known to be resident in Washington, and are being carefully monitored by the State Department of Game. One Moose herd (A. a. shirasi) is rapidly building in the Selkirk Mountains of northeastern Pend Oreille County. This herd numbers about 75 individuals. A second resident herd (A. a. andersoni) has recently been located ranging in the Pasayten Wilderness area to as far south as the upper Methow River system in Okanogan County. This herd's numbers are estimated at about 50 animals. In addition to these herds, Moose are occasionally sighted in Whatcom, Skagit and Ferry Counties. These animals are probably strays from Canada. It is assumed that the resident Moose herds in Washington will never become large, as the state has relatively little moose habitat.

Washington may host a relatively fair number of Moose during the summer when food is plentiful. Critical habitat for Moose implies a wintering range with adequate feed. Studies done by the Department of Game on the Selkirk herd indicates an abundance of willow to be the critical factor for Moose

Alces alces

residence. The willow bark supplies sufficient forage when deep snow covers most vegetation or when all other food is consumed. No studies have yet been undertaken on the Okanogan herd, but it is suspected that willow is also the governing factor. Moose do not compete with deer, elk or caribou on the available winter ranges in Washington due to differences in their food habits. Moose maintain themselves within a specialized ecological niche free of competition from the other members of the deer family by their preference for willow which the others do not utilize to the same extent. The presence of Moose in the State thus adds to Washington's wildlife diversity, free of signficant competition, by tapping a heretofore unutilized forage source.

Moose stand seven or more feet tall at the shoulder. The species is unique, not even closely resembling any other member of the deer family. Moose are brown to black in color with a large rounded snout, short tails and a "bell" which is a piece of skin hanging underneath its throat. The males have huge palmated antlers with tines projecting from the borders. GAME-WDG.

MOUNTAIN CARIBOU

The Selkirk Mountains of northern Idaho, northeastern Washington and southern British Columbia contain the only naturally remaining caribou herd in the contiguous United States. About 35 caribou are in the herd which winters in Washington's subalpine fir - Engelmann spruce forests between 4,500 and 7,100 feet elevation, feeding on arboreal lichens. They breed only in Canada. There is no evidence that caribou ever ranged in other sections of Washington and present numbers may be little changed from primitive conditions. Their present habitat can support only a small herd and ecological damage to this limited winter range, especially by logging and subsequent road building, could jeopardize the herd. Taxonomists are presently of two opinions about the subspecies of the Selkirk herd. The most recent taxonomic study was done by Canadian A. W. F. Banfield in 1961. He lumps the Selkirk caribou with those of eastern North America and considers them all Woodland Caribou, Rangifer tarandus caribou. Other taxonomists differentiate the Selkirk herd from eastern populations and consider them to be Mountain Caribou, R. t. montanus. Caribou are medium-sized members of the deer family, with characteristic semi-palmated antlers worn by both sexes - although antlers on the females are usually smaller. Caribou are blackish-brown, darkening to black on the lower legs; underparts and rump are grayish-white; the hooves are heavy, very wide, and serve as snowshoes during winter. PERIPHERAL-FWS; PROTECTED-WDG; RARE-WS.

Rangifer tarandus montanus

PRONGHORN ANTELOPE

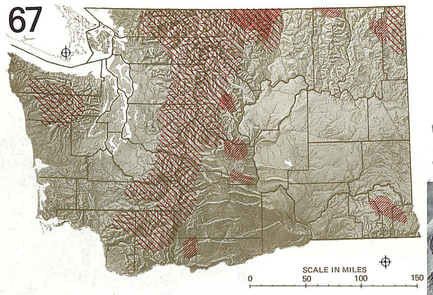
The Pronghorn is a unique mammal to North America. Although antelope bones have been found at Indian campsites in eastern Washington, there were no live antelope here when white men first visited the region. There were antelope in Idaho and Oregon however, and it is presumed that a severe winter eliminated them from the Washington segment of their former range. In 1938 the Game Department secured some antelope kids from Nevada and Oregon and established a herd in the Squaw Creek area of Yakima County. Some were later moved to Adams County, and additional introductions from Oregon in 1969 established small herds in Kittitas and Grant Counties. There are indications that during the mid-1950's, epidemics of the lethal Hemorrhagic Whitetail

Antilocapra americana

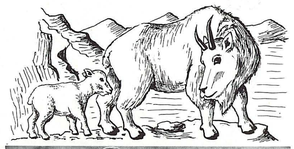
Deer Disease severely depleted Washington's limited antelope herds. This threat of recurring disease and limited habitat make it unlikely that the Pronghorn will ever be abundant in Washington. The state presently supports a population of about 100.

Pronghorns stand about three feet high at the shoulders and weigh from 100-125 pounds. They are slim-hooved animals with tan or yellow upperparts and a white belly and rump. The short, heavy horns are curved backward and have a forward-projecting prong. While these are true horns, they are shed yearly and regrown like antlers. GAME-WDG; RARE-WS.

SOME IMPORTANT WILDLIFE OF WASHINGTON



Mountain Goat





California Bighorn Sheep

MOUNTAIN GOAT

The Mountain Goat is native to the Cascade range in Washington and inhabits essentially the same areas it did when white men first arrived. The only exceptions are the result of transplants to the Olympic Peninsula and portions of Pend Oreille County. The state population of goats, including those inhabiting the national parks, is about 9,000 animals.

Oreamnos americanus

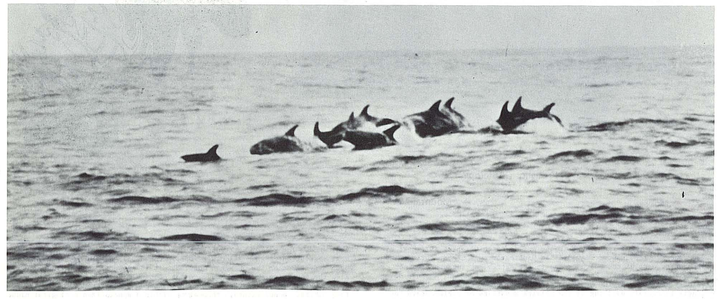
The Mountain Goat stands 3 to 3-1/2 feet high at the shoulders and weighs 125-130 pounds. It is completely covered with long white fur. The hooves and the slightly backward-curving horns are shiny black, contrasting with the rest of the animal. GAME-WDG.

CALIFORNIA BIGHORN SHEEP

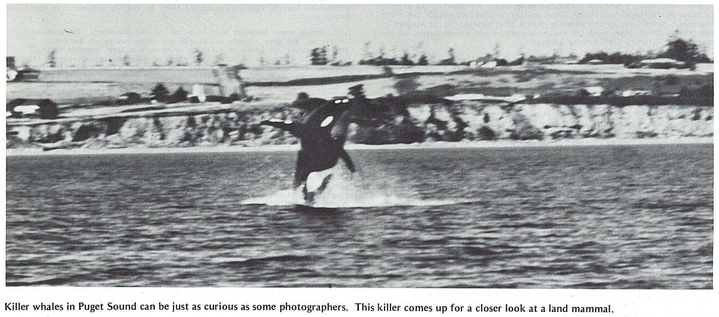
The California subspecies of Bighorn Sheep formerly occupied the rocky, arid ranges on the eastern Cascade slopes from the Canadian boundary to the Columbia River. Indian rock paintings along the Columbia depict mountain sheep and sheep hunting. In recent years however, the only Bighorn found in Washington were Canadian animals using Washington summer range in Okanogan County. In 1954 the Game Department secured some of these animals from British Columbia and initiated a restocking of their former range. At present there are about 440 Bighorn in the state and these herds are growing. Limited-permit hunts to control the population are allowed in certain areas. All Washington Bighorn Sheep are of the California subspecies except for a small herd of about 15 Rocky Mountain Bighorns (O. c. canadensis) which were recently stocked in the Selkirk Mountains of Pend Oreille County.

Ovis canadensis californiana

Bighorns are approximately the size of domestic sheep, with short grayish or brownish fur on the back and sides, white creamy fur on belly, muzzle and rump, and have a very short tail. Males have large horns which are thick at the base and spiral back, down and forward to form a complete circle in older animals. The females' horns are short and simply curve back. The California subspecies is small and dark among Bighorns. Its horns are slender and spread with a wide curl; also, the tips are not as blunt as in other subspecies and are usually completely curled. The Rocky Mountain Bighorn is paler in color and larger than the California Bighorn; its horns are thick and curl more tightly, and the horns are also usually not complete, but are broken off and blunt. REDBOOK-FWS; GAME-WDG; RARE-WS.



Some Risso's dolphins in their oceanic habitat.



Killer whales in Puget Sound can be just as curious as some photographers. This killer comes up for a closer look at a land mammal.

MARINE MAMMALS

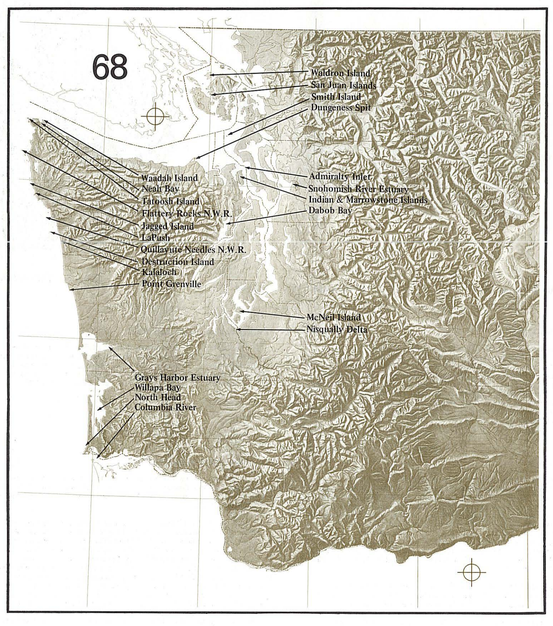
Washington's complex of coastal and sheltered waters is one of the finest environments for marine mammals known in North America. Because of their requirements for clean, undisturbed waters, the state's entire marine system provides critical habitat for these fascinating animals. In the past, value of marine mammals was reckoned in financial terms: meat, oil, skins, bone and aquarium specimens. Today, as a result of greater awareness and concern for environmental integrity, an increasingly aesthetic worth is being realized by the thousands of persons who are annually privileged to glimpse these unusual creatures.

In response to growing public sentiment and the increasingly critical marine mammal situation, the Marine Mammal Protection Act of 1972 (P.L. 92-522) was passed by Congress. The primary objective of marine mammal management was set as maintenance of the health and stability of the marine ecosystem. The Act brought about an immediate moritorium on the taking and importation of marine mammals and products derived from them. A provision was made in the Act for economic hardship exemptions during the first two years. This provision ends in October 1974. This grace period allowed exemption primarily for commercial fishermen for incidental taking of these mammals during fishing operations. During that time, the Act provided for research to improve gear and methods in order to prevent incidental kills. A further exemption is granted certain Aleut, Indian and Eskimo taking for consumption or use in native craft industries. The Pribilof Island Fur Seal Program is also exempted from the Act-imposed moritorium due to its international character. However, the formation of an extended research program in The Pribilofs was encouraged, and was adopted in March 1973 by the International North Pacific Fur Seal Commission.

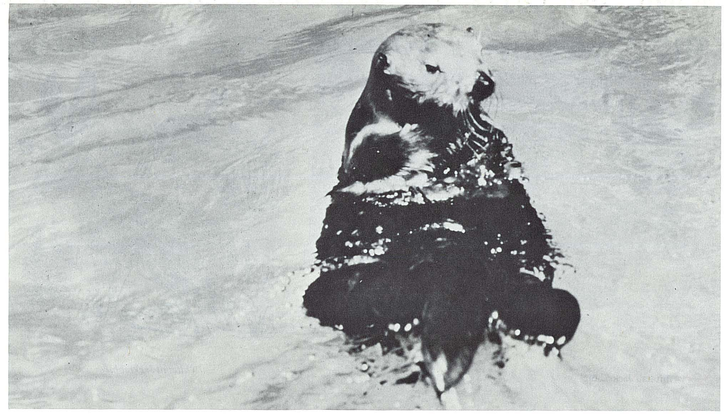
Responsibility for management and enforcement of the new law was divided, by animals, between the National Marine Fisheries Service (NMFS), Department of Commerce, and the U.S. Fish and Wildlife Service, Department of Interior. The former agency has jurisdiction over porpoises, sea lions, seals and whales, and the latter over sea otter, walrus, polar bear, dugong and manatee. The Act preempts certain state laws relating to marine mammals but does provide a mechanism for the states to coordinate for management and enforcement authority in lands and waters under state jurisdiction. The States of Washington and Oregon have both contracted with NMFS for enforcement authority in state waters. The Department of Game is the contracting agency in Washington.

Lastly, in accordance with the directives of the Act, a 3-man Marine Mammal Commission was appointed by the President to assist in formulation of major policy. A paper by Victor B. Scheffer, Chairman of that body, appears in The Zoological-Aquatic Section and covers Washington's marine mammal resources. A 9-member Committee of Scientific Advisors was also appointed, as required by the Act. These ruling bodies coordinate research and assist in the regulatory processes as required.

In addition, bilateral agreements between the United States and other countries for the protection of various marine mammal species in international waters are in the formative stages. Several international meetings and discussions have already taken place and more are scheduled. Recently the International Whaling Commission agreed to a decade-long, world-wide moritorium on commercial whaling, with all member nations except the U.S.S.R. and Japan signing the agreement. With this latest development, the outlook for marine mammal survival is dramatically brighter.



Some especially critical marine mammal habitats.



Once wiped out of Washington waters, the sea otter was recently reintroduced to the outer coast.

SEA OTTER

The earliest visitors to the Washington coast were traders in search of Sea Otter pelts. The great demand and high prices paid for skins put tremendous pressure on the species and they were almost eliminated. The last native Washington Sea Otter was reported killed in Willapa Bay in 1910.

Records indicate that Sea Otter were historically found along the entire Washington coast, from the mouth of the Columbia River to Cape Flattery, although they apparently did not range into the Strait of Juan de Fuca or Puget Sound. In 1969, efforts to restore Sea Otters to their former range were begun when the Washington State Game Department, cooperating with Alaska and the AEC, trapped 30 otters from Amchitka

Enhydra lutris lutris

Island and transplanted them along the Washington coast. During the summer of 1970, 30 more Sea Otters were released near La Push, and several additional otter were recently released into the lower Columbia River. Presently, Sea Otter occupy the coast from North Head to Neah Bay.

Sea Otter habitat is typically exposed saltwater coastline with rocky islands and points of rock that afford shelter from winter storms. Shallow shorelines with underwater reefs and extensive kelp beds are preferred, but most areas suffice that have abundant invertebrate bottom fauna and sheltered feeding and resting locations in waters less than 30 fathoms deep. PROTECTED-WDG; PROTECTED-MMPA.

KILLER WHALE

The first indication of Killer Whales would probably be black dorsal fins, which can be 6 feet tall in males, knifing the ocean surface. Often called the "wolf of the sea," it is actually a large dolphin which can reach 30 feet in length. Killer Whales generally travel and hunt in pods of from 5 to 30 individuals, feeding on fish, seals and other marine mammals.

Orcinus orca

The species is probably the second most commonly seen marine mammal along the Washington Coast and in Puget Sound. It is especially regular during summers while salmon and herring are running. Occasional whales have been seen up the Columbia River as far as Vancouver. The State Game Department has been conducting Killer Whale censuses in an effort to determine the state's whale population. PROTECTED-WDG; PROTECTED-MMPA.

HARBOR SEAL

This small pinniped is the most common of Washington's marine mammals. Averaging between 4 to 6 feet in length, it is gray or yellowish in color, covered with dark spots and blotches. The head is dog-like and the hind flippers are extended backward. These seals have no underfur or external ears. Harbor Seals may be found in nearly all warm, coastal waters and occasionally a few miles up certain large rivers. Their present populations are approximately 80 percent below 1930

Phoca vitulina richardi

levels; habitat encroachment and persecution by fishermen are the primary causes of this reduction. These seals feed entirely on fish, cephalopod mollusks and crustaceans. McNeil Island in southern Puget Sound, the San Juan archipelago, and some small areas along the coast harbor the only known Washington breeding colonies - remnants of former wide-spread breeding grounds. PROTECTED-WDG; PROTECTED-MMPA.

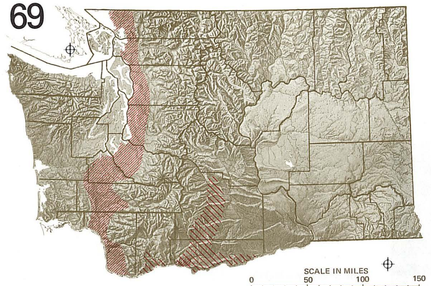


This harbor seal rookery on McNeil Island is a remnant of former widespread colonies.

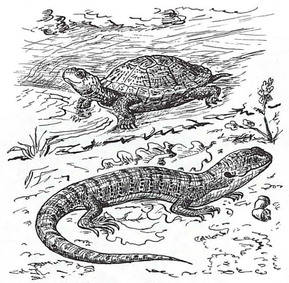
SOME IMPORTANT WILDLIFE OF WASHINGTON

REPTILES

69



Pacific Pond Turtle



Southern Alligator Lizard

Pacific Pond Turtle

Southern Alligator Lizard

PACIFIC POND TURTLE

Formerly common throughout the Puget Sound area this species, also called the Western Pond Turtle, is now thought to be rare. Both pollution and habitat encroachment have reduced population size and range.

Clemmys marmorata

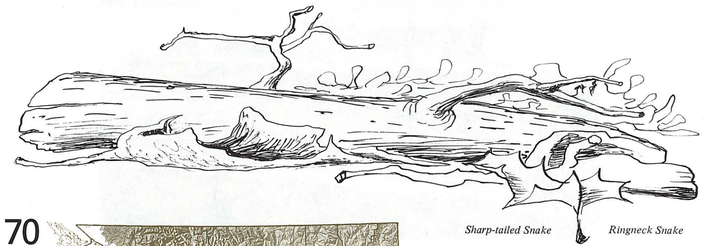
One of two Washington species, this turtle is between 5 and 7 inches long and ranges in color from dark brown to black, with a yellowish underside. It prefers quiet undisturbed water. PROTECTED-WDG.

SOUTHERN ALLIGATOR LIZARD

This lizard has an extremely restricted range in Washington. Also known by the name Foothill Lizard, it is distinguished from the more common Northern Alligator Lizard (G. coeruleus) by its larger (4 to 6-1/2 inch) size and lighter color. This Alligator Lizard is usually

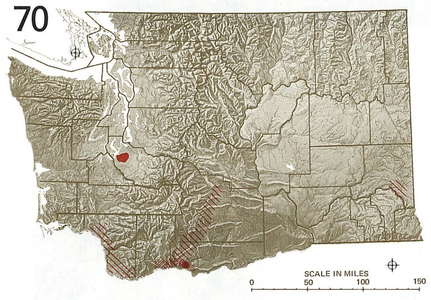
Gerhonotus multicarinatus

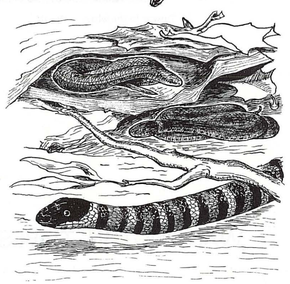
found in oak woods or brush. The lower part of the Klickitat River seems its best habitat, although specimens have been taken in Yakima and Skamania Counties. NOT PROTECTED-WDG.



Sharp-tailed Snake *Ringneck Snake*

70





California Mountain Kingsnake

Sharp-tailed Snake

California Mountain Kingsnake

Ringneck Snake

WESTERN RINGNECK SNAKE

The Ringneck Snake is at least as widespread as its range indicates, tending to inhabit the same types of habitat as the Southern Alligator Lizard. The snake is between 10 and 22 inches in length, and is usually

Diadophis punctatus occidentalis

found under debris in open woodlands. It is uniformly blackish or bluish-gray above, with a distinct yellow, red, or orange neck ring with a few small black dots on its belly. NOT PROTECTED-WDG.

SHARP-TAILED SNAKE

This snake is relict in Washington. The only records are from Lyle in Klickitat County and the northern end of Cravelly Lake in Pierce County, although it may be found in scattered localities in foothills. The Sharp-tailed Snake is usually found in moist well-drained places under

Contia tenuis

wood or other debris. It is brown to yellowish-gray in color, 10 to 16 inches long, and slender. Its name is derived from the sharp scale at the end of its tail. NOT PROTECTED-WDG.

CALIFORNIA MOUNTAIN KINGSNAKE

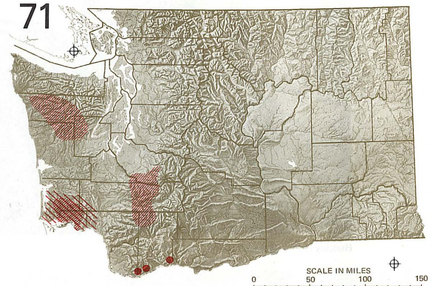
Between 1-1/2 to 3 feet long when fully grown, this beautiful snake is marked by alternating black and white rings - the black being split by red rings. It is found in coniferous or hardwood forests along the

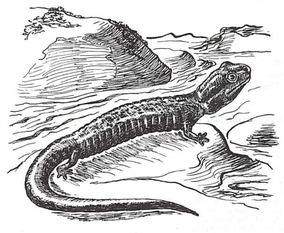
Lampropeltis zonata

lower Klickitat River and in the Mount St. Helens area of Skamania County. NOT PROTECTED-WDG.

AMPHIBIANS

71





Dunn's Salamander

Larch Mountain Salamander

Van Dyke's Salamander

Dunn's Salamander

DUNN'S SALAMANDER

This salamander occurs in Pacific and Cowlitz Counties. Dunn's Salamander is almost always associated with rocks near streams, springs and seepages.

Plethodon dunni

It ranges up to 6 inches in total length, but averages 4 to 5 inches. The main color is dark brown or black and the dorsal band is invariably greenish, with flecks of this color showing on the dark sides. NOT PROTECTED-WDG.

VAN DYKE'S SALAMANDER

Van Dyke's Salamander occurs in at least three isolated areas in the state: Olympic Mountains (Clallam, Jefferson, Mason and northern Gray's Harbor Counties), Willapa Hills (Pacific and Wahkiakum Counties), and the Cascade Mountains (Pierce, Lewis and possibly northern Skamania Counties). This is the most aquatic of the western plethodon salamanders. It is usually found in seepages and under rocks along streams in moist coniferous forests.

Plethodon vandykei

This Salamander is usually 2-1/2 to 3-1/2 inches in total length, and has an uneven dorsal stripe which may be yellow, green, orange or red. Its main color may be black, yellow or pinkish rose. NOT PROTECTED-WDG.

LARCH MOUNTAIN SALAMANDER

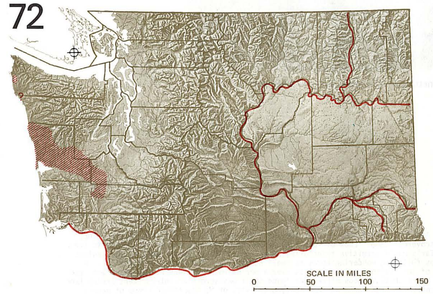
The Larch Mountain Salamander is known from three Columbia Gorge localities in southern Skamania County. It is closely associated with outcrops of basaltic rock and is most commonly found at the base of these outcrops where pieces of basalt are in contact with the soil. It is perhaps the most terrestrial of the western plethodons.

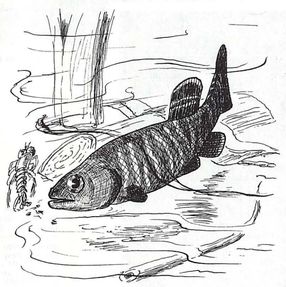
Plethodon larselli

This amphibian is usually 2 to 3-1/2 inches long and characteristically coils in a "watchspring" coil when disturbed. The main color is black with a dorsal stripe of usually red or orange, and ventral surface of red-orange. STATUS UNDETERMINED-FWS; INDETERMINATE-IUCN; NOT PROTECTED-WDG.

FISH & MOLLUSKS

72





Olympic Mudminnow (actual size)

Olympic Mudminnow

Freshwater Mollusks

OLYMPIC MUDMINNOW

First discovered in 1921, the Mudminnow is a species remnant once thought to have become extinct centuries ago. A 2 to 3 inch brown fish with blue markings on its sides and fins, it appears primarily in the lower reaches of the Chehalis and Quinault tributaries. Very small but healthy populations have just recently been located in the area around Lake Ozette by the Washington Cooperative Fishery Unit at the University of Washington. Fossil forms have been discovered in Oregon, but no other members of the genus Novumbra are known to exist. Even in its Olympic range the species is rare. Ditches, swamps and slow-moving streams with silty bottoms below 200 feet elevation are its preferred habitat.

Novumbra hubbsi

Scientists believe the Mudminnow has survived in these few isolated spots only because these were pockets missed by ice-age glaciers. After the glaciers retreated, the species was trapped by the scarcity of habitat. The Olympic Mudminnow is now in danger of extinction through filling of the few swamps and ditches where it lives. Evidence indicates that it cannot tolerate highly oxygenated and fast-flowing water, precluding the species' migration to other ranges. REDBOOK-FWS; NOT PROTECTED-WDG.

FRESHWATER MOLLUSKS

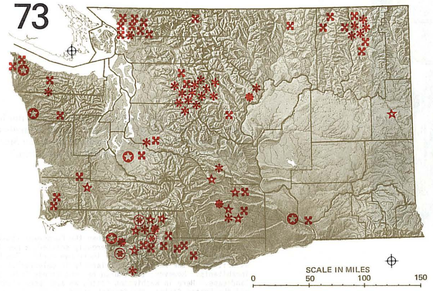
It is well established that invertebrate communities of an aquatic ecosystem respond quickly to environmental change (pollution, silting, change in current flow, habitat change) and serve as excellent indicators of the condition of lotic (running water) systems. As an aquatic invertebrate community is altered, the impact is transmitted throughout the food-web structure. Several species of Mollusks have been wiped out of the Spokane River, Snake River and Columbia River

Fluminicola columbiana

(Fluminicola spp., Goniobasis and Oxytrema spp.). F. columbiana of the Little Spokane River is being considered for inclusion on the Fish and Wildlife Service's Threatened or Endangered Species List. These species represent organisms that were found in relatively unaltered lotic environments, but to date little knowledge is available on what has happened to the communities these organisms were associated with. NOT PROTECTED-WDG.

SASQUATCH

73



REPORTS OF SASQUATCH TRACKS AND SIGHTINGS

Before 1968 Since 1968

Sightings
Tracks
Tracks and Sightings

	Tracks	Sightings	Both	Total
British Columbia	38	89	11	138
Washington	32	51	12	95
Oregon	15	25	6	46
California	82	59	10	151
Other	7	42	18	67
Total	174	266	57	497

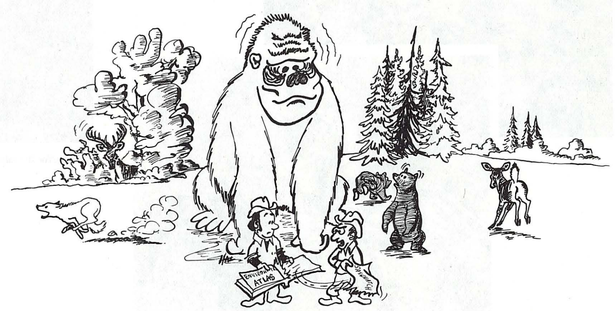
SASQUATCH

The very existence of Sasquatch, or "Big Foot" as it is sometimes known, is hotly disputed. Some profess to be open-minded about the matter, although stating that not one piece of evidence will withstand serious scientific scrutiny. Others, because of a particular incident or totality of reports over the years, are convinced that Sasquatch is a reality. Alleged Sasquatch hair samples inspected by F.B.I. laboratories resulted in the conclusion that no such hair exists on any human or presently-known animal for which such data are available.

Information from alleged sightings, tracks and other experiences conjures up the picture of an ape-like creature standing between 8 and 12 feet tall, weighing in excess of 1,000 pounds, and taking strides of up to 6 feet. Plaster casts have been made of tracks showing a large, squarish foot 14 to 24 inches in length and 5 to 10 inches in breadth. Reported to feed on vegetation and some meat, the Sasquatch is covered with long hair, except for the face and hands, and has a distinctly humanlike form. Sasquatch is very agile and powerful, with the endurance to cover a vast range in search of food, shelter and others of its kind. It is apparently able to see at night and is extremely shy, leaving minimal evidence of its presence. Tracks are presently the best evidence of its existence. A short film of an alleged female Sasquatch was shot in northern California which, although scoffed at, shows no indications of fabrication.

The Pacific Northwest is generally considered to be the hotbed of Sasquatch activity, with Washington leading in number of reports of tracks or sightings since 1968. However, reports of Sasquatch-like creatures are known from as far away as the Parmir Mountains in the U.S.S.R. and South America.

If Sasquatch is purely legendary, the legend is likely to be a long time in dying. On the other hand, if Sasquatch does exist, then with the Sasquatch hunts being mounted and the increasing human population it seems likely that some hard evidence may soon be in hand. Legendary or actual, Sasquatch excites a great popular interest in Washington.



"MYTHICAL CREATURES SHOULDN'T BE MENTIONED IN THE ATLAS!"

THE FIRST MEN



Ceremonial mask — Nootka

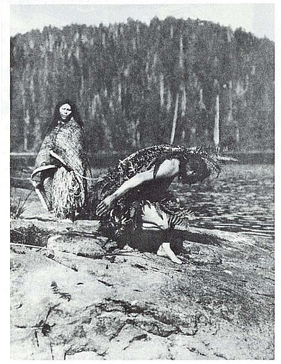
"The white men were many and we could not hold our own with them. We were like deer. They were like grizzly bears. We had a small country. Their country was large. We were contented to let things remain as the Great Spirit made them. They were not, and would change the rivers if they did not suit them."

-Chief Joseph, Nez Perce

First there were Indians. When the Europeans finally stumbled upon this continent, they found another race already prosperously settled, a people with their own religions, customs, and cultures - and at that time, their own world. The history of this continent since then, as written by the white man, is largely in celebration of the displacement of those original inhabitants. However, the Indian has not simply faded away as has so much of the original landscape. Here in Washington State, an area once claimed by Spain, Russia, Great Britain, and the United States, the Spanish-named straits of Juan de Fuca and Rosario, and the English-named Hood Canal and Puget Sound are still fed by rivers with such names as Dosewallips, Hamma Hamma, Skokomish, Nisqually, Puyallup, Snohomish, Skagit, and Nooksack; the Indians continue to maintain their world, offering food for thought.



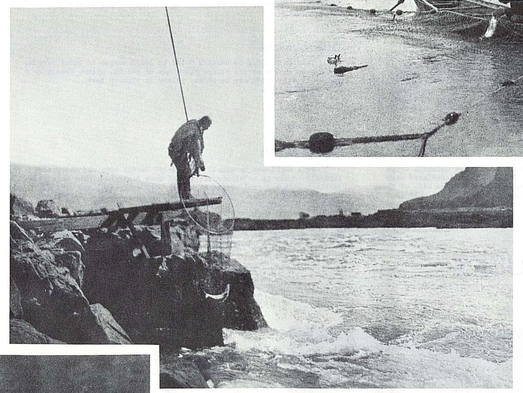
Hunting seals — Quinault



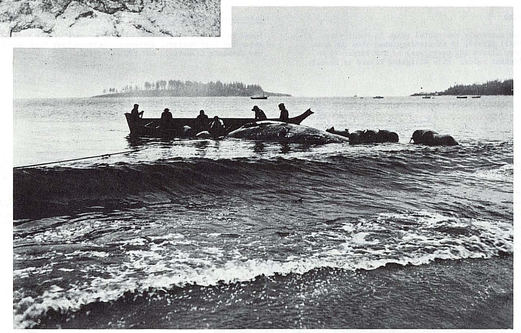
Whale ceremony — Makah



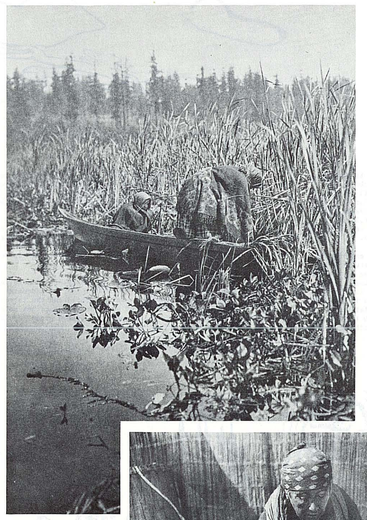
Lifting the net — Puget Sound



Platform netting on Columbia River — Wishham.



Towing in the whale — Makah



Gathering tules — Puget Sound



Wishham basket weaver



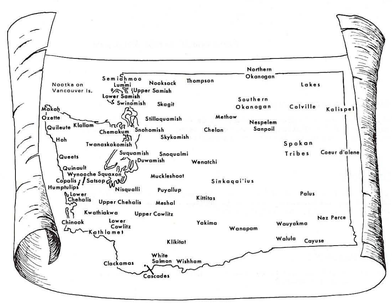
Watching for the salmon — Quinault

How the American Indian came to this continent has been a subject of speculation since Columbus "discovered" them. Lack of fossil evidence indicates they did not originate in the New World. Early man's primitive transportation methods suggests an entrance by the easiest route, perhaps following wandering herds as small hunting and food-gathering societies. A general view of the Indians' origin is that over a period not less than 20,000 years ago, and perhaps many times that, various migrations found their way across an intermittent Bering land bridge. Of course the New World was not settled quickly, or by any single group of people. Rather it was more a dribbling of successive groups of people, who as their numbers increased, spread south and east across North and South America. While these continents are large, it has been estimated that if a tribe moved merely at the rate of 3 miles per week, the southern tip of South America would be reached in just 70 years. This allows tremendous leeway for the peopling of the two continents over thousands of years.

The predominantly Salishan-speaking people settling in the Pacific Northwest found themselves in a garden of plenty. While neither the Coastal nor interior Plateau tribes practiced agriculture, the ocean furnished most of the sustenance required. Theirs was primarily a fish dependent economy, of which the ocean, sound and rivers gave tremendous runs that were easily caught, and could be supplemented by a fertile land with roots and berries in profusion and big game for hunting. Even the Plateau tribes of eastern Washington, who were greatly influenced by the budding Plains culture resulting from acquisition of the horse, relied heavily on the huge salmon runs of the Columbia and tributary rivers for subsistence. Archaeological evidence indicates the pattern of culture along the Northwest coast had remained essentially unchanged for at least 5 centuries. While the Plateau tribes' culture was doubtlessly altered after they acquired the horse, still both cultures were firmly established before the arrival of the white man to the region. The area's inhabitants had developed a beautiful and unique decorative art, a working social order and mythology to explain their world and set patterns of behavior. Contact between tribes existed, and already extensive trading was carried on throughout the Pacific Northwest as far north as Alaska.

Arrival of the first whites, usually traders seeking the rich peltries of beaver and sea otter, began the decline of traditional Northwest Indian culture. Some tribes vigorously resisted the change, others moved with it. All felt the impact, and although few if any cultures in this region were lost completely, none remained unaffected. This photo essay contains a few of the many pictures in the 20 volume set of books and folios entitled North American Indian, by Edward Curtis, and one photograph by his younger brother, Asahel Curtis. Both men were prominent photographers in the early 20th Century, although Asahel's fame never matched his brother's. Edward's ambition was to create a photographic record of those tribal groups still practicing their traditional customs. Already he could see their cultures being smothered beneath the white social order. A great deal of his work was done among Washington tribes. He spent 30 years gathering information and taking photographs for North American Indian, the final volume of which was published in 1930. Curtis made it a rule to allow as few signs as possible of the change brought about by the white man in his pictures. He was largely successful at this in the Pacific Northwest pictures. His work provides as nearly as possible a photographic look at the world of these first Americans.

WASHINGTON TRIBES





Bear costume — Nootka



ARCHEOLOGICAL FEATURES

PRESERVATION OF ARCHEOLOGICAL RESOURCES

By

Harvey S. Rice

The State of Washington is rich in archeological resources which, when properly managed, can provide the basis for education, research, and recreation programs, and can significantly augment the growing tourism industry in the State through programs of interpretive development. The wealth of archeological resources in Washington can provide knowledge of past life-ways for generations yet to come.

The archeological sites of the State vary greatly in age and content. From sites of more than 10,000 years of age, to historic sites of the first White contact, and the fur trading period, a continuous sequence of cultures and occupations is evident. The Marmes Rockshelter Site with the earliest well-documented human skeletal remains in the New World, and the Ozette Village Site where an entire prehistoric Indian village and all it contained was buried in an earthslide, are but two of the more spectacular archeological sites.

The public's interest in archeology is in part revealed by the number of people who walk the 8 miles to visit the Ozette Village Site - more than 50,000 vistors per year.

Relatively little is known of the total archeological resources of the State. Thus far, only about 2 percent of the 68,000 square miles that make up the State have been surveyed for archeological resources. These surveys were usually accomplished in conjunction with construction projects and therefore are varied in quality and intensity. The sites that were found have frequently been obliterated by the project that necessitated the survey. We are left with locations of archeological sites for less than 1 percent of the State. Thus, a review of presently known site locations becomes rather meaningless in planning a construction project. To say that a review of the records indicates that there are no known archeological sites within a project area is very misleading since in all probability the area has never been examined for archeological sites.

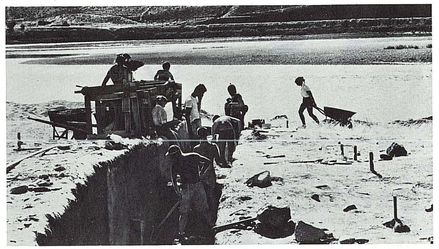
Given the current state of information on archeological site locations within the State, the only way to determine if there are sites within an area is for a qualified archeologist to accomplish an on-foot reconnaissance to record and to evaluate the archeological resources. This reconnaissance not only records the locations of the sites, but indicates their relative importance in understanding the total picture of the history and prehistory of an area. For example, a site seemingly insignificant to the layman may be the single missing component in a long cultural sequence for an entire region. Only an examination of the site by a competent archeologist can provide this determination. The value of a site as a data source is not necessarily dependent upon its size or its "richness" in artifacts.

An attempt has been made on the accompanying map to indicate in a general way, zones of the State with varying degrees of archeological potential. The thinner zones along the shorelines of the coast, inside Puget Sound, and along the Columbia and Snake Rivers indicate areas known to contain large numbers of sites. Sites are assured in these areas because of previous archeological work and the written accounts of the first Whites on locations of large concentrations of Indians.

The larger zones of interior Washington probably contain large numbers of sites; these areas are especially along watercourses where people are apt to settle. Present knowledge indicates that the heaviest concentrations of sites will be found in close proximity to shorelines, watercourses and springs. Of course it must be realized that availability of water supply, vegetation and animal life to support of human groups has changed through the passage of time as climate has changed.

The zones of the higher mountain areas of the Olympics and Cascades have minimum potential for archeological sites, but these areas may yield important finds on occasion. Sites occur, but not as many as above. A few of the better known archeological sites have been included on this map, but locations in no way represent the number or the distribution of sites in Washington.

A most important consideration when dealing with archeological resources is the fact that these resources are in every sense of the word, finite. They cannot be renewed. Since the end of World War II, the rate of land alteration and the attendant destruction of archeological and other resources, has increased geometrically. Construction activities (highway and dam construction, urban development, industrial expansion), agricultural practices (subsoiling, leveling, irrigation) and industrial developments (mining, pipelines, industrial parks) are rapidly destroying a resource which can never be renewed. Relic collecting, once considered by many to be an enjoyable family hobby, has become extremely destructive due to the sheer numbers of participants. Relic collecting is an activity extremely destructive to archeological resources. Relic collectors can damage a site beyond salvage in a short time. Relic collecting by individuals and by commercial concerns depletes a resource which is part of the national heritage of all the people. The destruction of archeological resources is well-documented and a continuing tragedy. Appropriate action must be taken now if we and all future generations are not to lose this record of the past.



An archaeological dig on the lower Snake River.

With the advance planning involved in construction projects, it should be possible in all cases to provide preservation of the archeological resources that may be threatened. The most critical factor is timing. The reconnaissance for archeological resources should be accomplished as early as possible, and the information should be used in determining the feasibility and location of a project. For example, if one of three potential reservoir sites may be selected for construction, the archeological factors may be an important consideration in both actual costs and in the destruction of nonrenewable resources. One or two of the potential reservoir sites may be loaded with archeological resources, while another may be relatively free of such resources.



THE OZETTE VILLAGE SITE

Cedar planks with carvings of a wolf and a thunderbird on them emerge from the Washington State University excavation at the Ozette Village site. Thousands of well-preserved artifacts composed of organic material have been found in the salvage excavation of this site on the Olympic Peninsula. The site is threatened by destruction from wave action and relic collectors.

To provide assistance on archeological matters to agencies involved in construction activities, the Washington Archeological Research Center is being established as a consortium of the four State colleges and two universities. The Center was formed when many of the professional archeologists and members of the amateur societies of the State recognized the need for a center for collecting and disseminating archeological information. In cooperation with archeologists at Washington State University, the University of Washington, the State colleges, the community colleges, and the archeological societies within the State, archeological expertise is now available to representitives of State and Federal agencies, local groups, schools and private citizens.

Recent State and Federal programs, directives, legislation and executive orders, generated for the protection of the environment, have been concerned with the protection of archeological resources. One of the major purposes of the Washington Archeological Research Center is to provide archeological information to State and Federal agencies and to private firms faced with environmental considerations involving archeology. The Center is equipped to provide information and personnel whenever needed. Specifically, the programs and activities of the Center are as follows:

1. Maintain an up-to-date record of the locations of all known archeological sites within the State.
2. Maintain a library of all publications and manuscripts relating to the archeology of the State.
3. Maintain an inventory of the location of archeological collections within the State.
4. Provide a resource center, in cooperation with archeologists at other institutions, where State and Federal agencies, schools and private citizens can obtain information about archeology within the State.
5. Sponsor archeological research within Washington in cooperation with archeologists in the State's colleges and universities.
6. Publish technical and popular studies concerning the archeology of Washington.
7. Solicit grant funds from Federal, State and private sources and administer such funds for archeological investigations within Washington.
8. Award grant funds in support of archeological research within the State.
9. Operate regional centers as necessary: Western Regional Center at the University of Washington, Office of Public Archeology; Central Regional Center at Central Washington State College, Central Washington Archeological Survey; Eastern Regional Center and main office at Washington State University.

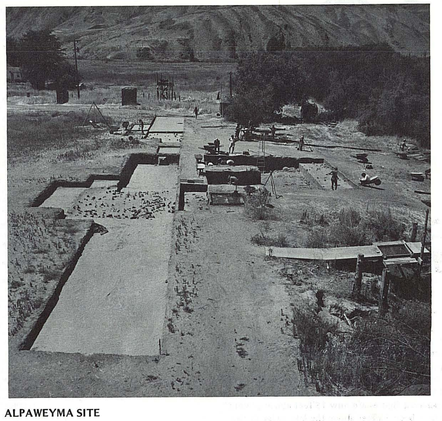
It is sincerely hoped that the efforts of State and Federal agencies and private firms concerned with the protection of archeological resources can be aided by the data and trained personnel available through the Washington Archeological Research Center.

HARVEY S. RICE, M.A., has been engaged in professional archeology for the past 14 years. Although his primary interest is the Pacific Northwest, he has also worked in Egypt, the Sudan, Alaska, and Mexico. He is the Assistant Director of the Washington Archeological Research Center at Pullman. He is also a member of the steering committee of the Society for American Archeology Committee on Public Archeology.



LIND COULEE SITE

Bones of extinct mammals and very ancient artifacts have been found at the Lind Coulee site near Warden. The site is one of the oldest known Paleo-Indian camps in the Northwest. The site, threatened by irrigation runoff and the recent rise in the water table, is being salvaged by Washington State University.

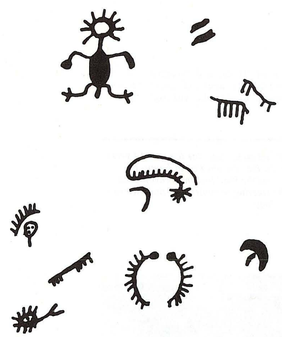


ALPAWEYMA SITE

A cultural sequence encompassing approximately 4000 years is being excavated at the Alpaweya site, 8 miles west of Clarkston in the Lower Granite Reservoir. A late prehistoric pit-house (ca. 1600 A.D.) can be seen in the large trench in the center of the photograph.

ARCHEOLOGICAL INDEX

The paintings and outlines sometimes seen on the faces of cliffs are often called Indian writings. They are known to anthropologists as pictographs and petroglyphs. Pictographs were done with native paints. Petroglyphs are designs etched into the rock. Pictographs and petroglyphs are found in all parts of western North America but their origin is unknown to present day Indian tribes. Their meaning is also obscure but is often interpreted as depicting religious experiences, hunting records or meetings with other tribes.



ORANDO

The Orando site is north of the Columbia River bridge at Wenatchee, within the present Rocky Reach pool area. The pictographs are found on the walls of a small rock shelter on the east side of the river. The overhang is well smoke-blackened.



OMAK LAKE

The Omak Lake site is a relatively isolated one, located in a box canyon northeast of the lake. The pictographs are difficult to locate, but are found on the canyon's south face under an overhang. Most of the pictographs are faded, but some appear almost freshly painted. The human figure with the headdress and holding the staff is exceptionally bright.

There are no sites near the lake itself, which was a taboo area to the local tribes, being inhabited by "water monsters." The three- and four-toed figures may represent these animals.

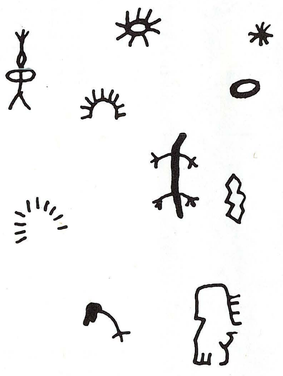


LAKE CHELAN

This site is located on the rock cliffs directly across the lake from the dock at Stehikin, at the north end of Lake Chelan. The wall is perpendicular, composed of smooth granite, and the only way the artist could have worked is from a raft or canoe. A dam at the lower end of the lake raised the level 20 feet, inundating pictographs below these shown. The uppermost figures are now 15 feet above present lake level, and would have been 35 feet above the lake prior to the dam's construction. Either the Indians employed scaffolds on the rafts, or the lake was much higher at some unknown time in the past.

In conformity with requests from professional archeologists in Washington, the Archeology map presented here displays only a small number of the sites recorded in the state. It is felt by archeologists that such a map published for public perusal should contain only those sites which have a sufficient measure of protection from misuse. To offset the information gap thus created, archeologists at the Washington Archeological Research Center, Washington State University, Pullman, have mapped out the "zones of significance" shown here. This presentation has high practical utility because, no matter where a substantial project is planned in the state, it is required by law that professional archeologists be consulted as to project impacts on the state's archeological resources. The matter of judgment as to who shall be given information about sensitive sites is thus put into the hands of professional archeologists.

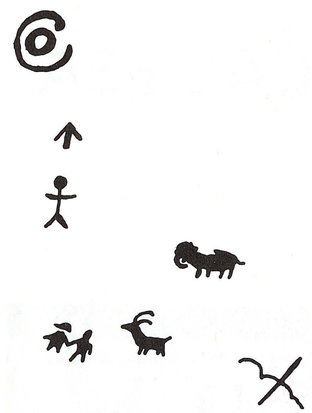
Map Key No.	Map Index Grid Ref.	Feature	County
Sites and areas of suspected sites AS			
1	G-6	Richland Site	Benton
2	C-5	Lake Chelan- Stehekin Pictograph	Chelan
3	D-6	Wells Dam Museum Pictographs	Chelan
4	D-5	Tumwater River Pictographs	Chelan
5	E-5	Malaga Petroglyphs	Chelan
6	E-5	Buffalo Cave Pictograph	Chelan
7	E-5	Spanish Castle Petroglyphs	Chelan
8	C-1	Ozette Village Site	Clallam
9	C-6	Pateros Rapids Petroglyph	Douglas
10	D-5	Orando Pictographs	Douglas
11	E-5	Picture Rock Indian Carvings	Douglas
12	D-6	Moses Coulee Pictograph	Douglas
13	F-8	Lower Granite Dam Site Indian Symbols	Garfield
14	E-6	Crescent Bar Pictograph and	Grant
15	D-6	Steam Boat Rock Pictographs	Grant
16	D-6	Blue Lake Pictographs	Grant
17			
18	F-6	Beverly Pictographs	Grant
19	C-3	Camano City Indian Village Site	Island
20	C-3	Ebeys Prairie Village Site	Island
21	C-3	Dugualla Bay Village Site	Island
22,23			
24	C-3	Cornet Bay Village Site	Island
25	C-3	Snakelum Point Village Site	Island
26	C-3	Penn Cove Village Site	Island
27	D-3	Marymoor Prehistoric Indian Site	King
28	D-4	Snoqualmie Falls Historic Indian Site	King
29	D-3	Suquamish, Chief Sealth's Grove	Kitsap
30	D-3	Old Man House where Chief Seattle was born	Kitsap
31	F-6	Vantage Pictograph and Petroglyphs (4 sites)	Kittitas
32	E-5	Whiskey Dick Canyon Pictographs and Petroglyphs	Kittitas
33	F-6	Simmonds Graveyard Pictograph Site	Kittitas
34	F-6	Vantage Cave Shelter Site	Kittitas
35	E-5	Quilomene Rapids Pictograph	Kittitas
36	G-7	"Twin Sisters" Ceremony Site of Wanapum Indians (Rock Formation)	Benton
37	C-3	Swinomish	Skagit
38	H-4	Horsethief Butte & Lake; Petroglyphs (A5194) and Wishram Indian Village. Note: Edward S. Curtis spelled Wishram as "Wishham," probably according to the sound of the word spoken in the native tongue.	Klickitat
39			



TIETON CANYON I

Located off the Naches Pass Highway on the road to Rimrock, these pictographs are painted on the vertical face of a granite outcrop. There is a slight overhang near the center of the rock with a slight blackening on the walls, indicating it may have been used as a shelter. The pictographs themselves are typical, except for the lizard symbol, which was seldom used in this area.

Map Key No.	Map Index Grid Ref.	Feature	County
40	H-4	Wakemap Mound	Klickitat
41	B-7	Indian Ceremonial Rock Cairns	Ferry
42			
43			
44	D-8	Indian Paintings	Stevens
45	H-4	Rattlesnake Creek Indian Camp	Klickitat
46	H-3	Cape Horn Indian Site	Skamania
47	H-4	Home Valley Indian Camp Site	Skamania
48	H-4	Cooks In-Lieu Indian Site	Skamania
49	H-4	Underwood In-Lieu Indian Site	Skamania
50			
51	B-6	Oroville Site Pictograph	Okanogan
52	B-6	Loomis-Sinlahekin Creek Site	Okanogan
53	B-6	Loomis, Corral Site	Okanogan
54	B-6	Bonaparte Creek-one	Okanogan
55	B-6	Bonaparte Creek-two	Okanogan
56	F-6	Lind Coulee Site	Adams
57	F-7	Marmes Rock Shelter	Franklin
58	B-6	McLaughlin Canyon Pictographs	Okanogan
59	D-5	Chelan Pictographs	Chelan
60	B-5	Winthrop Chewak Creek Site	Okanogan
61	B-5	Methow Valley Pictograph Site	Okanogan
62	C-6	Riverside Site Pictograph Site	Okanogan
63	C-6	Omak Lake Site	Okanogan
64	C-6	Frekin	Okanogan
65	C-6	Nespelem Camp Site and Pictographs	Okanogan
66	F-3	Nisqually Indian Village Settlements	Pierce, Thurston
67	F-3	Rainier Nisqually Village	Thurston
68	F-3	Yelm Nisqually Village	Thurston
69	E-3	Olympia Nisqually Village	Thurston
70	F-2	Nisqually Village	Thurston
71	E-3	Roy Nisqually Village	Pierce
72	E-3	Dupont Nisqually Village	Pierce
73,74,75			
76	D-3	Snohomish Village	Island
77			
78	B-2	Lime Kiln Site	San Juan
79	C-3	Mackaye Harbor Site	San Juan
80	C-3	Cattle Point Site	San Juan
81	B-3	Fossil Bay Site	San Juan
82	B-2	Turn Point Site	San Juan
83	C-3	Richardson Site	San Juan
84	B-2	Argyle Lagoon Site	San Juan
85,86			
87	C-3	Tribal Longhouse Remains	Skagit
88			
89	D-8	Indian Rock Paintings	Spokane
90	D-8	Indian Pictographs	Stevens
91,92			
93	F-2	Grand Mound	Thurston
94			
95	F-5	Ah-Wah-Tum Prehistoric Pit Houses	Yakima
96	F-5	Indian Painted Rocks	Yakima
97	F-5	Selah Canyon Mouth Petroglyph Site	Yakima
98			
99	F-5	Tieton Canyons I Pictographs	Yakima
100	F-5	Tieton Canyon II	Yakima
101	F-5	Cowiche Creek	Yakima
102	G-6	Prosser Petroglyphs	Benton
103	G-1	Beards Hollow Site Shell Midden	Pacific
104,105			
106	F-8	Palouse Pictograph Site	Whitman
107,108			
109	F-8	Pictograph Site 45 C 05	Columbia
110	F-8	Petroglyph Site 45 WT 11	Whatcom
111	F-8	Pictograph Site 45 GA 21	Garfield
112	F-8	Pictograph Site 45 WT 49	Whitman
113	G-8	Petroglyph Site 45 AS 7	Garfield
114	F-6	Gable Mountain Ceremonial Locality	Benton
115	H-4	Indian Race Track	Skamania
116	C-1	Cape Alava - Wedding Rocks	Clallam
117	H-3	Indian Pits	Skamania
118	H-3	Vancouver Site - Buried Village	Clark
119	H-3	Broughton Point Archaeologic Site	Clark
120	C-2	Graveyard Spit	Clallam



BLUE LAKE

These paintings are located on the back wall of a small cave southwest of Blue Lake, west of the road. The site is distinctive for the strange figure which has been postulated as either a modern elephant (and thus the painting is fairly recent), or a bad portrayal of a mastodon, thus being one of the few graphic displays of a Pleistocene animal in North America. In his pictographic study of central Washington, Cain concludes the figure to be an elephant because of the shape of the tusk, which bears little resemblance to the mastodon's imposing ivory.

Map Key No.	Map Index Grid Ref.	Feature	County
121	C-3	Unnamed Site	Island
122	C-4	Skwikwikwab	Skagit
123			
124	E-4,3	Indian Petroglyphs	King
125	C-3	Skagit Delta Indian Sites	Skagit
126	B-3	Woodel Site	Whatcom
127			
128	E-5	Rocky Reach Petroglyphs	Chelan
129			
130	E-6	Ephrata Indian Campsites	Grant
131	E-2	Indian Cemetaries	Mason
132	E-3	Big Rock or North Bay Petroglyph	Mason
133	E-3	Indian Potlatches	Mason, Kitsap
134	C-3	Fish Town	Skagit
135	F-1	Point Brown Indian Middens	Grays Harbor
136	C-8	Indian Mission Caves	Fend Orielle
137	E-3	Indian Diggings	Thurston
138	E-1	Minard Site	Grays Harbor
139	E-3, F-3	Indian Potlatch	Thurston
140	B-3	Guemes Island Village Site	Skagit
141	B-3	Samish Island Village Site	Skagit
142	B-3	Friday Creek Village Site	Skagit
143	C-4	Sahkumehhu Village Site	Skagit
144	B-4	Misskaiwhoverhea Village Site	Skagit
145	B-4	Shaleoch Village Site	Skagit
146	B-4	Mesekwiquilse Village Site	Skagit
147	C-3	Chobahabbish Village Site	Skagit
148	C-3	Hooquachamish Village Site	Skagit
149	C-3	Kikiallus Village Site	Skagit
150	H-4	Spear Point Cave	Skamania
151	G-8	Red Wolf's Crossing	Asotin
152	D-3	Seal Rock Shell Mounds	Jefferson
153,154			
155			
156	F-4,3	Indian Gorge of the Cowlitz River	Lewis
157,158			
159,160			
161	G-7	Windust Cave	Franklin
162	G-7	Wallula Pictographs	Walla Walla
163	H-6	Wallula Gap Pictographs	Benton
164	F-3	Indian Henry Graveyard	Pierce
165			Grays Harbor
166			Clallam
167	G-8	Grave of Tu-Moot-Soo (Chief Timothy)	Asotin
168	C-7	Burial Ground of Chief Joseph and Yellow Wolf	Okanogan
169	E-2	Indian Settlement Site	Grays Harbor
170	E-2,F-2	Indian Settlement Site	Grays Harbor
171	F-2	Indian Settlement Site	Grays Harbor
172	F-2	Indian Settlement Site	Grays Harbor
173	E-2	Indian Settlement Site	Grays Harbor
174	F-2	Indian Settlement Site	Grays Harbor
175	E-2	Indian Settlement Site	Grays Harbor
176	E-1	Indian Settlement Site	Grays Harbor
177	E-1	Indian Settlement Site	Grays Harbor
178	E-1	Indian Settlement Site	Grays Harbor
179	E-1	Indian Settlement Site	Grays Harbor
180			
181	E-3	Osceola Site	King
182			
183	F-2	Indian Settlement Site	Grays Harbor
184	F-2	Indian Settlement Site	Grays Harbor
185	F-2,1	Indian Settlement Site	Grays Harbor
186	F-1,2	Indian Settlement Site	Grays Harbor
187	F-1	Indian Settlement Site	Grays Harbor
188	E-1	Indian Settlement Site	Grays Harbor
189	E-1	Indian Settlement Site	Grays Harbor
190	E-1	Indian Settlement Site	Grays Harbor
191			
192	E-5	Olds Bridge Site	Chelan
193	C-6	Disautel Pictographs	Okanogan
194	H-5	Roosevelt Petroglyphs	Klickitat
195	H-4	John Day Dam Area Petroglyphs	Klickitat
196	H-5	The Dalles Dam Area Petroglyphs	Klickitat
197			
198			
199	F-6	Priest Rapids Pictographs	Grant
200	F-6	Crab Creek Campsite	Grant


VANCOUVER ISLAND
STRAIT OF GEORGIA
STRAIT OF JUAN DE FUCA
PACIFIC OCEAN
WASHINGTON
OREGON
IDAHO
WHATCOM
SKAGIT
SAN JUAN
ISLAND
SNOHOMISH
CHELAN
OKANOGAN
FERRY
PEND OREILLE
STEVENS
CLALLAM
JEFFERSON
KITSAP
KING
DOUGLAS
LINCOLN
SPOKANE
ADAMS
WHITMAN
GRANT
MASON
GRAYS HARBOR
PIERCE
KITTITAS
FRANKLIN
GARFIELD
ASOTIN
WALLA WALLA
COLUMBIA
BENTON
YAKIMA
LEWIS
THURSTON
WAHKIAKUM
COWLITZ
SKAMANIA
KLICKITAT
CLARK
BELLINGHAM
EVERETT
SEATTLE
TACOMA
Port Angeles
Port Townsend
Shelton
Olympia
Aberdeen
Hoquiam
Chehalis
Centralia
Longview
Kelso
VANCOUVER
Camas
Ellensburg
Yakima
Toppenish
Sunnyside
Wapato
Grandview
Prosser
Kennewick
Pasco
Richland
Walla Walla
Dayton
Pullman
Colfax
Moses Lake
Ephrata
Wenatchee
Okanogan
Omak
Republic
Colville
Newport
Chewelah
Deer Park
Spokane
Cheney
Medical Lake
Davenport
Odessa
Ritzville
Othello
Connell
Lind
Ritzville
Harrington
Wilbur
Creston
Grand Coulee
Coulee Dam
Bridgeport
Chelan
Entiat
Leavenworth
Cashmere
Wenatchee
Quincy
Moses Lake
Soap Lake
Ephrata
Grand Coulee
Coulee Dam
Republic
Kettle Falls
Colville
Chewelah
Newport
Metaline Falls
Ione
Usk
Cusick
Tacoma
Seattle
Bellevue
Everett
Bellingham
Mount Vernon
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Friday Harbor
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Cashmere
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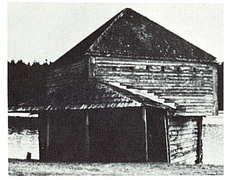
Republic
Kettle Falls
Metaline Falls
Ione
Usk
Cusick
LEGEND
AS SITES AND AREAS OF SUSPECTED SITES
AREAS KNOWN TO CONTAIN LARGE NUMBERS OF SITES
PROBABLY CONTAINS LARGE NUMBERS OF SITES
SITES OCCUR, BUT NOT AS MANY AS ABOVE
INDIAN SETTLEMENT, BURIAL GROUND, OR ARTIFACT CONCENTRATION.
STATE OF WASHINGTON
ARCHEOLOGICAL FEATURES
Washington Environmental Atlas
Second Edition, January 1975
Base modified from U.S. Geological Survey State
Base Map: Washington, 1:500,000, 1962
State capital
County seat
City, town, or village
Corporate boundary shown for towns over 5000 population
SCALE 1:750,000
10 0 10 20 30 40 miles
10 0 10 20 30 40 50 Kilometers



English Fort San Juan Island

HISTORICAL AND CONTEMPORARY CULTURAL FEATURES

WASHINGTON IN HISTORICAL PERSPECTIVE

By

Gary Fuller Reese

In present Washington State, the impact of man on the environment is of fairly recent origin. Except for the findings of archaeologists and the known and unknown activities of the aboriginal inhabitants, the story of modern man in our state begins during that period of world civilization when the great nation-states of western Europe were seeking additions to their empires in the New World.

The Spanish came north from California searching for sites for further colonization. Little remains of their entry into the area except a number of geographical designations which attest to their passage along the North Pacific coast.

The confrontation between the Spanish and the next set of explorers, the English, had international complications; but it was the English whose early visits and claims to the territory which makes up the present State of Washington who were of prime importance. Overlanders in the employ of the Hudson's Bay Company and others crossed the area looking for sites for company trading posts.

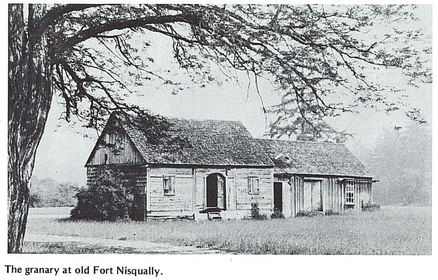
The first maps which were more than romantic intrepretations came from these overlanders and from official government surveyors who came by sea. It is perhaps not important to this study to determine exact locations for such events as the site of the luncheon held by Captain George Vancouver of the Royal Navy on the day he discovered present Commencement Bay at Tacoma, but it is important to recall the favorable impression made by the area on these early explorers for such an impression was of great consequence when the time came to lay claim to the territory explored.

American explorers came by land and by sea at the close of the 18th Century and the beginning years of the 19th. Captain Robert Gray discovered the Columbia River while he explored the coastline of the Oregon Country by sea in 1792. The Lewis and Clark expedition used the lower reaches of the river as an avenue for their overland expedition to reach the Pacific Coast a few years later.

As time passed British and American fur trading companies arrived in the area to trade with the local Indians for the furs of beaver, muskrat, and other animals. With the elimination of Russian hopes for claiming the area and their retreat into Alaska, the contest for control of the Oregon Country which includes the present states of Washington and Oregon, part of Idaho and Montana, and the province of British Columbia lay between the Mother Country and her young offspring, the United States.

Following the elimination of American fur companies during the War of 1812 and the final supremacy of the Hudson's Bay Company over its rivals a period of growth and exploitation began. The company organized trading posts at several locations in the present area of Washington, such as the mouth of the Nisqually River, near Spokane Falls, and most importantly on the Columbia River near the present site of Vancouver, Washington.

Many of the "firsts" for white men in this area occured at one or more of these locations. Interestingly, major settlements have not been built exactly on the sites of these early emporia and for several years archaeologists and historians have been able to reconstruct to some degree life as it was at both Fort Vancouver and Fort Spokane. Other sites such as the original Fort Nisqually and Fort Colville and Walla Walla should remain prime targets for the future archaeologists and historians.



The granary at old Fort Nisqually.

Since the Oregon Country was jointly occupied by both the United States and Great Britain for a number of years, institutions of both countries were allowed to function in a limited way. As more and more Americans came overland and by sea to participate in the permanent settlement of the area, the Hudson's Bay Company activities were necessarily curtailed as smaller and smaller yields of fur-bearing animals were obtained. Too soon the forests and the praries were emptied of their fur-bearing animals, the forests were cut, and much of the land was used for either crops or pasture.

The routes used by the early explorers and trappers as well as the Hudson's Bay Company employees often followed those of the Indians, but as time passed and the use of the wheeled vehicle was introduced more formal arrangements had to be made to join trading posts and settlements. One of the first of these was to join Fort Vancouver and Fort Nisqually on the banks of the Nisqually River. Men and goods were transported north on the Cowlitz River to the head of navigation and then overland north to the Hudson's Bay Company station of Muck, near present Roy, and then west to Nisqually. Some have said this was the first of the white man's roads in present Washington State. This route was later used as one of the numerous terminal branches of the Oregon Trail.

By 1853 the United States had successfully eliminated British claims to any area south of the 49th parallel and had embarked on a program of providing overland routes of communication. In that year a group called the Longmire-Byles wagon train successfully crossed the Cascade mountains using the Naches Pass and following a road prepared for them by citizens of the lower Puget Sound Country.

The Naches Pass trail had been used as early as 1841 by a detachment of the United States Exploring Expedition, commonly called the Wilkes Expedition, in their overland trek from Fort Nisqually to Fort Colville and Walla Walla. Some writers of history have reported that the trail used by these American explorers followed the route of an ancient Indian trail which joined the land east and west of the mountains.



The wheel is off a pioneer wagon which used the Naches Pass Trail in 1853.

With control of the Oregon Country south of the 49th parallel passing to the United States and the gradual elimination of the influence of the British controlled Hudson's Bay Company, the "Great Peace" nurtured by the company was soon broken. Hudson's Bay officials were generally interested in commercial activities and not in settlement, and so maintained good relations with the local Indians.

This was not the case with the administration that followed. With the territory north of the Columbia River organized into the Territory of Washington and that to the south organized into the State of Oregon, one of the first activities of the United States government was to call for a survey to see if it was possible to connect the new area with the rest of the nation by means of a railroad. In fact, the territorial governor designated for Washington Territory, Isaac I. Stevens, used his journey to his new post to survey for the railroad.

Needless to say, the Indians began to resist the encroachment of the white man, soon with violence. Missionary Marcus Whitman and members of his colony were killed and in 1849 there was an attack on Fort Nisqually. This attack brought elements of the United States Army into the area to protect permanent settlers and subdue the hostile Indians.

The Federal government built military installations to house men and equipment. The vacated Fort Vancouver became a military reservation and new forts were built at places like Fort Steilacoom. Soon it became necessary to join these installations with roads and a network of military roads were laid out to various portions of the territory, from Fort Vancouver to Fort Bellingham, from Fort Walla Walla to Fort Steilacoom, and elsewhere. Settlers also used these roads as more and more Americans poured into the area. These military roads are marked today by pyramid shaped markers which tell the stories of the roads and events that took place on them.

In 1855 there was a general Indian revolt. Isaac I. Stevens was engaged in writing treaties with various tribes in the territory when, one by one, settlements were attacked and Federal troops were called in to assist the territorial volunteers. Battles were fought on both sides of the Cascades with the final victory won by the American Army. Indian leaders were tried and some were hanged; peace was restored.



The Sale's family cabin was attacked during the Indian troubles in the 1850's; bullet holes in the logs are still evident.

Soon towns replaced the settlements and places like Steilacoom began to take on the air of a thriving center of life as newspapers, schools, churches, and even jails were built. The first millers arrived to dam creeks to provide power to mill wheat into flour; the first orchardists arrived to plant fruit trees, some of which still remain; and the first industrialists arrived to search out sites for the industries of those early days.

Except for a flare-up during the controversy over the actual water boundary between Canada and the United States in the San Juan Islands, little important military activity occurred as the territory worked its way toward statehood in 1889. Roads were built from the previous trails, cities and towns were developed and all of man's endeavors went forward.

To best explain the importance of historical features to the total environment and explain how such features are related to other items of importance one quite small portion of the state has been selected for study. The area around the town of Steilacoom could best typify what has happened, what is happening, and what could happen if wise and proper planning were continued so that all elements of life can live in harmony together.

The area of Steilacoom is one of great historic importance. Nearby are the sites of two early forts, one built by the Hudson's Bay Company, the other built by the United States Army. The town of Steilacoom was one of the earliest incorporated places in the state and has houses in it built in the mid-1850's. The site of a farm founded in 1845 is on the grounds of present Western State Hospital and remnants of mills are to be found at both the head and mouth of Chamber's Creek. Two wood-using industries are nearby and several large sand and gravel pits provide occupations for numbers of the area's inhabitants.

It is important to begin with a discussion of the water resources. When the Byrd family arrived in the 1850's to build a mill the waters of Chamber's Creek were dammed to provide pondage for the mill. The resulting pond became Lake Steilacoom around whose edges a large number of homes are built. If it had not been for the Byrd Mill, the area would have continued to be a series of marshy ponds.

At the lower end of Chamber's Creek, which empties into Puget Sound, is the Chamber's Mill. Occupying the area are the two wood-using industries, a sawmill and a paper plant which were attracted to the area for the same reason as the original Mr. Chambers: pondage, water supply, and sources for the delivery of raw materials available.

The first independent farmer in the area was Joseph Thomas Heath, an Englishman who arrived in the mid-1840's, and leased land from the Hudson's Bay Company. Heath selected a farm site on the tablelands above Puget Sound near Steilacoom Bay. Nearby was a small creek whose main source was an artesian well. The creek remains much the same as it was when Heath arrived, except for several modifications in its use as a water supply.

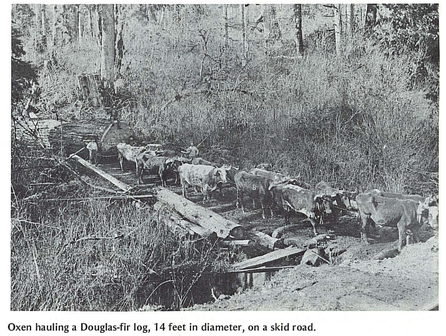
Heath died in the winter of 1848-49; his farm was occupied by the United States Army and became Fort Steilacoom. After the withdrawl of the Army in 1868 the land was transferred to the Territory of Washington to be used as an insane asylum. This area is presently divided into a golf course, the grounds of Western State Hospital, and a county park.

The town of Steilacoom contains a number of period houses. Unfortunately a number of historic structures were destroyed. In the case of the former county jail, however, the foundations lie under several feet of top soil and neighbors often dig up bricks and other artifacts that come to the surface.

The town was originally built along the shores of Puget Sound. With the coming of the railroad near the beginning of the 20th Century, the town was moved back up the hill on which it stands, with the commercial district one block higher today than it was during the historic period.

The site of Fort Nisqually lies on property owned by the I.E. DuPont Company. The buildings of the fort were transferred to Tacoma's Point Defiance Park during the 1930's and reconstructed. The DuPont Company has marked the sites of the original buildings, including the location where officers of the Wilkes Expedition of 1841 took astronomical readings.

Three of the officer's quarters and the post cemetery remain at Fort Steilacoom on the grounds of Western State Hospital. The officer's quarters served for many years as residences of hospital officials but now are abandoned and are in a deteriorated condition. The military burials were removed from the cemetery in the 1890's leaving only civilian burials. The grave of William H. Wallace, first territorial governor of Idaho and fifth territorial governor of Washington, is here.



Oxen hauling a Douglas-fir log, 14 feet in diameter, on a skid road.

HISTORICAL AND CONTEMPORARY CULTURAL FEATURES

Downstream from the Byrd Mill on the grounds of the South Tacoma Game Farm is the site of the Byrd family cemetery. More than 103 pioneer burials have been counted, although most graves are unmarked because of the many years of neglect and vandalism.

The Fort Lewis Military Reservation is nearby and serves as one of the borders of the town of Steilacoom. Puget Sound serves as another boundary. Deer still wander in from the nearby forests.

A local historical society is working diligently to preserve the historical flavor of the community. Plans are in progress to mark the historic section as a special historic district. A town ordinance enacting the change may soon be passed and is similar to legislation aimed at preserving portions of Port Townsend. Two pioneer homes have been maintained as they were originally with only modern conveniences added. Several others have been remodeled, retaining the historical flavor.

Three pioneer orchards remain in the area. A local group has been working to save as many trees as possible in one orchard from years of neglect. The two additional orchards are on land owned by large business concerns and arrangements are being made to preserve them as well.

The Steilacoom Historical Museum Association maintains a small museum in the basement of the town hall, including pioneer and Indian artifacts. Arrangements are now being made to obtain space for additional displays. The main assembly room of the town hall has a display of enlarged photographs of historic persons and events.

A museum at nearby Fort Lewis displays artifacts and photographs of military activities in the area. Attempts are being made to gather local history through photographs, oral history, and the gathering of diaries and other papers.

Another group is interested in preserving the arboretum atmosphere of the grounds of Western State Hospital. An especially fine stand of redwood trees is being giving special consideration.

Community groups throughout the state are learning from the citizens within the Steilacoom area and are attempting to preserve relics of the past, whether they are buildings, orchards, monuments, or other sites. While much has been done, much remains to be done by those who are interested.

Some may ask why do individuals wish to spend so much energy preserving the record of those who have gone on before? While it is true that only the specialist would care exactly where George Vancouver ate lunch that May day in 1792 when he discovered Commencement Bay, the important thing is that he did come, he was quite impressed with the beauty of the area, and he and those who followed him left us a heritage which we who live today must take advantage of if we are to remain in harmony with the life around us.

GARY FULLER REESE, Coordinator of Extension Services and Special Collections, Tacoma Public Library, is also Chief Librarian of the Tacoma Branch Geneology Library and author of the book Origin of Geographic Names of Pierce County, Washington soon to appear in print.



The Ahtanum Mission was built on this site in 1847. It was burned during the Indian troubles in 1855.

TYPOLOGICAL CONSIDERATIONS IN CONTEMPORARY ARCHITECTURE

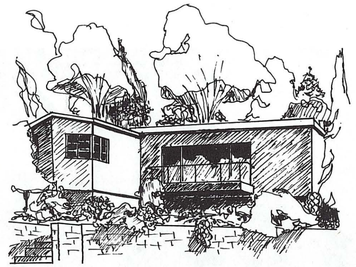
By

Folke Nyberg

Since contemporary architecture has deliberately favored experimental and innovative design rather than the use of traditional architectural forms, the classification or the development of contemporary architectural typologies must depend on categories other than those used by the classical language of architecture. This is particularly true in the State of Washington which has a relatively short history of architecture and subsequently possesses few buildings that rest within any definite historical style category. The imperatives of history have therefore been less of a force in the local architects' form considerations than in the states which possess a richer and more varied heritage of architectural history.

The emergence of functionalism as the basic theory for contemporary architecture coincided with a rapid growth in the state during the period immediately after World War II. Admittedly some experimental work was carried out by individual architects prior to World War II, but it was not until the post World War II period that the full thrust of modern architecture became apparent in all building types.

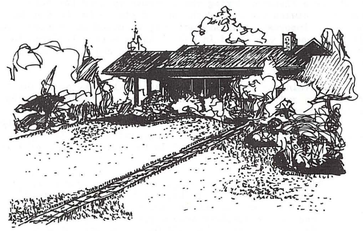
With the preeminence of modern architecture, it soon became apparent that the theoretical sources differed not only in strength of conviction but also in basic sources. Some local architects practicing in the modern idiom depended much on the international style for a theoretical framework (illustration 1). These principles



H. M. MYERS HOUSE, 1937
(Pietro Belluschi, Architect)

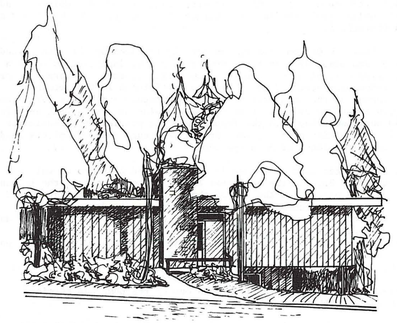
have been described by Philip Johnson and Henry Russell Hitchcock as being, "first, a new conception of architecture as volume rather than as mass. Secondly, regularity rather than axial symmetry serves as the chief means of ordering design. These two principles, with a third prescribing arbitrary applied decoration, mark the production of the international style." (Hitchcock, H-R and Johnson, P., The International Style).

Concurrently with this development of local adaptations of international trends, the rediscovery of regional vernacular architecture occurred. The influence of the northwest school centered around Portland, Oregon and brought a new awareness of the use of materials native to the region as well as a preference for rural vernacular forms, barns, and farm houses in particular. This direct expression of basic architecture without a dependence on the traditional form language of architecture coincided with the intentions of modern architecture to eliminate the iconography and imagery of past style in favor of a direct expression of utilitarian needs and regional characteristics. (Illustration 2) These two currents then,



PAUL THIRY RESIDENCE, 1937
(Paul Thiry, Architect)

one strongly oriented toward the international style and Bauhaus teaching of Walter Gropius, the other favoring the indigenous, were the strongest discernible forces determining the theoretical framework for contemporary architecture in Washington. As a matter of course combinations and ad hoc improvisations of the two sources occurred with varied success but generally making stylistic identification more difficult. (Illustration 3)



SEATTLE REVERE HOUSE, 1949
(Kirk & Chiarelli, Architects)

With this all too brief a summary of the emergence of contemporary architecture in Washington, the question remains of how to evaluate its cultural meaning. This task can perhaps best be done in considering the tendency of the theoretical tenets of modern architecture to ally themselves with utilitarian needs and functional demands. This attempt to modify the representational systems of pre-industrial architecture in favor of giving iconic values to technology has given modern architecture a limited range of iconic meaning, thus serving more as artifact than art.

This, however, does not say that contemporary architecture does not have cultural value. It recognizes that there exists a hierarchy of importance in contemporary architecture that can best be considered in terms of prototype, type, and stereotype as described by Emilio Ambasz. (Ambasz, Emilio, "The Formulation of a Design Discourse," Perspecta 12, The Yale Architectural Journal, 1969).

Prototype in the architectural sense can best be understood as the iconic agent which interprets the values and resources of a culture at a particular point in time through a manifestation in architectural form. This achievement is usually carried out by the architect as artist in individual buildings which become the source of an inspiration for the architect as professional. In other words, once the prototype has been acknowledged and understood, it makes its reappearance as the type in the institutionalization of the prototype by the professional designer. The final state of deterioration or form fatigue occurs when the many levels of meaning interact in the context of the type which no longer holds and this results in the development of stereotype. This development is usually carried out by the nonprofessional, i.e., the builder.

This is somewhat of a simplification of the range of typological considerations that can be given to classification of contemporary architecture.

The importance of understanding the role of prototypes as a generation of architectural form and as a frame of reference for architectural history and theory should encourage the early identification and conservation of them. This can best be carried out by architectural historians and theoreticians who are sensitive to contemporary architectural and cultural developments.

Although the prototype usually occurs as an individual building, one can also consider groupings of the type as being of worth in that they provide a convincing and harmonious environment at the urban design scale. The identification of these satisfying and architecturally cohesive examples of group form should also be carried out in order to minimize the disruption and disintegration of these successful environments.

An argument can also be made for the early identification of contemporary vernacular expressions of group form as identified by Fumihiko Maki in Investigations in Collective Form. The appreciation of prototypical industrial and commercial environments has traditionally been the domain of the artist. The writer and the painter have frequently identified the cultural importance of vernacular forms before a general recognition of their importance has occurred and this recognition should trigger the consideration of intelligent conservation of such settings, and districts, perhaps by nurturing their vitality and integrity by an intelligent policy of laissez faire while minimizing external development pressures.

What is being encouraged here is not merely the preservation of contemporary architecture but the development of a typology in view of the lack of a formal vocabulary of architecture in the traditional or classical sense. This typology would then not only deal with the recognition of the contribution that the architectural prototype makes to the profession, but also begin to consider the importance of contemporary group form which not only includes types but also vernacular expressions of stereotype. This is necessary since culture does not progress in a linear fashion and therefore recognizes that the creation of new prototypes is continually dependent on parts of other prototypes as well as types and stereotypes.

The importance of judgment must again be emphasized. Obviously the identification and conservation of these examples of contemporary architecture and urban design must be discriminating since most cities and towns are in a continuing state of rebuilding. (Whiffin, Marcus, American Architecture Since 1780: A Guide to the Styles). The choices of what is torn down and what remains in order to provide the availability of environments which contain the full range of prototype, type and stereotype are crucial in encouraging cultural continuity. A statewide inventory of towns and cities would provide the basis for understanding what the state possesses in contemporary architecture of note. This classification can also be subsequently evaluated in terms of its importance and assigned relative values of importance in context of the state's resources. This systematic approach can then be of direct assistance to decision makers contemplating intervention in the existing environment.

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This typical period farmhouse was built in 1893.

HISTORICAL — CULTURAL INDEX

HISTORICAL AND CONTEMPORARY CULTURAL ELEMENTS

HISTORICAL FEATURES

Map Key No.	Map Index Grid Ref.	Feature	County
National historic places CN			
1	G-8	Full Gospel Church	Asotin
2	H-3	Fort Vancouver National Historic Site	Clark
3	H-3	Covington House	Clark
4	C-1	Tatoosh Island	Clallam
5	E-5	Pangborn-Herndon Memorial	Douglas
6	F-7	Harmes Rockshelter	Franklin
7	C-3	Fort Townsend City Hall	Jefferson
8	C-3	Captain Enoches Fowler House (Little Fowler House at Polk and Washington Streets)	Jefferson
9	C-3	Francis Wilcox James House	Jefferson
10	C-3	Leader Building (Fowler Building)	Jefferson
11	C-3	Manresa Hall (Eisenbeis Castle)	Jefferson
12	C-3	Old German Consulate	Jefferson
13	C-3	Point Wilson Lighthouse	Jefferson
14	C-3	Rothschild House	Jefferson
15	C-3	St. Paul's Episcopal Church	Jefferson
16	C-3	Starrett House	Jefferson
17	D-3	Marymoor Prehistoric Indian Site	King
18	D-8	Alaska Trade Building (Union Record Building)	King
19	D-3	Building No. 105, Boeing Airplane Co. (E.W. Heath Shipyard)	King
20	D-3	Buttersworth Building	King
21	D-3	Fire Station No. 23	King
22	D-3	Iron Pergola	King
23	D-3	Pike Place Market Historic District	King
24	D-3	Pioneer Hall	King
25	D-3	Pioneer Square-Skid Road Historic District	King
26	D-3	Assay Office (German Club)	King
27	D-3	Colman Building	King
28	D-3	Park Department, Division of Playgrounds (1903 Fire Station)	King
29	D-3	Ward Home	King
30	D-3	Fire Station No. 25	King
31	D-3	Leary, Hiles Perry, House	King
32	D-3	Ellsworth Storey Residences	King
33	D-3	S.S. San Mateo (Ferryboat)	Kitsap
34	D-3	U.S.S. Missouri	Kitsap
35	D-3	Port Gamble Historic District	Kitsap
36	E-5	Olmstead Place State Park	Kittitas
37	B-5	Wishram Indian Village Site	Klickitat
38	B-5	Parson Smith Tree	Okanogan
39	G-2	Chinook Point	Pacific
40	E-3	Ezra Meeker Mansion	Pierce
41	E-3	Fort Nisqually Granary	Pierce
42	C-3	San Juan Island National Historical Park	San Juan
43	D-3	Equator (Schooner)	Snohomish
44	G-7	Whitman Mission National Historic Site	Walla Walla
45	B-3	Pickett House	Whatcom
46	B-3	Whatcom Museum of History and Art	Whatcom
47	B-3	Gamwell House	Whatcom
48	C-3	W.T. Preston (Snagboat)	Whatcom
49	C-3	Wawona (Schooner)	King
50	H-3	Officer's Row Historic District	Clark
51	H-3	Slocum House	Clark
52	C-3	Horace Tucker House	Jefferson
53	F-8	Perkins House	Whitman
54	F-8	Albert W. Thompson Hall	Whitman
55	E-3	Nathaniel Orr House and Orchard	Pierce
56	D-8	Cowley Park	Spokane
57	D-3	Navy View Apartments (Sidney Hotel)	Kitsap
58	E-3	Camp Six Logging Exhibit	Pierce
59	G-2	Grays River Covered Bridge	Wahkiakum
60	F-2	Hoquium's Castle (The Lytle House)	Grays Harbor
61	D-3	The Virginia V	King
62	C-3	La Conner Historic District	Skagit
State historic places CS			
1	E-5	Blewett Mining Arrasta on Peshastin River	Chelan
2	E-5	Pioneer Village	Chelan
3	E-5	Rock Island Dam	Chelan
4	D-4	Bygone Byways, Stevens Pass and Tye Historical Area	Chelan
5	C-2	Dungeness Lighthouse	Clallam
6	C-2	Graveyard Spit (Site of Tsimshian Indian Massacre)	Clallam
7	C-2	Dungeness School	Clallam
8	C-2	Clallam County Courthouse	Clallam
9	B-7	St. Paul's Mission (Kettle Falls)	Stevens
10	C-6	Sacajawea Historic Monument (and Ainsworth Ghost Town)	Franklin
11	C-8	Houser and Sons Flour Mill	Garfield
12	C-8	Garfield County Courthouse	Garfield
13	C-3	Phillips House	Jefferson
14	C-3	Parrish House	Jefferson
15	C-3	James Delzo House	Jefferson
16	C-3	City of Port Townsend	Jefferson
17	C-3	Vancouvers Landing, 1792 at Port Discovery	Jefferson
18	E-3	Point Robinson Lighthouse	King
19	D-3	Alki Point Lighthouse	King
20	E-4	Green River Gorge Coal and Clay Mining District	King
21	D-3	University of Washington Structures, including:	King
		a. Barrington Hall - 1902	
		b. Observatory - 1895	
		c. Columns - 1861 (From Old Campus)	
		d. Denny Hall - 1805	
		e. Architecture Hall - 1909	
		f. Lewis Hall - 1896	
		g. Clark Hall - 1896	
		h. Abortum	
22	E-3	Carnation Condensed Milk Factory - 1889	King
23	D-3	"Relief" 1904 Lightship	King
24	D-3	Ronald Hall House - 1889	King
25			
26	D-3	Sam Hill Home - 1909	King
27	D-3	Ellsworth Storey Cottages - 1912 (Separate from two-story residences)	King
28	D-3	Jefferson Park Ladies Club - 1886	King
29	D-3	Ballinger Home - 1903	King
30	D-3	Bell Apartment Building - 1890	King
31	D-3	King Street Station - 1906	King
32	D-3	Union Station - 1911	King
33	D-3	Row Houses in 800 Block of 23rd Avenue	King
34	D-3	Volunteer Park Water Tower - 1906	King
35	D-3	Raineer Club - 1904	King
36	D-3	Denny Park (First City Park - 1884)	King
37	D-3	Alki Beach, Site at First Pioneer Landing - 1851	King
38	D-3	Schmitz Park	King
39	D-3	Corst Field used for Boeing Test Flights and First Commercial Service in 1926	King
40	D-3	Battle of Seattle Memorial Plaque	King
41	D-3	U.S.S. Nebraska Launching - 1904, and Skinner and Eddy Shipyard Memorial Plaques	King
42	D-3	Yesler Wharf and Decatur Anchorage Memorial Plaques	King
43	D-3	Hospital Ship "Idaho" Memorial Plaque	King
44	D-3	Colman Dock Site and Memorial Plaque	King
45	D-3	Ferry Service to West Seattle Memorial Plaque	King
46	D-3	Carson Boren Home Site Memorial Plaque	King
47	D-3	Mlike Maru Arrival Site Memorial Plaque Commemorating first Steamer Service to the Orient - 1896	King
48	D-3	Great White Fleet Disembarkation Site Memorial Plaque Commemorates Fleets Visit to the Port in May 1908	King
49	D-3	Washington Territorial University Site Memorial Plaque Commemorating the Establishment of the University on donated land in 1861	King
50	D-3	First Post Office Site - 1853, Memorial Plaque	King
51	D-3	First Public School - 1870, Memorial Plaque	King
52	D-3	Start of Seattle Fire Site - 1889, Memorial Plaque	King
53	D-3	First Catholic Hospital Site - 1878, Memorial Plaque	King
54	D-3	Arthur Denny Home Site - 1805, Memorial Plaque	King
55	D-3	Fraternal Order of Eagles Founding Site - 1898, Memorial Plaque	King
56	D-3	Sailing of Willapa and Arrival of Ton of Gold Site - 1897, Memorial Plaques	King
57	D-3	First Automobile Service Station - 1901, Memorial Plaque	King
58	D-3	Maple Donation Claim Memorial Plaque commemorating site of Maple Valley as First Settlers in 1851, located at Boeing Field Airport	King
59	D-3	Round the World Flight in 1924 Monument	King
60	D-3	Fort Lawton	King
61	D-3	Bothell First School House - 1885	King
62	D-3	Andrew and Augusta Beckstrom Log Cabin - 1895	King
63	D-3	W.A. Hannan Home - 1893	King
64	D-3	Medina City Hall - 1913	King
65	D-4	Hop Curing Shed - 1886	King
66	D-4	Fall City Cemetery	King
67	E-4	Covered Bridge of Chicago-Milwaukee-St. Paul and Pacific Railroad	King
68	D-4	Snoqualmie Northern Pacific Railroad Depot - 1887	King
69	D-4	Bothell Fist School House - 1885	King
70	D-3	Northern Pacific Depot - Late 1800's	King
71	E-3	White River Massacre Site - 1855	King
72	D-3	Fire Station No. 7 - 1920	King
73	E-4	Yesler Library - 1914	King
74	D-3	Cascade Hotel - 1890. In Pioneer Square Historic District	King
75	D-3	Wilke Farmhouse - 1920. In Pioneer Square Historic District	King
76	D-3	Grand Central Hotel - 1898	King
77	F-2	Tiffany	Kittitas
78	H-5	Stonehenge Replica	Klickitat
79	H-5	Blockhouse	Klickitat
80	H-5	Alexander House	Klickitat
81	H-5	Hopkins House and Barn	Klickitat
82	H-5	Myron Potter Cabin	Klickitat
83	F-3	Claquato Church - 1853	Lewis
84	F-3	Jackson Prairie Courthouse (Log)	Lewis
85	F-3	McFadden House	Lewis
86	F-3	James Riley House	Lewis
87	F-3	M. Jackson House	Lewis
88	F-3	John R. Jackson House	Lewis
89	F-3	Borst Block House	Lewis
90	C-3	Cowlitz Mission - 1838	Lewis
91	C-3	Cowlitz Landing - 1836	Lewis
92	D-7	Fort Spokane	Lincoln
93	B-7	Logging Complex, remnants of flume and narrow gauge railroad	Ferry
94	D-6	Old Catholic Church	Douglas
95	H-4	Brougthon Lumber Mill Log Flume	Klickitat
96	H-4	North Bonneville Tote Road Portage Rocks (Rope Marks cut in Rocks)	Skamania
97	F-2	Bruceville-Bruceport Landing and Trading Post - 1851	Pacific
98	C-1	Cape Disappointment Lighthouse, North Head	Pacific
99	F-2	Willie Kiel's Grave	Pacific
100	F-1	Espey Estate House	Pacific
101	F-1	John Crellen House (Hecks Hotel)	Pacific
102	F-1	Tom Crellen House	Pacific
103	F-1	Wirt House	Pacific
104	F-1	Old County Jail	Pacific
105	F-1	Nelson House	Pacific
106	F-2	Woodwards Landing	Pacific
107	E-3	Kalispel Indian Cabin	Pend Oreille
108	E-3	Western Washington Fairgrounds	Pierce
109	E-3	Protestant Church	Pierce
110	E-3	Byrd Square	Pierce
111	E-3	Old City Hall	Pierce
112	E-3	St. Peter's Episcopal Church	Pierce
113	E-3	Job Carr Cabin	Pierce
114	E-3	Fort Steilacoom, Western State Hospital	Pierce
115	E-3	Connell's Prairie	Pierce
116	E-3	Clover Creek "Oregon Trail" Marker	Pierce
117	E-3	Greenwater "Oregon Trail" Marker	Pierce
118	E-3	Valley Church	San Juan
119	E-3	Makiteo Treaty Site and Light House	Snohomish
120	E-3	Mukilteo Cemetery - Snohomish County Cemetery	Snohomish
121	E-3	Brackets Landing - Sunset Beach	Snohomish
122	E-3	Fowler Pear Tree in Jade Gulch	Snohomish
123	E-3	Fort Ebey	Snohomish
124	E-3	Review Building	Spokane
125	E-3	Spokane River Front between Division and Maple Streets	Spokane
126	E-3	Spokane County Courthouse	Spokane
127	E-3	Crescent Building	Spokane
128	E-3	Unitarian Church Administration	Spokane
129	E-3	Columbia Park	Benton
130	E-3	Battle of Spokane Plains - 1858	Spokane
131	E-3	Four Lakes Battlefield - 1858	Spokane
132	E-3	Horse Slaughter Camp	Spokane
133	E-3	Indian Rock Paintings	Spokane
134	E-3	Little Red School House	Spokane
135	E-3	Four Corners	Spokane
136	E-3	Plantes Ferry Park	Spokane
137	E-3	Drumheller Spring	Spokane
138	E-3	Indian Painted Rocks	Stevens
139	E-3	Old Tshimakian Mission Monument	Stevens
140	E-3	Old Fort Colville (1859-1882)	Stevens
141	E-3	Old Indian Agency Building (Dr. McPherson Log Cabin)	Stevens
142	E-3	Bigelow House	Thurston
143	E-3	Crosby House	Thruston
144	E-3	Pioneer Cemetery	Wahkiakum
145	E-3	Hume Salmon Cannery site	Wahkiakum
146	E-3	Veterans Administration Hospital	Walla Walla
147	E-3	Hilltop House (Gardner's Castle)	Whatcom
148	E-3	Whatcom County Courthouse	Whatcom
149	E-3	Fort Bellingham	Whatcom
150	E-3	Fort Simcoe and Commandant House	Yakima

Other historic places or contemporary cultural features CC

1	G-8	Silicott House	Asotin
2	D-5	Old Mission at Cashmere - 1873	Chelan
3	C-2	Old Jail (Pettit Farm)	Clallam
4	H-3	Sawmill, First in state - 1827	Clark
5	H-3	Providence Academy	Clark
6	H-3	Slocum House	Clark
8	B-7	MacDonald's Grave	Ferry
9	F-6	Whites Bluff Hudson Bay Post Log House - 1850	Franklin
10	G-8	Andrew F. Lee Barn (E. of Alpowa on Stember Creek)	Garfield
11	F-2	Scammon House Site	Grays Harbor
12	F-2	Byles House	Grays Harbor
13	F-2	Old Methodist Episcopal Church in Montesano at Church and Spruce Streets	Grays Harbor
14	C-3	Crockett Blockhouse at Crockett Lake	Island
15			
16	C-3	Old Courthouse	Island
17	C-3	Alexanders Blockhouse - 1855	Island
18	C-3	Captain Thomas Coupe House	Island
19	C-3	Captain John Robertson House	Island
20	C-3	Captain Swift House	Island
21	C-3	Davis Blockhouse	Island
22			
23	C-3	Jacob Ebey House	Island
24	C-3	Major Granville O. Haller House (Second)	Island
25	C-3	Masonic Hall	Island
26	C-3	Charles T. Terry House	Island
27	C-3	Ebeys House at Ebeys Landing	Island
28	C-3	Jacob Ebey Blockhouse	Island
29	C-3	Engle House at Ebeys Prairie	Island
30	C-3	Kineth House	Island
31	C-3	Robertson-Sergeant House	Island
32	C-3	Busky House, Crescent Harbor	Island
34	C-3	Gould House, Crescent Harbor	Island
35	C-3	Major Granville O. Haller House at Crescent Harbor	Island
36	C-3	Fowler's House	Island
37	C-3	Doyle Log House	Island
39	C-3	Buckly Jewelry Shop	Jefferson
40	C-3	Clengor House	Jefferson
41	C-3	Big Fowler House (Quincy and Water Streets)	Jefferson
42	C-3	Bishop House	Jefferson
43	C-3	Nisbet Barn	Jefferson
44	C-3	Westergard House	Jefferson
45	D-3	Glendale House	Jefferson
46	C-3	Peterson House	Jefferson
48	D-3	First Automobile Service Station - Memorial Plaque	King
49	D-4	Wellington RR Disaster Site - 1910	King
50	D-3	Northern Pacific Depot - Late 1800's	King
51	E-4	White River Massacre Site - 1855	King
52	D-3	Fire Station No. 7 - 1920	King
53	D-3	Yesler Library - 1914	King
54	D-3	Cascade Hotel - 1890. In Pioneer Square Historic District	King
55	D-3	Wilke Farmhouse - 1920. In Pioneer Square Historic District	King
56	D-3	Grand Central Hotel - 1898	King
57	E-5	Tiffany	Kittitas
58	H-5	Stonehenge Replica	Klickitat
59	H-5	Blockhouse	Klickitat
60	H-5	Alexander House	Klickitat
61	H-5	Hopkins House and Barn	Klickitat
62	H-5	Myron Potter Cabin	Klickitat
63	F-3	Claquato Church - 1853	Lewis
64	F-3	Jackson Prairie Courthouse (Log)	Lewis
65	F-3	McFadden House	Lewis
66	F-3	James Riley House	Lewis
67	F-3	M. Jackson House	Lewis
68	F-3	John R. Jackson House	Lewis
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71	C-3	Cowlitz Landing - 1836	Lewis
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83	F-1	John Crellen House (Hecks Hotel)	Pacific
84	F-1	Tom Crellen House	Pacific
85	F-1	Wirt House	Pacific
86	F-1	Old County Jail	Pacific
87	F-1	Nelson House	Pacific
88	F-2	Woodwards Landing	Pacific
89	C-8	Kalispel Indian Cabin	Pend Oreille
90	B-8	David Thompson plaque commemorating fur trade and the first survey of the Pend Oreille River in 1810	Pend Oreille
91	E-3	Fort Steilacoom Officers House - 1849	Pierce
92	E-3	Captain Black House	Pierce
93	E-3	Gales House	Pierce
94	E-3	Old Brick Jail	Pierce
95	E-3	Stephen Judson House	Pierce
96	E-3	Philip Keach House	Pierce
97	E-3	Fred Wallus House	Pierce
98	E-3	First Post Office	Pierce
99	B-2	Lime Kiln Point	San Juan
100	B-2	Schoolhouse, Little Red	San Juan
101	B-4	David Douglas State Historical Marker Commemorating the founding of Forestry in the Pacific Northwest - 1825	Skagit
102	H-4	Fort Raines Blockhouse	Skamania
103	H-4	Fort Cascades Site - 1855-1861	Skamania
104	D-3	Edmonds Cemetery	Snohomish
105	D-3	Heritage House	Snohomish
106	D-3	Third Avenue School	Snohomish
107	D-8	Spokane House	Spokane
108	D-8	Hazard Post Office	Spokane
109	D-8	St. Michael Mission	Spokane
110	D-8	Stevens House	Spokane
111	C-8	Arden Flour Mill	Stevens
112	B-8	John Clugston Log Barn	Stevens
113	B-8	Dan Harbaugh Log House	Stevens
114	B-8	Court House (Hotel Log House)	Stevens
115	B-8	Stage Coach Station Barn	Stevens
116	C-8	Guy Haines Cottage	Stevens
117	C-8	Guy Haines House	Stevens
118	C-8	Peter King Log Cabin	Stevens
119	C-8	Charlie Regenary Cabin	Stevens
120	C-8	George Wait Log Cabin	Stevens
121	C-8	Douglas Log Cabin	Stevens
122	C-8	George Crea Log Cabin	Stevens
123	C-8	Ayers Barn	Stevens
124	E-3	Bush House	Thruston
125	E-3	Elwood Evans House	Thurston
126	E-3	David Chambers House	Thurston
127	E-2	Mud Bay Shaker Church	Thurston
128	G-2	Julia Butler Hansen House	Wahkiakum
129	G-2	Community Congregational Church	Wahkiakum
130	G-7	Fort Walla Walla - 1818-1855 (Abandoned at start of Indian War)	Walla Walla
131	G-7	Fort Walla Walla - 1856-1896	Walla Walla
132	G-7	Ransom Clark Cabin	Walla Walla
133	G-7	Whitmans Mission, Site of Whitmans Massacre - 1847	Walla Walla
134	B-3	Old Blockhouse	Whatcom
135	B-2	Point Roberts Boundary Marker	Whatcom
136	B-3	Peace Arch	Whatcom
137	B-3	Bellingham Bay Landing and Trading Post - 1792	Whatcom
138	E-8	Steptoe Battlefield Monument - 1852	Whitman
139	E-8	Steptoe Butte (Pyramid Peak), Site of James H. (Cashup) Davis Observatory	Whitman
140	E-8	Cashup Statecoach Station	Whitman
141	F-8	Colfin's House	Whitman
142	G-6	Ainsworth Railroad Ghost town	Franklin
143	G-5	Ah-Wah-Tum-Sunnyside Canal Intake	Yakima
144	F-5	Andy Burge Cabin	Yakima
145	G-5	Sawyer Log Cabin	Yakima
146	F-5	Saint Joseph's Mission	Yakima
147	F-5	Garvis Store	Yakima
148	G-5	Indian Methodist Episcopal Church	Yakima
149	F-5	David Longmire House	Yakima
150	F-5	Ben Shipes Cabin	Yakima
151	F-5	Splawn House	Yakima
152	C-8	Uak Mission	Pend Oreille
153	B-8	Harvey Homestead Cabin	Pend Oreille
154	C-3	Fort Worden - 1899	Jefferson
155	C-3	Fort Casey - 1899	Island
156	C-3	Fort Flagler - 1899	Jefferson
157	C-3	Fort Townsend Site	Jefferson
158	C-3	Monticello Convention Site	Cowlitz
159	D-1	Andrew's Barn, Olympic National Park	Jefferson
160	C-5	Stehekin School	Chelan
161	C-4	Three Fingers Mountain Lookout	Snohomish
162	B-4	Park Butte Lookout	Whatcom
163	B-4	Hidden Lake Lookout	Skagit
164	B-4	Brougthon Mill Log Flume	Skamania
166	E-3	McAllister Creek, Treaty Tree	Thurston
167	C-4	Monte Cristo RR	Snohomish
168	F-4	Copper City	Yakima
169	D-3	Blackman's Corner	Snohomish
170	G-6	Wallula Gap	Benton
171	D-8	Tschimakain Mission	Stevens
174	D-4	Monte Cristo	Snohomish
176	E-3	Kummer	King
177	E-4	Neely Mansion	King
178	E-3	Western State Hospital	Pierce
179		Old Town and Public Dock	Pierce
180	D-3	Kuykendahl Cabin and Farm	Snohomish
181	E-3	Lake Sequallitehew and Farm Celebration	Pierce
182	E-3	Stadium High School	Pierce
183	B-3	Moran Mansion	San Juan
184	G-2	Deep River Pioneer Luthern Church	Wahkiakum
185	G-2	Knappton Lumber Mill	Pacific
186	G-2	Gray's Anchorage	Wahkiakum
187	G-2	Gifford House	Wahkiakum
189	B-8	First County Seat of Spokane County	Stevens
190	E-3	First Presbyterian Church	Pierce
191	E-3	Old Northern Pacific Hqtrs.	Pierce
192	B-2	Hotel de Haro	San Juan
193	E-3	Union Station	Pierce
194	C-3	Town of La Conner	Skagit
195	C-3	La Conner City Hall	Skagit
196	E-2	Dalby Waterwheel	Mason
197	E-6	Italian Rock Ovens	Grant
198	F-6	Chief Moses Encounter	Grant
199	D-3	Blackman House	Snohomish
200	E-4	6036 Railroad Trestle	Pierce
201	E-4	Starbo Mine Road	Pierce
202	D-2	Interrorem Guard Station	Jefferson
203	E-4	Old Coal Town of Franklin	King
204	E-5	Wells House	Chelan
205	H-3	Copper Creek Mining Area	Skamania
206	G-3	Walnut Tree - 1853	Cowlitz
207	G-3	Henry Jackson Inn	Cowlitz
208	G-3	Lecklers Landing	Cowlitz
209	G-3	Cowlitz River Steam Boat Route	Cowlitz
210	G-3	The Castle Rock - 1852	Cowlitz
211	G-3	Four-Mile Springs	Cowlitz
212	G-3	Grave in the Middle of the Road	Cowlitz
213	G-3	Bush Pioneer Cabin	Cowlitz
214	G-6	British Poplar Tree	Benton
215	F-6	Hanford Townsite	Benton
216	B-C	Reef Net Fishing	San Juan
217	H-4	Indian Fishing	Skamania
218	E-3	Boston Harbor Lighthouse	Thurston
219	E-3	Obulate Mission - 1850	Thurston
220			
221	D-3	Lakeview Cemetery	King
222	D-3	Seattle Center	King
223	D-2	O'Neil Tass	Jefferson
224	G-8	Red Wolf's Crossing	Asotin
226	B-2	Schoolhouse, One Room, Stuart Island	San Juan
227	C-5	Trinity (Ghost Town)	Chelan
228	E-3	Home (Ghost Town)	Kitsap
229	D-3	Fort Ludlow (Ghost Town)	Jefferson
230			
231	D-3	Fort Blakely (Ghost Town)	Kitsap
232	B-7	Orient (Ghost Town)	Ferry
233	B-7	Republic (Ghost Town)	Ferry
234	B-7	Curlew (Ghost Town)	Ferry
235	E-5	Roslyn (Ghost Town)	Kittitas
236	C-3	Vader (Ghost Town)	Lewis
237	E-2	Union (Ghost Town)	Mason
238	F-3	Claquato (Ghost Town)	Lewis
239	B-6	Loomis (Ghost Town)	Okanogan
240	B-6	Conconully (Ghost Town)	Okanogan
241	B-6	Nighthawk (Ghost Town)	Okanogan
242	F-2	Oysterville (Ghost Town)	Pacific
243	F-2	Nahcotta (Ghost Town)	Pacific
244	G-2	Frankfort (Ghost Town)	Pacific
245	C-2	Knappton (Ghost Town)	Pacific
246	G-2	Chinook-Ville (Ghost Town)	Pacific
247	D-4	Index (Ghost Town)	Snohomish
248	D-4	Galena (Ghost Town)	Snohomish
249	B-8	Northport (Ghost Town)	Stevens
250	B-7	Bossburg (Ghost Town)	Stevens
251	G-2	Skamokawa (Ghost Town)	Wahkiakum
252	G-2	Altoona (Ghost Town)	Wahkiakum
253	B-7	Cottonwood Creek Indian Trails	Ferry
254	B-7	Rock Cairns	Ferry
255	D-3	Seal Rock Shell Mounds	Jefferson
256	E-2	Colonel Bob Lookout	Grays Harbor
257	D-2	Higley Peak Lookout	Grays Harbor
258	C-1	Norwegian Memorial	Clallam
259	D-1	Chilean Memorial	Clallam
260	D-2	Darby Mine	Jefferson
261	D-2	Black & White Lakes Mine	Jefferson
262	B-2	Afterglow Manor and J.S. McMillan Mausoleum	San Juan
263	D-1	James Island	Clallam
264	B-2	Waldron Island Cemetery	San Juan
265	B-3	Turtleback Mountain Stone Anchor	San Juan
266	B-3	Mt. Constitution Lookout Tower	San Juan
267	B-3	Rosario Hotel	San Juan
268	E-4	Kerriston	King
269	C-5	Holden	Chelan
270	D-3	Washington Elm	King
271	C-3	Mountaineers Open Air Theatre	Jefferson
272	B-3	Wickersham Upside Down Roller Rink	Skagit
273	D-4	Cascade Tunnel	King, Chelan
274	D-3	Denny Regrade	King
275	H-4	Appleton Log Cabin	Klickitat
276	D-3	Port Gamble Lumber Mill	Kitsap
277	D-3	Cornish School of Allied Arts	King
278	D-3	Penthouse Theatre	King
279	D-3	Glenn Hughes Playhouse	King
280	D-3	Showboat Theatre	King
281	D-3	Moore Theatre	King
282	D-3	A Contemporary Theatre	King
283	D-3	The Harvard Exit	King
284	G-8	Captain John's Crossing	Asotin
286	E-2	High Trestle Bridge	Mason
287	H-3	Broughton Point	Clark
288	D-2	Tubal Cain Mine	Jefferson
289	C-3	Warhawk Wreck	Jefferson
290	C-3	Cook Spit, Peckum Spit, mouth of Chimacum Creek	Jefferson
291	F-2	Hoquiam Public Library	Grays Harbor
292	E-2	The Stevens Creek Hatchery	Grays Harbor
293	F-2	Clemm's Tree Farm	Grays Harbor
294	F-1	Westport Lighthouse	Grays Harbor
295	F-1	The Lone Tree	Grays Harbor
296	E-2	The Seventh St. Theatre	Grays Harbor
297	F-1	Grossman House	Grays Harbor
298	F-2	Neil Cooney's Spruce Cottage	Grays Harbor
299	F-2	Cosmopolis Treaty Grounds	Grays Harbor
300	E-2	Hudson Bay Log Cabin	Grays Harbor
301	F-1	Brecknridge Bluff	Grays Harbor
302	F-2	Grays Harbor County Courthouse	Grays Harbor
303	D-5	Douglas County Courthouse	Douglas
304	E-2	Sahotski House	Grays Harbor
305	F-2	Schaefer Mansion	Grays Harbor
306	E-2	Wenzel Springs	Grays Harbor
309	D-3	Alexander Hall	King
310	B-3	Vancouver Expedition Anchorage (1792)	Skagit
311	C-8	Baileysburg	Columbia
312	C-3	The Civic & Garden Club Building	Skagit
313	C-3	Puget Sound Mail Building	Skagit
314	C-3	Fidalgo Art Building	Skagit
315	C-3	Fishtown	Skagit
316	D-2	Kamilche School	Mason
317	E-2	Log Slide Chute	Mason
318	E-2	Skokomish Shaker Church	Mason
319	B-3	Semiahmoo Spit Kitchen Middens	Whatcom
320	D-4	Cold Spr - Old Mining Town	Snohomish
321	B-3	"Tin Rock," Mound of Old Cannery Material	Whatcom
322	G-1	Army Barracks & Bunkers	Pacific
323	E-2	Cloquallum Log Orange Hall	Grays Harbor
324	F-6	Beverly Log Cabin	Grant
325	F-6	Priest Rapids Log Cabin	Grant
326	B-4	Sauk - Old Mining Town	Skagit

Historic transportation routes CT

1	F-8	Kentuck Road	Spokane, Whitman, Columbia, Walla Walla
2	F-7	Mullan Road	Spokane, Whitman, Adams, Franklin, Walla Walla
3	E-7	Whites Bluff Road	Spokane, Lincoln, Douglas, Grant, Adams,
4	C-6	Cariboo Trail	Okanogan,
5	F-5	Naches Trail (Ezra Meeker Trail)	Pierce, Kittitas, Yakima, Klickitat
6	G-7	Lewis and Clark Trail	Whitman, Garfield, Columbia, Walla Walla, Benton, Klickitat, Yakima, Kittitas, Pierce
7	C-1	Ozette Indian Reservation (Makah)	Clallam
8	D-1	Quillayute Indian Reservation	Clallam
9	E-2	Skokomish Indian Reservation	Mason
10	C-3	Swinomish Indian Reservation	Skagit
11	C-3	Suiattle indian reservation	Snohomish
12	C-5	Yakima Indian Reservation	Yakima, Klickitat
13	E-3	Squaxin Island Indian Reservation	Mason
14	E-3	Muckleshoot Indian Reservation	King
15	E-3	Puyallup Indian Reservation	Pierce
16	E-1	Quinault Indian Reservation

HISTORICAL - CULTURAL INDEX

Map Key No.	Map Index Grid Ref.	Feature	County
81	G-6	International Folk Dance Festival	Benton
82	B-C	Reef Net Fishery	San Juan
	2-3		
83	D-4	Fall City Theatre & Passion Play	King
84	D-3	Pacific Northwest Arts and Crafts Fair	King
85	D-3	Edmonds Art Festival	Snohomish
86	F-3	Tenino 4th of July Fiddlers Festival	Thurston
87	E-2	Shelton Loggers Festival	Mason
88	G-1	Long Beach Clam Bake	Pacific
89	F-1	Westport Salmon Derby	Grays Harbor
90	G-1	Ilwaco Salmon Derby	Pacific
91	F-5	Yakima State Fair	Yakima
92	C-3	La Conner World Smelt Derby	Skagit

Museums CM

1			
2	B-3	Whatcom Museum of History and Art	Whatcom
3	C-6	Fort Okanogan Museum	Okanogan
4	D-5	Willis Carey Historical Museum	Chelan
5	G-2	Wahkiakum County Historical Society Museum	Wahkiakum
6	B-8	Stevens County Historical Society Museum	Stevens
7	B-3	Orcas Island Historical Society Museum	San Juan
8	E-6	Grant County HIstorical Society Museum	Grant
9	E-4	Federation Forest and Educational Exhibit	King
10	E-3	Frontier Museum	Pierce
11	H-3	Clark County Historical Museum (Fort Vancouver Historical Society)	Clark
12	E-3	Gig Harbor Maritime Museum	Pierce
13	F-5	Ginkgo Petrified Forest Interpretive Center	Kittitas
14	G-6	Hanford Science Center, Science Museum	Benton
15	G-3	Cowlitz County Historical Society Museum	Cowlitz
16	H-5	Maryhill Museum of Fine Art	Klickitat
17A	F-4	Mt. Rainier National Park Longmire Museum	Pierce
17B	F-4	Mt. Rainier National Park Sunrise Museum	Pierce
17C	F-4	Mt. Rainier National Park Southeast Entrance Museum	Lewis
19	E-6	Moses Lake Museum	Grant
20	C-2	Port Angeleles Pioneer Memorial Museum	Clallam
21	C-3	Jefferson County Historical Society Museum and Library	Jefferson
22	D-4	Railroad Museum	King
23	G-6	Sacajawea Museum	Franklin
24	G-7	Fort Walla Walla Museum	Walla Walla
25	D-5	Douglas County Historical Society Museum	Douglas
26	E-5	North Central Washington Museum	Chelan
27	E-3	Paul H. Karshner Memorial Museum	Pierce (Tacoma)
28	E-7	Wheat Museum	Adam
29	C-5	Fort Simcoe Museum	Yakima
30	F-5	Yakima Valley Museum	Yakima
31	B-3	Anacortes Museum of History and Art	Skagit
32	E-3	White River Valley Historical Museum	King
33	D-3	Bothell Historical Society Museum	King
34	D-3	Kitsap County Historical Society Museum	Kitsap
35	D-3	Naval Shipyard Museum	Kitsap
36	F-3	Lewis County Historical Society Museum	Lewis
37	E-8	Tilllicum Club Historical Museum	Spokane
38	C-8	Chewelah Historical Society Museum	Stevens
39	G-2	Fort Columbia Interpretive Center	Pacific
40	E-5	Cle Elum Historical Society Museum	Kittitas
41	D-6	Dry Falls Interpretive Center	Grant
42	C-3	Island County Historical Society Museum	Island
43	C-3	Fort Casey Interpretive Center	Island
44	G-8	Dayton Museum	Columbia
45	E-4	Enumclaw Nature Museum of the Catherine Montgomery Interpretive Center	King
46	D-3	Snohomish County Historical Society Museum	Snohomish
47	D-1	Olympic National Park, Hoh Rain Forest Visitor Center and Nature Museum	Clallam
48	E-3	Fort Lewis Military Museum	Pierce
49	E-3	Fox Island Historical Society Museum	Pierce
50	B-2	San Juan Historical Society Museum	San Juan
51	H-5	Klickitat County Historical Society Museum	Klickitat
52	G-6	Ray E. Powell Museum	Yakima
53	D-3	Kirkland Historical Museum	King
54	C-3	Skagit County Historical Museum	Skagit
55	F-7	Adams County Historical Society Museum	Adams
56	E-4	Snoqualmie Valley Historical Society Museum	King
57			
58	E-3	St. Martins College Museum	Thurston
59	E-3	State Capitol Museum	Thurston
60	E-3	Washington State Pharmaceutical Association Museum of Pharmacy	Thurston
61	G-6	Benton County Historical Society Museum	Benton
62	F-8	Charles R. Conner Museum, Washington State University	Whitman
63	D-3	Marymoor Museum	King
64	B-7	Ferry County Historical Society Museum	Ferry
65	E-7	Dr. Frank R. Burroughs Home	Adams
66	E-5	Roslyn Historical Society Museum	Kittitas
67	D-3	Charles and Emma Frye Art Museum	King
68	D-3	Hall of Fire Engines	King
69	D-3	Museum of Flight	King
70	D-3	Museum of History and Industry	King
71	D-3	Pacific Science Center Museum	King
72			
73	D-3	Seattle Art Museum and Seattle Art Museum Pavilion	King
74	D-3	Seattle Pacific College Art Center	King
75	D-3	University of Washington Costume and Textile Study Center, Textile Display	King
76	D-3	University of Washington Henry Art Center	King
77	D-3	University of Washington Thomas Burke Memorial Washington State Museum	King
78	D-3	Wing Luke Memorial Museum	King
79	F-2	Pacific County Historical Society Museum	Pacific
80	D-8	Cheney Cowles Memorial Museum	Spokane
81	D-8	Fort Wright College Historical Museum	Spokane
82	D-8	Spokane Valley Pioneer Museum	Spokane
83	D-8	Spokane House Interpretive Center	Spokane
84	E-3	Steilacoom Historical Association Museum	Pierce
85	H-4	Skamania County Historical Society Museum	Skamania
86	G-5	Sunnyside Historical Association Museum	Yakima
87	E-3	Camp Six Logging Exhibit	Pierce
88	E-3	Fort Nisqually Museum	Pierce
89	E-3	Handforth Gallery	Pierce
90	E-3	Tacoma Art Museum	Pierce
91	E-3	University of Puget Sound, Kittredge and Hall Art Galleries	Pierce

SCENIC AND RECREATIONAL HIGHWAY SYSTEM CR

Under the Scenic and Recreational Highway Act of 1967 the following portions of Washington highways have been designated as the Scenic and Recreational Highway System of the state. The descriptions provided have been taken from the Revised Code of Washington, Chapter 47.39, July 1, 1972. Scenic Highway CR35 below was taken from the 1973 supplement to that act.

CR1 -(1) State route number 2 beginning at the crossing of Woods creek at the east city limits of Monroe, thence in an easterly direction by way of Stevens pass to a junction with state route number 97 in the vicinity of Peshastin;

CR2 -(2) State route number 3 beginning at a junction with state route number 106 in the vicinity of Belfair, thence in a northeasterly direction to a junction with Arsenal Way south of Bremerton; also
Beginning at a junction of Carr Boulevard north of Bremerton thence northeasterly to a junction with state route number 104 in the vicinity of Port Gambel;

CR3 -(3) State route number 8, beginning at a junction with state route number 12 in the vicinity of Elma, thence westerly to a junction with state route number 101 near Tumwater;

CR4 -(4) State route number 10, beginning at Teanaway junction, thence easterly to a junction with state route number 131 west of Ellensburg;

CR5 -(5) State route number 12, beginning at a junction with a county road approximately 2.8 miles west of the crossing of the Wynoochee river which is approximately 1.2 miles west of Montesano, thence in an easterly direction to a junction with state route number 8 in the vicinity of Elma; also

CR6 - Beginning at the Burlington Northern Railroad bridge approximately 3.4 miles west of Dixie, thence in a northerly and easterly direction by way of Dayton, Dodge and Pomeroy to a junction with a county road approximately 2.4 miles west of a junction with state route number 129 at Clarkston;

CR7 -(6) State route number 14, beginning at the crossing of Gibbons creek approximately 0.9 miles east of Washougal, thence in an easterly direction by way of Stevenson to a westerly junction with state route number 97 in the vicinity of Maryhill; also
Beginning at the easterly junction with state route number 97 in the vicinity of Maryhill, thence easterly along the north bank of the Columbia river to a point in the vicinity of Plymouth;

CR8 -(7) State route number 17, beginning at a junction with state route number 395 in the vicinity of Eltopia, thence in a northwesterly direction to the south end of the overcrossing of state route number 90, in the vicinity of Moses Lake; also
Beginning at a junction with Grape Drive in the vicinity of Moses Lake, thence northwesterly and northerly by way of Soap'Lake to a junction with state route number 2 west of Coulee City;

CR9 -(8) State route number 20, beginning at the crossing of Hanson creek approximately 6.0 miles west of Lyman, thence easterly by way of Concrete, Marblemount, Diablo Dam, and Twisp to a junction with state route number 153 southeast of Twisp;

CR10 -(9) State route number 21, beginning at the Keller Ferry slip on the north side of Roosevelt lake, thence in a northerly direction to the crossing of Granite creek approximately fifty-four miles north of the Keller ferry;

CR11 -(10) State route number 30, (now route 20) beginning at a junction with state route number 21 to Curlew, east of Republic, thence in an easterly direction to a junction with state route number 395 at the west end of the crossing over the Columbia river at Kettle Falls;

CR12 -(11) State route number 31, (now route 20) beginning at Newport, thence in a northerly direction to a junction with state route number 395 at the west end of the crossing of Omak creek east of Omak;

CR27 -(24) State route number 206, Mt. Spokane Park Drive, beginning at a junction with state route number 2 near the north line of section 3, township 26 N, range 43 E, thence northeasterly to a point in section 28, township 28 N, range 45 E at the entrance to Mt. Spokane state park;

CR28 -(25) State route number 294, (now route 20) beginning at a junction with a county road 2.76 miles east of the junction with state route number 395 in Colville, thence in a northwesterly direction to a junction with state route number 31 at Tiger;

CR29 -(26) State route number 395, beginning at a point approximately 2.6 miles north of Pasco thence in a northerly direction to a junction with state route number 17 in the vicinity of Eltopia; also

CR30 - Beginning at the north end of the crossing of Mill creek in the vicinity of Colville, thence in a northwesterly direction to a junction with state route number 30 at the west end of the crossing over the Columbia river at Kettle Falls;

CR31 -(27) State route number 401, beginning at a junction with state route number 101 at Point Ellice, thence easterly and northerly to a junction with state route number 5 (now route 4) in the vicinity north of Naselle;

CR32 -(28) State route number 504, beginning at a junction with state route number 5 in the vicinity north of Castle Rock, thence in an easterly direction by way of St. Helens and Spirit lake to Mt. St. Helens;

CR33 -(29) State route number 525, beginning at a junction with Maxwellton road in the southern portion of Whidbey island, thence northwesterly to a junction with Rhododendron road in the vicinity east of Coupeville; also
Beginning at a junction with Sherman road in the vicinity west of Coupeville, generally northerly to a junction with Miller road in the vicinity southwest of Oak Harbor; also
Beginning at a junction with Torpedo road in the vicinity northeast of Oak Harbor, thence generally by way of Deception pass to a junction with state route number 536 in the vicinity southeast of Anacortes;

CR34 -(30) State route number 542, beginning at the Nugent crossing over the Nooksack River approximately 7.7 miles northeast of Bellingham, thence easterly to the vicinity of Austin pass in Whatcom County.

CR35 -State route number 821, beginning at a junction with state route number 82 at the Yakima firing center interchange, thence in a northerly direction to a junction with state route number 82 at the Thrall road interchange.
Planning and design standards established for highways falling within the federal recreational highway system may include, but shall not be limited to, provision for the following:
(1) Hiking, bicycle, and bride trails, including regulations for their use;
(2) Campsites and shelters;
(3) Boat landing sites;
(4) Access trails to lakes, rivers and streams, and easements along their shores;
(5) Scenic rest areas;
(6) Historic and geologic interpretative facilities;
(7) Scenic observation facilities;
(8) Roadside landscaping, restoration and aesthetic enhancement;
(9) Specifically delineated highway corridors and means for the preservation of natural beauty, historic sites, or viewpoints;
(10) A uniform system of signs and markers designating the various features and portions of the scenic and recreational highway systems. [1967 1st ex.s. c 85.5.]

NOTE: The Highway Base map on the Historical and Contemporary Cultural Features Map is the USGS Topographic plats dated 53062. This plate has been revised by the Environmental Resources Section, Corps of Engineers, Seattle District, using the current map of the Washington State Highways. Copyright 1973. Copies of that map are available from: Public Information Director, Department of Highways, Highway Administration Building, Olympia, Washington 98504. Owing to the extensive renumbering of the state highway system now established on the Highway Commission's 1973 map, requiring numerous changes to the U.S. Geological Survey's Base plate, some new markers may have been overlooked on this Atlas map. It is suggested that the reader obtain the new map from the Highway Commission for reference. The new map also contains all the new exit and freeway milepost numbers now set up statewide on Interstate Highways 5 and 90 - extremely useful information for locating your position along these routes. The map also contains current information on many historical points of interest, scenic viewpoints, campsites and parks.

SCENIC TRAILS CP

Map Key	Name	Description
1	Crest Trail (Cascade Crest Trail; on Pacific Crest Trail)	Extends 457 miles within Washington from Canada to the Oregon Border. Continues as Pacific Crest Trail for 2,313 miles to Mexico. Of the 457 miles in Washington, 434 are in Federal ownership, 22 miles in private ownership and 1 mile in state ownership.

WASHINGTON STATE RECREATION TRAILS PROGRAM

The recreation trail corridors shown on the Historical and Contemporary Cultural Features Map and the selected information reprinted below, by permission of Richard Costello, Recreation Resource Specialist for IAC, have been taken from the booklet: Washington State Recreation Trails Program, 1974 prepared by the Interagency Committee for Outdoor Recreation (IAC), 4800 Capitol Boulevard, Tumwater, Washington 98504; Warren A. Bishop, Chairman; Loretta Slater, State Trails Committee Chairman; Gerald Pelton, Chief, Planning and Coordination Division. Due to space limitations, the information selected pertains only to sections in the booklet entitled: (Foreword), Chapter 1 - Introduction, Chapter 4 - Program Objectives and Corridor Concepts, Chapter 5 - Policies and Actions, Chapter 6 - A State Recreational Trail System, Appendix. Chapter 2 - Trail Programs and Chapter 3 - Trail Inventory have been omitted entirely. To conserve space, several tables and some paragraphs have been omitted from the chapters selected.

(Foreword) This State Trails Program has been prepared as a basic guide in which policies are adopted, and from which actions may be taken to allow the orderly development of a recognized system of trails within this state.

It is not intended to replace or to compete with existing trail programs of any agency of government or private organizations. Rather it is hoped that what is contained in this document will enhance and complement such programs.

Where possible the State Recreation Trails System envisioned by this document will incorporate many of the trails now existing or proposed in trail programs of Federal, state and local agencies. If a statewide system of trails is to evolve into a reality, then the full cooperation of all trail interests will be a necessity.

Chapter 1 - Introduction. GENERAL. Authority - The Washington Recreation State Trails Systems Act (RCW 67.32). In April, 1969 the Washington State Legislature adopted House Resolution 69-70 which stated that planning a system of trails was in the public interest. This resolution was supported by many public and private agencies and associations interested in recreation trails. The direct result of this Resolution was the formation of an Ad Hoc Trails Committee which played a major role in the development and ultimate passage of the Washington State Recreation Trails System Act in 1970. This Act calls for the preparation of a State Trails Plan and institutes a basic method for establishing and designating a State Recreation Trains System. Amendments to the "Trails Act" and other separate but related legislation have been passed since the original Act. The legislation passed after the Trails Act has served to increase the scope of the Trails Plan as well as to provide funds for the implementation of certain trail functions.

Purpose and Scope. This Trails Program has been prepared as an addendum to the Statewide Comprehensive Outdoor Recreation and Open Space Plan (SCORP). As such, it is not to be considered a completed document but rather the current state of an on-going planning process. Throughout this document it will be referred to as the "Trails Plan" recognizing that it is a planning program rather than a static document. Expansion of the Trails Plan and the completion of further studies will be accomplished as part of the updating and maintenance of SCORP. As a part of SCORP, this plan provides an information base and, most importantly, recommends future actions regarding the provisions of trails and trail-related programs throughout the state. It will be within the scope of this plan to:
-provide basic information regarding all types of trails and the programs of those agencies which provide or are authorized to provide such facilities;
-identify and correlate all legislation, and directives which affect the provision of trails;
-compile an inventory of all existing and potential trails in the state;
-identify and prioritize needs for trails throughout the state;
-recommend actions and programs to satisfy identified needs;
-specify and institute methods and procedures for the establishment of a State Recreation Trail System.

Through 1971 the five trail categories of trails included in the Trails Act (RCW 67.32) were:
(1) Cross-state trails which connect scenic, historical, geological, geographical, or other significant features which are characteristic of the state;
(2) Water-oriented trails which provide a designated path to, on, or along fresh and/or salt water in which the water is the primary point of interest;
(3) Scenic-access trails which give access to quality recreation, scenic, historic or cultural areas of statewide or national significance;
(4) Urban trails which provide opportunities within an urban setting for walking, bicycling,horseback riding, or other compatible activities. Where appropriate, these trails will connect parks, scenic areas, historical points, and neighboring communities; and
(5) Historical trails which identify and interpret routes which were significant in the historical settlement and development of the state.

In 1971 amendments to the Act added two more categories both of which were oriented to specific uses of trails rather than to general trail characteristics. These two new categories were:
(6) All-terrain vehicle trails which are suitable for use by both four-wheel drive vehicles and two-wheel vehicles.
(7) Off-road and off-trail areas which are suitable for use by both four-wheel drive vehicles and two-wheel vehicles.

With these and other amendments the emphasis in state trail planning since 1971 has been done with respect to specific type of trail use rather than on provisions for general categories which may involve a variety of uses. Therefore, the term "trail" as used in this plan is prefaced by one of the following six uses.
(1) All-terrain Vehicle Trail (3) Foot Trail (5) Snow Trail
(2) Bicycle Trail (4) Horse Trail (6) Water Trail
When specific trails are designated as State Recreational Trails however, direct relationship to one or more of the seven categories of the Act will be required.

As an addendum to SCORP, this Trails Plan considers the demand and needs identified in that document. As determined by the IAC Demand Survey in 1967, the citizens of the Upper Columbia planning district used urban trails more frequently than did persons in other districts. The Upper Columbia area is composed of Okanogan, Douglas, and Chelan Counties. The lowest rate of participation on urban trails was by citizens of the Northcoast district which comprises Clallam and Jefferson Counties. Non-urban trails showed the highest participation rates per capita in the Southeast district which included Walla Walla, Columbia, Whitman, Garfield and Asotin Counties. The lowest rates were recorded in the Southwest and Puget Sound districts which include Snohomish, King, Pierce, and Kitsap Counties. It should be noted however that while the lowest rates were from the most heavily populated area, the greatest number of participants also came from that district. Sufficient data has not been available from any source to determine the total impact from all users on any one area of the state nor on any one type of trail. Efforts will be made to obtain this information as part of the on-going planning process.

The emphasis in this plan has been twofold. The first was to identify existing trails and types of uses made of them, and the second to develop a procedure whereby a State Trails System can be established. Chapter 3 summarizes the inventory information gathered as part of this plan. Chpater 4 establishes Initial State Trail Corridors designed to serve as a conceptual framework for interconnecting systems of trails. Corridors are identified by the trail activities for which they will be designated as "State Recreation Trails." Chapter 5 discusses the procedure for designating specific trails as part of a State Trails System.

State funds for trail development are presently limited to specifically designated uses. Trails developed with these funds may or may not qualify for designation as part of the State Trails System. No funds have been provided for the expressed purpose of developing a State Trails System. This document will provide the basic plan for eventual establishment of a statewide system of trails to complement, enhance and, where feasible, include within it, existing trails on Federal land and parts of rapidly developing local trail systems throughout the state.

Chapter 4 - PROGRAM OBJECTIVES AND CORRIDOR CONCEPTS. PROGRAM OBJECTIVES:

During the preparation of both the Public Recreation Lands inventory of 1971 and the State Trails Inventory of 1972 it became apparent that not all trails could or should be part of a State Trails System. It could be seen that separate trails systems existed or were being developed by various levels of government to serve a variety of purposes and types of uses. Therefore in order to develop a statewide program for trails it was necessary to establish specific objectives. The objectives of the Statewide Trails Program are:
-To encourage local, state and federal government agencies to develop and maintain trails to the extent feasible.
-To encourage the development of trails which will connect existing trail systems.
-To encourage the development of trails which will connect urban areas to outlying public lands containing extensive trail use opportunities.
-To encourage the development of trails of historic or statewide significance.
-To encourage the development of trails with unique characteristics not duplicated within the local area and/or the state.
-To encourage the development of trails which provide exceptional opportunities for a type of trail use.

CORRIDOR CONCEPTS: In order to provide an orderly and systematic procedure for the development of a statewide system of trails a corridor concept was devised.

A State Trail Corridor is defined as: A trail route identified for a specific use or uses that now provides or will ultimately provide a continuous trail which: (1) connects urban centers to large federal trail systems, state trail systems, other local systems, or specific destination points; (2) provides a significant opportunity for a specific type of trail use; or (3) establishes a trail or trails in an outstanding recreational and/or scenic area where a recognized need has been established.

Four categories of corridors have been identified for this plan. They are:
1. bicycle trail corridors
2. water route trail corridors
3. foot and/or horse trail corridors
4. all-terrain vehicle trail corridors (yet to be established)

On December 10, 1973 after widespread review and adoption by the full Trails Committee, the following INITIAL STATE TRAIL CORRIDORS were presented to the IAC for adoption.

Bicycle Trail Corridors	Foot/Horse Trail Corridors
Olympic Peninsula Loop	Olympic Peninsula Loop
Southwest Washington Loop	Washington Coast
Whidbey - San Juan Islands	Tahuya Loop
Canada - Oregon via Puget Sound Basin	Whidbey - San Juan Islands
North Cascades	North Cross-State
Central Cross-State	Metropolitan Seattle - Cascade Crest
Tacoma - Yakima	Olympic - Cascade Mountain Connection
Canada - Oregon between Oroville & Tri-Cities	Central Washington Loop
Spokane - Canada	Columbia Riverbanks
Spokane - Pullman - Tri-Cities	Columbia River - Gifford Pinchot N.F.
	Snake and Grande Ronde Riverbanks
	Selkirk Mountains

Water Trail Corridors	
Freshwater:	Hood Canal
Dullayute River	Misqually River
Hoh River	Lake Washington
Willapa Bay	Sammamish River
Columbia River	Cascade River
Pend Oreille River	Snohomish River
Spokane River	Snoqualmie River
Lake Chelan	Skykomish River
Yakima River	Skagit River
Snake River	Nooksack River
Grande Ronde River	Saltwater:
Cowlitz River	San Juan Island Area

These corridors were officially adopted on December 10, 1973 by the Interagency Committee for Outdoor Recreation with the following motion:
WHEREAS, a State Trails Program has been adopted by this Committee in accordance with its authority under RCW 67.32 and
WHEREAS, the State Trails Committee has fully reviewed the "interim" corridors as adopted on May 29, 1973 and recommends certain changes and additions to those corridors, therefore,
BE IT RESOLVED, (1) That the initial state trail corridors as recommended by the State Trails Committee be adopted by the Interagency Committee as the "initial" routes within which a system of State Recreation Trails will be promoted, coordinated, and designated in the manner prescribed within the State Trails Program.

The adopted corridors are recognized as being only a beginning in indentifying and developing trail routes for a statewide system of trails. They have purposefully been limited in number in order to establish initial priorities for development of a state system of trails. It must again be emphasized that this corridor system is not intended to replace or supercede existing or proposed trail systems of federal, state or local agencies. It is intended to compliment such systems as well as to be used for a general guide for all levels of government and the private sector in planning for the future.

Chapter 5 - POLICIES AND ACTIONS. Before a State Trails System can become a reality in the State of Washington, certain policies had to be adopted and a variety of actions will need to be accomplished. This chapter discusses those policies and the actions proposed for the future. On May 29, 1973 the Interagency Committee for Outdoor Recreation acting in accordance with its authority under RCW 67.32 adopted this Trails document with a motion which state in part:
BE IT RESOLVED, (1) that the State Trails Plan as required by RCW 67.32 will hereinafter be called the Washington State Trails Program, and (2) that this program document is hereby adopted as the State Trails System Planning Guideline for the State of Washington.

The policies contained in the document adopted by that motion have been consolidated into this chapter.

POLICIES: While the State Trails System will consist only of those trails officially designated under the procedures outlined in Chapter 6, the Interagency Committee fully recognizes that the need to provide trail use opportunities is far greater in scope than is possible within the system identified in this plan. It is therefore the policy of the Interagency Committee to encourage local, state and federal agencies to develop and maintain trails systems to the extent feasible under this existing legal authority, agency policies and funding constraints.

In designing the corridor system as the basis for a statewide trails system the following policies have been adopted:
(1) The trail corridors as depicted (on the Historical and Contemporary Cultural Features map) are recognized as the official corridors within which State Trails may be designated. (Criteria for eligibility is outlined in Chapter 6).
(2) All public or private agencies having existing or proposed trails within these corridors will be encouraged to have such trails designated as part of the State Trails System.
(3) Corridors are recognized as general routes and are not to be construed as specific locations for any trail. Specific trail locations within these corridors must comply with the Recreation Trail System criteria before they will be considered for official designation. State Trail Corridors adopted shall be considered to have flexible boundaries which can be adjusted for width but not for general direction. These adjustments may be made when trails that are not within the limits of the corridors as shown can be justified on the basis of providing a necessary link in the route to accomplish the purpose for which the corridor was established.
(4) Additional corridors may be added to this plan in any of the four designated categories through the following procedure:
a. Submission of a written statement to the IAC staff identifying the corridor to be considered and with justification for its need by the public agency whose lands the largest segment of the corridor traverses, or by a recognized statewide user organization associated with the primary use of the proposed corridor or by the State Trails Committee;
b. Presentation of the proposed corridor to the IAC by its staff at a regular quarterly meeting and concurrence in the proposal by the IAC.
(5) Trails are recognized as an acceptable form of outdoor recreation in the IAC Granting Program. Funding will be in accordance with the Statewide Comprehensive Outdoor Recreation and Open Space Plan (SCORP) which states in part:
a. For local agencies:"...for the acquisition and development of corridors or for areas for recreational travel to include walking, bicycling, horseback riding or other compatible trail uses".
b. For state agencies:"...for the development and, as necessary, acquisition of trails, trailheads and auxiliary facilities...".
(6) While some portions of corridors are duplicated within use categories it is hoped that as specific trail links are constructed by operating agencies, that consideration will be given to providing opportunities for all compatible uses. Where trails be parallel routes encouraged for noncompatible uses so that necessary service facilities such as water, parking and restrooms can be jointly shared. Priority will be given to designating such trails within the system.

ACTIONS: The State Trails Program is not a static document and has been designed as an on-going program rather than as a specific plan. The following actions have commenced or are proposed to assure that the trail planning process and programs envisioned by this program are continued.

1. State Trails Committee has been activated and is working directly with IAC staff on all matters related to trail corridors and the development of the State Trails System. Membership on this committee is designed to include:
a. State agency representation from DNR, Parks, Game and Highways;
b. Federal agency representation from the Forest Service, National Park Service and BOR;
c. Local agency representation from one westside and one eastside agency who have officially adopted trails plans and who are designated by the Association of Washington Cities and Counties.
d. User group representation of one individual representing each of the six uses identified in this plan, i.e., all-terrain vehicles, bicycles, foot, horse, snowmobiles and watercraft.
e. One representative of private land owners.

2. Using the present inventory now on file at IAC all corridors indentified in this plan need to be mapped showing presently existing trails located within each corridor.

3. When all existing trails have been identified, all corridors need be re-examined to determine the appropriateness of their designation and the probability of completion of routes within a reasonable period of time. Those considered feasible should be deleted by official action of the IAC.

4. Through the State Trails Committee, eligible agencies as defined by this plan, who have trails identified under 2 above, will be encouraged to apply for State Recreation Trail System designation for such trails through the process outlined in Chapter 6 of this plan.

5. Funding for trails while recognized as a need by all levels of government has not received sufficient funding priority to allow a very significant increase in the miles of trails within Washington State. Therefore, funding priorities by all agencies should be given to the early acquisition and development of trails which will connect open links within each corridor.

6. Through the State Trails Committee new corridors should be evaluated and recommended for acceptance. When officially adopted by the IAC in the manner prescribed in this plan, steps 2 through 5 above should again be followed for each new corridor.

7. The private sector is also recognized as being a contributor to satisfying trail demand within this state. Efforts need to continue to coordinate both public and private efforts to meet rapidly expanding demand for trail opportunities in varied types of uses.

Chapter 6 - A STATE RECREATIONAL TRAIL SYSTEM. GENERAL: The Washington State Recreation Trails System Act (RCW 67.32) provides the authority and a general procedure whereby a State Recreation Trails System may be established. The purpose of this chapter is to specify criteria and working procedures within which trail designation can be accomplished within the system. The Act does not provide funding nor does it establish a future source of funds for development of such a system.

The responsibility for establishment and maintenance of trails must be with the public agencies at all levels of government and the private organizations who own and/or manage the lands on which trails now exist or will be developed.

The responsibility for making application to have these trails designated as State Recreation Trails also rests with those agencies, however the cooperation of user groups in making application for designation is anticipated and encouraged.

The process whereby trails become designated as part of the State Recreation Trails System is the responsibility of the Interagency Committee for Outdoor Recreation. Criteria, procedures, and other requirements through which a trails system for the State of Washington will evolve are the purpose of this plan and these guidelines.

ELIGIBILITY REQUIREMENTS: ALL TRAILS DESIGNATED AS STATE RECREATION TRAILS WILL BE CONSTRUCTED, MAINTAINED, AND OPERATED TO PROVIDE FOR ONE OR MORE OF THE FOLLOWING GENERAL TYPES OF USE: FOOT, FOOT POWERED BICYCLE, HORSE, MOTOR VEHICULAR OR WATERCRAFT TRAVEL AS APPROPRIATE TO THE TERRAIN AND LOCATION OR TO LEGAL, ADMINISTRATIVE OR OTHER NECESSARY RESTRAINTS. IT IS FURTHER PROVIDED THAT THE SAME TRAIL SHALL NOT BE DESIGNATED FOR USE BY FOOT AND VEHICULAR TRAVEL AT THE SAME TIME. RCW 67.32.090 (note: vehicular in the above context does not include bicycles).

All trails to be designated must be ready for and open to public use during the majority of the seasons of heavy use. Note: State Trail Corridors as identified in Chapter 4 are not to be construed as designated State Recreation Trails. The Corridors are identified as routes, within which specific trail segments could best be linked to form a continuous trail for one or more of the six categories listed on page 34.

ELIGIBLE AGENCIES: Any federal, state or local agency of government, public or private organizations having jurisdiction over an eligible trail may apply for designation of trails as components of the system.

TRAIL CATEGORIES: Trails shall be designated with reference to the type(s) of use permitted thereon. The following categories shall be used either singly or in combination for designation purposes.

All-terrain Vehicle Trail or Area	Foot Trail
Bicycle Trail	Snow Trail
Equestrian Trail	Water Trail

GENERAL CRITERIA: A trail or any segment of trail may be designated as a State Recreation Trail if one or more of the following criteria are met:
A State Recreational Trail must:
-provide access to recreation, scenic, historical or cultural features of statewide or regional significance.
or -follow, identify and interpret routes which were significant to the historical settlement and development of the state.
or -act as a connecting link within a State Trail Corridor presently identified in Chapter 4 or within future corridors which may be added to this plan by the IAC.
or -provide an exceptional opportunity for a certain type of trail use.

SUPPLEMENTAL CRITERIA: In addition to meeting one or more General Criteria, a trail must meet all of the Supplemental Criteria established for each type of use which will be permitted on the designated trail. Exceptions will be considered; provided that they are made in writing at the same time that the initial application is made for designation.

ATV Trails
-must be at least 5 miles in length.
-must be located outside or extend from urban and suburban areas of the state.
-must be signed appropriately.
-must be regulated in strict accordance with RCW 46.09.
-must be routed so that comfort stations and/or overnite facilities are available at appropriate intervals.

Bicycle Trail
-must permit safe, continuous passage under normal cycling conditions.
-must have uniform route signing so trail can be easily followed and identified.
-must have a connecting link to State Trail Corridor or otherwise act to connect local systems of bicycle trails.
-must be routed so that comfort stations and/or overnite facilities are available at appropriate intervals.

Equestrian Trail
-must provide for safe passage of two horses at hazardous points throughout length of trail.
-must have adequate parking at an established trail head.
-must be routed so that comfort stations and/or overnite facilities are available at appropriate intervals.

Foot Trail
-must permit safe, continuous passage under normal walking and/or hiking conditions with adequate allowances for two directional traffic.
-must be routed so that comfort stations and/or overnite facilities are available at appropriate intervals.

Snow Trails
-must be at least ten miles in length.
-must be available for at least two winter months of every year.
-must have adequate, legal parking near trail head.
-must have a sign in/sign out register located at head of trail.
-must be signed properly along its entire course.
-must be described properly on maps available from the operating agency.
-must be routed so that comfort stations are available at appropriate intervals.
-for snowmobiles, must permit only one-way traffic unless located on a road on which two way motorized travel is normally allowed when the road is opened to wheeled vehicles.

Water Trails
-must possess water quality acceptable for all important recreation activities which would logically occur along the trail route.
-must be reasonably safe for users.
-must have sufficient water depth to support designated use.
-must be classified as to difficulty with appropriate warnings adequately displayed.
-must be properly described on easily available maps.

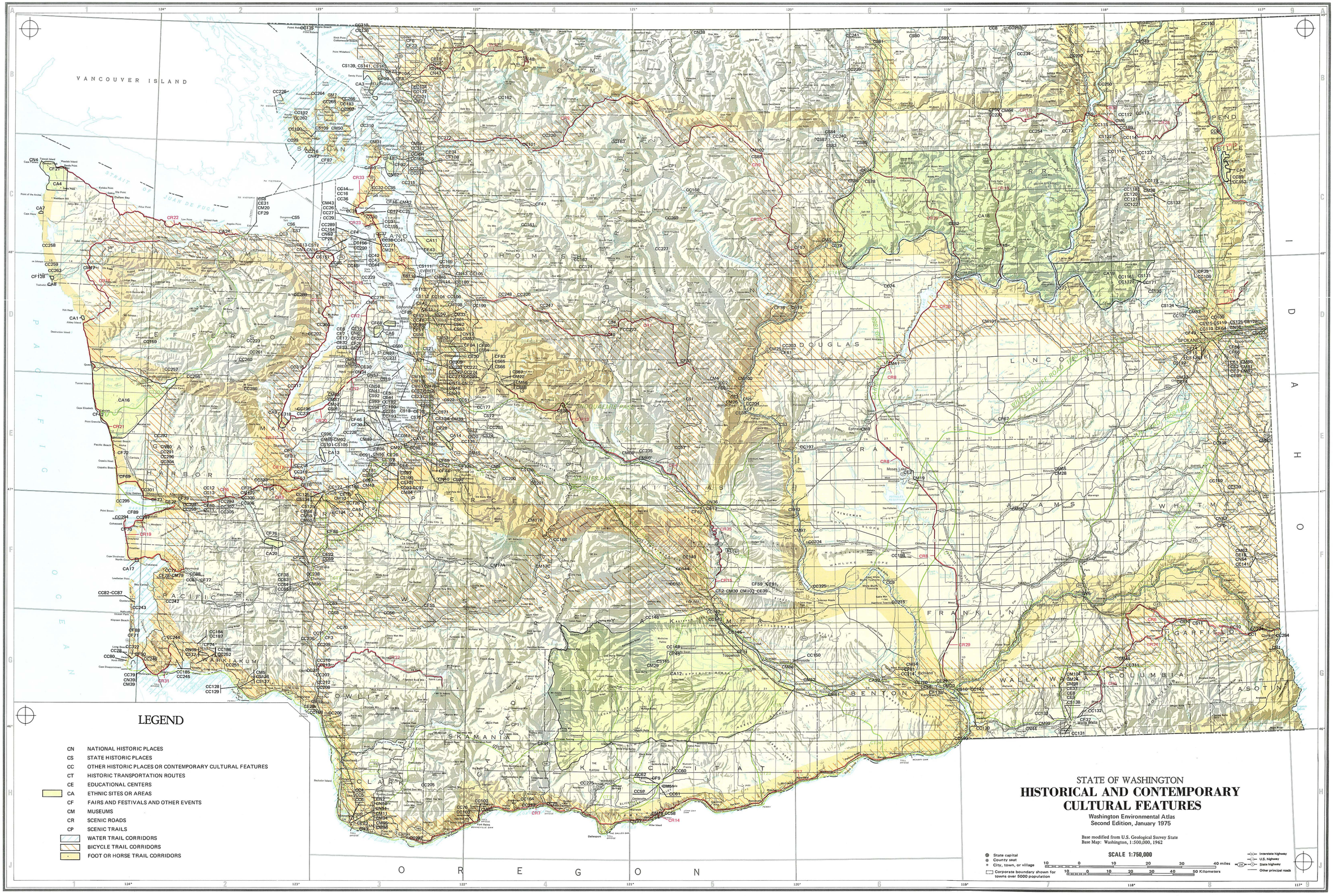
APPLICATION: Applications for designation of a trail as a component in the State Recreation Trail System shall be accepted periodically as determined by the Interagency Committee for Outdoor Recreation. Before any specific trail is considered for designation as a State Recreation Trail, an application must be submitted to the IAC showing the following information:
(a) The route of such trail, including maps and illustrations and the mode or modes of travel which will be permitted thereon;
(b) A map showing the current status of land ownership and major land uses along the designated route;
(c) The name of the agency or combination of agencies that will be responsible for trail improvement, use regulation, operation and maintenance, and a statement from those agencies indicating the conditions under which they will accept those responsibilities;
(d) Any anticipated problems of maintaining and supervising the use of the trail and any anticipated hazards to the use of any land or resource adjacent to such trail;
(e) The characteristics that in the judgement of the agency or organization proposing the trail, make it worthy of designation as a component of a State Recreation Trail or Trail System;
(f) A description of how the trail meets the established criteria for inclusion into the System;
(g) Documentation showing official approval of the proposal by all responsible agencies named in (c) above.

Application Review. All complete applications for trail designation shall be reviewed by: (1) IAC staff; and (2) a Trail Advisory Committee appointed by the Administrator of the IAC. Review shall consist of an examination of the documentation supplied with the application and a field investigation of each trail for which designation is proposed. Both portions of the review process shall be performed under the direction of IAC staff. With the advice of the State Trails Committee, IAC staff shall make its recommendations to the IAC regarding trails to be considered for official designation.

Designation. All complete applications having been reviewed by IAC staff and the State Trails Committee shall be considered for approval at a regular public meeting of the IAC. If an application is approved by the IAC for inclusion in the State Recreation Trail System, the trail shall be designated as a State Recreation Trail.

APPENDIX. NATIONAL TRAIL NOMINATION PROCEDURE: The National Trails System Act (Public Law 90-543, October 2, 1968) provides an opportunity for state and local governments and private organizations to develop and maintain trails which can be incorporated into the National Trails System. This system will include federally administered national scenic trails, like the Pacific Crest Trail, as well as national recreation trails and connecting or side trails. Those trails which are designated as national scenic trails must be of indisputable national significance. They are authorized and designated only by Act of Congress. Because of special characteristics they must be capable of promoting interest and attracting visitors throughout the United States. Two national scenic trails have been formally established and 14 other routes were named by the Act for future stdy as to their feasibility and desirability for inclusion in the system. Some of these studies are now underway.

National recreation trails, as stated in the Act, "will provide a variety of outdoor recreation uses in or reasonably accessible to urban areas". These trails are envisioned as traversing attractive countryside near urban areas, easily accessible to a large number of users, and of good design and construction. They may link local parks and recreation areas, provide scenic vistas, and even pass through the heart of a city. The opportunities for such trails have not been fully realized. If a proposed national recreation trail meets the established criteria, and if no Federal land acquisition is involved, the Secretary of the Interior may designate such a trail as part of the National Trails System with the consent of the states, their political subdivisions, or other appropriate administering agencies. Any agency or organization interested in nominating a trail should write to the Regional Director, Pacific Northwest Region, Bureau of Outdoor Recreation, and request copies of an outline for the application statement and the "Criteria for National Recreation Trails". The completed application statement, together with sketch maps required supporting data, should be submitted to


VANCOUVER ISLAND
PACIFIC OCEAN
IDAHO
OREGON
LEGEND
CN NATIONAL HISTORIC PLACES
CS STATE HISTORIC PLACES
CC OTHER HISTORIC PLACES OR CONTEMPORARY CULTURAL FEATURES
CT HISTORIC TRANSPORTATION ROUTES
CE EDUCATIONAL CENTERS
CA ETHNIC SITES OR AREAS
CF FAIRS AND FESTIVALS AND OTHER EVENTS
CM MUSEUMS
CR SCENIC ROADS
CP SCENIC TRAILS
WATER TRAIL CORRIDORS
BICYCLE TRAIL CORRIDORS
FOOT OR HORSE TRAIL CORRIDORS
STATE OF WASHINGTON
HISTORICAL AND CONTEMPORARY
CULTURAL FEATURES
Washington Environmental Atlas
Second Edition, January 1975
Base modified from U.S. Geological Survey State
Base Map: Washington, 1:500,000, 1962
SCALE 1:750,000
State capital
County seat
City, town, or village
Corporate boundary shown for towns over 5000 population
Interstate highway
U.S. highway
State highway
Other principal roads



Snow Lake

ENVIRONMENTAL USE AND RECREATIONAL MANAGEMENT AREAS

SOME PHILOSOPHICAL THOUGHTS ON WASHINGTON'S WILDLIFE

By

Eugene S. Dziedzic

INTRODUCTION. The 1960's and 70's have been times of strife, concern and reevaluation. Among the issues subjected to these tensions in our nation and the world has been the quality of our environment. Wildlife has become a symbol and its status an indicator of environmental quality.

The current effort of the U.S. Army Corps of Engineers with their Washington State environmental inventory also reflects this concern. The choice of Washington as one of the pilot project states for this inventory seems logical. Fortunately, the Evergreen State with its diverse habitats and abundant natural resources remains a part of our nation with qualities worth saving.

At the same time, decisions must be made on the direction the state will take. It is not my intent to say what the decisions should be. My role is to point out the possible consequences of those choices which affect wildlife. Society will make the final decisions, for that is and should be its role in a democracy.

Emotion and empathy may sometimes seem to override attempts at logical analysis when wildlife and others are at stake. For the record I submit that there is a place for emotion and empathy in the process, for these qualities are unique to the human animal. Man's concern for "lesser" creatures may be one of the missing links separating him from the beasts.

In addition to a sound philosophy, there is need for greater understanding of animal populations and the forces which control their numbers and distribution. Also, historical background and knowledge of management programs, along with discussion of significant habitats, should lead to better understanding.



Western Washington black bear cub

HISTORICAL BACKGROUND. Records of early explorers and settlers show that Washington Territory was not blessed with an abundance of wildlife. When they left the fish-filled rivers, white men were in great danger of starving. Virgin forests or unbroken grass prairies did not have the habitat diversity necessary to wildlife. So early travelers, as did Indians, stayed near the rivers and depended on them for their survival.

With the advent of logging and farming, changes took place. Openings in "virgin" or climax vegetation created habitat for wildlife to move into and expand. But because early loggers and farmers were not as efficient as we are today the openings they made in the wilderness were relatively small and scattered. This made conditions ideal for wildlife.

As settlers moved westward and land use intensified in Washington, changes began to take place to reverse the trend which favored wildlife. Sharp-tailed grouse were once so numerous they were killed "by the wagon load" in southeastern Washington. However, when native grasses and shrubs were eliminated by wheat farming and livestock grazing, there no longer was habitat for sharp-tailed grouse and they disappeared.

Similar in-roads were made into habitats of other native birds and mammals. But new habitats were created. Introduced game birds like pheasant, partridge and quail were more tolerant of these changed habitats so they prospered. Rocky Mountain elk were transplanted and expanded to fill ranges in eastern Washington. Some natives continued to increase, especially deer, and spread along the lowlands as they were opened up by loggers and farmers.

The post-World War II years were typified by extensive interest in hunting and fishing. Sportsmen rallied behind efforts of the Washington Game Department to protect game birds, mammals, and fish. Game farm and fish hatchery production expanded. Exotic species were introduced to broaden the spectrum of game available for harvest. Biologists were hired to provide professional guidance in resolving game management problems.

While all this was going on, the Game Department made an important decision to acquire land for wildlife as an investment in the future.

WILDLIFE RECREATION AREAS. Early in its history, the Game Department began acquiring key environments for wildlife. Because of conflicts in land use between game animals and private or even public land users, it was necessary to insure that the interests of wildlife were protected. Purchases were made to assure that migrating deer and elk had secure ranges available during critical winter periods. Similarly, wetlands and feeding areas were made available to waterfowl during migration and breeding seasons. Upland game benefited because habitat also was made available to them by purchase of waterfowl and elk ranges.

Looking back it seems obvious that this decision was a reasonable one to make. Such was not the case thirty years ago, as dedication of funds from limited budgets took courage in the face of more-immediate and popular programs. It was a pioneering effort not common to game agencies elsewhere. However, this foresight has proven to be prudent and is now paying dividends to the people of the state.

Citizens of Washington now have more than 750,000 acres of land included in Game Department's Wildlife Recreation Areas. These wildlife lands have been acquired to solve specific problems faced by wildlife. They are key habitats essential to the welfare and survival of big game, waterfowl and upland birds. All of these areas are mapped on the Zoological-Terrestrial and Environmental Use maps and each is discussed in the County Discussion section of the atlas.

At present, the Game Department operates more than 25 major Wildlife Recreation Areas. They vary from the relatively small Oyhut Marsh at Ocean Shores, which serves waterfowl and shore birds, to the huge elk and deer ranges of the L. T. Murray Wildlife Recreation Area north of Yakima. Game Department Wildlife Recreation Areas carry every conceivable type of wildlife found in the state: Mountain goat and mule deer on the Sinlahekin; elk, deer and mountain sheep on the Wooten, and Colockum; turkey, quail, chukar and deer on the Klickitat and Oak Creek; ducks, geese, swans and upland birds on the McNary, Sunnyside, Skagit and Lake Terrell areas. And so it goes, on these and the other Wildlife Recreation Areas which serve as investments for the future of wildlife.

An important additional benefit accrued to the people of the state who do not hunt or fish on lands purchased with funds from hunters and fishermen. A great variety of non-target birds, mammals, fish, reptiles and amphibians have found homes on Game Department areas. This of course is possible because of the many land and water environments which were made secure for all time. As a result, use of Wildlife Recreation Areas by those with a more passive interest in wildlife almost equals use by hunters and fishermen.

STATUS AND NEEDS OF WILDLIFE IN WASHINGTON. Impressive as the Game Department holdings may be, wildlife in Washington is vitally dependent upon land held for other purposes. Farming, grazing, urban-



One of several osprey nests on old pilings in the Pend Oreille River.

ization, logging, transportation and development projects exert a controlling force on the welfare of wildlife.

A shift in Federal farm policies means a difference of thousands of pheasants and quail to hunters. A speed-up in forest regeneration cuts short the time that logged-off land will support vegetation vital to deer. Highway location through elk range may bisect migratory routes and isolate herds from lowland winter ranges. Expansion of human population into suburbia eliminates thousands of creatures because natural habitat disappears under asphalt and rooftops. Seldom are man-made projects consciously designed to eliminate wildlife. But, rarely are these developments considered as threats to the survival of a species. Each takes its toll, however, and cumulatively the losses can be devastating.

Along with these major forces operating against wildlife are more subtle influences. Advanced agricultural technology has led to a shift from ditch to sprinkler irrigation. This means greater yields in sugar beets and spuds, but it also means loss of yellow-headed blackbirds, pheasants, meadowlarks and frogs because less "waste" land and water will be available to them.

Corporate farming has lead to ever-larger farm units in eastern Washington. Division fences are fewer because land holdings have been consolidated. And with the elimination of the narrow strips of cover along the fences has come elimination of wildlife that lived there. It may be hard to believe, but the virtual disappearance of bluebirds from parts of the Palouse can be attributed to the concurrent disappearance of barbed-wire fences. The blocking of rivers by dams had obvious impacts on wildlife. Changes in composition of fish species took place to fit the changed aquatic environment. Birds and mammals which depended on riparian vegetation are now gone. But how predictable were fish losses from gas supersaturation or time lost during migration over a series of dams?

The many forces, both dramatic and subtle, which operate on wildlife lead to a simple conclusion. Everything done to our land and water has an effect on wildlife. Decisions made for the "common good" therefore must take on a new dimension if our wildlife heritage is to be protected. Because the choice is in our hands, we must assume responsibility for our actions. If we decide that progress must proceed at all costs, so be it. But if we strive for nobler goals, we will make the necessary concessions, choose the better alternative, or even decide it may not be worth the costs in quality of life to proceed with a project which eliminates wildlife.

THE QUESTION OF "SIGNIFICANCE." With this as background, we can approach a discussion of significant areas for wildlife. It may seem dogmatic to say that all of Washington is significant. But is this more dogmatic than to impose man-made semantic criteria on a natural system? Man has the capability of creating steel and concrete and placing it almost anywhere he chooses. He can use the energy found on earth and propel a missle to the moon. But can man create an eagle, a robin, or an elk? There lies the dilemma. To protect the creatures who depend on us, we cannot rely on technology alone. We must not arbitrarily assign locations and impose conditions on living things and expect the same results we get from our machines and structures.

We have cooperated in this effort of the Corps of Engineers because we feel their motives are commendable. I must stress, however, that we cannot accept their concept of "significance." Some important well-known areas of value to wildlife are documented. But we do not choose to make a Solomon-like decision and say by default that any part of our state is of lesser importance than another.

The basic needs of wildlife are usually described as being: food, shelter, water, and space. This of course, is an oversimplification when considering the total needs of all wildlife in a state such as Washington. There is a great amount of overlap between species which use portions of the same range. Migratory species have ranges which include habitats many miles apart. Daily and seasonal cycles expand the area needed for some to survive. Breeding, feeding, resting, and other behavioral characteristics require definite areas for these activities.

Taken alone, the home range of a species depends upon complex ecosystems for support. For several species, the elements and distribution of their habitats would appear as complicated as a spider web superimposed on a maze. Likewise, to define which segment of a species' range is significant, some questions must be answered. What is really critical? Are some of the less obvious needs more important than expected? How are other animals and plants affected? Which species will replace those that are lost? Because of complex interrelationships, the basic problems of delineating those habitats which are most significant is virtually unanswerable. Again, one is forced to conclude that everything is significant. I submit that, rather than being a simplistic conclusion to this problem, it more accurately represents reality.

A few years ago the Game Department wrestled with what its role would be in decisions affecting wildlife in a changing society. We adopted a goal to guide us in making these decisions. The Corps of Engineers is on the threshold of making a similar decision. We recommend to the Corps, and to others concerned with the Corps' Washington Environmental Atlas, that they share our goal:

> "Mankind's welfare, security and destiny, along with that of all living things, are threatened by challenges to the environment. To cope with these challenges, the Game Department recognizes the need for further knowledge and the application of dynamic ideas of environmental management. In accomplishing these goals the Department will continue to create, expand, and carry out programs that emphasize the relationships of man to wildlife and other elements of our common environment. These activities enhance the abundance, quality, and distribution of avian, aquatic and terrestrial wildlife and their habitats. With thoughtful management they can be enjoyed by all people for all time under conditions worthy of mutual dignity."

EUGENE S. DZIEDZIC, M.S., Assistant Chief of Environmental Management in the Washington Department of Game, is a biologist of 24 years experience working with land-related wildlife problems and environmental management.

ENVIRONMENTAL USE AND MANAGEMENT AREAS

WILDERNESS IN WASHINGTON STATE

By
Polly Dyer

HISTORICAL BACKGROUND. The lowlands in the State of Washington were the first to lose their primeval wilderness characteristics in the first one hundred and twenty years of residence by non-Indian settlers. Most of the remaining wild lands are found either in the Cascades or the Olympics; a few sections remain in eastern Washington. The areas discussed in this paper are mostly Federal lands as detailed information was not obtained about lands under the jurisdiction of the Department of Natural Resources or the Department of Game of the State of Washington, except in one or two places.

In 1964 the U.S. Congress passed the Wilderness Act, designed to give legal protection to wilderness. Only four areas in the National Forests are formally classified as Wilderness within the National Wilderness Preservation System. Some small islands in the San Juan Islands and off the northwest coast of Washington State have been designated as wilderness in the National Wildlife Refuges previously established. In the national parks formal wilderness designation has yet to be made.

Prior to passage of the Wilderness Act (Public Law 88-577, 88th Congress, S. 4, September 3, 1964), maintaining any areas in a wilderness or natural state was at the discretion of the government's administering agencies. The National Park Act of 1916 seemed to call for perpetuation of wild country when Congress established and directed the National Park Service to administer the "...national parks, monuments and reservations by such means and measures as conform to the fundamental purpose...to conserve the scenery, and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Interpretation of this directive was often difficult; "impairment" was inevitable when providing for an increasing number of facilities for "enjoyment" of the national park system, especially as the population grew and transportation methods advanced.

Fifty years ago the U.S. Forest Service also recognized the desirability of retaining areas in the national forests as wilderness. In 1924 the Gila Primitive Area in New Mexico was the first "wilderness" area designated by the Forest Service. In the 1930's the term "primitive" was replaced by "wilderness" or "wild" (to be areas over 100,000 acres and between 5,000 and 100,000 acres, respectively). Each previously established primitive area was to be reexamined to determine if it should be kept wild. In the review process many areas were reduced in size, the eliminated sections being allocated to commodity production. For example, the Gila Wilderness today is 134,000 acres smaller than its original 533,000 acres. In the Pacific Northwest the Three Sisters Primitive area was reduced by 53,000 acres in 1954 when it became the Three Sisters Wilderness Area; the virgin forest area eliminated was opened to logging.

WILDERNESS ACT. The loss of wild lands and waters in areas thought to be protected increased the fears of uncertainty that successive administrators in the Federal agencies would assure any permanency of wilderness in the National Forests, areas of the National Park System, as well as in the National Wildlife Refuges. After some 8 years of Congressional hearings, the Wilderness Act was adopted in 1964. In it Congress recognized:

> "Sec.2(a) in order to assure that an increasing population, accompanied by an expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural condition, it is hereby declared to be the policy of the Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness. For this purpose there is hereby established a National Wilderness Preservation System to be composed of federally owned areas designated by Congress as 'wilderness areas', and these shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character...."
>
> "(b) The inclusion of an area in the National Wilderness Preservation System notwithstanding, the area shall continue to be managed by the Department and agency having jurisdiction thereover immediately before its inclusion in the National Wilderness Preservation System unless otherwise provided by Act of Congress...."

DEFINITION OF WILDERNESS

> "(c) A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."

The Wilderness Act stipulated that by 1974 all National Forest "primitive" areas be reviewed and "wilderness" recommendations sent to the President, and thence to Congress. The State of Washington has no Primitive Areas.

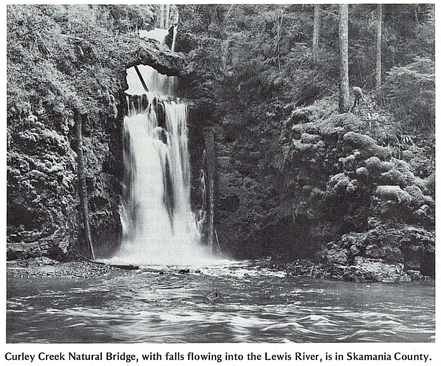
The Secretary of Interior was also required, by 1974, to review "every roadless area of five thousand contiguous acres or more in the national parks, monuments and other units of the national park system and every such area of, and every roadless island within, the national wildlife refuges and game ranges... as to the suitability or non-suitability of each such area or island for preservation as wilderness."

The agency having jurisdiction over the individual Wilderness areas designated by Congress is "responsible for preserving the wilderness character of the area." These areas are to be devoted to "the public purposes of recreational, scenic, scientific, educational, conservation, and historical use," except in some special cases. The specific exceptions to complete wilderness preservation and as cited in the Act include permission to continue previously established uses of a nonconforming nature in a specific area subject to such restrictions as the administering Secretary (of Agriculture or of the Interior) deems desirable; the President may allow certain facilities in National Forest Wilderness if he determines these are necessary to "better serve the interests of the United States and the people thereof...." Otherwise, except for the minimum requirements of administration and for "emergencies involving the health and safety of persons within the (wilderness) area...," there shall be no temporary roads, mechanical transport or other vehicles, aircraft landings, or structures and installations.

WILDERNESS STATUS TODAY. Two percent is the figure generally heard as the amount of wilderness remaining in the United States; most of this is in the West.

In Washington only four units of the National Forests are within the National Wilderness Preservation System, some within the National Wildlife Refuges, and none under the jurisdiction of the National Park Service.

In 1972 the U.S. Forest Service identified the remaining wild lands located in the National Forests. These are roadless undeveloped areas, each of 5,000 acres or more. Some of the areas had been under consideration for Wilderness status and local organizations had urged their protection for a number of years. In January 1973 the Forest Service announced a new list of Candidate Wilderness Study Areas throughout the United States. Nationally, these totaled 235 areas out of the 1448 roadless, undeveloped areas listed in the inventory. This figure is not quite accurate since many larger contiguous roadless, undeveloped areas had each been divided into two or more smaller units; this was also the case in several places in the State of Washington. Some of the individual National Forests also included in their inventories National Forest lands interspersed with private lands. This ownership situation resulted when the railroad companies were granted every other section of land in the 19th century to encourage the building of railroads. Other National Forests excluded all such "checkerboard" areas. These roadless, undeveloped areas are the last remaining wilderness lands in the country's National Forests and are frequently referred to as "defacto wilderness," i.e., existing wilderness without formal legal protection.



Curley Creek Natural Bridge, with falls flowing into the Lewis River, is in Skamania County. This site is considered by many to be deserving of special protection.

The State of Washington has no provision for classifying any of the state-owned lands for formal preservation in a wilderness condition. Locations of "defacto wilderness" in roadless, undeveloped areas remaining on state-owned lands was, therefore, not available. The State of Washington has two consolidated blocks of land, one on the Olympic Peninsula abutting the western boundary of Olympic National Park and the other in north central Washington's Okanogon region. Others are scattered in smaller holdings throughout the State.

The accompanying map shows the locations of the wilderness on the Federal lands in the State of Washington. Where more than one Forest Service area was contiguous to another, these boundaries have been eliminated. Where more than one name is listed for a map number, that generally indicates one single area divided into more than one. Names given for the Wilderness Areas and for the unroaded, undeveloped areas are those by the Forest Service. Conservation organizations in the state, as well as some of the national conservation organizations with local membership, have made recommendations for various means of protecting these last remaining wildernesses. In cases where the areas are less well known, especially if distant from major population centers, the recommendations are contingent on further field study. Breakdowns into the categories "Scenic U-3" (a Forest Service administrative term), "Roadless Area - Non Mechanized" (i.e., trail bikes and all terrain vehicles to be prohibited), or "Insufficient Information", is indicated where information was gathered. Otherwise, it is presumed that either "Scenic" or "Roadless Area" would be the minimum designation for an area where complete information has not been available to indicate whether the loss of an area as future Wilderness might be acceptable. However, areas shown as having high attributes for immediate designation as Wilderness or areas recommended for wilderness study are the result of first hand knowledge by those who have been in the region.

Recommendations contained herein are based on the best accumulated knowledge of April, 1973. Proposals from conservation organizations concerned with these recommendations are listed and appear in the Discussion Section. Generally speaking, the conservation organizations would prefer that a thorough study be made of each unroaded and undeveloped area and that all be included in the plans of the Forest Service for Wilderness Study. In the national forests these are the last areas in a natural condition, and it is felt by many that hasty decisions for road building or commodity utilization or for assigning some lesser protective category than Wilderness should be deferred. For more than 10 years groups of conservationists have been requesting an opportunity to examine areas as to their long-term potential as Wilderness prior to timber sales, road building contracts, or other planned alterations became irrevocable. This was not provided until the announcement in 1972 of the location of "defacto wilderness." A recent requirement that the Forest Service shall prepare Environmental Impact Statements prior to developing roadless areas is seen as a step in the right direction from the conservationist's viewpoint, but it is felt that the statement will not necessarily provide as full a review of an area's wilderness attributes as would be desirable.

Several of the areas on the inventory have for many years been proposed for Wilderness status by the various conservation organizations within Washington. For more thorough descriptions and discussions or the proposals by various conservation organizations information can be obtained from the organization named for the area of its particular concern, or contact can be made with the broader based groups such as The Mountaineers, the Sierra Club, or the Wilderness Society.

WILD, SCENIC, AND RECREATIONAL RIVERS. No wild, scenic, or recreational rivers within the State of Washington have been incorporated into the National Wild and Scenic Rivers System under the Act passed by Congress in 1968 (Public Law 90-42). This Wild and Scenic Rivers Act provides that:

> "...certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations. The Congress declares that the established national policy of dam and other construction at appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers or sections thereof in their free-flowing condition to protect the water quality of such rivers and to fulfill other vital national conservation purposes."

The Act designated eight rivers throughout the Nation to immediately become a part of the National Wild and Scenic Rivers System; twenty-seven additional rivers were designated for potential addition to the national system following studies to determine their qualifications for inclusion.

In Washington State the Act designated the Skagit River and its major tributaries for study, to include "the segment (of the Skagit) from the town of Mount Vernon to and including the mouth of Bacon Creek; the Cascade River between its mouth and the junction of its North and South Forks; the South Fork to the boundary of the Glacier Peak Wilderness Area; the Suiattle River from its mouth to the Glacier Peak Wilderness Area boundary at Milk Creek; the Sauk River from its mouth to its junction with Elliott Creek; the North Fork of the Sauk River from its junction with the South Fork of the Sauk to the Glacier Peak Wilderness Area boundary." Studies of these rivers are being made by the U.S. Forest Service and preliminary recommendations are in preparation.



Tiffany Mountain (8,242 feet) supports a climax "defacto" wilderness. Located in Okanogan County, the area has been cited by conservationists as deserving special protection.

The National Wild and Scenic Rivers Act established criteria, and as directed by Congress the Departments of Agriculture and Interior adopted supplemental criteria for the classification and management of rivers as "Guidelines for Evaluating Wild, Scenic and Recreational River Areas Proposed for Inclusion in the National Wild and Scenic Rivers System under Section 2, Public Law 90-452." The classification system is based on the character of a river's existing environs, and three categories are outlined in the Act:

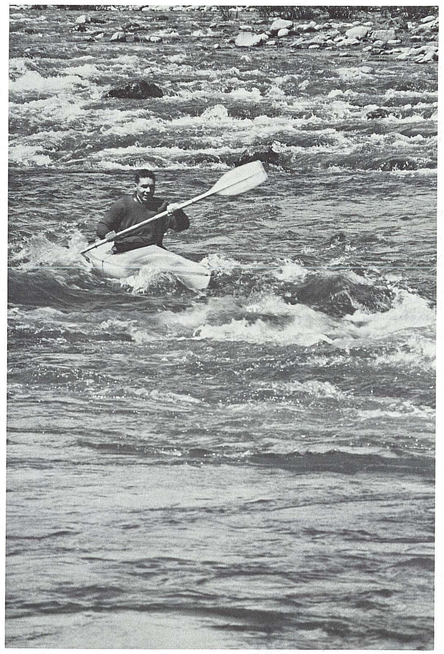
> (1) "Wild river areas -- Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America." The Guidelines provide for administration of a Wild River Area to give primary emphasis to protecting the values making it outstandingly remarkable while affording river-related outdoor recreation opportunities in a primitive setting.
>
> (2) "Scenic river areas -- Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads." Scenic Rivers are to be managed so as to maintain and provide outdoor recreation opportunities in a near-natural setting.
>
> (3) "Recreational river areas -- Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past." Management guidelines for recreational river areas are to protect and enhance existing recreational values. The primary objective is to provide opportunities for engaging in recreation activities dependent on or enhanced by the largely free-flowing nature of the river.

When considering alternative classification proposals for the Skagit River and environs, the U.S. Forest Service has initially determined that the Skagit itself could qualify only for a Recreational River classification under the criteria established by the Act. Its associated rivers, the Cascade, Suiattle, the Sauk and its North Fork, are considered by the Forest Service as appropriate for Scenic Rivers, but not sufficiently free of intrusions to permit Wild River status.

Congress limited the study to those sections of these rivers outside of the Glacier Peak Wilderness and Ross Lake National Recreation Area down to the town of Mount Vernon. Several conservation groups are recommending that the study be extended to include the Skagit River within the boundaries of the Ross Lake National Recreation Area and west from Mount Vernon to include the river's estuary at Puget Sound. Final action on the Skagit River and its tributaries will be determined by Congress.

It would also be desirable to extend Wild River classification to those portions of the Suiattle, Cascade, and North Fork of the Sauk within the Glacier Peak Wilderness. This step would afford increased protection to these rivers; under the previously reviewed Wilderness Act the President of the United States is permitted to authorize in Forest Service Wildernesses "the establishment and maintenance of reservoirs, water-conservation works, power projects...." Wild River classification could remove that potential threat. In addition, under provision of the National Wild and Scenic Rivers Act, protection from mining could be provided for those segments of rivers within Wilderness in the event they were classified as Wild Rivers.

ENVIRONMENTAL USE AND MANAGEMENT AREAS



The Middle Fork Snoqualmie River is a favorite kayaking stream. . . .

In addition to the eight rivers immediately designated and the twenty-seven given study authorization in 1968, the Secretaries of Agriculture and Interior were directed by the Act to make specific studies and recommendations "to determine which additional wild, scenic and recreational rivers areas...shall be evaluated in planning reports by all Federal agencies as potential alternative uses of the water and related land resources involved." On September 11, 1970, the two Secretaries issued a list of forty-seven rivers which must be evaluated in Federal planning reports. It includes the following Washington rivers: segments of the Snake, Columbia, and Grande Ronde; all of the Wenatchee River and its tributaries, the Chiwawa and White Rivers.

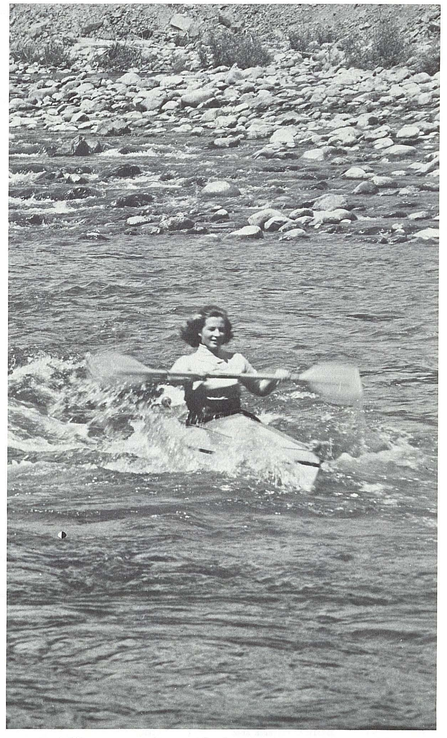
For the eight initial rivers in the National Wild and Scenic Rivers System, the Act provided that the boundaries were to include an average of not more than 320 acres per mile on both sides of the river. On these first eight, as well as all other rivers added by an Act of Congress, a limitation on fee acquisition was established to permit an average of not more than 100 acres per mile on both sides of the river. Where land is not publicly owned, other controls may include local zoning, the acquisition of scenic easements (including the air space above such land) where an area is maintained in a natural condition but the private owner remains, or other easements.

STATE SYSTEMS. The fifty States may also designate and administer wild, scenic, and recreational river areas; and in some cases either state or other locally administered rivers in these categories can become a part of the National Wild and Scenic River System. This necessitates a designation of a free-flowing river area by the State Legislature as either wild, scenic, or recreational "...permanently administered in a manner consistent with the Federal Wild and Scenic Rivers Act and Guidelines, and subsequent application made by the Governor to the Secretary of Interior."

Since 1967 various bills to effect legislation to protect rivers, streams, and shorelands have been introduced into the Washington State Legislature. A Shorelines Management Act is in force, but it does not give complete protection to all the shoreline environs of a free-flowing river. No legislation has been enacted to permit establishment of wild and scenic rivers at the State level.

In 1972 a House of Representatives' resolution did recognize some rivers could be important and in need of protection from "irreparable damage...and unregulated development". The House directed the Legislative Council "to undertake a study of certain river systems of the state, investigating alternative measures which might be adopted to protect and preserve those river systems."

Prior to this, in 1970, the Washington State Interagency Committee for Outdoor Recreation established a Rivers Subcommittee "to develop recommendations for a method and guidelines for classification and designation of the state's wild, scenic, and recreational rivers." This subcommittee, in cooperation with the Legislative Council and others, issued a "Report on Wild, Scenic, and Recreational Rivers" in November 1972. In it are outlined definitions and methodology for analyzing a River Environment and their application in determining what might be a River Classification. Pilot studies were conducted on the Snohomish-Skykomish Rivers and the Yakima River to test the methods and definitions. The first results indicate sufficient modifications and developments to prevent any part of these rivers from qualifying for Wild classification. Under this trial system of analysis, segments of each river could be eligible for either Recreational or Scenic classification. These are not final nor are they legislative recommendations, but represent the kind of knowledge to be gained when studying other rivers with the methods prepared by the Subcommittee on Rivers. The Report has been accepted by the Interagency Committee for Outdoor Recreation and would be followed should the Washington State Legislature authorize a State System of Wild, Scenic, and Recreational Rivers.



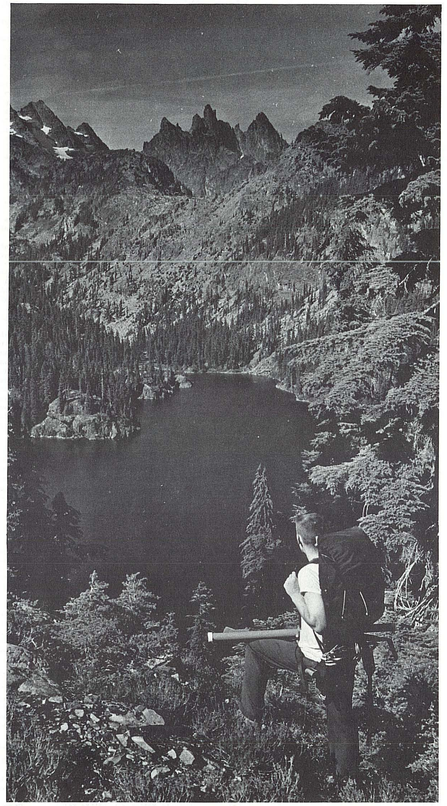
. . . . and offers numerous other recreational opportunities.

H.B. 1086 was introduced in the 1973 Washington State Legislature to inaugurate a State System of Wild, Scenic, and Recreational Rivers. Criteria would be similar to those in the National System. Listed for initial inclusion in a State system, if enacted, are the Grande Ronde, the Yakima from its source to the head of the Santa Rose dam pool, the Wenatchee from its outlet at Lake Wenatchee downstream to its confluence with the Icicle River, the Methow River, and the Kalama River.

Various state groups also recommend rivers for incorporation in the National Wild and Scenic Rivers System. Among these are the Duckabush, Hoh, and Gray Wolf Rivers on the Olympic Peninsula. In Eastern Washington the Snake River and the last fifty-seven miles of the free-flowing segment of the Columbia River near the Tri-Cities have strong support. Achieving some protective status for the Nisqually River and its immediate environment from Mt. Rainier to Puget Sound has received attention from private organizations, State, and Federal officials and agencies. A conservationist proposal for an Alpine Lakes Wilderness and National Recreation Area asks that "all portions within the area of the following rivers be designated for study and recommendations for inclusion within the National Wild and Scenic Rivers System: Cle Elum, Icicle, Miller, Skykomish (south fork), Snoqualmie (all forks), Tye, and Wenatchee."

The only major river in the State of Washington already receiving formal protection by a Federal agency for most of its length is the Queets River flowing through Olympic National Park. It provides at least one river substantially protected in its natural free-flowing state from the mountains to the point where it enters the Quinault Indian Reservation near the Pacific Ocean.

POLLY DYER is an active environmentalist of many years standing. She is President of the Olympic Park Associates, a founder of the North Cascades Conservation Council and a member of its Board of Directors since 1957, a former member of the Sierra Club Board of Directors, and a past member of the Board of Trustees of the Mountaineers. She is also included in Who's Who in the West.



This backpacker pauses before descending to one of Kittitas County's high Cascade lakes.

WASHINGTON'S NON-GAME PROGRAM

By

Carroll A. Rieck

The Washington State Department of Game has developed a non-game program encompassing a wide range of interests related to wildlife and recreation. Presently an inventory is being made of non-hunting resources and recreational possibilities in seven categories: Birds, Mammals, Reptiles and Amphibians, Fish and Invertebrates, Wildlife Nature Trails, Wildflowers and Rare Plants, and Archaeology, Geology, Historical Sites, and Vistas. One of the first program mandates will be to determine which species in the state are rare and endangered. Plans will then be drawn to protect and perpetuate them, including land acquisition. At the same time, research will be needed on several species to learn their life history requirements.

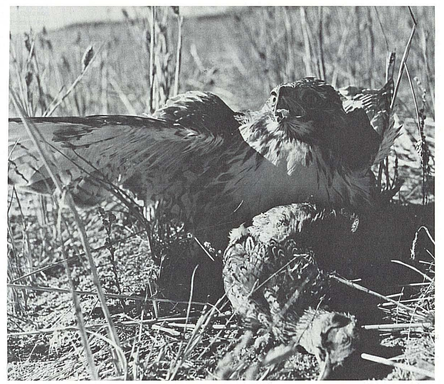
The condition of songbirds, shorebirds, sea birds, and raptors in Washington will be one aspect of the non-game program. Public demand for wildlife viewing is growing. People enjoy watching and studying birds and mammals, as evidenced by the growing numbers of backyard feeders and nest boxes, and the response of spectators when a pod of killer whales is visible near shore. Some people get a thrill just hearing a coyote call! Self-interpreting wildlife trails, with signs describing the cogent features of a particular area, can be created, providing for a variety of activities, from viewing wintering elk or blooming wildflowers to more conventional canoeing, bicycling, or snow-mobiling. Those who are not physically able to get about would benefit from an auto wildlife trail. With sufficient funding, staff naturalists could be hired to lead and interpret for groups. Pamphlets showing bird and plant lists could be provided.

The Department of Game has extensive landholdings in the state. Although originally purchased for their high wildlife habitat value or as hunting and fishing areas, these lands hold a wide variety of non-game species and recreation potentials. Several recreation areas have historical Indian campgrounds and petroglyphs which might be examined by archaeologists. Several areas in eastern Washington are endowed with fossils and semi-precious stones. Lands in the Columbia basin contain geologically remarkable canyons and coulees which can be developed for public enjoyment. In addition, there are numerous historical areas which could be developed and protected. The Department has proposed developing an old stagecoach road between Ellensburg and Yakima. Also, an Indian and pioneer portage of the Columbia will be reconstructed and reader boards installed. Pioneer graves near this portage on Bonneville Pool would be marked and fenced.

Presently, little is known of the density and distribution of the state's reptiles and amphibians. Research is needed to determine their status. Locations are being identified where large numbers of fish can be viewed during the spawning period. At the north end of Banks Lake, for example, the water is especially clear, and spiny rays can be seen at their nests.

The reality of the new non-game program, now being implemented with funds derived from the sale of personalized license plates, will finally permit management of a valuable resource which is the common property of all the State's citizens.

CARROLL A. RIECK, M.S., is Nongame Supervisor in the Washington Department of Game. He has twenty years experience with that agency on habitat improvement, land acquisition, and as regional biologist and wildlife planner. He has also served one and a half years with the Zambian Game Department on a United Nations' sponsored project.



Falconry is an exciting and demanding sport.

ENVIRONMENTAL USE INDEX

ENVIRONMENTAL MANAGEMENT AND RECREATIONAL USE AREAS

Several million acres in the State of Washington have been legally designated as areas for recreational use or environmental management. These areas include national, state, city, and county parks, wilderness areas, national recreation areas, and state game reserves. A number of other areas have been proposed for inclusion in the recreational use and environmental management systems in the state and ongoing programs of land acquisition are contributing to the development of these systems.

The following list describing places located on this map is not a complete inventory. It should be recognized that many other places in the state, on public and private land, are accorded some form of "environmental management status." For example, counties have zoned lands as "rural-recreational" in character, and in other instances statutes such as the Shoreline Management Act declare it to be the policy of the state to consider shorelines as an important environmental resource. Thus, users of the atlas should expect to find local areas which are significant from the standpoint of environmental use and/or management but which are not shown on this map.

Map Key No.	Map Index Grid Ref.	Feature	County
Parks EP			
1	B-3	Portage Island Park	Whatcom
2	D-3	Woodland Park	King
3	E-3	Point Defiance Park	Pierce
4	G-6	Columbia Park	Benton
5	D-5	Lakeshore Park	Chelan
6	B-3	Peace Arch State Park	Whatcom
7	H-5	Brooks Memorial State Park	Klickitat
8	G-1	Fort Columbia State Park	Pacific
9	G-2	Fort Columbia State Park	Pacific
10	H-3	Beacon Rock State Park	Skamania
11	G-5	Fort Simcoe State Park	Yakima
12	G-6	Sacajawea State Park	Franklin
13	F-5	Ginkgo Petrified Forest State Park	Kittitas
14	F-7	Palouse Falls State Park	Whitman
15	E-8	Steptoe Butte State Park	Whitman
16	E-4	Federation Forest State Park	King
17	D-6	Sun Lakes State Park	Grant
18	C-6	Fort Okanogan State Park	Okanogan
19	B-8	Crawford (Cave) State Park	Pend Oreille
20	C-3	Fort Worden State Park	Jefferson
21	C-3	Fort Flagler State Park	Jefferson
22	C-3	Fort Casey State Park	Island
23	C-3	Old Fort Townsend State Park	Jefferson
24	D-3	Mukilteo State Park	Snohomish
25	B-3	Moran State Park	San Juan
26	B-2	English Camp National Historical Park	San Juan
27	B-3	Sucia Island Group State Marine Park	San Juan
28	D-8	Riverside State Park	Spokane
29	D-8	Mt. Spokane State Park	Spokane
30	E-8	Steptoe Battlefield (Memorial) State Park	Whitman
31	F-8	Kamiak Butte State Park	Whitman
32	C-8	Pend Oreille State Park	Pend Oreille
33	D-8	Spokane Plains Battlefield State Park	Spokane
34	G-7	Lewis and Clark Trail State Park	Columbia
35	B-7	Curlew Lake State Park	Ferry
36	F-6	Wanapum State Park	Kittitas
37	E-6	Moses Lake State Park	Grant
38	D-6	Steamboat Rock State Park	Grant
39	C-6	Bridgeport State Park	Okanogan
40	C-6	Alta Lake State Park	Okanogan
41	C-5	Pearrygin Lake State Park	Okanogan
42	B-6	Conconully State Park	Okanogan
43	B-6	Osoyoos Lake State Park	Okanogan
44	D-5	Lake Chelan State Park	Chelan
45	E-5	Squilchuck State Park	Chelan
46	D-5	Lake Wenatchee State Park	Chelan
47	F-5	Indian Rock Paintings State Park	Yakima
48	F-5	Yakima (Sportsmen's) State Park	Yakima
49	C-4	Rockport State Park	Skagit
50	C-4	Mt. Pilchuck State Park	Snohomish
51	E-4	Lake Easton State Park	Kittitas
52	H-4	Horseshief Lake State Park	Klickitat
53	H-3	Paradise Point State Park	Clark
54	C-3	Seaquest State Park	Cowlitz
55	F-3	John R. Jackson House State Park	Lewis
56	G-2	Lewis and Clark Camp Site State Park	Pacific
57	F-3	Lewis and Clark State Park	Lewis
58	F-3	Matilda Jackson State Park	Lewis
59	F-2	Rainbow Falls State Park	Lewis
60	F-2	Willie Keil's Grave State Park	Pacific
61	F-2	Bush Pacific Pioneer County Park	Pacific
62	F-1	Twin Harbors State Park	Grays Harbor
63	F-3	Ike Kinswa State Park	Lewis
64	F-3	Millersylvania State Park	Thurston
65	E-2	Lake Sylvia State Park	Grays Harbor
66	E-1	Ocean City State Park	Grays Harbor
67	E-2	Schafer State Park	Mason
68	E-2	Potlatch State Park	Mason
69	E-3	Belfair State Park	Mason
70	E-3	Twanoh State Park	Mason
71	E-3	Jarrel Cove State Marine Park	Mason
72	E-3	Squaxin Island State Marine Park	Mason
73	D-3	Scenic Beach State Park	Kitsap
74	E-2	Lake Cushman State Park	Mason
75	D-3	Pleasant Harbor State Marine Park	Jefferson
76	D-3	Dosewallips State Park	Jefferson
77			
78	C-2	Dungeness State Park	Clallam
79	D-1	Bogachiel State Park	Jefferson
80	C-2	Sequim Bay State Park	Clallam
81	C-3	Camano Island State Park	Island
82	C-3	Wenberg State Park	Snohomish
83	C-3	South Whidbey State Park	Island
84	C-3	Deception Pass State Park	Island
85	C-3	American Camp National Historical Park	San Juan
86	C-3	Bay View State Park	Skagit
87	B-3	Matia Island State Marine Park	San Juan
88	B-3	Clark Island State Marine Park	San Juan
89	B-2	Reid Harbor State Marine Park	San Juan
90	B-2	Posey Island State Marine Park	San Juan
91	C-3	Odlin State Park	San Juan
92	C-3	James Island State Marine Park	San Juan
93	B-3	Birch Bay State Park	Whatcom
94	B-3	Blake Island State Marine Park	Kitsap
95	E-3	Penrose Point State Park	Pierce
96	E-3	Kopachuck State Park	Pierce
97	E-3	Saltwater State Park	King
98			
99	D-3	Illahee State Park	Kitsap
100	D-3	Edmonds State Park	Snohomish
101	D-3	Kitsap Memorial State Park	Kitsap
102	D-3	Fay Bainbridge State Park	Kitsap
103	B-3	Donovan State Park	Skagit
104	B-3	Larabee State Park	Whatcom
105	D-3	Lake Sammamish State Park	King
106	E-3	Dash Point State Park	Pierce
107	C-8	Fields Spring State Park	Asotin
108	D-3	Chief Seattle's Grave State Park	Kitsap
109	E-6	Dry Falls State Park	Grant
110	D-8	Spokane House State Park	Spokane
111	D-8	Indian Rock Paintings State Park	Spokane
112	B-2	Jones Island State Marine Park	San Juan
113	D-3	Old Man House State Park	Kitsap
114	B-2	Prevost Harbor State Marine Park	San Juan
115	B-3	Turn Island State Marine Park	San Juan
116	C-3	Rothschild House State Park	Jefferson
117			
118	B-7	Saint Paul's Mission State Park	Stevens
119	D-3	Fort Ward State Park	Kitsap
120	E-3	Tolmie State Park	Thurston
121	F-1	Leadbetter Point State Park	Pacific
122	C-8	Lake Newport State Park	Pend Oreille
123	C-3	Fort Ebey State Park	Island
124	E-2	Swinging Bridge Park	Grays Harbor
125	F-2	Unnamed state park	Grays Harbor
126	C-3	Northwest Island Marine Park (State Admin.)	Skagit
127	C-3	Strawberry Island Marine Park (State Admin.)	Island
128, 129			
130	E-3	Eagle Island Marine Park (State Admin.)	Pierce
131	D-3	Volunteer Park	King
132	B-2	Flat Top Island Marine Park (State Admin.)	San Juan
133,134,135			
136	E-1	Ross's Campground State Park	Grays Harbor
137	E-1	Griffith - Priday Ocean Beach State Park	Grays Harbor
138	F-1	Westhaven State Park	Grays Harbor
139	F-1	Grayland Beach State Park	Grays Harbor
140	F-1	Midway State Park Access	Pacific
141	G-1	Pacific Pines State Park Access	Pacific
142	G-1	Loomis Lake State Park Access	Pacific
143	H-3	Battleground State Park	Clark
144	B-7	Ronald McDonald Grave State Park	Ferry
145	D-5	Twenty-Five Mile Creek State Park	Chelan
146	D-6	Northrup Canyon State Park	Grant
147	D-6	Summer Falls State Park	Grant
148	F-6	Potholes State Park	Grant
149	D-8	Newman Lake State Park	Spokane
150	C-2	Lyre River State Park	Clallam
151	C-2	Tongue Point County Park	Clallam
152	E-3	Wright Park and Arboretum	Pierce
153	B-3	Mt. Erie City Park	Skagit
154	E-3	Fort Steilicoom County Park	Pierce
155	E-2	Promised Land Park	Grays Harbor
156	G-1	North Head Park	Pacific
157	G-2	Hayes Park (Crown-Zellerbach)	Wahkiakum
158	G-2	Abo Creek Park (Crown-Zellerbach)	Wahkiakum
159	G-2	K-M Wayside Park (Crown-Zellerbach)	Wahkiakum
160	G-3	Cougar Camp (Pacific Power Co.)	Cowlitz
161	G-7	Hood Park (Pacific Power Co.)	Walla Walla
162	G-6	Chiwana Park	Franklin
163	G-6	Horn Rapids	Benton
164	G-6	Two Rivers Park	Benton
165	G-7	Hover Park	Benton
166	G-7	Levey Park	Walla Walla
167	G-7	Fish Hook Park	Walla Walla
168	G-7	Big Flat Park	Franklin
169	F-7	Windust Park	Franklin
170	F-7	Marmes Rock Shelter	Franklin
171	H-6	Plymouth Park	Benton
172	G-6	Howard Amon Park	Benton
173	G-6	Leslie Groves Park	Benton
174	F-6	Scooteney Park	Franklin
175	E-3	Priest Point Park	Thurston
176	D-3	Green Lake Park - Seattle	King
177	D-3	Burton Acres County Park	King
178	B-3	South Terminal Park	Whatcom
179	C-2	Crescent Bay	Clallam
180	B-3	Sehome Hill Park	Whatcom
181	E-3	Stretch Island State Park	Mason
182	G-3	Spirit Lake Campground	Skamania

National Forests EF

Map Key No.	Map Index Grid Ref.	Feature	County
1	B,C,D,E, F-4	Snoqualmie -Mt. Baker (Formerly Snoqualmie) NF	Whatcom, Okanogan, Skagit, Snohomish, King
2	D-2	Olympic NF	Clallam, Jefferson, Mason, Grays Harbor
3	F,G,H-4	Gifford Pinchot NF	Lewis, Pierce, Yakima, Cowlitz, Skamania, Klickitat
4	B,C-5	Okanogan NF	Okanogan
5	C,D,E F-5	Wenatchee NF	Kittitas, Chelan
6	B-7,8	Colville NF	Ferry, Stevens, Pend Oreille
7	B,C-8	Kaniksu NF	Pend Oreille
8	C-8	Umatilla NF	Walla Walla, Columbia, Garfield, Asotin

National Parks EN

Map Key No.	Map Index Grid Ref.	Feature	County
1	D-2	Olympic National Park	Clallam, Jefferson, Mason, Grays Harbor
2	B-4	North Cascades National Park	Skagit, Chelan
3	F-4	Mt. Rainier National Park	Pierce, Lewis
4	C-1	Point of the Arches region (This region has been proposed as an addition to the Olympic National Park. It covers 7 miles between the Park's coastal strip and the Makah Indian Reservation)	Clallam

Wilderness areas formally designated by Congress EW

Map Key No.	Map Index Grid Ref.	Feature	County
1	B-5	Pasayten Wilderness	Okanogan, Whatcom
2	C-5	Glacier Peak Wilderness	Chelan, Snohomish, Skagit
3	G-4	Goat Rocks Wilderness	Lewis, Yakima
4	G-4	Mt. Adams Wilderness	Yakima, Skamania

Roadless areas (a Forest Service term) - DeFacto Wilderness (a conservation group term) ED

Map Key No.	Map Index Grid Ref.	Feature	County
1	B-4	Tomyhoi-Silesia	Whatcom
2	B-4	Twin Sisters-Mount Baker	Whatcom, Skagit
3	B-4	Noisy-Diosbud	Whatcom, Skagit
4	B-4	Alma Cooper	Skagit
5	C-4	Cascade River	Skagit
6	C-4	Jug Lake Falls	Skagit, Snohomish
7	C-4	Pressentin Creek	Skagit
8	C-4	Higgins Mountain	Skagit
9	C-4	Circle Peak	Snohomish
10	C-4	Lost Creek	Snohomish
11	C-4	Boulder River	Snohomish
12	C-4	Dickerman	Snohomish
13	D-4	Ragged Ridge	Snohomish
14	D-4	Monte Cristo - Grizzly Peak - Lake Wenatchee	Chelan, King, Snohomish
15	D-5	Lake Chelan (South)	Chelan
16	C-5, D-5	Entiat	Chelan
17	C-5	Lake Chelan	Chelan
18	D-5	Stormy	Chelan
19	D-5	Slide Ridge	Chelan
20	C-5	Grade Creek	Chelan
21	C-5	Hungry Ridge	Okanogan
22	C-5	Black Canyon	Okanogan
23	B-5, C-5	Lucky Jim	Okanogan Chelan
24	B-5	Liberty Bell I & II	Skagit, Okanogan, Whatcom, Chelan
25	B-5	Driveway Butte	Whatcom, Okanogan
26	B-5	Disaster Creek	Okanogan
27	B-5	Farewell Creek	Okanogan
28	B-5, B-6	Sherman Peak	Okanogan
29	B-6	14-Mile	Okanogan
30	B-5, B-6	30-Mile	Okanogan
31	B-6	20-Mile	Okanogan
32	B-5, B-6	Pebble Creek	Okanogan
33	C-6	South Ridge	Okanogan
34	D-4	Unnamed	King, Snohomish
35	D-4	Mount Index	King, Snohomish
36	D-5	Nason Ridge	Chelan
37	D-4, D-5, E-4	Alpine Lakes (includes Enchantment Area)	King, Kittitas, Chelan
38	E-5	Mission Ridge	Chelan
39	E-4	Clearwater	Pierce
40	E-4	Quartz Mountain	Kittitas
41	E-4, F-4	Cougar Lakes	Pierce, Yakima
42	F-4	Mount Aix	Yakima
43	F-4	Tatoosh Ridge Park Addition	Lewis
44	F-4	Davis Mountain	Lewis
45	F-4, G-4	Pompey Peak - Packwood Lake	Lewis
46	F-4, G-4	Goat Rocks Additions	Lewis,
47	F-4	Blue Slide	Yakima
48	G-3	Strawberry	Skamania, Lewis
49	G-3	Upper Lewis River	Skamania
50	G-3	Mount St. Helens	Skamania
51	G-4	Shark Rock	Skamania
52	G-4	Mount Adams Additions	Skamania, Yakima
53	H-3	Siouxon	Skamania
54	H-3, H-4	Trapper	Skamania
55	H-4	Indian Heaven	Skamania
56	H-4	Big Lava Bed	Skamania
57	H-4	Bear Creek	Skamania
58	D-1	Elk Reade	Clallam
59	D-1	Rugged Ridge	Clallam
60	C-2	Mount Baldy	Clallam
61	D-3	Zion	Clallam
62	D-3	Green Mountain and Mount Zion	Jefferson, Clallam
63	D-2	Quilicene	Clallam, Jefferson
64	D-2	The Brothers	Jefferson
65	D-2	Mildred Lakes	Mason
66	D-2	Wonder Mountain	Mason
67	D-2	Moonlight Dome	Grays Harbor
68	D-2	Colonel Bob	Grays Harbor
69	D-2	South Quinalt Ridge	Grays Harbor
70	D-2	Matheny Ridge	Jefferson
71	B-6	Mount Bonaparte	Okanogan
72	B-7	Clackamas Mountain	Okanogan
73	B-7	Independent-Boundary	Ferry
74	B-7	East Deer Creek	Ferry
75	B-7	Profanity	Ferry
76	B-7	Hoodoo Canyon	Ferry
77	B-7	Bald-Snow - 13-Mile	Ferry
78	B-7	Jackson Creek	Okanogan
79	B-8	Abercrombie - Hooknose	Stevens, Pend Oreille
80	B-8	Hall Mountain - Harvey Creek	Pend Oreille
81	B-8	Salmo-Priest	Pend Oreille
82	G-8	Hogback	Asotin
83	G-8	Wenaha Backcountry	Asotin, Garfield, Columbia
84	G-8	Asotin Creek	Asotin, Garfield
85	D-5	Coulter Creek Area	Kittitas, Chelan
86	B-6	Long Draw Okanogan	Okanogan
87	C-1	Point of the Arches	Clallam
88	G-3	Mount Margaret Backcountry	Skamania

Many other areas indexed under other headings could also be roadless areas or de facto wilderness, such as sections of Mt. Rainier National Park, Olympic National Park, North Cascades National Park, Ross Lake, and Lake Chelan National Recreation Areas, and the coastal islands of the state.

Wildlife refuges, state game farms, and state wildlife recreation areas WR

Map Key No.	Map Index Grid Ref.	Feature	County
1	C-1	(Cape) Flattery Rocks National Wildlife Refuge	Clallam
2	D-1	Quillayute Needles National Wildlife Refuge	Clallam, Jefferson
(NOTE: 1&2 comprise the Washington Island Wilderness)			
3	E-1	Copalis National Wildlife Refuge	Grays Harbor
4	G-2,F-1	Willapa National Wildlife Refuge	Pacific
5	H-3	Ridgefield National Wildlife Refuge	Clark
6	H-6	Umatilla National Wildlife Refuge	Benton
7	G-6	McNary National Wildlife Refuge	Walla Walla, Franklin, Benton
8	F-6	Columbia National Wildlife Refuge	Adams, Grant
9	G-5	Toppenish National Wildlife Refuge	Yakima
10	H-4	Conboy Lake National Wildlife Refuge	Klickitat
11	C-2	Dungeness National Wildlife Refuge	Clallam
12	B-3	Matia Island National Wildlife Refuge	San Juan
13	B-2	Jones Island National Wildlife Refuge	San Juan
14	C-3	Smith Island National Wildlife Refuge	Island
15	B-2	San Juan National Wildlife Refuge	San Juan
17	E-8	Turnbull National Wildlife Refuge and Pine Creek Natural Area	Spokane
18	G-2	Columbian White-Tailed Deer National Wildlife Refuge	Wahkiakum
19	C-3	False Bay and Kanaka Bay State Marine Preserves	San Juan
20	D-6	Banks Lake State Wildlife Recreation Area	Grant
21	E-6	Gloyd Seeps State Wildlife Recreation Area	Grant
22	F-1	Oyhut State Wildlife Recreation Area	Grays Harbor
23	F-2	John's River State Wildlife Recreation Area	Grays Harbor
24	E-2	Olympic State Wildlife Recreation Area	Grays Harbor
25	F-6	Crab Creek State Wildlife Recreation Area	Grant
26	F-6	Priest Rapids State Wildlife Recreation Area	Grant
27	E-6	Lenore Lake State Wildlife Recreation Area	Grant
28	E-6	Long Lake State Wildlife Recreation Area	Grant
29	B-7	Sherman Creek State Wildlife Recreation Area	Ferry
30	B-6	Sinlahekin State Wildlife Recreation Area	Okanogan
31	H-3	Shillapoo - Vancouver Lake State Wildlife Recreation Area	Clark
32	H-4	Klickitat State Wildlife Recreation Area	Klickitat
33	C-8	Little Pend Oreille State Wildlife Recreation Area	Pend Oreille
34	G-8	W.T. Wooten State Wildlife Recreation Area	Columbia, Garfield
35	G-8	Asotin Creek State Wildlife Recreation Area	Asotin
36	G-8	Grouse Flats State Wildlife Recreation Area	Garfield
37	E-6	Quincy State Wildlife Recreation Area	Grant
38	E-5	Colockum State Wildlife Recreation Area	Kittitas
39	C-3	Skagit State Wildlife Recreation Area	Skagit
40	D-4	Stillwater State Wildlife Recreation Area	King
41	G-7	McNary State Wildlife Recreation Area	Walla Walla
42	G-5,6	Sunnyside State Wildlife Recreation Area	Yakima
43	D-5	Entiat State Wildlife Recreation Area	Chelan
44	D-5	Swakane State Wildlife Recreation Area	Chelan
45	B,C-5	Methow State Wildlife Recreation Area	Okanogan
46	D-5	Chelan Butte State Wildlife Recreation Area	Chelan
47	E-3	Nisqually Delta State Wildlife Recreation Area	Thurston
48	E-6	Desert Potholes and Winchester Wasteway State Wildlife Recreation Area	Grant
49	F-2,3	Scatter Creek State Wildlife Recreation Area	Thurston
50	F-5	Oak Creek, Wenas, and L.T. Murray State Wildlife Recreation Area	Kittitas, Yakima
51	B-3	Lake Terrell State Wildlife Recreation Area	Whatcom
52	G-6	Rattlesnake Slope State Wildlife Recreation Area	Benton
53	F-6	Wahluke Slope State Wildlife Recreation Area	Grant, Franklin
54-56			
57	D-3	Ebey Island Game Farm	Snohomish
58	E-3	Auburn State Game Farm	King
59	E-3	South Tacoma State Game Farm	Pierce
60	E-3	Union River State Waterfowl Range	Mason
61	C-3	Marrowstone Island State Waterfowl Range	Jefferson
62	F-5	Ellensburg State Game Farm	Kittitas
63	G-6	Kennewick State Game Farm	Benton
64	G-7	Walla Walla State Game Farm	Walla Walla
65	F-2,3	Lewis County Game Farm	Lewis
66	C-3	Whidbey Island State Game Farm	Island
67	B-8	LeClerc Creek State Wildlife Recreation Area	Pend Oreille
68	D-8	Spokane Game Farm	Spokane

Nature trails, arboretums, or gardens ET

Map Key No.	Map Index Grid Ref.	Feature	County
1	D-3	Bellfields Nature Park	King
2	D-3	University of Washington Arboretum and Arboretum Nature Trail	King
3	D-3	Hiram M. Chittenden Locks, Gardens	King
4	D-8	Finch Arboretum	Spokane
5	E-2	Lions Park, Hoquiam	Grays Harbor

Research or educational areas EE

Map Key No.	Map Index Grid Ref.	Feature	County
1	F-8	Smoot Hill	Whitman
2	F-8	Prairie Preserve	Whitman
3	F-8	Lyle Grove	Whitman
4	F-8	Kramer Prairie Preserve	Whitman
5	C-1	Waadah Island	Clallam
6	C-1	Hukkaw Bay	Clallam
7	C-1	Tatoosh Island	Clallam
8	G-3	Douglas-fir Study Area	Cowlitz
9	C-3	Lake Crockett Salt Marsh	Island
10	C-3	Fort Discovery	Jefferson
11	D-1	"Benchmark" Research Area	Jefferson
12	D-3	Marymoor	King
13	D-3	Lake Sammamish (North)	King
14	D-3	Magnolia Bluffs	King
15	D-4	Gordon Harckworth Experimental Forest and Educational Area	Snohomish, King
16	E-3	Fern Lake	Kitsap
17	D-3	Big Beef Creek	Kitsap
18	G-1	Beard's Hollow Site	Pacific
19	G-2	Friday Harbor Laboratories	San Juan
20	B-3	Pea Pod Rocks	San Juan
21	C-3	Black Rocks	San Juan
22	C-3	Dot Rock	San Juan
23	B-2	Cactus Island	San Juan
24	B-3	Point George and Park's Bay	San Juan
25	C-3	Turn Island	San Juan
26	B-3	Parkers Reef	San Juan
27	B-2	Lonesome Cove and Limestone Point	San Juan
28	B-2	Mitchell Bay (Southerly entrance)	San Juan
29	B-2	Deadman Bay to Lime Kiln Light	San Juan
30	C-3	Cattle Point	San Juan
31	D-3	Lee Forest	Snohomish
32	B-3	Lake Louise Road	Whatcom
33	B-4	Wells Creek	Whatcom
34	C-6	Soap Lake Mountain Area and Soap Lake	Okanogan
35	E-3	Lea Hill Environmental Study Laboratory	King
36	C-2	Scientific Benthic Research Area	San Juan
37	C-3	Quaternary Research Group Scientific Area	Island, Snohomish
38	B-2	Eagle Point Scientific Research Area	San Juan
39	C-2	Friday Harbor Scientific Research Area	San Juan
40	C-3	Scientific Research Area	Snohomish
41	D-3	Scientific Research Area	Island, Snohomish
42	D-3	Scientific Research Area	Kitsap, Island
43	D-3	Richmond Beach Scientific Research Area	Snohomish, King
44	D-3	Scientific Research Area	King, Kitsap
45	D-3	Scientific Research Area	King
46	D-3	Scientific Research Area	Kitsap
47	D-3	Elliott Bay Scientific Research Area	King
48	D-3	Scientific Research Area	King
49	D-3	Scientific Research Area	Kitsap
50	D-3	Scientific Research Area	Kitsap
51	D-3	Shellfish Research Area	Kitsap
52	D-2	Scientific Research Area	Mason
53	E-3	Scientific Research Area	King
54	E-3	Scientific Research Area	King
55	E-3	Scientific Research Area	Pierce
56	E-3	Scientific Research Area	Pierce
57	E-3	Scientific Research Area	Pierce
58	E-3	Scientific Research Area	Mason
59	E-3	Scientific Research Area	Mason
60	E-3	Scientific Research Area	Mason
61	E-3	Scientific Research Area	Mason, Thurston
62	E-3	Scientific Research Area	Thurston
63	E-3	Scientific Research Area	Mason
64	E-3	Scientific Research Area	Thurston
65	D-3	Point Whitney Shellfish Lab (State Administration)	Jefferson
66	C-2	False Bay Intertidal Area	San Juan
67	B-3	Matia Island Intertidal Area	San Juan
68	B,C-3	Mt. Erie Mountaineering Educational Area	Skagit
69	B,C-3	Shannon Point Marine Science Center (WWSC)	Skagit
70	B-2	Argyle Lagoon Intertidal Area	San Juan
71	B-2,3	Turn Island Intertidal Area	San Juan
72	C-3	Iceberg Point Intertidal Area	San Juan
73	C-3	Smith Island Intertidal Area	San Juan
74	B-2	Battleship Island Intertidal Area	San Juan
75			
76	C-3	Cypress Island Marine Biological Preserve	Skagit
77	G-6	Arid Lands Ecology Site	Benton
78	G-2	National Environmental Training Center	Wahkiakum
79	G-3	Goat Marsh	Cowlitz
80	D-5	Swakane Canyon	Chelan
81	C-4	Lake 22	Snohomish
82	G-4	Meeks Table	Yakima
83	D-3	Golden Gardens - North Beach	King
84	D-3	Lincoln Beach	King
85	D-3	Quartermaster Harbor	King
86	E-3	Point Defiance - Owens Beach	Pierce
87	C-3	N.W. Environmental Education Center	Island
88	C-4	Sauk Mtn. Outdoor Education Site	Skagit
89	C-4	Silverton - Waldheim Outdoor Lab Site	Snohomish
90	B-3	Cypress Island	Skagit
91	B-3	Parkers Reef	San Juan
92	C-3	Wildflower Acres	Snohomish
93	F-4	Bethel Ridge	Yakima
94	C-2	Thomas T. Aldwell Environmental Study Area	Clallam

The preliminary atlas provided incomplete identification of certain research and educational areas. The information below presents the best descriptions now available and hopefully serves as a focus for future revisions of the atlas. The asterisks (*) indicate that location data is lacking and could not be researched in time to meet printing deadlines.

Map Key No.	Map Index Grid Ref.	Feature	County
*	*	Subtidal biological preserve - stretch of water from Lopez Sound into East Sound	San Juan
*	*	Wind River Nursery, Forest Experiment Station	*
*	*	Allen Thompson Research Center	*
*	*	Jekyll's Lagoon Intertidal Area	San Juan
*	*	The Waters of San Juan County Marine Biological Preserve	San Juan
*	*	Guss Island Intertidal Area	San Juan

National Recreation Areas EC

Map Key No.	Map Index Grid Ref.	Feature	County
1	C-7	Coulee Dam National Recreation Area	Grant, Lincoln, Ferry, Stevens
2	B-4	Ross Lake National Recreation Area	Whatcom, Skagit
3	C-5	Lake Chelan National Recreation Area	Chelan

Recreation areas, other EA

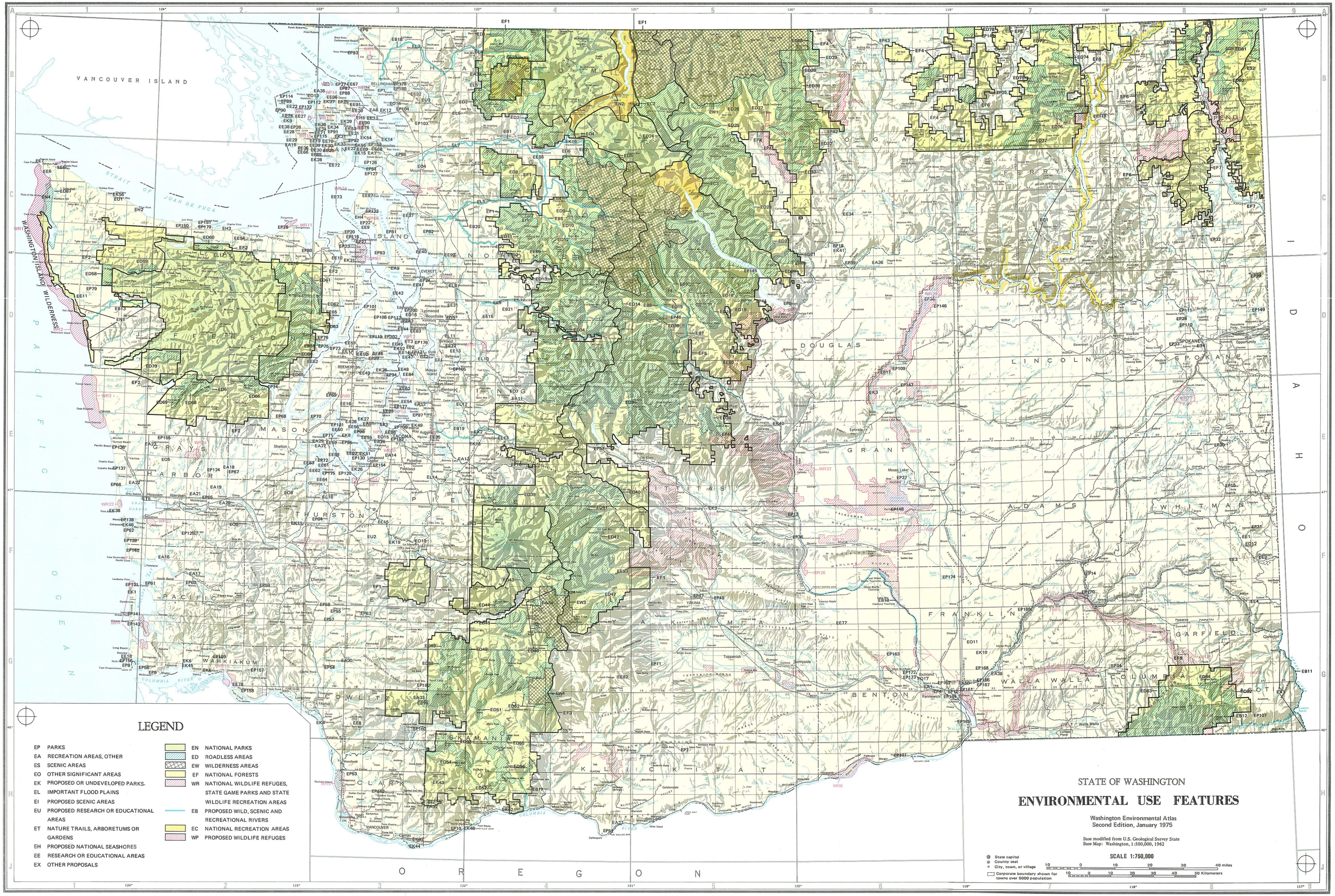
Map Key No.	Map Index Grid Ref.	Feature	County
1	G-6	Yakima River Delta and Columbia Point Recreational Area	Benton
2-5			
6	B-3	Lummi Island (Federal) Recreation Area	Whatcom
7	C-3	Heart Lake Recreation Area (State Administration)	Skagit
8			
9	D-3	Useless Bay Recreation Area (State Administration)	Island
10			
11	E-4	Twin Falls Recreation Area (State Administration)	King
12	E-3	Des Moines Recreation Area (State Administration)	King
13	E-3	Mahler Recreation Area (State Administration)	King
14	E-3	Rigney Recreation Area (State Administration)	Pierce
15	C-2	Lime Kiln Point Recreation Area (State Administration)	San Juan
16	F-2	Smith Creek Access Site	Pacific
17	F-2	Willapa Creek Access Site	Pacific
18	E-2	Shaefer State Park Access	Grays Harbor
19	E-2	Satsop Creek Access Site	Grays Harbor
20	F-2	Brady Loop Access Site	Grays Harbor
21	E-2	Black Creek Access Site	Grays Harbor
22	E-1	Newton Access Site	Grays Harbor
23	E-2	Railroad Bridge Access Site	Grays Harbor
24	F-4	White Pass	Lewis, Yakima
25	E-4	Snoqualmie Pass	King, Kittitas
26	E-3	Wollochett Bay	Pierce
27	E-3	Longbranch Harbor	Pierce
28	E-3	Vaughn Bay	Pierce
29	E-3	Buffington's Lagoon	Mason
30	G-3	Hollywood Corge Recreation Area	Cowlitz
31	E-3	Gig Harbor	Pierce
32	H-3	Silver Star Scenic Area	Skamania
33	F-3	Mount St. Helens Recreational Area	Skamania
34	F-4	White Pass Recreational Area	Lewis
35	E-3	Point Doughty (MNR)	San Juan
36	C-6	Rufus Woods Lake	Douglas, Okanogan
37	H-4,5	The Dalles Reservoir	Klickitat
38	G-7	Ice Harbor Reservoir	Franklin, Walla Walla
39	B-4	Mt. Baker Recreation Area (U.S. Forest Service administered)	Whatcom

Scenic areas (a Forest Service term) ES

Map Key No.	Map Index Grid Ref.	Feature	County
1	D-5	Tumwater Botanical area	Chelan
2	B-8	Roosevelt Grove of Ancient Cedars	Pend Oreille

Other significant areas EO

Map Key No.	Map Index Grid Ref.	Feature	County
1	C-4	Pilchuck DNR Land	Snohomish
2	C-4	Gold Basin Cr. (USFS)	Snohomish
3	D-3	Lee Forest (U of W)	Snohomish
4	C-3	Little Mountain (City of Mount Vernon)	Skagit
5	E-2	Camp Kalhanie Girl Scout Camp	Grays Harbor
6	F-2	Camp Delezene Boy Scout Camp	Grays Harbor
7	E-4	Camp Waskowitz	King
8	E-2	Camp Thunderbird	Thurston
9	E-4	Denny Moore Forest	Kittitas
10	F-3	Charles Lathrop Pack Demonstration Forest	Pierce
11	G-7	Juniper Forest	Franklin
12	F-8	Rose Creek Preserve	Whitman
13	B-2	Waldron Island	San Juan
14	B-3	Chuckanut Property	Whatcom
15	E-3	Mason Gulch	Pierce
16	D-3	Chase Lake	Snohomish



LEGEND

EP	PARKS	EN	NATIONAL PARKS
EA	RECREATION AREAS, OTHER	ED	ROADLESS AREAS
ES	SCENIC AREAS	EW	WILDERNESS AREAS
EO	OTHER SIGNIFICANT AREAS	EF	NATIONAL FORESTS
EK	PROPOSED OR UNDEVELOPED PARKS.	WR	NATIONAL WILDLIFE REFUGES, STATE GAME PARKS AND STATE WILDLIFE RECREATION AREAS
EL	IMPORTANT FLOOD PLAINS	EB	PROPOSED WILD, SCENIC AND RECREATIONAL RIVERS
EI	PROPOSED SCENIC AREAS	EC	NATIONAL RECREATION AREAS
EU	PROPOSED RESEARCH OR EDUCATIONAL AREAS	WP	PROPOSED WILDLIFE REFUGES
ET	NATURE TRAILS, ARBORETUMS OR GARDENS		
EH	PROPOSED NATIONAL SEASHORES		
EE	RESEARCH OR EDUCATIONAL AREAS		
EX	OTHER PROPOSALS		

STATE OF WASHINGTON

ENVIRONMENTAL USE FEATURES

Washington Environmental Atlas
Second Edition, January 1975

Base modified from U.S. Geological Survey State
Base Map: Washington, 1:500,000, 1962

State capital
County seat
City, town, or village
Corporate boundary shown for towns over 5000 population

SCALE 1:750,000

10 0 10 20 30 40 miles

10 0 10 20 30 40 50 Kilometers

IN PRAISE OF THE COMMON LANDSCAPE



This Seattle family enjoys a leisurely stroll on the Waterside Trail along the Lake Washington Ship Canal.

IN PRAISE OF THE COMMON LANDSCAPE

By

Richard K. Untermann

To most of us, the Pacific Northwest is the most beautiful landscape in the United States: with large forests, seemingly endless areas of water, expansive river valleys, farmlands, and dramatic mountain ranges all growing and changing as a harmonious total combining both man and nature. Although the state is comprised of numerous distinctive environmental and cultural features which have been marked on the previous maps, it also consists of many more common elements which combine to create an overall environmental quality valued by most citizens. Often the same interactions of the physiographical, biological, and cultural elements responsible for the unique environment also produce our common landscape. Additionally, these elements often duplicate in miniature those qualities found in unique elements. Our common continuous landscape, which alone seldom qualifies as being of statewide or national significance when combined with its unique features, is held in high esteem by both local and out-of-state visitors. The common landscape is necessary to give value to the unique environmental elements and to provide a setting; for without the proper balance of surrounding landscape, the unique features become meaningless.

Though man is attracted by the unique, the extraordinary, the biggest, the last one left and the oddest, he travels miles and miles over "common" landscape which he enjoys and values. This common landscape is the real backbone of our state. It provides continuity and a setting for the unique land types, the diverse biological, physiographical, and cultural interactions that occur. Man is attracted to this landscape for the fresh air, change of scene, or solitude and regeneration. Man seems impressed and pleased with natural environments, or at least environments less intruded upon than most of our urban areas. Man appreciates the correctness of natural elements, the complete forest in the right place, the trees in harmony with all the birds, animals, plants, and insects. Man is beginning to become concerned about preserving sections of the common landscape for his offspring to share and enjoy in the future.

There are many economic, social, and psychological reasons for understanding and abiding by nature's rules. All stem from the fact that we are intrinsically a part of the complex ecology of our system. Whatever we do to it will in some way be done back to us at a time and in a manner we would least suspect. Our past cultural values shape our outdoor experiences. They remind us of our dependency on our common landscape, its soils, plants, animals and the fundamental organization of life that is far more powerful than economics.

Yet, all too often, we take the landscape for granted, assuming an endless supply, assuming it is not special, assuming it will regenerate quickly, and assuming it plays a minor role in the quality of life we expect from our state. However, the opposite is generally true. This common landscape performs a vital function in our everyday lives and it is far more fragile than we suspect.

The common landscape we are concerned with is one with minimum visible intrusion by man--just plain old nature. Though appearing simple, it is in fact complex and achieves its beauty or memorable quality because of its completeness and its impressive scale and size. Completeness means that the landscape's complex interdependencies are evident. The common landscape is difficult to talk about because we are so deeply involved with it everyday. It is often nothing more than a feel for the land; its overall natural beauty, the endless topography which leaves even the least sensitive person with a sense of belonging. The common landscape varies from place to place, but there is always a proper form and style of the land which is immediately recognizable. Washington State has many scenic wonders, each symbiotically located in its natural community. The common landscape is this collection of natural communities--the world around us. The common landscape is always near; it serves us everyday, to live on, travel through and view. However, it also exists for itself as part of a much larger process. The common landscape is simply soil, plants, and animals creating a continuously evolving landscape in our narrow view, made up of isolated elements such as streams, creeks, waterfalls, valleys and rivers. More importantly, it is continuously interacting and in perfect ecological repose when its limits for adaptation are respected.

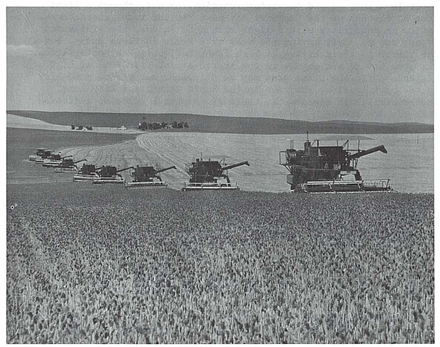
The majority of our common landscape is just as fragile as the unique elements. Man must treat the land with "knowing concern," or its balance will be disturbed and something of value will be lost. The seeming vastness of our common landscape deceives man and tricks him into believing he can do it no harm. We need an ethic stressing harmony with the land--a task made difficult by many people who, on the surface, have forgotten that there is such a thing as land.

The major attractions for most people in Washington are the mountains covering large areas along the coast. These mountains, principally our Cascade range, are part of a larger range extending from Northern California into Canada. This magnificant range includes many botanical zones and accounts for most of the forest so sought after for timber production. These mountains are characterized by sharp peaks, steep sides, high snow fields, and extensive evergreen forests. They achieved their ragged beauty through the diverse geologic and climatic processes of formation, sedimentation, brutal upheaval, volcanic action, and finally water and glacial erosion. This gives the Cascades their dramatic visual quality, the barren, steep-rock cliffs washed clean by water from melting snow and ice. Landslides blocked streams and created thousands of lakes. At the higher elevations, fir, hemlock and spruce become sparse, climatic conditions become harsh and all vegetation is short. The alpine meadow in this region is one of our most fragile landscape types; the balance of nature is easily overturned, and recovery is slow. Wildflowers and heather cover the ground, bloom profusely, and disappear. Alpine lakes dot the landscape and streams begin their long journey to the sea. The meadows are constantly changing in their own dynamic balance, yet are able to adjust only to minimum foreign intrusion.

These higher elevations, the alpine meadows, bring to mind our nine mountain passes, made up predominately of common landscapes. The road winds carefully up, crossing small streams several times; steep valley walls combine with narrow bottoms to suggest the maximum size of any intrusion. The views from the roads are subtle, often nonexistent, because of the steep terrain and denseness of the forest. Occasionally, bends in the road allow an overview, revealing lakes, the continuous carpet of the forest, and raging rivers. The irregularity and ruggedness of most passes limits the usability of the land for most human endeavors--it is unproductive and seemingly of little value.

The forest extends through all mountain passes as a dense carpet, thickening at ideal exposures, decomposing organic matter and slowly building soil, reducing erosion, purifying air and providing shelter for smaller plants and animals. The forests are packed tight, difficult to walk through, enabling each plant to support others against the high wind and shallow soil.

The Cascades appear stronger, rougher and perhaps more beautiful north of Snoqualmie Pass. To the south, the mountains are gentler and less dramatic. The peaks don't drop off as suddenly and forests are less dense. In many places fossils can be found in shale deposits left from an era when the land was covered with water. Many foothill areas contain deposits of coal, reminders of bygone times when the area was swampy with very dense vegetation. The Blue Mountains in southeastern Washington contrast with the mountains of western Washington. Rolling mountains and buttes rising from the plains are sites of important timber stands and wildlife habitats.



It's harvest time in eastern Washington's Palouse wheat country. In this early August scene a few miles north of Walla Walla, nine combine harvesters roll across the prairie gathering in Gains Wheat for North America's market places.

Where there are mountains there will also be valleys. Most valleys of the Cascade range were formed by glaciers, including the Methow, Yakima, Okanogan, Wenatchee, Skagit, Chehalis and Snoqualmie. Each has the typical "U" shape caused by glaciers. Many contain low, rounded hills near rivers, and gravel and topsoil siltation in their valley bottoms. These valleys are subject to many pressures for development. Our use of the valleys, whether for timber harvest, hiking and camping, industrial development, or second home development, must bear in mind that the landscape is extremely fragile, subject to erosion, slow to repair, and easily damaged by seemingly simple human intrusion.

No less dramatic, though not quite as large, is the Olympic mountain range to the west. These mountains were once an offshore island and now provide climatic protection for Seattle, assuming the brunt of most Pacific storms. This storm system is responsible for the giant spruces, cedars, firs and hemlocks of the well known Olympic rain forests. The extreme variations in rainfall on the Olympic Peninsula--from four inches to 300 inches at times--account for the wide range of variation in plant and animal life.

Around Seattle the common landscape is Puget Sound, the largest glacier-carved basin in the West. With many miles of shifting sand beaches first eroding and then redepositing, this inland sea is the playland for the state's three million inhabitants. The Sound's beaches are broken occasionally by rock outcroppings, numerous streams, creeks, and rivers, and wide expanses of estuaries, marshes, and deltas. These tidal areas, protected waters and sheltered coves, are biologically our most productive areas, though only yesterday they were thought of as dumping grounds for unwanted debris. The marshes produce more life per unit measure than any other landscape, thereby providing an important link in the food chain as well as a home for many small plants and animals.

Because of surrounding mountains, this area of western Washington produces a linear climate pattern varying from rain forest downpours, to mild marine climate around Seattle, to heavy snowfalls on the Cascades, and to a dry inland desert. This is a consistent landscape worn smooth by glaciation, often taken for granted, with few outstanding features to be used for man's immediate needs. However, its natural beauty is unsurpassed in the entire United States and extreme care must be used to assure its continued viability.

To the west beyond Puget Sound are located Washington's ocean beaches. These beaches are not unique or outstanding in a national sense, but nonetheless they are outstanding in a common landscape vocabulary. The same qualities reappear: a certain freshness in the air, the lack of intrusion by man, the seemingly successful harmony of the natural world, the meeting of forest and ocean where a continent ends. This timeless scenic landscape symbolizes the endless struggle between land and sea. Most cliffs are still being eroded by wave action, and rocks crumble into tiny pebbles. Our Olympic shorelines are very dramatic because of numerous cliffs dropping sharply to the water. They contrast with the more gradual shores with sand dunes and level lagoons found further south.

Closely associated with Puget Sound are major rivers, the Nooksack, Green, Skagit, Snohomish, Stilliguamish, Nisqually, and Skykomish. Each river has created a characteristic delta, rich in deposited soils, with flat and expansive farmlands; a memorable landscape achieving quality through its size, minimum urban intrusion, agricultural productiveness, traditional sparse planting, and farm and ranch character.

Most of Washington's river beds originated from glaciers, and when followed far enough exhibit the characteristic "U" shaped form. We live in a relatively young landscape--geologically speaking--for old rivers destroy the varied terrain and leave instead a soft, gently rolling landscape. Each river has a particular story constantly changing with the currents and volume of water and waterfalls. For example, the Snohomish, once a huge lake, chewed away at its glacial dam, finally becoming a river. Most rivers have recognizable features distinguishing them from others. The level river terraces on the Okanogan are badly cut by erosion and are made strikingly visible because of the absence of plant growth. The wind-eroded banks of the Columbia River Gorge were created by sand particles whipped against the pass by powerful ocean winds.

Probably the most spectacular river in the state is the Columbia. It originates high in the Canadian Rockies and travels some 1,200 miles to the Pacific Ocean. The river traverses various land forms including lava flows and the massive Columbia River Gorge where the river has cut through the Cascades. Sites such as Dry Falls mark how the river has changed its course over time.

The Cascade Mountain Range divides the state into eastern and western Washington. East of the Cascades, the landscape changes dramatically. The Cascade range blocks much rainfall from reaching the far side. The landscape is drier, creating a desert surrounded by mountains on three sides, with cold winters and very hot summers. Where there is soil, a variety of crops can be grown, but large portions are barren rock-strewn deserts, intrinsically beautiful as desert. The soil found here is porous and retains little rainfall while hot, dry air quickly evaporates whatever water remains.

The desert landscape is as fragile and as interesting as the more lush western landscapes. The Columbia Plateau, extending across state borders into Oregon, forms the backbone for much of the eastern Washington landscape. This basalt plateau was formed over long time periods by many layers of liquid rock laid down following eruption, and then eroded by wind, water, and glaciers. The Plateau also contains many unique attributes such as Grand Coulee, once a part of the Columbia River, with its geological and archeological remnants, numerous potholes, channels, fossil caves and ancient lava flows.

Many lakes dot the region. Lake Chelan, one of the major glacial lakes in the United States, was formed when glacial deposits blocked water passage at Chelan. The fjord-like lake, varied in its length, is one of the deepest lakes in the country. The common landscape there is sparse pine and fir reaching down to the lake on the west, with stubble grass and sagebrush covering steeply rolling foothills. Apple orchards now planted there on the well-drained soils, and the perfect climate for apple-growing, provide a visual and aromatic delight when the trees are in full bloom.

Southeastern Washington is rural Washington, with thousands of acres of open rolling farmlands. Moses Lake, Walla Walla, Palouse and Pullman are all prosperous wheat and farming regions. But it wasn't always that way; wheat wasn't planted until around 1900. Farming has been continuously increasing as more irrigation water becomes available. New crops are being introduced, and the character of the landscape is changing as more lands become irrigated. The Yakima Valley is now a fruit growing region producing apples, pears, grapes, peaches, melons, and hops. Further east lies the Inland Empire, known for its lumber and agricultural production. To the south is the Palouse country, one of America's most productive wheatlands, often called "the dust country" after the disastrous dust storms in the 1920's and 30's. These storms were caused by poor farming practices which eroded valuable top soils. Ranching is found in areas with poor soil not suitable for wheat or vegetable growing.

Our common landscape is the result of millions of years of building and destruction, of earthquake, arctic cold, and intense heat. There are many functions continuously occurring--climatic, geologic, and hydrologic--which will continue regardless of what man does. The main problem is one of timing. Nature has more time than man does, and is capable of healing any wound over many thousands of years. Man usually cannot wait, and therefore we must find ways to integrate man's endeavors with the landscape by creating productive harmony between nature and man. The common landscape is the stage for most of man's activities. It is often more fragile than we acknowledge, and has public value when used within its' ecological boundaries. Values of the common landscape can accrue to either nature or man, or to both. A coherent, workable, common landscape evolves where there is a coherent definition, not of man, but of man's relation to the world and to his fellow men.

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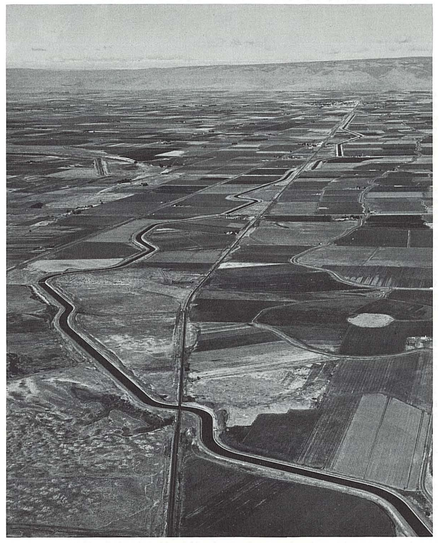
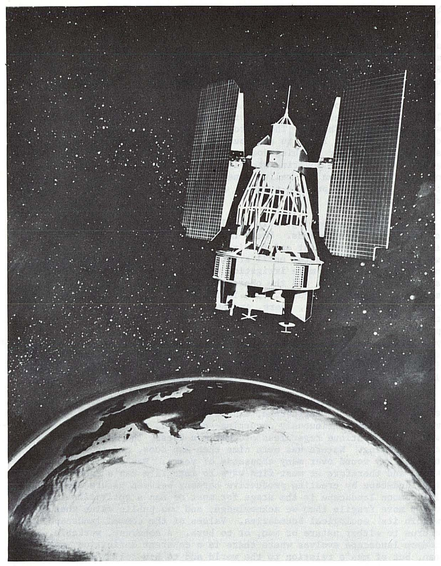


Farmland in the Quincy Valley of eastern Washington, with town of Quincy in the distance.

EARTH RESOURCES TECHNOLOGY SATELLITE IMAGERY



Artist's concept of the ERTS-I, the first U.S. Satellite program devoted exclusively to the study of earth resources from space.

REMOTE SENSING — AN OVERVIEW

By

John C. Garcia

What you see in the photograph opposite is Washington in 1972. This is but a frozen moment in time, an instant within a steady progression of natural and man-induced processes, recording one page in the history of Washington. The product of remote-sensing technology carried aboard a satellite, the photograph is included in the atlas to provide a current picture of the state as an overview affording some added perspectives about our environment.

Placed at the end of the introductory papers and maps, the photograph augments aspects of foregoing subject matter. Many environmental features evident in patterns of land use such as agriculture in the east and urbanization in the west may be noted. Botanical features such as extensive clearcuts in the Cascades can be clearly seen and their effect on wildlife habitats surmised. A striking geological feature showing up in sharp detail in the east is the extensive network of channeled scablands. Old dry stream courses can also be seen and might have significance for archeological studies of prehistoric Indian settlements. This satellite photograph has a number of potential uses - many of which the reader may invent for his own purposes.

THE SATELLITE IN ORBIT. Changing land-use patterns and increasing scarcity of vital natural resources has led to the development of the Earth Resources Technology Satellite Program which entails, in part, the photographing of the entire United States for purposes of resource inventory and monitoring of environmental pollution. Launched in July, 1972, the satellite (ERTS-1) is still taking pictures. A modified Nimbus weather satellite, it is on a near-polar sun-synchronous orbit at an altitude of 569 miles which permits repeated site coverage every 18 days during daylight hours. The satellite orbits Earth 14 times per day, or every 103 minutes, at a speed of about 1,700 miles per hour.

The interaction of the Earth's normal direction of rotation and the satellite's fixed polar orbit creates the means by which an orderly progression of evenly-sequenced pictures are taken of Washington starting directly over Pend Oreille County in the northeast corner and ending over the Olympic Penninsula in the west. Four of the satellite's orbits each day cover the state completely. The image area in each picture frame is 115 miles by 115 miles or about 13,000 square miles of land area.

THE SATELLITE PICTURES. As the satellite passes over, taking pictures in a 115 mile swath, each succeeding orbit overlaps the previous one by about 11 miles and each frame taken along the orbit overlaps the previous frame by approximately the same amount. This overlap is used to match frames when a composite photomosaic of the entire state is constructed by expert photogrammatrists. The photograph here was assembled by the Cartographic Division of the Soil Conservation Service, U.S. Department of Agriculture. They selected from frames taken July through October, 1972, to construct this mosaic. Due to the high altitude at which the pictures were taken, the mosaic does not contain distortions characteristic of much aerial photography. It is very near to being perfectly orthographic, that is corrected for tilt and changes in scale due to ground altitude change.

The picture-taking mechanism is not a film process. It is accomplished by remote sensing through use of a multispectral scanner imaging system (MSS). The MSS is a four-band line-scanning device which records wavelengths of reflected light created by solar energy. The various light frequencies reflected are recorded electrically as information bits (pixels) sequentially picked up by means of a rapidly oscillating mirror positioned behind lenses pointing down at the Earth. The scanner's video signal is transformed to a digital base and telemetered to receiving stations on Earth where it is stored on tapes and later sent to the NASA Data Processing Center in Sioux Falls, South Dakota. There, it is converted to digital tapes and photographs.

For each data bit recorded there are 15 different tonal values possible. This is the case for any one of the four bands, MSS-4, MSS-5, MSS-6 and MSS-7, which together comprise the total information content recorded in each photograph frame. Place the four bands together in perfect register and you get a color photograph composited from the negatives. Print each band separately and you get photographs in different color hues, all convertible to black and white prints. The photograph in the atlas is a mosaic of frames from band 5 only. The possible data combinations per discrete area recorded in each frame by the four bands can be extremely large, increasing resolution of fine detail discernable in the photographs. Each of the four bands recorded in each picture frame are separable and have certain unique properties which are most beneficial for interpretation of various environmental characteristics.

Band 4 records the visible blues and greens of the light spectrum. This band has good water-penetrating capabilities useful for detection of water pollution, especially suspended solids like silt. The band is sensitive to light scattering and can be used to detect smoke and other types of air pollution.

Band 5 records the visible reds of the light spectrum. This band is suitable for vegetation interpretation. Various vegetation types appear in several dark tones. Non-vegetated conditions, like urban areas, appear in light tones. Snow appears white. The band can detect forest clearcuts, irrigation projects and associated types of agricultural activities. It was also very useful in updating the map of the Life Zones of Washington which is presented on the Life Zone Overlay in another section of the atlas. Techniques used to accomplish that mapping revision are discussed below.

Bands 6 and 7 record the near infrared wavelengths of the light spectrum. Band 7 is particularly valuable for detecting moisture and surface waters which show up conspicuously black in the photographs. When the sun angle is low, physiographic land forms on the earth are enhanced in the photographs by shading effects. Band 7 is useful for interpretation of geological features because dense reflecting surfaces, such as rock, appear black in contrast with vegetation - the vegetation taking on lighter tones. An infrared composite of MSS-6 and MSS-7 provides a "false color" image useful for interpretation of vegetation health by evaluation of various shades of red in the photograph. False color images are also useful for detecting forest clearcuts, agricultural areas, urbanized areas , and some types of air and water pollution.

PREPARATION OF ATLAS LIFE ZONE OVERLAY. Due primarily to zoological considerations in the development of this atlas edition, it was found suitable to include a current detailed Life Zone Overlay for use with all the maps and ERTS photograph in order to integrate and conveniently organize the large amount of zoological data provided by contributors. Due also to the fact that all references to animal species distribution with respect to habitat type and Life Zone were provided within the context of C.Hart Merriam's System of Life Zones, it was deemed appropriate to maintain but update that system for use in the atlas.

While the overlay was designed to mainly augment zoological information, it also has general utility for botanical considerations. For refined botanical detail however, the current system of vegetation zones and plant community associations set forth by J.F. Franklin and C.T. Dyrness in their book Natural Vegetation of Oregon and Washington is the guide for most botanists. The ideal Life Zone Overlay for this atlas, if it were possible to develop it in some future edition, might well be based upon the vegetation zones and plant communities described by those authors. This would require much work by zoologists to inventory habitats afforded by those defined communities and redevelop species lists accordingly. Perhaps one day such work may be accomplished and a detailed overlay prepared of equal utility to both zoologists and botanists. It would seem feasible to organize a cooperative program between educational institutions in Washington for purposes of zoological inventory of the plant communities described by Franklin and Dyrness. Such work would establish a firmer foundation for biotic inventory reflecting flora and fauna joined within a total-community context worked out mutually by both scientific disciplines.

The author was charged with the task of preparing a current and detailed Life Zone Overlay that would match up with the atlas maps and ERTS photograph. The primary reference materials used were: (1) a planimetric map entitled "Life Zones of Washington" drawn in 1953 by Bess O.M. MacMaugh from information by Charles V. Piper dated 1906; (2) a base map of Washington showing physiographic relief published by the U.S. Geological Survey - the same base used on all the maps in the atlas; (3) band 5 of the ERTS mosaic photograph prepared by the Soil Conservation Service; (4) state-wide weather maps. To achieve precise register, all map materials and the ERTS photograph except the weather maps, were scaled and diameters photoenlargement calculated by Larry Signani, Map Survey Branch, Seattle District Corps of Engineers. The base relief map negatives and ERTS mosaic imagery were obtained from Dr. John C. Sherman, Department of Geography, University of Washington. Dr. Sherman provided invaluable advice throughout the conceptual development of the atlas maps in conjunction with ERTS image. Match of all materials was maintained throughout the mapping revision by use of register pins.

The Life Zone map drawn by MacMaugh was based upon Merriam's system of Life Zones. It is now out of date with respect to changing land-use patterns in the state and not of sufficient detail for most effective use in the atlas. Due to the fact that it was printed on paper, an unstable base, its image was found to be distorted when attempt to register it to the U.S.G.S. base map was made. The high mountain valleys however, fell into good alignment and these were the points of register maintained throughout the process. MacMaugh's map was photoenlarged and provided as both a film negative and a file positive. The U.S.G.S. base map and ERTS photograph were both provided as positive prints. Scale at which the work was performed was 1:750,000 - the same scale presented in the atlas. Upon enlargement, it was found that both of these prints matched very closely. A single clear sheet of stable base Mylar was pin-registered with the other materials; the revised Life Zone map was prepared on this Mylar and work was done on a light table. Missy Deardorff, Botanist, University of Washington, assisted in the preparation of the Life Zone Overlay.

The general perimeters of the Life Zones were first sketched on the Mylar using MacMaugh's map as a guide. This procedure provided the broad distribution pattern of the Life Zones in the state.

Next, we placed the Mylar over the base map showing physiographic relief. Locations of Life Zone perimeters were then adjusted to fit topographic characteristics of this map. For example, the Upper Sonoran Life Zone winds along the Columbia River in the northeastern part of the state essentially confined by the immediate river valleys and contiguous ravines. Location of this Life Zone in that region could accurately be defined with the base relief map. Patterns of mountain ridges and valleys also afforded better definition of perimeters. This step greatly increased the resolution possible for the Life Zone mapping. Due to distortion in the original map some border lines, especially in the northeastern part of the state, had to be realigned drastically to fit appropriate topographic features. By this procedure, more accurate definition of the Life Zone pattern was obtained and transfer onto stable base material was thus achieved with little distortion.

Next, the Mylar was placed over the ERTS photograph for further correction by methods of photointerpretation. Tonal characteristics of the mosaic and geographic location were the two primary elements utilized in this procedure. Tonal characteristics matched particular tones with surface characteristics. Heavily forested areas are much darker than treeless areas. Snow covered areas are lighter than areas with no snow. Two main considerations about locations guided our interpretation. First, though a light area at the top of the Cascades may have similar tonal characteristics in comparison with a light area near Tacoma, the similarity is not due to their having the same Life Zones in these areas, but due rather to their having similar light reflecting characteristics. One area may be wet meadow in the Arctic-Alpine Life Zone at high altitude while the other area may be a lowland wet meadow community in the open treeless prairies in the Humid Transition Life Zone. Though similar in appearance, their geographical location indicates what you are seeing. The second consideration about location concerned Life Zone perimeters. Once an area was established as a particular Life Zone, it was evaluated to determine whether there were identifiable tonal differences contrasting with adjacent Life Zones. In some cases, like the Arctic-Alpine and Hudsonian Life Zones, the distinction was sharp. In other cases, as with the perimeter separating the Hudsonian and Canadian Life Zones, the distinction was very faint or altogether absent. Weather maps and reference to altitudes were adjunct information used to clear up questionable situations. Definition of the Life Zone perimeters was further edited for accuracy by botanists David Deardorff and David Every, Department of Botany, University of Washington. The approximate altitudes of the Life Zones printed on the overlay and entered on the Life Zone Habitat Matrix were provided by Douglas Henderson, Department of Botany, University of Idaho. Henderson has studied Washington's Life Zones first hand.

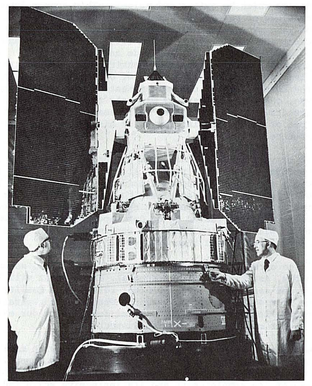
The delineation of the Life Zones, though more detailed and accurate than previously recorded, are still generalized. This treatment does not attempt to address the ecotone problem. The perimeters are not fixed; this is a mapping of the state's Life Zone distribution at one point in time. The patterns are susceptible to change through the action of climate, fire, geological processes and the activities of man. More sophisticated utilization of ERTS imagery is possible for this kind of Life Zone mapping, but facilities required for analysis are not available in Seattle at this time. The use of multi-band matrices of signatures, especially utilizing original data pixels, would increase accuracy of interpretation and identify in a quantifiable fashion more detailed reflectance characteristics of Washington's Life Zones.

MORE ON PHOTOINTERPRETATION. The degree of resolution possible with the photograph here is the visual discernment of objects of as small a diameter as 70-80 meters, or about one acre, under optimum conditions of tonal contrast. Straight linear objects can sometimes be more readily seen such as the two floating bridges on Lake Washington, in Seattle and the Tacoma Narrows Bridge, and the Hood Canal floating bridge. Surface waters of area size above 10 acres can be scaled and measured with near 100 percent accuracy, but band 7 is better for this work than band 5 due to inherent tonal contrasts favoring sharpness of streams and water bodies. ERTS imagery has been used successfully for a surface water inventory in the San Juan Islands.

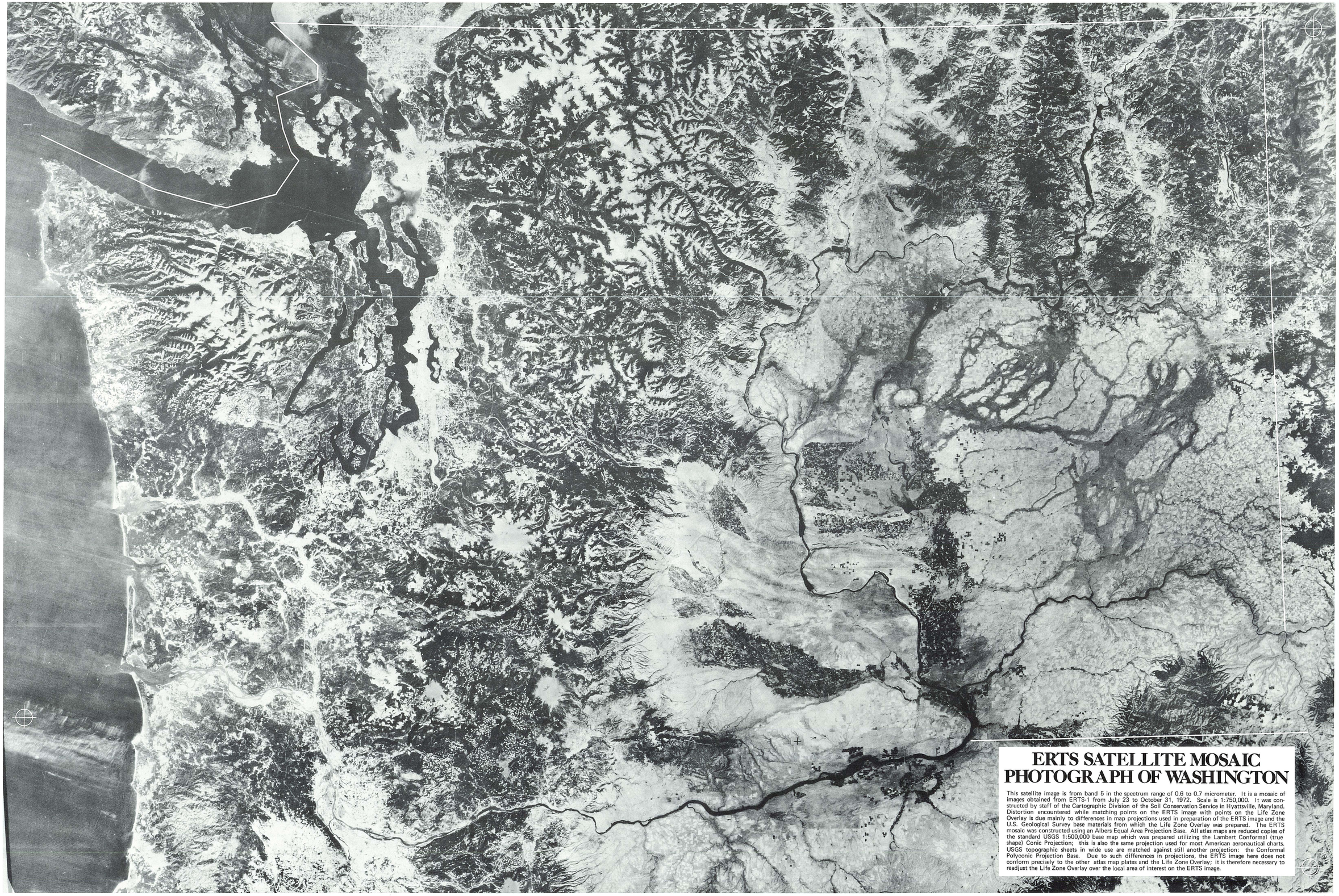
A clear depiction of the photograph's scale is provided by study of the small circular irrigation units in eastern Washington. Many farms there use an irrigation device that is a single series of connected pipes, one quarter of a mile long, having numerous sprinklers spaced along its length. The pipe is held supported above the crops on a series of wheels. The pipe pivots at the source of water supply while the entire length slowly moves in a circle one half mile in diameter, irrigating as it travels. The resultant lush vegetational growth, in the form of round black dots in the photograph, contrasts sharply with the surrounding arid landscape. Most of this kind of farming is concentrated in the Upper Sonoran Life Zone. In several places, four dots may be seen grouped together, forming square blocks. Each block is exactly one square mile in area, and matches the scale on all of the eight atlas maps.

SOURCES OF FURTHER INFORMATION ON AVAILABLE ERTS IMAGERY. For an index of ERTS imagery available covering Washington, and for information on availability and costs of prints and negatives of mosaics of the Continental United States and Alaska, write to: Remote Sensing Coordinator, Resource Inventory Section, Department of Natural Resources, Olympia, Washington 98504. Additional information about available materials may be obtained from: Earth Resources Observation System Data Center, U.S. Geological Survey, Sioux Falls, South Dakota 57198. A bibliography of research endeavors employing ERTS technology may be obtained by writing to Director, Remote Sensing Applications Laboratory, Department of Urban Planning, 12 Gould Hall JO-40, University of Washington, Seattle 98195. The same bibliography and a booklet on applications of imagery may also be obtained from the Department of Natural Resources in Olympia. Also of value on ideas concerning applications for ERTS imagery are publications of the Cold Regions Research and Engineering Laboratory (CRREL), Corps of Engineers, located in Hanover, New Hampshire. Their Technical Report 241, "An ERTS View of Alaska, Resources Based on Satellite Imagery," June, 1973, describes analysis of seven surfical geology categories, eight vegetation categories, and four permafrost categories. The data collected by use of the imagery correlated favorably with known ground truth information.

JOHN C. GARCIA is Natural Systems Specialist for the Remote Sensing Applications Laboratory, Department of Urban Planning, University of Washington. He holds a B.S. in Interdisiplinary Studies and an M.S. in Wildlife Biology from the University of Washington.



The two scientists beside the satellite give some idea of the size. A data collection system aboard the craft gathers environmental information from earth-based platforms and relays it to the ground processing facility.



ERTS SATELLITE MOSAIC PHOTOGRAPH OF WASHINGTON

This satellite image is from band 5 in the spectrum range of 0.6 to 0.7 micrometer. It is a mosaic of images obtained from ERTS-1 from July 23 to October 31, 1972. Scale is 1:750,000. It was constructed by staff of the Cartographic Division of the Soil Conservation Service in Hyattsville, Maryland. Distortion encountered while matching points on the ERTS image with points on the Life Zone Overlay is due mainly to differences in map projections used in preparation of the ERTS image and the U.S. Geological Survey base materials from which the Life Zone Overlay was prepared. The ERTS mosaic was constructed using an Albers Equal Area Projection Base. All atlas maps are reduced copies of the standard USGS 1:500,000 base map which was prepared utilizing the Lambert Conformal (true shape) Conic Projection; this is also the same projection used for most American aeronautical charts. USGS topographic sheets in wide use are matched against still another projection: the Conformal Polyconic Projection Base. Due to such differences in projections, the ERTS image here does not conform precisely to the other atlas map plates and the Life Zone Overlay; it is therefore necessary to readjust the Life Zone Overlay over the local area of interest on the ERTS image.

COUNTY DISCUSSION

Adams

ADAMS COUNTY HISTORICAL MUSEUM
Located at Lind, pioneer exhibits and paintings by local artists are featured. See Historical-Cultural map.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Adams County discussion are plotted on the Archeological map and listed in its index.

BURROUGHS HOME
Furnished home of pioneer Ritzville physician, Frank R. Burroughs. See Historical-Cultural map.

CARIBOO TRAIL
See Okanogan County.

CHANNELED SCABLANDS
See Lincoln County.

COLUMBIA NATIONAL WILDLIFE REFUGE
The refuge is located on Crab Creek, just below Potholes Reservoir. It is managed primarily for waterfowl, encompassing 28,978 acres. Approximately 40 percent of the refuge is open to public hunting. See Environmental Use and Zoological-Terrestrial maps.

CRAB CREEK
A free-flowing stream through the channeled scablands and central plains divisions of the Columbia Basin. It is a rich upland bird and waterfowl habitat. Several complete skulls of extinct Bison along with horn cores and other fossils have been collected here. It is also a nesting area of the long-billed curlew. See Zoological-Terresterial map.

DRUMHELLER CHANNELS
This is one of the most spectacular portions of the butte and basin scablands of the Columbia River Plateau. Features of the area were formed by immense floods which eroded a complex network of channels, rock basins, and small abandoned cateracts. Successive floods created gigantic cascades which cut 300 feet into a previously intact divide. The Drumheller Channels were the outlet for glacial meltwater from the Quincy Basin, which served as a collecting basin for waters from Grand Coulee, Soap Lake, Dry Coulee, and Long Lake Coulee. Additionally, a number of basaltic craters were formed by eruption from beneath the lava of the Columbia River Plateau. These basaltic volcanoes and their craters are visible today. The site has been recommended as a natural landmark.


Drumheller Channels - Lower Crab Creek

DUNE AREA
A modest-sized dune area occurs in the south-central part of the county, remote from any river. See Geological map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Adams County discussion are plotted on the Historical-Cultural map and listed in its index.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Adams County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LIND COULEE SITE
This site contains the earliest known evidence of man in the State of Washington. The dating is not conclusive at present. The people who occupied the site hunted a large form of pre-historic bison. See Archeological map.

MOSES LAKE POTHOLES RESERVOIR
See Grant County.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Adams County discussion are plotted on the Geological map and listed in its index.

MULLAN ROAD
Historic route. See Historical-Cultural map.

PALOUSE RIVER
A free-flowing river flowing southwest into the Snake River, the Palouse River carries heavy sediment loads, particularly during periods of maximum runoff (winter and early spring). The most significant pollution in the Palouse River Basin results from land use and management practices in the agricultural area of the Palouse drainage. The Palouse drainage has the greatest sediment yield of the Pacific Northwest area. The loess soils of the area are extremely susceptible to erosion. Thousands of acres bared by the plow are exposed to strong winds, spring rains, and thaw which move great quantities of the loess topsoil into the streams. The area has long been a site of soil conservation measures and methods of development, but erosion control measures have, in most cases, been inadequate as applied by the farmer. This eroded soil costs thousands of dollars in road maintenance to the local counties and is the largest polluter of water within the Snake-Columbia River system. In addition, bacterial densities are above limits recommended for water-contact recreation (1,000 organisms/100 ml). This river contains a trout population. See Zoological-Aquatic and Hydrological maps.

PLANT COMMUNITIES
The climax plant communities listed below occur in Adams County. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Big sagebrush - bluebunch wheatgrass
Big sagebrush - Idaho fescue
Big sagebrush - needle and thread
Bluebunch wheatgrass - Idaho fescue
Bluebunch wheatgrass - sandberg bluegrass
Needle and thread - sandberg bluegrass
Threetip sagebrush - Idaho fescue

ROCKY COULEE
Stony soils supporting native sagebrush and associated wildlife, such as pygmy rabbit, mule deer, and upland birds are located southwest of Moody. See Geological, Botanical, and Zoological-Terrestrial maps.

SCABLAND AREA
An unusual, rough area with the only interior drainage of the Palouse-Cheney Scabland Tract. Loessial hills, spared by the Spokane Flood, are located northwest of Benge. See Geological map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SPRAGUE LAKE
Important waterfowl winter habitat. See Hydrological and Zoological-Terrestrial maps.

TWELVE MILE SLOUGH
This brackish water lake is 5 miles northeast of Benge. During years of low precipitation, the lake dries up completely. It is an important waterfowl and shorebird breeding and migration habitat, and because of the brackish water, it is one of the few lakes supporting breeding populations of avocets. The Department of Zoology at Washington State University, recommends an artificial water supply to maintain minimum lake level. It has also been recommended in a contract study for the National Park Services as a natural landmark for preservation. See Hydrological and Zoological-Terrestrial maps.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide and national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. Habitat for the Columbian sharp-tailed grouse (Pediocetes phasianellus columbianus) is found along grassy breaks of river canyons in the Palouse hills.

MAMMALS. The pronghorn antelope (Antilocarpa americana) has a limited range in the county. There are about 100 pronghorns in the state. The Cow Creek Valley, 10 to 15 miles south of Sprague Lake, is a critical wintering ground. Some other mammals noted in the county are mule deer, pygmy rabbit and black-tailed jackrabbit.

REPTILES. Populations of short-horned lizards, (Phyronosoma douglassi) are found in the county.

Asotin

ALPOWA CREEK
Native steelhead spawn in Alpowa Creek. See Zoological-Aquatic map.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Asotin County discussion are plotted on the Archeological map and listed in its index.

ASOTIN CANYON AND CREEK, UMATILLA NATIONAL FOREST
This rugged, scenic canyon holds large populations of blue grouse, ruffed grouse, deer, elk, California and mountain quail, and gray partridge. One of the few trout-spawning streams in the Columbia Basin, it is a free-flowing river. See Hydrological, Zoological-Terrestrial, Geological, and Environmental Use maps.

ASOTIN CREEK AND GROUSE FLATS WILDLIFE RECREATION AREAS
Asotin Creek (15,385 acres) and Grouse Flats (680 acres) in the Blue Mountains compliment each other. Grouse Flats is adjacent to Umatilla National Forest on a bench 6 miles south of Mount Misery and is an important elk calving ground. Asotin, 13 miles southeast of the town of Asotin, includes winter range for elk, as well as outstanding chukar habitat. Except for big-horn sheep, Asotin and Grouse Flats contain most mammals and birds found on W. T. Wooden Wildlife Recreation Area. Steelhead and trout fishing in Asotin Creek is best during early summer. All southeast Washington birds of prey and wild country song birds may be seen here. Pileated woodpecker are rare while rattlesnake, badger, a variety of bats, whitetail jackrabbit and many small mammals also live on Asotin and Grouse Flats. See Zoological-Terrestrial and Environmental Use maps.

ASOTIN CREEK, UMATILLA NATIONAL FOREST
This area has been recommended for roadless management. See Environmental Use map.

BASALT BLUFF
These 1,000-foot high, brown basalt bluffs are 15 to 30 miles downstream from Lewiston on the Snake River. The bluffs were formed by successive lava flows. See Geological map.

BASALT DIKE
A vertical dike, 60 feet thick is located on the north bank of the Grande Ronde River. See Geological map.

BLUE MOUNTAINS
The Blue Mountains are a steep, rugged and heavily forested wilderness area in southeastern Washington, and spilling over into northeastern Oregon. The entire range is within the Umatilla National Forest, and part has been designated by the U.S. Forest Service as the Wenaha Backcountry Area. However, a great portion is still unprotected, and the extensive forests, which are scarce in this part of the state, constitute a distinctive mountain feature.

All the principal canyons provide prime wildlife habitat. Golden eagle are relatively common within the mountain canyon country. Rapid mountain streams in the southeastern Blue Mountains support concentrations of the tailed frog (Ascaphus truei), a species thought to be rare within the state. Other species found within the Blue Mountains include grouse, green-tailed towhee, mule and white-tailed deer, elk, mountain goat, black bear, and cougar. In many ways the fauna of the Blue Mountains is unique in Washington, as many species show close affinities to Rocky Mountain forms. See Wenaha Backcountry Area. See Geological, Botanical, and Zoological-Terrestrial maps.

CAPTAIN JOHN CROSSING ON THE SNAKE RIVER
The Nez Perce tribe forded the river at this point when moving between Idaho and Washington. See Historical-Cultural map.

CLARKSTON BASALTIC CLIFFS
The northern extremity of the range of the spiny shrub, green-bush, (Glossopetalon nevadense stipuliferum). See Botanical map.

FIELDS SPRING STATE PARK
Covering 340 acres, Fields Spring State Park is 24 miles south of Asotin in the Blue Mountains. The park is 4,000 feet above sea level. Camping in summer is limited; there are winter sports during appropriate months. See Environmental Use map.

FULL GOSPEL CHURCH
A National Historic Place in the town of Asotin at First and Monroe Streets. See Historical-Cultural map.


Smallmouth Bass - Snake River

GRANDE RONDE RIVER
The Grande Ronde is a freshwater, free-flowing stream, presently being considered for wild and scenic river status. It is a major summer-run steelhead stream. The lower Grande Ronde River and Canyon are the most outstanding, scenic canyon and free-flowing river in southeastern Washington. The area possesses a rich upland game and valued big-game habitat. It is one of the finest fishing streams in North America. Deer, upland birds, green-tailed towhee, gray-crowned rosy finch, and the common egret have been seen. Excellent exposures of Columbia River basalts and the work of erosional forces are displayed in the canyon. The narrows of the river provide a stretch of rapids popular with whitewater kayakers. See Hydrological, Geological, Zoological-Aquatic, Zoological-Terrestrial, and Environmental Use maps.

GRAVE OF TA-MOOT-SOO (CHIEF TIMOTHY)
Chief Timothy of the Alpowa band of the Nez Perce met Lewis and Clark on their historic journey. He was largely responsible for establishment of the Presbyterian missions of Marcus and Narcissa Whitman and Henry Harmon and Eliza Hart Spalding in areas of southeast Washington and adjacent Idaho. Ta-Moot-Soo was Spalding's first Christian convert and was named Timothy by the missionary. Timothy was throughout his life a friend of the white man. Among many acts he saved Colonel Steptoe's army from annihilation in a battle at Rosalia, Washington. Timothy was a gentle mediator and counselor performing many valuable services aiding Spalding in his work with the Nez Perce Indians. He was buried at the confluence of Alpowa Creek with the Snake River. A few years ago his bones were removed and reinterred in the city park at Clarkston, Washington, a few miles from his old home at Alpowa. A monument commemorates his life. See Archeological map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Asotin County discussion are plotted on the Historical-Cultural map and listed in its index.

HOGBACK, UMATILLA NATIONAL FOREST
Located in the Umatilla National Forest in southeastern Washington, the Hogback has been recommended for roadless management and protection from mechanized vehicles. See Environmental Use map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state not specifically mentioned in the Asotin County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LARSON EXCLOSURE
Livestock are excluded from this area to facilitate botanical studies. The area includes an area of virgin prairie (Agropyron-Poa type) and a part of an old abandoned field. It is studied to learn the rate of natural revegetation of abandoned marginal farmland. See Botanical map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Asotin County discussion are plotted on the Geological map and listed in its index.

PLANT COMMUNITIES
The climax plant communities listed below occur in Asotin County. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Big Sagebrush - Idaho Fescue
Bluebunch Wheatgrass - Idaho Fescue
Bluebunch Wheatgrass - Sandberg Bluegrass
Idaho Fescue - Nootka Rose
Ponderosa Pine - Common Snowberry
Ponderosa Pine - Mallow Ninebark
Red Threeawn - Sandberg Bluegrass
Sand Dropseed - Sandberg Bluegrass
Subalpine Fir - Oregon Boxwood

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SNAKE RIVER
The Snake has its headwaters in the Rocky Mountains, and twists its way westerly through Idaho, then flows almost directly north, forming the border between Idaho and Oregon, and into the State of Washington where it again veers west, joining with the Columbia River just south of the Tri-Cities area. Together with the Columbia, the Snake River was one of the most important factors in the settlement and development of the Pacific Northwest. Sections of the river throughout its length have been dammed by Federal or private concerns to provide navigation, flood control, and/or power. Above Clarkston, Washington, the Snake is free-flowing to the Oregon border.

The Snake River Canyon is one of the most scenic in the world, cutting through Miocene basalts for most of its length. At Granite Point, near Wawai, pre-Miocene grandiorite has been exposed. Late Pleistocene sediments deposited along the river course include catastrophic flood gravels, lake sediments, flood plain sediments, volcanic ashes, alluvial sediments, and soils which reflect the climatic and geologic processes at work in the area during the past 17,000 to 20,000 years. The riverbottom still contains many natural white-sand beaches and bars formed by spring high-water and deposition by currents. These can reach 30 feet above low-water levels and are composed of a very fine, light sand. The bars often serve as nesting grounds for certain bird species. Many of the beaches and bars have been lost, as they are easily destroyed in the process of inundation, and are not reformed after impoundment is complete.

The canyon bottom contains several hundred archeological sites which record Amer-Indian occupation in the area during the past 10,000 to 11,000 years. A number of early Euro-American settlements dating between 1840 and 1900 were also located along the river canyon. Most of these sites are now inundated by the pools behind existing dams.

The Snake is also a major anadromous fish stream, containing runs of all Pacific salmonid species. It is particularly noted as an outstanding summer and winter run steelhead river, and receives heavy use by sportsmen. In addition, the river contains resident populations of rainbow, cutthroat and brown trout, as well as large populations of rapid-growing small-mouth bass. The river is reputed by leading sports magazines to have the best smallmouth bass fishing in the United States. White sturgeon are also found in the Snake, although to a lesser degree than former times. Once found throughout much of the Columbia-Snake Rivers system, impounding of the rivers has limited sturgeon reproduction to those stretches below Bonneville Dam on the Columbia, and above Clarkston on the Snake.

A number of migratory birds, and especially the Great Basin Canada goose, nest along the lower river up to the Oregon border (river mile 0 - 140). These nesting areas are threatened due to the amount of human activity along the river. The islands of the Snake River are the only potential breeding areas for caspian terns, Foster's terns, ring-billed gulls, and double-crested cormorants. The traditional breeding islands of these species were inundated behind dams on the Columbia River. Recommendations have been made by many sources that new islands be constructed to re-establish breeding grounds, and that the remaining islands in both the Snake and Columbia Rivers be designated bird refuges. These species cannot tolerate human disturbance during the breeding season. The surrounding valley offers habitat to a number of other bird and animal species including raptors, chukar, mule and white-tail deer, and other big game species. The river valley from the confluence of the Tucannon River to west of Lewiston, and from Asotin to the Oregon border is a critical elk wintering ground.

Water quality in the lower Snake is rated moderately good to good. High water temperatures (70 to 80 degrees Fahrenheit) during the summer and fall months threaten all salmonid species, but have a particularly adverse effect on anadromous species which have already been subjected to above desirable temperatures and nitrogen supersaturation in the Columbia River. Other water quality problems in the Snake includes algae and aquatic slime which occurs upstream from Asotin during periods of low waterflow. This condition interferes with boating, sport fishing and renders other water contact recreation unsafe. Further contamination from municipal and industrial wastes takes place in the Clarkston-Lewiston area and further algae blooms (usually Aphanizomenon flosacue) occur in the area near Central Ferry in the pool behind Little Goose Dam. With impoundment of the Lower Granite area, these blooms are expected to shift upstream to the Lower Granite Pool. See Hydrological, Geological, Zoological-Terrestrial, and Zoological-Aquatic maps.

SWALLOW ROCK
A cliff of valley-filling basalt flow. See Geological map.

WEATHERLY EXCLOSURE
This small fenced area of virgin prairie (Artemisia tridentata-Festuca type) is used in ecological studies. This is the finest example of the type anywhere in Washington. See Botanical map.

WENAHA BACKCOUNTRY AREA
A 111,200 acre tract embracing the crest of the northern Blue Mountains, the Wenaha Backcountry Area has been set aside for all available forms of undeveloped outdoor recreation. Most of the Area lies within the State of Washington. Rugged basalt ridges and outcroppings separated by deep canyons with steep sideslopes, rapid streams, and an abundance of native plants and wildlife, contribute to the uniqueness of this remote country. Motorized travel is prohibited within the Area, with trail use being restricted to horse and foot travel. Over 150 miles of scenic trails cris-cross the Area's stream valleys and ridgetops.

Timber is primarilly Douglas-fir and white fir, with smaller scattering of ponderose pine, western larch, Engelmann spruce, alpine fir, and lodgepole pine. A virgin stand of white pine is located in the upper portion of the Butte Creek drainage, far from its natural range. Contrasting with the rugged topography, these scattered stands provide outstanding scenery as well as excellent wildlife habitat. Rocky Mountain elk and mule deer are typical big game species ranging in the Wenaha. An expanding population of white-tailed deer is found along the Wenaha River each fall.

The Wenaha River, Crooked Creek, Butte Creek and other streams contain excellent resident populations of rainbow and Dolly Varden trout. In addition, these streams provide spawning grounds for salmon and steelhead trout.

The entire Backcountry Area has been recommended for inclusion in the national wilderness preservation system. See Geological, Botanical, Zoological-Terrestrial, Zoological-Aquatic, and Environment Use maps.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide and national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. The Columbian Sharp-tailed grouse (Pediocetes phasianellus columbianus) lives along the grassy breaks of river canyons in the Palouse Hills. The prairie falcon (Falco mexicanus) is found in the county. Other birds noted are the common egret, golden eagle, gray-crowned rosy finch, and green-tailed towhee.

MAMMALS. Bighorn sheep inhabit the upper half of the Tucannon River Valley. Critical elk wintering ranges are Asotin Creek Valley, Grande Ronde River Valley, Snake River Valley from Tucannon River to west of Lewiston and from Asotin to the Oregon border, and the area running parallel to U.S. 12 on the east side from the Oregon border to northeast of Dayton. The pine marten (Martes americana) inhabits the upper mountain slopes throughout the county. The western jumping mouse (Zapus princeps) has a restricted range in Asotin, Garfiled, Columbia and Whitman Counties. Other mammals in the county are black bear, mountain goat, and mule deer.

REPTILES. Short-horned lizard (Phrynosoma douglassi) occurs east of Cascade crest. Its population is decreasing. Also, the ring-necked snake lives in the county.

Benton

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Benton county discussion are plotted on the Archeological map and listed in its index.

ARID LANDS ECOLOGY SAND DUNE STUDY AREA
This site is maintained by the U.S. Atomic Energy Commission as a natural desert habitat. It is entirely fenced and closed to general public use. The area is a significant visual site from Ringold, Washington, and is of scientific importance for the study of wildlife. See Environmental Use map.

BASALT WALL
This wall is found on the north bank of the Yakima River between Prosser and Benton City. See Geological map.

BENTON COUNTY HISTORICAL SOCIETY MUSEUM
At Prosser, this diorma features the Horse Heaven Hills in the early days. Features include a reconstructed homestead shack, Indian artifacts, and pioneer items. See Historical-Cultural map.

COLD CREEK AND DUNES
This year-round free-flowing stream in an otherwise semi-arid habitat is unique and relatively undisturbed. Excellent wildlife habitat, the stream eventually sinks into the ground. Cultural evidence of early human inhabitants is apparent throughout area. See Hydrological and Geological maps.

COLUMBIA PARK
This is a local park located on the shores of Lake Wallula. It comprises 436 acres of continuous picnicking areas along the river. The park was donated and is maintained by various service organ-

COUNTY DISCUSSION

izations. Concessionaires provide a golf course, campground with general store, an archery range, covered moorage docks and a launching ramp. A large outdoor stage has been built by the Tri-Cities Water Follies. See Environmental Use map.

COLUMBIA POINT
Excellent habitat for both mammals and birds, this area is still undeveloped though it is in a growing urban area. There are many archeological sites nearby. See Geological map.

COLUMBIA RIVER (FROM MCNARY POOL TO PRIEST RAPIDS DAM)
The reach between the upper limits of the McNary pool and Priest Rapids Dam is the only remaining, free-flowing segment of the upper river in Washington. This stretch is the last spawning grounds of the fall chinook salmon. The reach also holds a significant population of steelhead trout and some of the best remaining sturgeon holes on the Columbia River.

Along the Priest Rapids Dam area are numerous Indian archeological sites. The construction of dams have flooded most of these sites along the Columbia, but a few are still available for viewing. Some Indian pictographs may still be seen along this reach. Contributors state that "further development of hydroelectric power in this area should be looked at with great care."

This section of the river supports a variety of wildlife. The entire reach of the Columbia River from the delta of the Yakima River near Richland to the Priest Rapids Dam should be considered one continuous waterfowl area of statewide significance. The reach is particularly important to geese. About 80 percent of the Great Basin Canada Goose (B.c. moffitti) nest and live here most of the year. This is also one of the primary continental wintering grounds for the rare giant Canada Goose (B.c. maximus). The best goose nesting areas are between river mile 366 and river mile 376. Other important waterfowl areas in this region are found in the delta area at the mouth of Walla Walla River, and delta, and areas immediately south of the mouth of the Snake River. Most of the area of the Columbia from Richland to Priest Rapids is either in the McNary National Wildlife Refuge, or the AEC Hanford Reservation which is a refuge. Peak winter populations in the Richland to Priest Rapids area approach 300,000 ducks and 15,000 geese.

In approximately this same stretch of river are two colonies of gulls, the California gull (Larus californicus) and the Ring-billed gull (Larus delawarensis) each numbering several thousand birds. These groups are probably the most intensively studied gull populations in the world, and thus are of considerable scientific value. While the exact place is unknown, the double-breasted cormorant (Phalacrocorax auritus) is known to breed in this area. The cormorant originally bred on Goat Island, however, this island was flooded by the lake formed behind McNary Dam. During the fall, five or six bald eagles may be seen along the stretch of river. Occasionally a nesting pair has been noted. Other animals of importance found here include the golden eagle, prairie falcon, hawks, white pelican, deer, and striped whipsnake. See Clark County. See Archeological, Geological, Hydrological, Botanical, Zoological-Terrestrial, and Zoological-Aquatic maps.

DEAD CANYON
An important area for deer, upland birds, and waterfowl. See Zoological-Terrestrial map.

EARTHFLOW TOPOGRAPHY
This topographic formation is located in the Yakima River Valley where the north base of Horse Heaven Hills was undercut by flood backwaters during the Spokane Flood. See Geological map.

GABLE MOUNTAIN
This mountain is located on Hanford Reservation west of the city Hanford. See Geological map.

GLADE CREEK AND CANYON
This is a free-flowing stream, and an important habitat area for deer, upland birds, and waterfowl. See Hydrological and Zoological-Terrestrial maps.

HANFORD RESERVATION
Research has been going on in this area for over 25 years. Within the reservation is a stretch of the Columbia River retained as a natural area. The area has been kept under tight security and use of the river has been limited. The area has a natural serenity that contrasts sharply to its favor with the managed parks, forests, and refuges throughout the state.

Fifteen percent of the fall chinook salmon and a substantial but undetermined number of steelhead trout spawn in the Hanford Reach of the Columbia River. The river islands are nesting grounds for remnants of the Great Basin Canada Goose population. About 125 significant archeological sites have been located along this stretch of the Columbia River and await investigation by archeologists.

The river islands, the White Bluffs, and the Ringold sand dune area has been suggested, be retained and protected as on ecological study area. See Geological, and Environmental Use maps.

HANFORD SAND DUNES
Parallel dune ridges, advancing over a cobble substrate, show all successional stages from bare sand to stabilized vegetation. These are quite different from dunes to the east in Franklin County. See Botanical map.

HANFORD SCIENCE CENTER, SCIENCE MUSEUM
At Richland on U.S. Atomic Energy Commission Reservation. Exhibits detail activities of the development of the atomic industry and activities at the adjacent Hanford plant. See Historical-Cultural map.

HANFORD TOWN SITE
This town was completely abandoned during World War II when the atomic works were built at Hanford Reservation. Some of the old buildings including the schoolhouse are still standing. Because of the national importance of the Hanford Reservation, this old townsite has particular historical significance. See Historical-Cultural map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Benton County discussion are plotted on the Historical-Cultural map and listed in its index.

HORN RAPIDS PARK
This is a riverside park located on the north bank of the Yakima River at Horn Rapids, downstream from Benton City. This was the site of a prisoner-of-war camp during World War II. There is a small waterfall near here where Indians fish in their traditional manner. See Environmental Use map.

HORSE HEAVEN HILLS
The Horse Heaven Hills are located in the southwestern corner of the county, between the Yakima Valley and the Columbia River. It is a relatively remote and rugged country and still contains much of its original flavor, although the lower hillsides are rapidly being irrigated and developed for agriculture. The hills rise higher to the west toward the Yakima Indian Reservation and Cascade wilderness around Mount Adams. The hills derive their name from the herds of wild horses which used to run over the rolling, grassy slopes. Very small remnant herds are still thought to exist in the upper reaches along with other wildlife.

The area is popular with geologists and amateur rock-hounds. The north side contains extensive beds of fossil vertebrate remains dating from the Pliocene, Pleistocene, and sub-Recent. See Geological map.

HOVER PARK
This is a riverside park located in Benton County across the river from the town of Wallula. See Environmental Use Map.

HOWARD AMON PARK
This is a riverside park in Richland, on the Columbia River. See Environmental Use map.

INTERNATIONAL FOLK DANCE FESTIVAL, RICHLAND
A folk dance festival is held each fall on the second weekend in October in Richland. Folkdancers from Washington and Oregon participate in this 2 day festival. See Historical-Cultural map.

JUNIPER STANDS
More northerly than the well-known juniper forest in Franklin County near Pasco, these unique stands of 100 to 200 trees, are located below the high water mark of the Columbia River and are flooded annually. See Botanical map.

KENNEWICK GAME FARM
Located at Finley, 8 miles south and east of Kennewick, Washington, it produces an average annual crop of 9,000 Chinese ringneck pheasants. These birds are released in Yakima, Benton, Grant, Adams, Franklin and Douglas counties. See Zoological-Terrestrial map.

KENNEWICK RODEO
Held at Kennewick the first week in July and includes the Pioneer Reunion. See Historical-Cultural map.



LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Benton County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LESLIE RIVER, GROVES PARK
This is a riverside park in Richland, on the Columbia River. See Environmental Use map.

MCNARY NATIONAL WILDLIFE REFUGE
The refuge consists of 7,215 total acres with a portion of the Hanford Islands Division of the Refuge in this county. The refuge contains waterfowl and pheasant. Located at Burbank at the mouth of the Walla Walla River, the state-owned recreation area provides for hunting of ducks and geese. See Environmental Use and Zoological-Terrestrial maps.

MCNARY WILDLIFE RECREATION AREA
Known for its excellent waterfowl population, McNary (8,784 acres) is reached through the town of Burbank. It lies along U.S. Highway 12-395, between the Snake and Walla Walla Rivers. A separate segment is two miles upstream from the mount of the Yakima River.

Hunting for ducks and Canada geese is this area's prime fall and winter attraction. There is, however, a wide variety of other wildlife which may be observed year-round. Long-billed curlew, valley quail, avocet, burrowing owl, pheasant, weasel, kangaroo rat, spadefoot toad, and yellow-bellied racer are examples of wildlife residents on McNary. See Zoological-Terrestrial and Environmental Use maps.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Benton County discussion are plotted on the Geological map and listed in its index.

NACHES PASS TRAIL
See Pierce and Kittitas Counties.

PLANT COMMUNITIES
The climax plant communities listed below occur in Benton County. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Big sagebrush - bluebunch wheatgrass — Spiny hopsage - sandberg bluegrass
Rock buckwheat - sandberg bluegrass — Stiff sagebrush - sandberg bluegrass

PLYMOUTH PARK
This is a riverside park located on the Benton County bank of the Columbia River, downstream from McNary Dam. See Environmental Use map.

RATTLESNAKE HILLS
Relatively inaccessible pristine grasslands and wildflife sanctuary, exposed minerals, fossils and cultural sites are found throughout these hills. The hills are the dominant visual feature of the lower Yakima Valley. The hills contain superlative virgin stands of sagebrush, bunchgrasses, winterfat, and spiny hopsage.

Excellent petrified wood is in the vicinity, and the area provides habitat for upland birds, sage hen, partridges, hawks, and coyotes. See Environmental Use, Zoological-Terrestrial, Geological, and Botanical maps.

RICHLAND FLOOD PLAIN
The Wallula Ecology Center refers to this floodplain as a fragile, endangered floodplain wetlands area. See Hydrological and Environmental Use maps.

SACAJAWEA STATE PARK
This 275 acre state park was named for the Indian girl who accompanied Lewis and Clark on much of their journey. An Interpretive Center features an exhibit of Indian artifacts in her honor. The park is located 5 miles southeast of Pasco at the confluence of the Snake and Columbia Rivers. There is swimming, fishing, picnic facilities, and moorage and launching for boating enthusiasts. See Environmental Use map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SNIVELY ROAD AREA
This area is located just north of Richland near intersection of Highway 240 and Snively Road, between the Yakima and Columbia Rivers. This extensive marsh, pasture and wetlands area provides habitat for waterfowl, many shorebirds, songbirds, birds of prey, some game birds, small mammals, reptiles and amphibians. It is used as both a nesting area and as a stop-over for migrating birds. Much of the land is privately owned and managed for hunting. See Zoological-Terrestrial map.

TWO RIVERS PARK
This is a riverside park located on the Benton County bank of the Columbia opposite the confluence of the Snake River. See Environmental Use map.

UMATILLA NATIONAL WILDLIFE REFUGE
The refuge consists of 12,500 acres of land and 17,000 acres of water in Washington and Oregon. It is located on the John Day Pool of the Columbia River, and provides excellent goose and duck hunting. It is most important as a nesting and resting area for geese. See Environmental Use and Zoological-Terrestrial maps.

WALLULA GAP
The story told by Wallula Gap is one of the most remarkable in the history of recorded geology. During the last great period of glaciation at the close of the Pleistocene epoch the Pend Oreille lobe of the Cordilleran Ice Sheet blockaded the canyon of the Clark Fork River in Idaho. This great ice sheet created a very large lake known as Lake Missoula, which filled the valleys of western Montana, to a depth from hundreds to thousands of feet. A volume of 500 cubic miles of water stood poised to be released as catastrophic floods whenever the glaciers retreated. Although authorities think several floods occurred with the advance and retreat of the ice sheet, it is believed that the last flood (which occurred only 10,000 to 15,000 years ago) was the greatest of all. When this torrent reached Wallula Gap, the flow was so great, the size of the gap was insufficient to permit the water to pass. At its peak, the flow was perhaps as great as 9 cubic miles per hour. Water filled much of the Columbia Basin and rushed up the Snake River into Idaho and up the Yakima River into the foothills of the Cascades. The rise of the water was stopped only when it overflowed the Horse Heaven Hills. The water reached a level of 1,000 feet above sea level, as shown by the high flood channels on the hills to the east of the Twin Sisters. It was during this last and greatest flood that the sculpturing of the gap was finished.

To the Wanapum Indians who inhabited the Columbia Basin before the arrival of the white man, the Twin Sisters rock formation located on the east bank of the Columbia River was of special significance. In Indian legend this rock formation was created when the Guardian Spirit-Bird of the Wanapum tribe turned two wicked sisters into stone as punishment for their wrong-doings. This was one of three locations to which young braves journeyed to seek the identity of their guardian spirit. Those who were fortunate would obtain the guidance of a strong spirit, while those less fortunate would live lesser lives.

Lewis and Clark passed through Wallula Gap on their way to the Pacific Ocean and again on their return to the east. In their journals they refer to the Twin Sisters rock formation.

Although now submerged by the waters of McNary Dam, Fort Walla Walla stood at Wallula Gap for many years and was an early stopping point for travelers in this area. See Channeled Scablands, Lincoln County. See Historical-Cultural map.

WALLULA LAKE
See Walla Walla County.

WHITE BLUFFS
This area is 7 miles of bluffs associated with Plio-Pleistocene lake and floodplain beds with fossils. Plio-Pleistocene has already been discovered in three areas between Ringold and Hanford, including mastodon, horse, deer, camel, vertebrate fauna and tortise. See Geological map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part the year. These species were identified as being of statewide or national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. Columbian sharp-tailed grouse (Pedioecetes phasianellus columbianus) occur along the grassy breaks of river canyons in the Palouse Hills. Prairie falcon nest adjacent to Lake Wallula. Individual white pelican are seen occasionally in Benton County. Other birds noted in county are Canada geese, golden eagle, partridge, and sage hen.

MAMMALS. The least chipmunk (Eutamias minimus scrutator) has a restricted range in Yakima, Benton, and Kittitas Counties. The ord kangaroo rat (Dipodomys ord columbianus) lives in western Walla Walla County, and along the Columbia River in southern Benton County, including Blalock Island and the area north of Pasco. This species is apparently expanding its range at the rate of a mile per year. Rocky Mountain elk have critical wintering ranges in the county's river drainages. Other mammals of note are the coyote and mule deer.

REPTILES. The striped whipsnake and the spotted night snake have a restricted range in the county. The short-horned lizard is found here in a decreasing population.

YAKIMA RIVER
See Yakima County.

YAKIMA RIVER DELTA AND FLOOD PLAIN
The area at the confluence of the Columbia and Yakima Rivers at Richland, Washington, is especially valued by residents of the Tri-cities area. The uniqueness of the lower Yakima flood plain lies in its subterranean water channels through permeable fertile soils which provide nutrients to a wide variety of vegetation. In the Columbia Basin sizeable areas of dense natural vegetation are especially hard to find. The Yakima flood plain and delta is one of the few areas where one can find any significant wooded thickets. The abundant foliage provides cover for many bird and animal species. It has the added benefit of being near a sizeable population center. The Yakima Bewick's wren has a geographic range that is limited to this lower Yakima River streamside and is probably vulnerable to extinction due to habitat reduction.

Although not officially called a park by the city of Richland, the lands of the Yakima floodplain below West Richland and Columbia Point and to the north of the mouth of the Yakima form a parcel of land used for diverse recreational purposes. See Hydrological, Botanical, Zoological-Terrestrial, and Environmental Use maps.

Chelan

AGNES CREEK DRAINAGE
Shelton's violet (Viola Sheltonii) is found in this drainage. See Botanical map.

AGNES CREEK, WEST FORK
A wall of ice nearly 5 miles long (broken up by a few rock out-crops) rests on spectacular canyon walls, with waterfalls dropping precipitously off into the valley below. It is a very little known area, and yet only about 90 airline miles from Seattle. It is one of the most stunning spots in the state. See Geological map.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Chelan County discussion are plotted on the Archeological map and listed in its index.

ALPINE LAKES WILDERNESS AREA, SNOQUALMIE AND WENATCHEE NATIONAL FORESTS
See King County.

APPLE BLOSSOM FESTIVAL
This well-known festival takes place at Wenatchee, in early May. See Historical-Cultural map.

BLEWETT PASS
Blewett Pass was actually a continuous string of small towns, mills and settlements now faded away. A substantial reminder of those roaring days when thousand-dollar gold nuggets were not uncommon is the Blewett Stamp Mill, north of the summit of the Pass. Gold was mined largely through hard-rock techniques until about 1905. Simpler placer operations now remain where hundreds of goldseekers once toiled. See Historical-Cultural map.

BULL'S TOOTH
This peak area is between Icicle River and U.S. Highway No. 2., east of Stevens Pass. See Geological map.

BYGONE BY-WAYS
This historical area is in the vicinity of Stevens Pass in the Wenatchee and Snoqualmie National Forests. It contains portions of original travel routes: railroad, motor roads, and trails. See Historical-Cultural map.

CASCADE RIVER, SOUTH FORK
This is a spectacular glacial cirque in the Glacier Peak Wilderness. It is the site of the South Cascade glacier, a broad flat valley glacier, one of the very few in the lower 48 states. Very little is known about this region. See Geological map.

CASCADE TUNNEL
This Burlington Northern Railroad tunnel is the longest in the western hemisphere. See Historical-Cultural map.

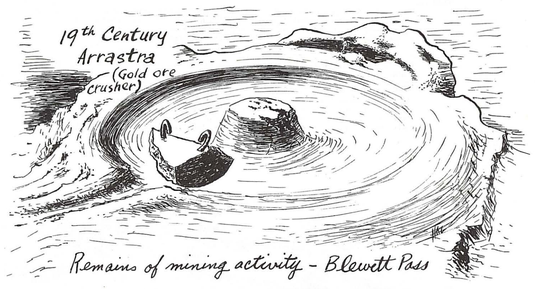
CASHMERE MOUNTAIN
This area is between Jack Creek and Icicle River. See Geological map.

CHELAN BUTTE WILDLIFE RECREATION AREA
Acquired primarily as an upland game bird area, Chelan Butte (3,170 acres) has one of the highest chukar and valley quail populations in north-central Washington. Chelan Butte's flat ridges, deep canyons, and steep grassy slopes typify the geography of the Columbia River breaks. Farming of winter wheat, an abundance of brush, and 30 developed springs furnish ideal habitat for game and song birds alike. See Environmental Use and Zoological-Terrestrial maps.

CHELAN FISH HATCHERY
State Game Department. Species propagated: rainbow trout and steelhead trout. Water Source; springs and wells. See Zoological-Aquatic map.

CHELAN ICE CAVE
This is a small overhang at the lower end of a talus slope, near the bottom of the canyon, 6.2 miles south of the county line on U.S. Highway 97. It is a typical example of cold-trapping talus. In warm weather, cold air remaining from the previous winter is slowly emitted. Ice remains on the floor of the cave in late spring. Because of its location beside a main highway, Chelan Ice Cave has been known for more than 50 years. A sign points it out to travelers. See Geological map.

CHELAN MOUNTAINS
This group of mountains runs along the southern shore of Lake Chelan between the lake and the Entiat River. Specific peaks or areas within this range which have been noted as being outstanding mountaineering areas include: Cardinal Peak, Emerald Peak, Gopher Mountain, Graham Mountain, Pinnacle Mountain, Pyramid Mountain, and Saska Peak. See Geological map.



CHIWAUKUM CREEK DRAINAGE
There are colonies of Lewisia tweedyi here. See Botanical map.

CHIWAUKUM MOUNTAINS
This mountain range lies between Icicle River and U.S. Highway No. 2, east of Stevens Pass. See Geological map.

CHIWAWA MOUNTAINS
This mountain group lies between the Napeequa and Chiwawa Rivers. Specific mountains and areas within this range which have been noted as outstanding mountaineering areas include: Buck Mountain, Chiwawa Mountain, Fortress Mountain, Helmut Butte, Liberty Gap, and Peak 7600. See Geological map.

CHIWAWA RIVER
This major tributary to the Wenatchee River holds significant numbers of anadromous fish, and is used for kayaking. See Hydrological and Environmental Use maps.

CHUMSTICK SNAG
This rockclimbing area is located south of Spromberg Canyon, and west of Chumstick Creek. See Geological map.

CINDER CONES
Three large cinder cones are located on the east side of Indian Pass. See Geological map.

CLARK MOUNTAIN
This mountain is located between the White River and the Napeequa River. See Geological map.

COLOCKUM WILDLIFE RECREATION AREA
One of eastern Washington's most important elk wintering areas, the Colockum (115,527 acres) is the largest single land-holding of the Game Department. It lies west of the Columbia River, south and east of the Colockum Pass Road, and north of State Highway 10.

The Colockum is famous for rocky mountain elk, and also has mule deer, bighorn sheep, pronghorn antelope, chukar, valley quail, Merriam's turkey, ruffed grouse, sage hen, pheasant and dove. Grain fields, flats, and protected bays along the Columbia are excellent waterfowl habitat.
Rolling, open sagebrush hills drop off to steep cliffs along the Columbia where Indian artifacts and petrified wood may be found. At higher elevations, timbered draws give way to ponderosa pine stands near the Colockum's boundary with Snoqualmie National Forest and State-owned lands. See Zoological-Terestrial and Environmental Use maps.

COLUMBIA RIVER
See Clark County.

COLUMBIA RIVER VALLEY
Columbia River Valley from Brewster to Vantage, excluding small areas around the cities of Chelan and Wenatchee, is critical deer wintering grounds.

CUTTHROAT PEAK/WHISTLER MOUNTAIN
This peak is located north of Bridge Creek and east of Rainy Pass. See Geological map.

DIRTY FACE MOUNTAIN
This is located north of Lake Wenatchee. See Geological map.

DOUGLAS-FIR - GRAND FIR STAND
A mixed stand of Douglas-fir and grand fir, 400 to 500 years old, is located in this area. See Botanical map.

DUDLEY SPIRE
This area lies between Jack Creek and Icicle River. See Geological map.

EIGHTMILE MOUNTAIN
This area is located between Jack Creek and Icicle River. See Geological map.

ENTIAT MOUNTAINS
The Entiat Mountains lie between the Chiwawa and Entiat Rivers in central Chelan County. The mountains are all within the Wenatchee National Forest and the northern extremities are included in Glacier Peak Wilderness.

Mountains of note between Railroad Creek and the Chiwawa River include: Buckskin Mountain, Cooper Peak, Dumbell Mountain, Ice Creek Ridge, Marmot Pyramid, Mount Fernow, Mount Maude, Red Mountain, Seven Fingered Jack, Spectacle Buttes, and Tin Pan Mountain.

COUNTY DISCUSSION

Specific peaks within the same range but between the Chiwawa and Entiat Rivers include: Carne Mountain, Devil's Smoke Stack, Estes Butte, Fifth of July Mountain, Garland Peak, Old Gib Mountain, and Rampart Mountain. See Geological map.

ENTIAT NATIONAL FISH HATCHERY
Over 90,000 pounds of rainbow trout were produced in 1972. See Zoological-Aquatic map.

ENTIAT RIVER
This is a major tributary to the Columbia River, holding significant numbers of native and anadromous fish. It is a free-flowing stream. Total coliform bacteria counts are in excess of recommended criteria in the lower reaches of the river. Inadequately treated municipal wastes and septic tank drainages are generally responsible for this problem. See Hydrological map.

ENTIAT WILDLIFE RECREATION AREA
Entiat (11,343 acres) and Swakane (11,589 acres) are located in adjacent drainages on the east side of the Columbia River just upstream from Wenatchee. Both may be reached from U.S. Highway 97 and, at higher elevations, through more primitive connecting national forest roads.

Entiat and Swakane typify this part of Washington where steep, western yellow pine forests give way to grassland and basalt benches near the Columbia River. Both are vital wintering areas for mule deer and provide outstanding habitat for chukar.

Quail are found in the lower brushy draws, while cougar, black bear, blue grouse, and other wildlife characteristic of the eastern Cascades slope are common residents in timbered areas. See Swakane Wildlife Recreation Area. See Environmental Use and Zoological-Terrestrial maps.

FISH LAKE
This is an important lake for fishing, holding spiny-rays and rainbow trout. See Hydrological and Zoological-Terrestrial maps.

FLAGPOLE NEEDLES
This area includes: Pennant Peak, Horizontal Spire, the Flagpole, Seal Head, Porpoise Point. See Geological map.

FLAT CREEK, WEST FORK
The spectacular Flat Creek glacial cirque has glaciers which are continually breaking off and dropping far down in the valley below, particularly the LeConte glacier. This is a very little known region. See Geological map.

FOSSIL BEDS
A Swauk formation with fossils and leaf prints of Eocene age. One of very few sedimentary fossiliferous strata in Washington. See Geological map.


Fruit Harvesting - Cashmere/Wenatchee

FUNGI SITES
The following areas in Chelan County are noted for abundance and variety of higher fungi or important species: Upper Wenatchee, White, Chiwawa and Napeequa Valleys. See Botanical map.

GLACIAL ERRATICS
Glacial erratics are numerous at Wenatchee and Malaga. See Geological map.

GLACIER PEAK WILDERNESS
See Snohomish County.

GRADE CREEK, OKANOGAN NATIONAL FOREST
Roads separate this from the Hungry Ridge and Black Canyon areas and from the northern segment of the Lake Chelan unit. Roadless area management without mechanized use has been recommended by some conservationists. See Environmental Use map.

GREAT TERRACE OF THE COLUMBIA RIVER
This stratified drift and glacial outwash area is north of the Chelan River mouth. See Geological map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Chelan County discussion are plotted on the Historical-Cultural map and listed in its index.

ICICLE RIVER CANYON
The Icicle River Canyon is 8,000 feet deep, deeper than Hells or Grand Canyon. Only the fact that the Icicle is not a major river prevents it from being considered one of the deepest river canyons on the continent. It is a most spectacular gash in the earth, as anyone who flies over it can see. About 4 miles from the road end, one comes upon a magnificent and unusual stand of western red cedar and a moist environment, not far from a very typical, dry lodgepole pine association. See Geological map.

ICICLE RIVER
The Icicle River flows easterly from Cascade Crest to enter the Wenatchee River at Leavenworth. This small river is one of the most beautiful free-flowing streams accessible in Washington. It is used by fishermen and other outdoor people, and contains significant numbers of resident and anadromous fish. The ridge longside the river is a well known rockclimbing area. See Hydrological and Geological maps.

INGALLS CREEK CANYON
This spectacular canyon, on the south side of Mount Stuart, is extremely deep and precipitous. See Geological map.

INGALLS CREEK SLOPE
This area includes the following mountains: Lichen Tower, Coney Rocks, Cigar Tower, Glockenspiel Tower, Orange Tower and Window Tower. See Geological map.

JACK RIDGE
This area lies between Jack Creek and Icicle River. See Geological map.

JIM HILL MOUNTAIN
This area is north of Icicle River and south of U.S. Highway No. 2, east of Stevens Pass. See Geological map.

KAME TERRACES
An example of continental glaciation along the Columbia River. See Geological map.

KNAPP COULEE
The outlet of an ice-dammed lake in Chelan Valley, now an abandoned valley. See Geological map.

LAKE CHELAN
This lake is the work of one of the largest glaciers of the west. It was made by a valley glacier in the Pleistocene glacial epoch. The lake has been raised 20 feet to hold more water for a power dam located at the lower end of Chelan Gorge.

This is one of the deepest canyons in the state, measuring almost 9,000 feet from mountain top to lake bottom. It is a most unusual geological feature because of its long and narrow configuration. The lake is about 55 miles long with a maximum depth of approximately 1,500 feet. Ruggedly spectacular cliffs and mountains line the fiord-like lake through the Wenatchee National Forest. The upper portion is in the North Cascades National Recreation Area. This is habitat for kokanee salmon and the area from Stehekin to Chelan is a critical deer wintering ground. See Geological, Hydrological, Zoological -Aquatic and Environmental Use maps.

LAKE CHELAN, ENTIAT, LAKE WENATCHEE, WENATCHEE AND OKANOGAN NATIONAL FOREST
The Entiat area, as inventoried by the Forest Service, is contiguous with the Lake Chelan (south) unit to the east and the segment of the Lake Wenatchee area east of Chiwawa River. This general area has long been considered by conservation interests to be a prime area for wilderness preservation, either as an addition to the Glacier Peak Wilderness or as a second wilderness. The three western segments of the Lake Wenatchee unroaded, undeveloped area are all contiguous to the Glacier Peak Wilderness, but penetrated by roads paralleling the White and little Wenatchee Rivers. This area has also been recommended in the past as an addition to the Glacier Peak Wilderness and has again been recommended for wilderness protection. These are all readily accessible to the population centers east and west of the Cascades and visited as wilderness. See Environmental Use map.

LAKE CHELAN NATIONAL RECREATION AREA
Comprised of about 62,000 acres in the southern portion of the North Cascades National Park Complex, this area is noted for the rugged beauty of its mountain setting. Recreation includes camping, picnicking, swimming, and boating.

Within the park are two former wilderness study areas, Picket Range Wilderness in the North Unit and Eldorado Peaks Wilderness in the South Unit.

The plant communities show a tremendous variation between the moisture-laden west side of the mountain and dry east slopes, which range from rain forest through subalpine conifers, verdant meadows, and alpine tundra back down to pine forests and sunny, dry shrublands. These communities combine to form a vast acreage of unimpaired wilderness ecosystems.

Mountain goats, deer, and black bear are common in the wilderness. Such animals as wolverine, marten, fisher, grizzly bear, cougar, and moose are rarely seen. White-tailed ptarmigan and a host of other smaller birds and mammals make this harsh land their home. See Environmental Use map.

LAKE CHELAN REGATTA
The Regatta is held in Chelan on the second week in August. See Historical-Cultural map.

LAKE CHELAN RODEO
This Washington rodeo is held in Chelan on July 4th. See Historical-Cultural map.

LAKE CHELAN STATE PARK
This 127 acre park on Lake Chelan is in one of the deepest glacial gorges in the world. The area is noted for the rugged mountain setting. Boating facilities, fishing, camping, picnicking, and swimming are offered. See Environmental Use map.

LAKE CHELAN, WENATCHEE AND OKANOGAN NATIONAL FOREST
This segment of the three-part Lake Chelan unit parallels Railroad Creek west of Lake Chelan and abuts the Glacier Peak Wilderness on the north. It has been proposed as an addition to the Glacier Peak Wilderness. See Environmental Use map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in Chelan County discussion are plotted on the Hydrological map and llisted in its index. Also, see the listing of Hydrological features covered by the Shoreline Management Act.

LAKE WENATCHEE
This lake is fed by the Little Wenatchee River. Several osprey nest at the lake outlet. See Hydrological and Zoological-Terrestrial maps.

LAKE WENATCHEE, WENATCHEE NATIONAL FOREST
The section of Lake Wenatchee unroaded area is contiguous with the adjoining areas in the Snoqualmie and Mount Baker National Forests. All of this contiguous region has received wilderness advocacy by the wilderness users and wilderness protection groups. See Environmental Use map.

LAKE WENATCHEE STATE PARK
Covering 143 acres, the park is 22 miles north of Leavenworth on U.S. 2, then north on State 209. Facilities include camping, picnicking, swimming, fishing, horseback riding, and a boat ramp. See Environmental Use map.

LEAVENWORTH NATIONAL FISH HATCHERY
Species propogated: coho, spring chinook, and kokanee salmon, and rainbow and cutthroat trout. See Zoological-Aquatic map.

LIBERTY BELL I AND II AND DRIVEWAY BUTTE, MOUNT BAKER AND OKANOGAN NATIONAL FOREST
See Whatcom County.

LIBERTY BELL AND EARLY WINTERS SPIRES
Larch trees grow in this scenic area with good climbing rock (i.e. Golden Hara batholith). Blue Lake is a spectacular high alpine tarn. See Botanical and Geological maps.

LITTLE WENATCHEE RIVER
From its origin to Lake Wenatchee, this free-flowing stream is a significant habitat for native and anadromous fish. See Hydrological and Zoological-Aquatic maps.

LUCKY JIM, WOLF CREEK, MIDNIGHT MOUNTAIN, SAWTOOTH, TWISP RIVER, MIDDLE CREEK, LAKE CHELAN, OKANOGAN NATIONAL FOREST
These areas are all one undivided area, the Lake Chelan unit is within the Wenatchee National Forest, the others are administered by the Okanogan National Forest. The area adjoins Liberty Bell I to the north. Most of this area at one time or another has been proposed for Wilderness permanency either adjoining the Glacier Peak Wilderness, as a part of the North Cascades National Park, or a National Recreation Area. The area continues to be an attractive wild entity and wilderness advocates have strongly maintained this major intact area will be essential as Wilderness before this century ends. Necessary steps should be taken to assure its basic wilderness resources are not lost to the twenty-first century. See Environmental Use map.

MCCUE RIDGE, COULTER CREEK
This area has a magnificent stand of old-growth ponderosa pine (4-6 feet in diameter, 150 feet high) about 6 miles into the de facto wilderness of what is the eastern part of the Alpine Lakes area. It is the largest intact stand of virgin ponderosa pine anywhere in the State of Washington. See Botanical map.

MISSION RIDGE, WENATCHEE NATIONAL FOREST
Close to the city of Wenatchee the Mission Ridge Roadless, undeveloped area has been recommended for thorough study pending final management decisions. It is thought to be an ideal area for day hikes in an unroaded environment. See Environmental Use map.

MOLE RIDGE
This ridge, on both sides of Rat Creek and from Earle Lake to Icicle River, includes: The Mole, The Dragon Teeth, The Duolith, The Shrew, Monkey's Head, The Comb, Yellowjacket Tower, The Hook, The Blockhouse, April Fool Tower, Easter Tower, and Snow Creek Wall. See Geological map.

MOUNT STUART
A major landmark in the Enchantment country and reportedly the largest granite monadnock on the North American continent. See Geological map.

MOUNTAINS BETWEEN MIDDLE FORK CASCADE RIVER AND STEHEKIN RIVER
The mountains in this area include: Magic Mountain, Pelton Peak, and Mix-up Peak. See Geological map.

MOUNTAINS BETWEEN LAKE CHELAN AND AGNES CREEK, AND RAILROAD CREEK AND THE STEHEKIN RIVER
The mountains in this area include: Bonanza Peak, Castle Peak, Cloudy Peak, Devorce Peak, Flora Mountain, Martin Peak, Mount Lyall, Needle Peak, North Star Mountain, Riddle Peaks, Tupshin Peak, White Goat Mountain, and Wy' East Mountain. See Geological map.

MOUNTAINS BETWEEN NORTH FORK BRIDE CREEK AND STEHEKIN RIVER
The mountains in this area include: Sahale Mountain, Ripsaw Ridge, Horseshoe Peak, Buckner Mountain, Booker Mountain, Storm King, Goode Mountain, and Hemaloose Ridge. See Geological map.

MOUNTAINS BETWEEN SOUTH FORK AGNES CREEK AND STEHEKIN RIVER
This area includes: Sitting Bull Mountain, Bannock Mountain, Saddle Bow Mountain, Plummer Mountain, Sinister Peak, Dome Peak, Spire Point, Lizard Mountain, Sentinel Peak, LeConte Mountain, Spider Mountain, Hurry-up Peak, Trapper Mountain, Glory Mountain, Blue Mountain (Gunsight Peak), and Agnes Mountain. See Geological map.

MOUNTAINS BETWEEN STEHEKIN RIVER AND NORTH FORK OF BRIDGE CREEK AND GRANITE CREEK, WEST OF RAINBOW CREEK
The mountains in this area include: McGregor Mountain, Mount Benzarino, Frisco Mountain, Corteo Peak, Black Peak, Fisher Peak, Mount Arriva, Bowan Mountain, and Rainbow Mountain. See Geological map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Chelan County discussion are plotted on the Geological map and listed in its index.

NASON RIDGE, WENATCHEE NATIONAL FOREST
Wilderness advocates have pointed out the desirability of retaining the wild character of this ridge area north of the Stevens Pass Highway, where it is readily accessible for wilderness travel of shorter duration than in other larger wilderness regions. West of the area approximately 3 to 5 miles is an area in an undeveloped state, but not inventoried because of the intermixing of Forest Service lands with private holdings in a checkerboard pattern. The entire area has been recommended for wilderness within the National Wilderness Preservation System. See Environmental Use map.

THE NIGHTMARE NEEDLES
The Needles includes the following: Fire Spire, The Ostrich Head, Little Snowpatch, The Lizards, Cynical Pinnacle, Windjammer Tower, Westwind Tower, Three Feathers, Nocturne Tower, Cruel Finger, Crystal Lake Tower, and Fantasia Tower. See Geological map.

NORTH CENTRAL WASHINGTON MUSEUM
Located at Wenatchee, the museum specializes in Indian relics and South Pacific items. See Historical-Cultural map.

NORTH FORK TEANAWAY - INGALLS CREEK DIVIDE
This mountain climbing and rock climbing area includes: Three Brothers, Navaho Peak, Volcanic Neck and Ingalls Peak. See Geological map.

OLD STAGE COACH ROAD (COLOCKUM PASS TRAIL)
Historic route. See Historical-Cultural map.

PESHASTIN PINNACLES (SANDSTONE PINNACLES)
This area is located on a hillside north of U.S. Highway No. 2, 4.1 miles east of the junction of the Blewett Pass and Stevens Pass Highways. See Geological map.

PLANT COMMUNITY
The climax plant community listed below occurs in the county. Some of the species are discussed briefly in Daudenmire's review article. Scientific names are listed in the index to the Botanical map.

Bitterbrush - Idaho fescue

RAILROAD CREEK HANGING VALLEY
The valley joins Lake Chelan at Lucerene. See Geological map.

RAINY CREEK
All stages of the Canadian and Hudsonian life zones are represented at the 2545-acre Rainy Creek area including western hemlock, red cedar, Pacific silver fir, and mountain hemlock. Pioneer to climax stages are present. See Botanical map.

RIBBON MESA (EARTHQUAKE POINT)
A rockslide, caused by an earthquake, slid into the Columbia River occured in 1872. The remains can still be seen near Entiat. See Geological map.

ROCKY REACH DAM MUSEUM
This museum explains the history of man on the Columbia River. See Historical-Cultural map.

ROCKY REACH SPAWNING CHANNEL
State Fisheries Department. Species propagated: chinook salmon. See Zoological-Aquatic map.

ROSE QUARTZ EXPOSURE
Rose quartz found near Cashmere. See Geological map.

ROSS LAKE NATIONAL RECREATION AREA
See Whatcom County.

SAND CREEK
Sand Creek recreational area represents a transititon zone from Douglas-fir to ponderosa pine. Its area is 1,020 acres. See Botanical map.

SAWTOOTH RIDGE
This ridge is located between Lake Chelan and the Twisp River. It includes: McAlester Mountain, Reynolds Peak, Cone Mountain, Twin Peaks, Sun Mountain, Star Mountain, Grey Mountain, Finney Peaks and Navarre Peaks (South and North). The 250,000 acre range is a major habitat area for Mountain goat and ptarmigan. Coupled with the Chelan Mountains on the opposite lakeshore, Sawtooth Ridge gives Lake Chelan its spectacular scenery. See Geological and Zoological-Terrestrial maps.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SKI JUMP TOURNAMENT
This nationallly known event takes place in the Leavenworth alpine valley the third week in February. See Historical-Cultural map.


Leavenworth Ski Jump Tournament

SLIDE RIDGE, WENATCHEE AND OKANOGAN NATIONAL FOREST
Immediately above Lake Chelan State Park, the Slide Ridge area provides day use hiking in a roadless environment. See Environmental Use map.

SNOWGRASS MOUNTAIN
This area lies between Icicle River and U.S. Highway No. 2, east of Stevens Pass. See Geological map.

SQUILLCHUCK STATE PARK
Comprising 286 acres, the park is 7 miles southwest of Wenatchee, with winter sports and limited camping. See Environmental Use map.

STEHEKIN RIVER AND MARSH
A dense breeding population of harlequin ducks is found at the head of Lake Chelan. See Hydrological and Zoological-Terrestrial maps.

STEHEKIN SCHOOL
This is the only remaining one-room country school still in use in Washington. See Historical map.

STEHEKIN VALLEY AND LAKE CHELAN
The Stehekin Valley and Lake Chelan is an excellent example of glacial erosion. See Geological map.

STILETTO PEAK
This peak is located northwest of Twisp Pass and south of Copper Creek. See Geological map.

STORMY, WENATCHEE NATIONAL FOREST
Roadless, undeveloped area. See Environmental Use map.

STUART RANGE: MCCLELLAN RIDGE
This area includes: McClellan Peak, The Chessmen, The Prong, Tulip Towers, Scapula Spire, Rocket Peak, The Snags, Gremlin Peak, Arrowhead Peak, The Sentry, The Dagger, The Chisel, The Dart, and The Heronhead. See Geological map.

STUART RANGE: NORTH OF INGALLS CREEK
This area includes: Mount Stuart, Sherpa Peak, Argonaut Peak, Colchuck Peak, Orgontail Peak, Rosebud Spire and Colchuck Balanced Rock. See Geological map.

SWAKANE CANYON AND SWAKANE WILDLIFE RECREATION AREA
Virgin meadow communities with rare, very restricted Thompsons' clover (Trifolium thompsoni) can be found in the canyon. Thompson Clover, was first described in 1936 and can be found on alluvial outwash from side canyons of main Swakane Canyon. The wildlife recreation area supports a population of California bighorn sheep, (Ovis canadensis californica). See Entiat Wildlife Recreation Area. See Botanical, Zoological-Terrestrial, and Environmental Use maps.

TEMPLE RIDGE
This ridge, north and west of Snow Lakes includes: Mount Temple, The Box Top, Mounument, Flake Tower, Prusik Peak, Enchantment Peak, Lighthouse Tower, Razorback Spire, Comet Spire, The Meteor, The Professor, The Black Pyramid, The Eagleheads, The Candle, and Pogo Pinnacle. See Geological map.

THREE MUSKETEERS RIDGE
Mountains between Mole and Temple Ridges. See Environmental Use and Geological maps.

TOP OF RIBBON MESA
Part of a prebasalt surface, covered by a single flow, now largely eroded off. See Geological map.

TRINITY
Trinity is located along Phelps Creek in a wild and remote section of the Cascades. Around 1914 the Royal Development Company was formed and began mining copper. The town immediately became a bustling community of mines and small businessmen. The mines employed about 275 men, part of whom worked the mill. As the cost of mining rose and the prices of ore stabilized, the number of men dwindled until one man, Mr. Foster, a watchman remained. Today only skeletal evidence of the mining community remains. Flattened shacks from the heavy winter snow are scattered around with old rail ore carts near once active mine shafts. See Historical-Cultural map.

TUMWATER BOTANICAL AREA
The area was set aside in 1938 to protect the rare Tweedy bitterroot (Lewisia tweedyi). This species is confined almost entirely to the granite soils of western Okanogan County, Chelan County, and northern Kittitas County on well-drained slopes, usually on talus or in rock crevices. The genus, Lewisia, is named after Meriweather Lewis. The tweedyi commemorates Frank Tweedy, who collected this species while a member of a survey team from the Northern Pacific Railway.
The area occupies 1,104 acres in the Wenatchee National Forest. In addition to the Tweedy bitterroot, the primary vegetation consists of pondrosa pine (Pinus ponderosa) and Douglas-fir (Pseudotsuga menziesii) in the overstory and vine maple (Acer circinatum), bitterbrush (Purshia tridentata), Ceonothus (Ceonothus sp.), willow (Salix sp.), and pinegrass (Calamagrostis rubescens). See Botanical and Environmental Use maps.

TUMWATER CANYON
A particularly scenic whitewater area of the Wenatchee River paralleled by U.S. 2 - Stevens Pass Highway, the Wenatchee River System has been proposed for Wild and Scenic River classification. The river is nationally known by kayak enthusiasts as one of the best rivers for running. It is also extensively used by fishermen and the adjoining road represents an outstanding scenic drive.

This is a rock climbing area on both sides of U.S. Highway No. 2 in Tumwater Canyon west of Leavenworth. The Canyon includes: Castle Rock, Midnight Rock, Noontime Rock, Rattlesnake Rock, Piton Tower, West Tumwater Rock, Jupiter Rock, Waterfall Column, Tumwater Tower. See Geological, Hydrological, and Botanical maps.

TWENTY-FIVE MILE CREEK
A high density of coyotes (5 per square mile) live along the creek and in vicinity of Lake Chelan. The creek also holds spawning runs of kokanee salmon. See Hydrological, Zoological-Aquatic, and Botanical maps.

TWIN LAKES
These lakes are used by the Washington Department of Game as brood lakes for high lakes cutthroat. See Hydrological map.

VERTICAL DIKES
Many north-trending vertical dikes may be found on both slopes of Swauk (Blewett) Pass. See Geological map.

WASHINGTON PASS
A pass through the northern Cascade Mountains, at a 5,477 foot elevation, on State Route 20. See Geological map.

WELLS FISH HATCHERY
State Game Department. Species propagated: trout. Water source: Columbia River and wells. See Zoological-Aquatic map.

WELLS HOUSE
This gracious home was built in 1909 by W. R. Clark, the "Father of Wenatchee Valley." He was the engineer who built the Hi-Line Irrigation Canal which irrigates the orchards of the Wenatchee Valley and the east side of the Columbia. The building is unique architecturally and for this reason it was chosen by the Governor's Advisory Council on Historic Sites to be on the National Register of Historic Sites. It was purchased by A. L. Wells in 1919 and was given to Wenatchee Valley College in 1951, along with 5 acres of landscaped land which formed the nucleus of the college. See Historical-Cultural map.

WENATCHEE BOULDER FIELDS
This area is comprised of extensive fields of very large boulders of northern origin. The mechanism of their transport to their present location is unknown. They may have been associated in some way with the Bretz floods. See Geological map.

WENATCHEE MOUNTAINS
Distinctive vegetation is found growing on serpentine soils within the Wenatchee Mountains between the Cle Elum River and Icicle River. Significant mountineering areas exist in the area of the Cascade Crest, south of Stevens Pass. The mountains in this area include: Granite Mountain, Harding Mountain, Mac Peak, The Cradle, Thunder Mountain, and Trico Mountain. See Botanical and Geological maps.

WENATCHEE RIDGE
This range of the Cascades lies north of Stevens Pass, between the White and Little Wenatchee Rivers. A large extent of this area has been included in Glacier Peak Wilderness. Mountains within the Wenatchee Ridge include: Bryant Peak, Irving Peak, Longfellow Mountain, Mount David, Mount Jonathan, Mount Saul, Poe Mountain, and Whittier Peak. See Geological map.

WENATCHEE RIVER
This is a freshwater, free-flowing stream habitat from Lake Wenatchee to town of Leavenworth, valued as a very scenic stretch of wild river. The river is nationally known by kayak enthusiasts as among the best rivers for running. It is also a major summer-run steelhead stream. Total coliform bacteria counts in excess of recommended criteria occur in the lower reaches of the Wenatchee River. Inadequately treated municipal wastes and septic tank drainages are generally responsible for the problem.

The Wenatchee River Valley, from southeast of Lake Wenatchee to Wenatchee, is a critical deer wintering grounds. See Hydrological, Environmental Use, and Zoological-Terrestrial maps.

WENATCHEE VALLEY COLLEGE (JR)
Located in Wenatchee, the college was established in 1939. See Historical-Cultural map.

WHITE RIVER
From Glacier Peak Wilderness to Wenatchee Lake, it is a freshwater, free-flowing stream. This river contains an important trout population. See Hydrological and Zoological-Aquatic maps.

COUNTY DISCUSSION

WILDLIFE

Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide and national significance and reflect, in part, the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington"; (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. In the county are found grouse, golden eagle, bald eagle, prairie falcon, osprey, owls, Canada goose, partridge, ptarmigan, and various waterfowl species.

MAMMALS. River drainages contain critical elk winter ranges. Specific wintering grounds extend in a narrow band 2 to 5 miles west of the Columbia River from the Rock Island Dam south to the county line; and scattered ranges located between Wenatchee, U.S. 2, U.S. 97 and Chelan County line. The western gray squirrel (Sciurus griseus) has a restricted range in Chelan, Klickitat, Pierce and Thurston counties. There are areas of importance to grizzly bear (Ursus arctos). They are found only in North Cascades National Park and in extreme northeast corner of state. The total is about 10 bears. Mountain goat have important ranges in the county. Other mammals noted in Chelan County are bighorn sheep, coyote, pine marten, Canada lynx, cougar, fisher and mountain red fox in the Cascades, and pronghorn antelope - part of the approximately 100 animals in the state.

REPTILES. Short-horned lizard is found in decreasing populations.

AMPHIBIANS. The tailed frog (Ascaphus truei) inhibits the rapid mountain streams of the Cascades.

Clallam

AGATE BAY CAVES
The extent of these littoral caverns is undetermined. They are of interest largely because of Indian legend. See Geological map.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in this county discussion section are plotted on the Archeological map and listed in its index.

BAILEY RANGE
The following mountains are included in this range paralleling the upper Hoh River Canyon, west of Lake Mills and the Elwha River: Boulder Peak, Cat Peak, Catwalk, Mount Appleton, Mount Carrie, Ruth Peak, Stephen Peak, and Sue Peak. See Geological map.

BOGACHIEL REARING POND
The pond is operated by the State Game Department. Species propagated: winter steelhead trout. Water Source: springs. See Zoological-Aquatic map.

BOGACHIEL RIVER
A major winter run steelhead stream, this river also contains fall chinook and coho salmon. See Jefferson County. See Zoological-Aquatic and Hydrological maps.

CAPE ALAVA AND WEDDING ROCKS
This site's outstanding features are its petroglyphs depicting birds, whales, people and old ships. They are an important element of Washington archeology in conjunction with the digging going on about 10 miles to the north at the Ozette Village site. Some coastal tribes held their marriage rituals at this site, hence the name. The rocks lie at the high tide mark and have been recommended be placed under the jurisdiction of the National Park Service. The beach can be reached by a unique plank trail from Ozette. See Archeological map.

CALAWAH REARING PONDS
State Game Department. Species propagated: trout. Water source: springs. See Zoological-Aquatic map.

CALAWAH RIVER
Coho and chinook salmon and winter run steelhead trout spawn in this free-flowing stream. See Zoological-Aquatic map.

CAPE FLATTERY
From this scenic veiwpoint a large variety and number of sea-birds, both resident and migrant, may be observed. Tatoosh Island, offshore, has a large nesting colony of a variety of sea-birds.

The rocky saltwater shores surrounding Cape Flattery and Waadah Island are liberally sprinkled with stands of the brown kelp (Postelsia palmaeformis). Nowhere else along the Washington coast can this seaweed be observed. It inhabits the Pacific Coast of central Oregon south, and is therefore unique in Washington. See Botanical, Zoological-Terrestrial and Environmental Use map.

CAPE FLATTERY SEA STACKS
These interesting rock formations are produced by vigorous wave erosion of volcanic rocks along the Pacific coast. See Geological map.

CARSON CAVE
This is a major littoral cavern containing a large variety of marine life. See Geological map.

COAST DOUGLAS-FIR
The Pseudotsuga menziesii, var. menziesii is the largest of its species. Its measurments are: diameter: 4-1/2 feet; height: 221 feet; crown spread 61 feet. See Botanical map.

COAST NEAR LA PUSH
This is the probable range of the sea otter, a rare Washington State mammal. About 60 otters were imported from Alaska in 1969-70 in an effort to reintroduce the species to the state. See Zoological-Terrestrial map.

CONVULSION CANYON
Named by Press Expedition after hearing Indian legends of great convulsions in the mountains, this canyon is on the Elwha River below Lillian Creek, at the site of a great landslide. See Geological map.

DICKEY RIVER, INCLUDING EAST AND WEST FORKS
This free-flowing river offers excellent steelhead, cutthroat, and salmon fishing. See Zoological-Aquatic map.

DUNGENESS BAY
This bay is famous for its Dungeness crabs, other shellfish, and octopus. Its Dungeness eelgrass areas provide major feeding grounds for black brant. See Dungeness National Wildlife Refuge. See Hydrological and Zoological-Aquatic maps.

DUNGENESS LIGHTHOUSE
The lighthouse is listed on the State Register. It was the first lighthouse to operate in the State of Washington. See Historical-Cultural map.

DUNGENESS NATIONAL WILDLIFE REFUGE
This 556 acre area of sand, second-class tidelands, and saltwater was established in 1915 to protect extensive eelgrass beds and to allow black brant to use them unmolested. The Dungeness Refuge consists of a sandspit extending out into the Strait of Juan de Fuca and portions of Dungeness Bay. The Dungeness Spit is the longest natural sandspit in the United States. It is 7 miles long and has approximately 20 miles of undisturbed sandy beach.

This refuge provides a feeding and resting area for several thousand black brant and up to 30,000 ducks during migrations and in winter. Thousands of shorebirds of many species use the area. The most abundant are sandpipers, black turnstones, red knots, and dowitchers. Harbor seals are common in the bay, and groups can usually be seen loafing along the shoreline on the sandy beach.

Dungeness Refuge is open to public use from March 1 through September 30. The area's small size requires that it be closed to entry during the period in which migrating and wintering waterfowl and shore birds are present. A small picnic area has been provided on the spit, under an agreement between the Bureau of Sport Fisheries and Wildlife and the Washington State Parks and Recreation Commission. Overnight camping is not permitted. Access to the spit is by a forest trail that originates in a County campground. Birdwatching, beachcombing, fishing, clamming, crabbing and related uses are permitted. The area is closed to public hunting by Presidential Proclamation. See Dungeness Spit. See Environmental Use map.

DUNGENESS RIVER
It is free-flowing from the fish hatchery upstream to Three Forks. A major winter run steelhead, salmon and anadromous trout stream. See Hydrological and Zoological-Aquatic maps.

DUNGENESS SPIT
A spit extending into the Strait of Juan de Fuca about 12 miles east of Port Angeles, it is a significant feeding and resting area during migration and winter seasons for great numbers of herons, waterfowl, shore birds, gulls, terns and other species. There is a smelt run here for about one month in the fall. The land on the spit itself is unusually dry, a semi-desert zone with associated plants. It is the dryest point on the west coast north of San Diego. The spit is protected by the U.S. Bureau of Sport Fisheries and Wildlife and is one of the very few undisturbed habitats of this type remaining in Washington. See Dungeness National Wildlife Refuge. See Botanical map.

DUNGENESS STATE PARK
This 36 acre park, 5 miles northwest of Sequim, offers swimming, fishing, clamming and boat launching. See Environmental Use map.

DUNGENESS STATE SALMON HATCHERY
Species propagated: spring and fall chinook and coho salmon. See Zoological-Aquatic map.

EDIZ HOOK
Waves from northwesterly and westerly storms during high tides have occasionally washed over the narrow portion of Ediz Hook, damaging a road and utilities, depositing debris, and sometimes breaching the Hook at one or more places. Comparison of condition surveys during the period 1883 to 1970 reveals that erosion has a southward trend in the western half of the Spit. The comparison also shows a progressive elongation of the spit eastward about 280 feet. In recent years, the increased severity and frequency of wave attack, combined with a reduction in the source of beachfeed material, is threatening to breach the Hook in several places. Continued erosion would destroy the spit, forcing relocation of the Coast Guard base at its eastern extremity and eliminate the natural protection to Port Angeles Harbor, leaving port facilities and a Federally constructed boat basin vulnerable to severe wave attack. The city of Port Angeles and industries located on Edis Hook have expended considerable funds in an effort to arrest the erosion. See Geological map.

ELK READE, OLYMPIC NATIONAL FOREST
This area is similar in characteristics to the Bogachiel area in Olympic National Park. The two areas are contiguous. Logging incursions have been made into the Elk Reade block, and timber incursations have been proposed throughout most of this 8,400 acre roadless area. See Environmental Use map.

ELWHA RIVER
Up until 1912, when Elwha Dam was constructed creating Aldwell Lake, the Elwha was a major salmon producing river. The remaining fish runs in its lower 3 miles consist of spring and fall chinook, coho, chum, pink slamon, steelhead and cutthroat trout. The stretch below the dam is also favored for kayaking. Discovered and named by the Press Expedition in the late 1800's, the Elwha River, in part of its length, runs along side a cliff and makes an abrupt right angle turn into a cliff canyon through a "gate" where eroded rock resembles faces. The seashore at the mouth of the river has been identified for potential federal protection by the Northwest Seashore Alliance. See Hydrological, Geological, Historical-Cultural, and Zoological-Aquatic maps.

ENGELMANN SPRUCE
This is one of three recently-discovered groves of Engelmann Spruce in the Olympic Mountains. These trees are usually found east of the Cascade Summit. See Botanical map.

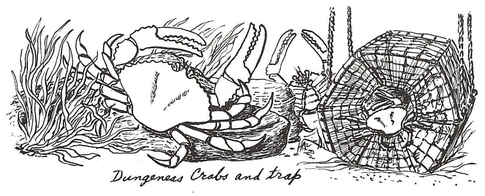
FIFTEEN MILE SHELTER
Impressive stand of Douglas-fir. See Botanical map.

FLATTERY ROCKS NATIONAL WILDLIFE REFUGE
Extending for more than 100 miles off the precipitous and stormy shores of Washington, from Cape Flattery south almost to Copalis Beach, are some 870 islets and islands of the National Refuges of the Washington Coast. Many are no more than barren, rocky outcroppings. Some have dense stands of salal, salmonberry and related bushes. A few support stands of stunted conifers. Ozette Island has the best tree cover. Most, however, are relatively inaccessible.

The unique nesting habits of sea birds living here are such that no other area meets their demands. Chief among these requirements are a lack of predatory animals, limited outside harrassment and the convenience of a plentiful marine food supply. Many other birds who nest elsewhere also use these environs as feeding and loafing sites.

The most common nesting birds of the Flattery Rocks Refuge are: pelagic cormorant, glaucous-winged gull, tufted puffin, and pigeon guillemot. Not nesting, but commonly seen on or near the islands at least seasonally, are pink-footed shearwaters, sooty shearwaters, harlequin ducks, white-winged scoters, surf scoters, black turnstones, wandering tatlers, western gulls, California gulls, Bonaparte's gulls, mew gulls, Heerman's gulls and marbled murrelets. Bald eagles, Peale's peregrine falcons, northwestern crows, and common ravens are seen, but no nesting has been recorded. Fox sparrows, song sparrows, and winter wrens are permanent residents of the vegetated islands.

As many as 500 sea lions use the refuges, but do not breed there. Harbor seals, fur seals, Pacific harbor porpoises, piked whales, gray whales, and humpback whales frequent the area. These islands can only be visited through use of private or chartered boat, and landing is apt to be dangerous at any time. Visitors should first check with the Refuge Manager at Ilwaco. See Environmental Use map.



FUNGI SITES
The following areas in this county are noted for their abundance and variety of higher fungi or important species: Soleduck Valley Area, Middle Dungeness River Area. See Botanical map.

GENTIAN
Gentian (Gentiana douglasiana), which grows freely about Lake Ozette, is known only in two localities in the state of Washington. Its presence in this part of the state should be noted to add to the list of unique features in the Lake Ozette region. The other area known for this plant is the vicinity of Snoqualmie Pass. See Botanical map.

GRAVEYARD SPIT STATE MARINE PARK
Graveyard Spit at the east end of Dungeness Bay, also known as "Massacre Spit," is a State Historical Place. It is a marine park one-half acre in size. See Archeological map.

GRAY WOLF RIDGE
This ridge is west of Dungeness River and south of the Gray Wolf River. See Geological map.

GRAY WOLF RIVER
This river has steelhead, salmon, and cutthroat fishing. See Zoological-Aquatic map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the county discussion section are plotted on the Historical-Cultural map and listed on its index.

HOH RIVER
See Jefferson County.

HORO RIVER
This river has salmon, steelhead, and cutthroat fishing. See Zoological-Aquatic map.

HOLE-IN-THE-WALL
A tunnel-like littoral cavern that extends through a headland. See Geological map.

HURRICANE RIDGE
A mile-high ridge in the northern Olympic Mountains, affording views of the high, interior mountains and lowlands of the Strait of Juan de Fuca. It is an extremely popular tourist area. See Geological map.

INDIAN FESTIVAL
It takes place at La Push, the first week of July. See Historical-Cultural map.

JAMES ISLAND
This island was used historically as a refuge for coast Indians against raiding northern tribes. See Historical-Cultural and Geological maps.

JASPER EXPOSURE
Jasper is found at Crescent Bay. See Geological map.

LAKE ALDWELL
Formed behind Elwha Dam, the area surrounding the lake is a very dry, supporting such unusual plants as madrone, manzanita and white pine. See Botanical map.

LAKE CRESCENT
This popular lake is located in the northern part of Olympic National Park. The Beardsley trout, a rare and magnificent, solid sky-blue trout is found here and in the Lyre River. Portions of the lake are proposed as part of a wilderness area. See Hydrological, Zoological-Aquatic, and Environmental Use maps.

LAKE WILLOUGHBY CEDARS
This is a little lake about a half-mile inland from the Point of Arches and Shi-shi Beach. A stand of huge cedars surround the lake, but will soon be logged off. Lowland stands of giant old cedars such as this are increasingly scarce in the Olympic Peninsula. Some Forest Service papers indicate that large cedars will be extinct on the peninsula in a few years. Almost all of the stands presently preserved in the park coast strip are scraggly and not large because of the ocean winds; but this one is sufficiently inland that the cedars have been permitted to grow to a large size. They are typical of what has been logged off in this region. See Botanical map.



LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Clallam County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LA PUSH
A Quillayute Indian village, La Push is set on a dramatic, expansive beach punctuated by massive, offshore sea stacks. The beach is readily accessible by trail, with the surrounding bluffs harboring large spruces and hemlocks. A large sports and commercial fishing fleet, and a U.S. Coast Guard are located here. See Botanical map.

LYRE RIVER
From its source at Lake Crescent to its mouth on the Strait of Juan de Fuca, the river is noted for its excellent sport fishing. Access is difficult throughout most of its length, and it is uncluttered by developments of any kind. Many local citizens feel that this river should be kept in its pristine shape and, except for a trail along its bank, no development of any kind should be permitted. The Beardsley trout, discussed under Lake Crescent, is found in Lyre River. See Hydrological and Zoological-Aquatic maps.

MAKAH INDIAN FESTIVAL
Neah Bay. Last week in August. See Historical-Cultural map.

MAKAH INDIAN RESERVATION
Ethnic group. See Historical-Cultural map.

MAKAH NATIONAL FISH HATCHERY
A large, 150,000 pound production hatchery proposed to rear chinook, coho and chum salmon as well as steelhead and rainbow trout is under development. See Zoological-Aquatic map.

MAKAH RIVER SALT MARSH
This unique salt marsh is the last large salt marsh north of the Grays Harbor area. It is still an active dynamic ecosystem. See Hydrological map.

MARYMERE FALLS
These 90-foot falls near Lake Crescent are quite impressive. See Hydrological map.

MAYNARD PEAK
This peak is west of Dungeness River and southeast of the Gray Wolf River. See Geological map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Clallam County discussion are plotted on the Geological map and listed in its index.

MOUNT ANGELES
This mountain is the home of numerous mountain goats introduced by the Game Department. The peak is located 2-1/2 miles northeast of the Hurricane Ridge Visitor Center. See Zoological-Terrestrial and Geologic maps.

MOUNT OLYMPUS
The lowest elevation glacier in the world is found at Mount Olympus. See Geological map.

MOUNT STORM KING
Mount Storm King is a spectacular mountain peak at the southeast end of Lake Crescent. See Geological map.

MOUNT TOWNSEND
Many rock garden-type plants are found along the ridge. The approach is through a forest with a dense understory of rhododendron. In early June, the finest display of rhododendron blossoms in the Olympics is found here. See Botanical map.

MOUNT ZION AND GREEN MOUNTAIN, OLYMPIC NATIONAL FOREST
These two separated areas are east of the Olympic wilderness proposal. Both are surrounded by logging roads and clearcut areas. Some conservation organizations believe they should be studied for their possible wilderness designation; others recommend a roadless category with motorized access prohbited. See Environmental Use map.

MOUTH OF THE FYSHT RIVER
This seashore is in the process of being identified as a protected seashore by the Seashore Alliance. See Environmental Use map.

MUKKAW BAY
This is an educational site for marine life habitat and open intertidal areas. It is unique along Washington coast. This is Makah Indian land. See Zoological-Aquatic, Hydrological and Historical-Cultural maps.

OLYMPIC HOT SPRINGS
This natural hot springs was once a resort with a swimming pool. It is not being used now. See Hydrological map.

OLYMPIC NATIONAL PARK
Olympic National Park is a 1,400-square-mile expanse of wild, forest-clad and glacier-studded mountains, with - at lower elevations - coniferous rain forests, lakes, streams, a 50-mile seacoast with rocky headlands and beaches, and a thriving wildlife population.

The Olympic Mountains are composed almost entirely of sedimentary rocks, such as sandstone and shale, formed from sand and silt deposited in the shallow seas that many millions of years ago covered western Washington. These rocks were later uplifted, and carved by erosion and glaciers into the present rugged range. Mount Olympus, at 7,965 feet, is the highest peak. Several other peaks rise above 7,000 feet, but elevations of the ridges and crests are mostly between 5,000 and 6,000 feet. There are about 60 glaciers, with an aggregate area of about 25 square miles, in the Olympic Mountains. The three largest, on Mount Olympus, are 2 miles or more in length.

In a region of glacier-carved basins and heavy precipitation, it is natural to find numerous lakes and streams. Most of the lakes are small, their beauty adding much to the charm of the Olympic landscape. Lake Crescent, which is nestled at the foot of the mountains of the park's northern extremity, is relatively large - about 10 miles long and 1-1/2 miles wide.

The 50-mile-long strip of Pacific coastline is one of the most primitive remining in the conterminous United States. The encroaching sea has produced a scenic landscape of many shoreline needles, offshore rocks, and islands. Some of these are used by nesting colonies of birds, as a rest stop by migrating birds, and by seals and other marine mammals.

Olympic National Park protects many species of wild animals - invertebrates, fish, amphibians, reptiles, birds, and mammals - and their habitats. Of the larger mammals, the Roosevelt elk is the species most commonly seen, especially in the rain forest valleys from late autumn to early spring. Black-tailed deer, bear, raccoon, and skunk live in the park, including the Pacific Coast Area. Seals are frequently seen in the water or on offshore rocks. Visitors to higher and more open country can expect to observe many kinds of animals. About 140 species of birds have been identified in a variety of habitats in the park.

The west side of the Olympic Peninsula has the wettest winter climate in the conterminous United States, with yearly precipitation exceeding 140 inches in some sections. Mount Olympus and all the high country in the western part of the park receive much more precipitation, mostly in the form of snow. In contrast to the wetness of the west side, the northeast side of the peninsula is one of the driest areas on our Pacific coast outside of southern California.

An extraordinary rain forest growth has developed under the conditions of abundant moisture that have existed for many centuries in the western valleys of the park. Sitka spruce and western hemlock dominate this environment; Douglas-fir and western red cedar are present, too. Some Douglas-fir and Sitka spruce here attain a height of nearly 300 feet and a diameter of 8 feet or more.

Roads provide access to about 600 miles of trails. Some short trails provide easy trips requiring 1 day or less; longer, more difficult trails may take up to 1 week or more. See Environmental Use map.

OLYMPIC COASTAL STRIP
The area from Cape Alava to the Makah Indian Reservation is now held privately. The hope of many conservationists is that the Pacific Ocean strip of the Olympic National Park will be continued from Ozette, which is now the National Park boundary, to the Makah Indian Reservation line. See Enviromental Use map.

OLYMPIC NATIONAL PARK, HOH RAIN FOREST VISITOR CENTER AND NATURE MUSEUM
As an introduction to understanding and enjoying Olympic National Park, the National Park Service has three visitor centers - the Pioneer Memorial Museum near Port Angeles (open all year), Storm King Visitor Center at Lake Crescent, and the Hoh Rain Forest Visitor Center at Forks. At these centers are audiovisual programs, talks, exhibits, and numerous interpretive publications and maps. Self-guiding nature trails, located throughout the park, sample many different life communities. See Historical-Cultural map.

OLYMPIC NATIONAL PARK WILDERNESS AREA
See Jefferson County.

OZETTE LAKE
The shores of Lake Ozette have been suggested for preservation. Lake front development outside the park is underway and eventually will progress to the point that the lake will bear too much traffic for enjoyment. Increased traffic will also affect the National Parks shores with eventual detrimental effects. Every effort should be made to put all of Lake Ozette within the National Park boundary. Field studies by the University of Washington Fisheries College have located 3 separate populations of Olympic mudminnow, a threatened species, at the lake. See Hydrological map.

OZETTE VILLAGE SITE COMPLEX
Excavations at this location have disclosed a prehistoric Indian Village buried by a earth slide. The slide preserved all of the material culture elements known to the society and the artifact inventory of the site is truly remarkable. Houses, and their contents, have been preserved at this site. See Archeological map.

PACIFIC COASTAL SHORELINE
See Pacific County.

PAT'S PRAIRIE
This unusual ecological interest area contains plant communities not usually associated with each other. The 430 acre bog area is located at elevation 2,700. See Botanical map.

PENINSULA COLLEGE (JR)
Port Angeles. See Historical-Cultural map.

POINT OF THE ARCHES
The Point of the Arches comprises one of the finest scenic beaches and marine tidelands along the Pacific Coast. Rugged rock outcroppings on a predominantly sandy stretch of beach are accessible only by rough roads or along the beachline. The rock formations and abundance of marine life on the coast are the points of interest. It is registered as an existing Natural Landmark. See Geological map.

COUNTY DISCUSSION

POINT OF THE ARCHES NATIONAL SEASHORE
The National Seashore (as proposed by the Olympic Park Associates) adjoins the Flattery Rocks National Wildlife Refuge to the west, the southern boundary of the Makah Indian Reservation to the north, and the boundary of Olympic National Park north of the Ozette River to the south. The area totals 2,662 acres. See Environmental Use map.

PORT ANGELES BAY
Studies for the Puget Sound Governmental Conference have shown that pulp and paper mill effluents in Port Angeles Bay have caused damage to the indigenous marine life by injuring juvenile salmon migrating through the harbors, by suppressing photoplankton activity, by damaging oyster larvae and growth, by damaging bottom fish eggs, by damaging bottom organisms, and by producing overall unattractive aesthetic conditions. Among restoration plans is one by the Rayonier Company to eliminate 80 percent of its suspite waste liquor by July 1974. See Hydrological map.

PORT ANGELES PIONEER MEMORIAL MUSEUM
Historical and natural history items are displayed, including a 1890 log cabin. See Historical-Cultural map.

PORT ANGELES TERTIARY FOSSIL SITE
Silicified pelecypods and gastropods are common along the bluffs fronting the Strait of Juan de Fuca immediately west of the West Twin River. See Geological map.

PRESS EXPEDITION ROUTE
During one of the most severe winters ever recorded for western Washington, (1889-1890) six men, four dogs, and two mules set out to explore the heart of the mysterious Olympic peninsula, unknown even to the Indians. The expedition was sponsored by a newspaper, The Seattle Press, after whose publisher, William E. Bailey, the "backbone of the Olympic Peninsula"-the Bailey Range-was named. The expedition was the brainchild of a reporter named Edmond S. Meany, who later became a professor of history at the University of Washington, and second president of the Seattle Mountaineers. He served in this latter capacity from 1918 until 1935. See Historical-Cultural map.

PUGET SOUND AND STRAIT OF JUAN DE FUCA
Those areas of Puget Sound and the Strait of Juan de Fuca and adjacent salt waters north to the Canadian line and lying seaward from the line of extreme low tide are designated Shorelines of Statewide Significance under the State Shoreline Management Act. See Kitsap County.

PYSHT RIVER
Coho and chinook salmon and winter run steelhead trout spawn in this free-flowing stream. See Zoological-Aquatic map.

QUEETS RIVER
Small runs of pink salmon have recently been found in this river. See Jefferson County. See Zoological-Aquatic map.

QUILCENE, THE BROTHERS, MILDRED LAKES, OLYMPIC NATIONAL FOREST
This region on the eastern scarp of the Olympics, abutting Olympic National Park, was recommended for wilderness designation. The Forest Service has made a similar proposal for study as a Wilderness Candidate Area. All of the conservation-concerned organizations support inclusion of the Lena Lake area in the southern part of The Brothers roadless, undeveloped area, together with closure of the upper portion of the road following the Hamma Hamma River to permit the area to regain a natural condition.

Much of this area had originally been designated as a primitive area in the 1930's prior to the establishment of Olympic National Park. The remaining sections of the primitive area were declassified after the other parts were included in the park. See Environmental Use map.

QUILLAYUTE BURIAL GROUNDS
The traditional old cemetery of the Quillayute Indians. Much history can be seen there in the headstones which date back to pre-white days. See Archeological map.

QUILLAYUTE INDIAN RESERVATION
Ethnic group. See Historical-Cultural map.

QUILLAYUTE NEEDLES
This rock formation is off the southwest coast of the county near the town of La Push. See Geological map.

QUILLAYUTE NEEDLES NATIONAL WILDLIFE REFUGE
See Jefferson County.

QUILLAYUTE RIVER
This is a free-flowing river. Small runs of pink salmon have recently been found in this river. See Zoological-Aquatic and Hydrological maps.

QUINAULT RIVER
Small runs of pink salmon have recently been found in this river. See Zoological-Aquatic map.

RUGGED RIDGE, OLYMPIA NATIONAL FOREST
The 6,200 acre Rugged Ridge area adjoins Olympic National Park. Wilderness status has been recommended for the area. See Environmental Use map.

SALMON FISHING DERBY
The derby takes place in Port Angeles, on Labor Day. See Historical-Cultural map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SEQUIM BAY
This bay is an important feeding area for waterfowl, gulls, terns, and alcids - including the rhinoceros auklets from the very large colony nearby at Protection Island. See Jefferson County. See Zoological-Terrestrial map.

SEQUIM BAY STATE PARK
This 90 acre park, 4 miles south of Sequim, fronts on Sequim Bay. Camping, trailering, swimming, clamming and boating are offered. See Environmental map.

SEVEN LAKES BASIN
This sub-alpine basin has many beautiful lakes. See Hydrological map.



Whales / Shipping - Juan de Fuca Strait

SHI SHI BEACH
This beautiful, crescent, sandy-beach looks out at the rocks in the Pacific. It is one of the most scenic spots in the state. See Geological map.

SITKUM RIVER
Coho and chinook salmon and winter run steelhead trout spawn in this free-flowing stream. See Hydrological and Zoological-Aquatic maps.

SOL DUC HOT SPRINGS
A mineral hot spring located on the Soleduck River. Formally the hot springs was the site of a large resort which was visited by a number of the era's leading personalities. The springs are now within the Olympic National Park. See Hydrological map.

SOLEDUCK FALLS
On the Soleduck River, about 2 miles above the hot springs. See Hydrological map.

SOLEDUCK SALMON HATCHERY
State Fisheries Department. Species propagated: salmon. See Zoological-Aquatic map.

SOLEDUCK RIVER
Coho and chinook salmon and winter run steelhead trout spawn in this free-flowing stream. It is used by kayakers. See Hydrological map.

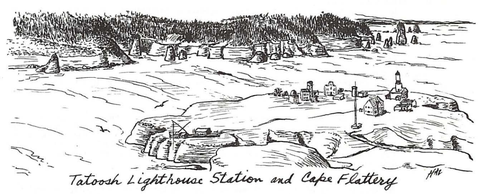
STEEPLE ROCK
This rock is located 2 miles southwest of the Hurricane Ridge Visitor Center, just above the Obstruction Point Road. See Geological map.

STEEPLE ROCK ALASKA YELLOW CEDAR
The largest known specimen of Alaska yellow cedar is to be found near Steeple Rock. It has a circumfrance of 31 feet, height of 133.5 feet, and crown spread of 59 feet. It was discovered in 1969. See Botanical map.

STRAIT OF JUAN DE FUCA AND PILLAR POINT
The shoreline from Angeles Point to Cape Flattery is a narrow beach backed up by steep high bluffs with many outcrops of rock. Most of the shoreline along the Strait of Juan de Fuca is privately owned and undeveloped. Minor noncritical erosion is occurring along the shoreline west of Kydaka Point and at Pillar Point.

This seashore is recommended for protection by the Northwest Seashore Alliance. See Environmental Use map.

TATOOSH ISLAND
A lighthouse location west of the tip of Cape Flattery at the mouth of the Strait of Juan de Fuca. It is a National Historical place. The island is owned by the U.S. Geological Survey and is used for biological studies and other aspects of marine sciences. There is a large nesting colony of glaucous-winged gulls, and also nesting there are Leach's petrel, fork-tailed petrel, pelagic cormorant, black oystercatcher, common murre, pigeon guillemot, Cassin's auklet, and the tufted puffin. See Zoological-Terrestrial map.



Tatoosh Lighthouse Station and Cape Flattery

THREE O'CLOCK RIDGE
This site contains one of the best examples of xerophytic plants, notably Rocky Mountain Juniper, in the Olympic Mountains. See Boatnical map.

THUNDER CANYON
Named by Press Expedition for the thunderous roar of Elwha River in the canyon. See Geological map.

TONGUE POINT
Tongue Point is a reef extending westward, partically across Crescent Bay, composed of basalt and hard sandstone and congolmerate. It is located adjacent to a Clallam County park and is particularly interesting for the abundance of marine life that can be observed at low tide. See Geological map.

TYLER PEAK
This peak is west of the Dungeness River and southeast of the Gray Wolf River. It is the habitat of mountain goat which were introduced by the Department of Game. See Geological and Zoological-Terrestrial maps.

WAADAH ISLAND
This island is used for study as a natural biome. The tidal layers of sealife are strikingly demonstrated. See Environmental Use map.

WAATCH RIVER LOWLANDS
Estuarine habitat. See Hydrological map.

WASHINGTON COAST
See Grays Harbor County.

WASHINGTON ISLANDS WILDERNESS AREA
Proposed area is along 100-mile coastal stretch comprising a total of 250 acres. This includes Flattery Rocks and Quillayute Needles National Wildlife Refuge. This is one of the nation's most important undisturbed nesting areas for sea birds: fork-tailed storm petrel, Leach's storm petrel, Brandt's cormorant, pelagic cormorant, black oystercatcher, glaucous-winged gull, western gull, common murre, pigeon guillemot, ancient murrelet, Cassin's auklet, rhinoceros auklet, tufted puffin, bald eagle, and Peale's peregrine falcon. See Zoological-Terrestrial map.

WESTERN RED CEDAR STANDS
The coastal-plain, western red cedar stands along the narrow Olympic Ocean Strip are the only protected examples of this forest type on the Olympic Peninsula. At the present rate of harvest of old-growth cedar, they will be the only remaining examples within 10 years. Because of the narrowness of the strip in public ownership, these stands are peculiarly vulnerable to cedar poaching. See Botanical map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the Atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide or national significance and reflect, in part, the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. The spotted owl (Strix occidentalis) is a very rare owl in this county, possibly no longer a resident. The Peale's peregrine falcon is an uncommon coastal resident and wintering species. It is one of the world's last races of peregrine showing reproductive ability to maintain numbers, but even this is questioned by some. Other birds of note in Clallam County are black brant, great blue heron, murre, pileated woodpecker, and snow bunting.

MAMMALS. The coast of the county has much important habitat for marine mammals like porpoises, dolphins, sea lions, elephant seal (Mirounga angustirostris), migratory fur seal and sea otter (Enhydra lutris). Sea otter have been reintroduced near La Push. Other mammals noted in county are fisher (Martes pennanti) in the Olympic forests, pine marten (Martes americana), black bear, Roosevelt elk, black-tailed deer, and cougar.

AMPHIBIANS. Both the Olympic salamander and red-legged frog are found in this county.

Clark

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Clark County discussion are plotted on the Archeological map and listed in its index.

ARNOLD PARK, VANCOUVER
This park is one of the stopping places on the migratory route of the band-tailed pigeon. See Zoological-Terrestrial map.

BACHELOR ISLAND
This privately owned island near the town of Ridgefield is one of the larger archeological sites on the river and has had some initial digging on it by the Oregon Archeological Society. This island is a wintering habitat for waterfowl. See Archeological map.

BATTLE GROUND LAKE AND STATE PARK
This small, deep-water lake, situated in a volcanic crater, is being developed as a state park. See Hydrological and Environmental Use maps.

BEACON ROCK STATE PARK
This is one of two state parks on the Washington side of the Columbia River Gorge. See Environmental Use map.

BLACKWATER ISLAND (RESEARCH NATURAL AREA)
This area includes stands of white oak, Douglas-fir, and seasonally flooded swales and ponds. See Botanical and Zoological-Terrestrial maps.

BROUGHTON POINT
Captain Broughton anchored here to claim the Oregon Country for the United States. He documented the presence of a village at this location. See Historical-Cultural and Archeological maps.

BURNT BRIDE CREEK
This area provides a habitat for many birds and animals such as the red-tailed hawk, sharp-shined hawk, mourning dove, rufus-sided towhee, Stellar jay, evening grosbeak, ring-neck pheasant, West Coast chipmunk, and western gray squirrel. Other lesser birds include juncos, finches, chickadees, band-tail pigeons, goldfinch, a variety of warblers, red-winged blackbirds, wrens, and bushtits. See Zoological-Terrestrial map.

CAPE HORN
This area east of Washougal has a spectacular view of the Columbia River Gorge and potential as a natural landmark, state park, or other special use area. The old road that was built as an overhang from the cliff area will be bypassed by the new road and would make a good state park or scenic highway. See Environmental Use map.

CLAONO ROCK
Some very old volcanic lavas and tuffs are, exposed at river side and road side. See Geological map.

CLARK COLLEGE (JR)
Located in Vancouver. See Historical-Cultural map.

CLARK COUNTY HISTORICAL MUSEUM (FORT VANCOUVER MUSEUM)
Located at Vancouver in the city's first Carnegie library, the museum exhibits examples of an early county store, doctor's office, and other pioneer artifacts. See Historical-Cultural map.

COLUMBIA RIVER
The Columbia River has its source in British Columbia, Canada. Entering Washington in the northeast, the river zig-zags across the state generally southerly and westerly to the Washington-Oregon border just below the river's confluence with the Snake. From this point, the river makes a sharp bend turning westward, plunging through the Cascade Mountains via the spectacular Columbia River Gorge to the Pacific Ocean. Throughout this stretch, the river forms the boundary between Washington and Oregon.

Once thought to be the Pacific outlet for the mythical "Northwest Passage," the Columbia was discovered by Captain Robert Gray, an American, in 1792, and named after the captain's ship. Together with the Snake River further inland, the Columbia River and its tributaries were the most important features of the Pacific Northwest to the Indians and white man alike. A great deal of early human activity centered around these huge rivers. Many of the region's tribes built villages along the rivercourse, and most depended at least in part on the river's huge fish runs for survival. The first whites were drawn by the region's extensive fur industry, and their first settlements were built along the river which provided some ease of transportation. Many of these early posts grew to become towns or cities, and many other communities sprang up along the riverbanks.

The Columbia River is a major anadromous fish stream, containing runs of all Pacific salmonid species. At one time these runs extended into Canada, but now spawning runs are limited to the river below Chief Joseph Dam. Although these runs are largely sustained now by hatchery plantings, some natural spawning areas remain. White sturgeon are found throughout the lower Columbia and Snake Rivers. Impounding of these two rivers has limited sturgeon reproduction to those stretches below Bonneville Dam on the Columbia, and above Clarkston, Washington on the Snake. In addition, the river contains resident populations of rainbow, cutthroat, and brown trout, as well as several other lesser species.

Much of the land adjacent to the river has been developed to support human activity, usually agricultural. The reach between the upper limits of McNary Pool and Priest Rapids Dam is a notable exception. This reach is the last free-flowing segment of the upper river. As such, it has tremendous value for the wealth of resident and migratory animal, bird and aquatic life, botanical areas, archeological sites, and aesthetics. More detailed information concerning this stretch is given in Benton County under COLUMBIA RIVER (FROM MCNARY POOL TO PRIEST RAPIDS DAM) and HANFORD RESERVATION. Generally, the entire Columbia River Valley provides good-to-excellent wildlife habitat, with the exceptions of those areas surrounding large population centers. The river is of special importance to the waterfowl of the Pacific Flyway. Although not of high waterfowl reproductive potential, the river is highly valued as migratory resting habitat. Islands within the river are the breeding grounds of the Great Basin Canada Goose, and are the only potential nesting grounds for caspian terns, Foster's terns, ring-billed gulls and double-crested cormorants. The former breeding grounds of these last four species were inundated behind dams on the Columbia River. Recommendations have been made by many sources that new islands be constructed to re-establish breeding areas, and that the remaining islands in both the Columbia and Snake Rivers be designated bird refuges. These species cannot tolerate human disturbance during the breeding season. Bonneville Pool at present has 20 islands which are used by wildlife. One of these, Miller Island, supports nesting geese, hawks, and gulls. The lower end of the Columbia Gorge near Vancouver is another important nesting area for waterfowl. The bluffs and cliffs along the upper river provide excellent chukar habitat, and are favorite hunting grounds with many Washington sportsmen. The same area is also a critical mule deer wintering ground, and often supports wintering herds of Rocky Mountain elk. Many other smaller species also find habitat along the Columbia.

The Columbia River Basin is an outstanding example of comprehensive development, and possesses the highest degree of hydroelectric development of any river basin in the world. Presently the Federal government maintains 26 hydroelectric projects within the basin, and private enterprises add to this number. In addition to power, the dams along the Columbia are an aid to navigation and help control flooding.

However, human activity on and along the river have created some environmental problems. Summer temperature levels of the Columbia are above the recommended limits for fish migration. Most of this heat results as a natural consequence to the extensive damming which has taken place. However, the Atomic Energy installation at Hanford discharges large quantities of waste heat into the river, which contributes to the problem. These temperatures threaten all anadromous salmonid species. Also as a result of damming, the Columbia contains supersaturated levels of dissolved nitrogen gas during peak runoff periods. This condition is caused by air entrapment by the river water as it surges through dam spillways. Air is composed largely of nitrogen. This condition is not well understood as yet, but it is known to cause gas-bubble disease in fish, and is particularly lethal to juvinal salmonids. Studies are being made to understand and correct this problem.

Other water quality problems prevail in the river. For more than 25 years, the lower Columbia River has been experiencing periodic slime growths. The slime is a biological mass which is combined with varying amounts of fibers, sand and debris. Wastes discharged into the river from the pulp and paper industry are a primary cause, but are not wholly responsible for the slime problem. Nutrients from municipal sewage also contribute to the problem. Commercial fishermen have found their nets become coated with these slime masses and must be frequently cleaned, or else they must be highly selective in their placement. Sports fishing and other forms of water contact recreation have also been adversely affected by the growths. The bacteriological quality of the river below the Interstate Bridge between Portland, Oregon, and Vancouver, Washington, exceeds the limits specified in the Water Quality standards established by both the States of Oregon and Washington. Inadequately treated wastes from the cities of Portland and Vancouver are the major cause of the problem. In addition, raw domestic sewage from houseboats, pleasure boats, and ships is presently discharged into the lower river. Although these wastes probably do not contribute significantly to the high coliform levels which presently exist, they do constitute a health hazard from pathogenic organisms and create a nuisance condition resulting from floating debris. See Hydrological, Zoological-Aquatic, and Zoological-Terrestrial maps.

COLUMBIA RIVER GORGE
Due to the salmon, waterfowl, game, and abundant vegetation, the area probably supported one of the largest native American Indian populations in the United States. The entire length of the Gorge abounds with petroglyphs, stone artifacts, and other remnants of the presence of Stone Age man. Many important archeological sites have been lost due to developments such as Portland International Airport, Vancouver Industrial Park, and Ridgefield Wood Treatment Plant. Many more sites are still buried under the silt of past floods. Many known sites are still undeveloped or only partially explored. See Archeological and Botanical maps.

COPPER CREEK MINE
Old copper mines which were used in early 1900's are now abandoned. They are unmarked and are difficult to reach. Copper samples may be found scattered outside. See Historical-Cultural map.

DRANO LAKE
Drano Lake is the backwater of the Little White Salmon River before it empties into the Columbia. Both the Lake and the Little White Salmon River are in need of preservation as special management areas. The Little White Salmon River drainage has been suggested for inclusion in the wild river system. Also associated with the river are several fish hatcheries that are being affected by problems associated with water quality. There is one commercial recreation site associated with Drano Lake. See Hydrological map.

FLY CREEK FALLS
This 50-foot high waterfall is still in its rugged natural state. See Hydrological map.

FORT VANCOUVER
The fur resources of the Pacific Northwest were discovered by British seamen who visited the northwest coast and traded with the Indians for valuable furs about the time of the American Revolution. Soon traders from Canada, the United States, and several European countries were vying for these riches. After years of competition, the Hudson's Bay Company gained ascendency in the northwest fur trade. In 1824, the Hudson's Bay Company moved its western headquarters from Fort George, at the mouth of the Columbia River, to a site about 100 miles upstream (within present-day Vancouver, Washington). The move both strengthened British claims to the territory north of the Columbia and put the Fort near lands better suited for farming. The post was named in honor of Captain George Vancouver, an early British explorer. Five years later, a new fort was built 1 mile west of the first site and closer to the river.

Chief Factor John McLoughlin commanded the Fort between 1824 and 1846. Of towering height and impressive appearance, he was known to the local Indians as "White Eagle." Under his leadership, the Hudson's Bay Company won a virtual monopoly of the fur trade in the area now comprising British Columbia, Washington, Oregon, Idaho and western Montana, and Fort Vancouver became the nerve center of this vast commercial empire.

The Fort was also the center for an important farming and manufacturing community. Lumber, pickled salmon, and other products of the Fort's mills, drying sheds, forges and shops supplied not only the wants of the fur trade, but also a brisk commerce with such distant places as the Hawaiian Islands, California, and the Russian settlements in Alaska. In addition, much of the cultural and social life of the country revolved around Fort Vancouver. The first school, the first circulating library, first theater, and several of the earliest churches in the Northwest were located at the Fort.

At the height of its prosperity (1844 to 1846), Fort Vancouver was an extensive settlement. The Fort proper measured about 732- by 325-feet, surrounded by a stockage with a bastion at the northwest corner mounting seven or eight 3-pound cannon. These defenses were never tested, as the nearby Indians were not hostile and the American settlers never acted upon the occasional threats uttered during the tense period before and after the boundary treaty of 1846. Within the stockade were about 22 major buildings and several lesser structures.

The treaty of 1846 between the United States and Great Britain established the 49th parallel as the southern boundary of Canada. This compromise placed Fort Vancouver in American territory, and thereafter the influence of the post and the Hudson's Bay Company in the area declined rapidly. A U.S. Army camp was established in 1849, and shortly afterwards, a military reservation was created around the old trading post. The last Chief Factor of Fort Vancouver presented the keys to the Army quartermaster in 1860. Six years later the old stockade was destroyed by a fire.

Fort Vancouver National Historic Site was established in 1954, containing 89 acres. In 1966, the National Park Service reconstructed the north stockade, north gate, and a portion of the east stockade on the exact location of the old fort. A visitor center contains exhibits depicting the early history of the fort. See Officers Row Historic District. See Historical-Cultural map.



Fort Vancouver Barracks (Restored)

COUNTY DISCUSSION

FORT VANCOUVER-FORT BELLINGHAM ROAD
This historic route was first used by Hudson's Bay Company employees and then by the pioneers and settlers of the area. It later became a military road. See Historical-Cultural map.

FUNGI SITE
The Tumtum Mountain area in Clark County is noted for its abundance and variety of higher fungi. See Botanical map.

GIENTIC GRAVEL BAR
This is a Missoula flood remnant. See Geological map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Clark County discussion are plotted on the Historical-Cultural map and listed in its index.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Clark County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LAKE RIVER
Lake River is about 17 miles long, and flows between Vancouver Lake and the Columbia River. Since it is under tidal influence, sometimes it flows one direction and sometimes the other. Outside of a few minor creeks, it is the only source of water for Vancouver Lake. See Hydrological map.

LEWIS AND CLARK TRAIL
Lewis and Clark were commissioned by President Jefferson to map the way west through the recently purchased Louisiana Territory. They were instructed to find a navigable passage to the Pacific Ocean. Seventeen arduous months after leaving St. Louis, Missouri, the Expedition entered the State of Washington on October 11, 1805. The Corps of Discovery, as the Expedition is commonly known, traversed the Snake and Columbia Rivers and by mid-November reached its principal goal, the Pacific Ocean, at Cape Disappointment near the present community of Ilwaco, Washington. After spending the winter of 1805-06 at Fort Clatsop near the mouth of the Columbia, the explorers retraced their journey and returned to St. Louis. See Historical-Cultural map.

LEWIS RIVER
This is a free-flowing stream, used for kayaking. It has been suggested this river be declared a wild river to preserve its natural beauty and the anadromous fish runs. The river and its tributaries contain steelhead all year long; the East Fork is among the best steelhead fishing rivers in the state. Almost any stretch of the river through Clark County contains stretches of white-water. See Hydrological, Zoological-Aquatic, and Zoological-Terrestrial maps.

LUCIA FALLS
This is a privately owned waterfall, open to the public for a fee. It has excellent steelhead fishing, swimming, overnight camping (limited in summer), and picnicking. The river along this stretch, and particularly near the falls, is beautiful, containing whitewater, deep gorges, and shallow pools. This site is extremely popular with people in Portland and Vancouver. See Hydrological and Geological maps.

MCCURDY LAKE - LOST LAKE
This is one of many mountain ponds plant Although
it is called "Lost Lake" by the Forest Service, local citizens have named the lake "McCurdy."
See Hydrological and Zoological-Aquatic maps.

MOLTEN FALLS
A falls located on the East Fork of the Lewis River two miles south of Yacolt. The state has been asked to make this series of falls and its surrounding area into a state park. The area contains much recreation potential: excellent rock-diving places, large sunning rocks, pools for swimming, and good fishing areas. See Hydrological map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned in the Clark County discussion are plotted on the Geological map and listed on its index.

MOUNT NORWAY, MOUNT ZION, PEPPER MOUNTAIN, CLARK COUNTY
These mountains are boring age shield volcanoes. See Geological map.

OFFICERS ROW HISTORIC DISTRICT
This is the "Officers Row" of the "old" Vancouver barracks. Five of the houses have been listed and the entire row of houses has been submitted to the National Registry for addition to its list of historic homes. The last remaining building now known is the "U.S. Grant House." The house is a log building, later covered with siding, built in 1849. U.S. troops first came in 1849 and were housed in buildings owned by the Hudson's Bay Company until construction of their barracks. The 21 houses of the row date from 1849 to 1906 in construction, and were used continuously by the Army until after World War II. They were declared surplus in 1947 and are now owned by the Veteran's Administration and used as housing for members of the hospital staff of the Veteran's Administration Hospital, Vancouver, Washington. These houses are some of the last remaining examples of the type of housing of the old Army posts of the west. See Historical-Cultural map.

PRUNE HILL
This is a boring age, mid-pleistocene volcano. See Geological map.

REED ISLAND
This rather large island in the Columbia has recently been purchased by the state for development as as state park. The only access is by boat. It has been a favorite with boaters for many years. See Environmental Use map.

RIDGEFIELD NATIONAL WILDLIFE REFUGE
As of January 1, 1972, 2,993 acres of a proposed 6,100 acres have been acquired on the Columbia River flood plain, primarily for migrating and wintering ducks and geese. Improved pastures and shallow marshes are managed for western, lesser, and dusky Canada geese and wigeon. Waterfowl hunting is under a controlled program. Fishing is excellent in adjacent waters. See Environmental Use and Zoological-Terrestrial maps.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SHILLAPOO-VANCOUVER LAKE WILDLIFE RECREATION AREA
This area (1,456 acres) is one of the most popular wildlife areas in the state. It borders the Columbia River 12 miles north of Vancouver, directly opposite Caterpillar Island. Shillapoo-Vancouver Lake management is oriented towards waterfowl and spinyray fishing. It is also used as a pheasant release site in fall. Terrain is river floodplain covered with heavy grass and brush. Thick patches of timber and willow are found along the Columbia River. A boat launch on the Columbia provides access for fishermen. One hundred plus yellow-headed blackbirds are found near the south end of Lake Shillapoo. These birds are generally uncommon. See Zoological-Terrestrial and Environmental Use maps.

SHOULDER BAR
A stranded gravel bar of the Spokane Flood displaying giant ripple marks is located opposite the mouth of Palouse River. See Geological map.

SKAMANIA VOLCANICS
These volcanoes are the oldest rocks in the area, from the Eocene age. They contain many zeolites. See Geological map.

SLOCUM HOUSE
Originally built in a two story Italianate villa style in the mid-1800's by Mr. and Mrs. Charles Slown, it was the first real elegant home in Vancouver. Placed in the National Register of Historic Places. See Historical-Cultural map.

SUNSET FALLS ON EAST FORK OF LEWIS RIVER
This is a public site in Gifford Pinchot National Forest. The river flows over a cliff 30 to 40 feet high. The Forest Service has places for camping and picnicking. See Hydrological map.

TROUTDALE FORMATION
Located east of Washougal, these Pliocene alluvation contain exotic pebbles. See Geological map.

VANCOUVER LAKE
This area around Vancouver Lake is one of the few natural flood plains remaining in the Columbia River Basin. It is of general importance to waterfowl and is an important nesting and feeding spot for migrating bald eagles. Sandhill cranes migrate to this lake in groups of 20 to 40. This body of water has potential for recreational use. See Hydrological and Zoological-Terrestrial maps.

WILDLIFE
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BIRDS. Birds seen in county include golden eagle and wood duck.

MAMMALS. The pocket gopher (Thomomys talpoides douglassi), is a rare subspecies. It has a critical habitat in Clark County.

AMPHIBIANS. The larch mountain salamander (Plethodon larselli), has very limited range and is found in the Columbia River Gorge in Skamania and Clark Counties.

Columbia

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Columbia County discussion are plotted on the Archeological map and listed in its index.

BLUE MOUNTAINS
See Asotin County.

DAYTON MUSEUM
Located in the Dayton Public Library, pioneer items of Columbia County are displayed. See Historical-Cultural map.

HISTORICAL AND CULTURAL FEATURES
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LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Columbia County discussion are plotted in the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LEWIS AND CLARK TRAIL STATE PARK
Comprising 37 acres, it is 5 miles west of Dayton on U.S. 12. Camping, swimming, and fishing are available. See Clark County. See Environmental Use map.

PLANT COMMUNITIES
The climax plant communities listed below occur in Columbia County. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Black hawthorn - common snowberry
Bluebunch wheatgrass - Idaho fescue
Bluebunch wheatgrass - sandberg bluegrass
Grand fir - Oregon boxwood
Idaho fescue - nootka rose

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Columbia County discussion are plotted on the Geological map and listed in its index.

RAINBOW CREEK RESEARCH NATURAL AREA
Exemplifies three forest types typical of the interior mixed conifer forest zone. A 600-acre tract consisting of: SAF-214, ponderosa pine, larch, Douglas-fir, 230 acres; SAF-213, grand fir, larch, Douglas-fir, 140 acres; SAF-212, larch, Douglas-fir, 40 acres; wheatgrass, bluegrass, 10 acres. Elevation: 3,600-4,700 feet. Topography: steep, broken.

Rocky Mountain elk (Cervus canadensis) use the area extensively as summer range. The animals usually migrate down Butte Creek to winter along the Wenaha River. Utilization by elk appears to be causing some change in the grassland communities and may be influencing reproduction of yew within the forest stand. Other animals inhabiting this tract include mule deer (Odocoileus hemionus), cougar (Felis concolor), black bear (Ursus americanus), blue grouse (Dendragapus obscurus), which is the only resident game bird, Douglas squirrel (Tamiasciurus douglasii), white-footed deermice (Peromyscus maniculatus), and chipmunks (Eutamias quadrivittatus). See Botanical and Zoological-Terrestrial maps.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SHOULDER BAR
A stranded gravel bar of the Spokane Flood displaying giant ripple marks is located opposite the mouth of Palouse River. See Geological map.

SNAKE RIVER
See Asotin County.

TOUCHET RIVER
The South Fork, North Fork, and Wolf Fork from the National Forest boundary to Dayton is valued as big game habitat. See Hydrological and Zoological-Terrestrial maps.

TUCANNON FISH HATCHERY
State Game Department. Species propagated: trout. Water source: Tucannon River and springs.

TUCANNON RIVER
The entire length is protected for steelhead fishing. It is the last river in southwestern Washington that has both salmon and steelhead spawning grounds. It is heavily fished for spring chinook above the community of Marengo, from late May through June.

The Tucannon River carries heavy sediment loads, particularly during periods of maximum runoff (winter and early spring). This results from lack of use of adequate soil conservation practices on the highly erosive loess topsoils characteristic of the area. Streambank and channel erosion is also important. In addition, bacterial densities are above limits recommended for water-contact recreation.

The Tucannon River Basin is a critical deer and elk wintering grounds. Bighorn sheep may be found in the upper half of valley. See Zoological-Terrestial, Environmental Use, and Hydrological maps.

W.T. WOOTEN WILDLIFE RECREATION AREA
See Garfield County.

WENAHA BACKCOUNTRY AREA, UMATILLA NATIONAL FOREST
See Asotin County.

WILDLIFE
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BIRDS. The Columbian sharp-tailed grouse (Pedioecetes phasianellus columbianus) ranges along the grassy breaks of river canyons in the Palouse Hills. Other significant birds found within the county are prairie falcon, green-tailed towhee, and grouse.

MAMMALS. There are critical deer wintering grounds running east of and parallel to U.S. 12, from Walla Walla north to Dayton. The river drainages contain critical elk winter range. Specific wintering grounds are the Tucannon River Valley from the Oregon border to the northeast of Dayton, and all Blue Mountain Canyons in the Umatilla National Forest to approximately 1,800 feet in elevation. The western jumping mouse (Zapus princeps) has a restricted range in Columbia, Asotin, Garfield, and Whitman Counties. A subspecies of the coast mole (Seapanus orarius schefferi) has a restricted range in Walla Walla and Columbia Counties. Mountain goat and cougar also have ranges in Columbia County.

REPTILES. The short-horned lizard and ring-necked snake may be found here. The short-horned lizard (Phrynosoma douglassi) is decreasing in numbers.

Cowlitz

ABERNATHY NATIONAL FISH HATCHERY
Species propagated: chinook salmon. See Zoological-Aquatic map.

ALDER CREEK REARING PONDS
Operated by the State Game Department. Species propagated: trout. Water source: Alder Creek. See Zoological Aquatic map.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Cowlitz County discussion are plotted on the Archeological map and listed in its index.

BLUE LAKE AREA AND GOAT MARSH
Blue Lake contains an old-growth stand of noble fir, possibly the finest in the state. See Botanical map.

BUSH PIONEER CABIN
This cabin is a remnant of the era when people were taking up homesteads and a shelter had to be built hurriedly. Its original location was at Hazel Dell, on the homestead of Edgar W. Bush. The cabin was already on the property when Edgar Bush went to the homestead there in 1880. It was moved to the Cowlitz County Fairgrounds in 1953 where it has been maintained by the Cowlitz County Historical Society. Each year during fair time the cabin is furnished with antiques of the period. See Historical-Cultural map.

CASTLE ROCK
In 1852, the city of Castle Rock was named for the large rock overlooking the Cowlitz River on the southern city limits. The park area and land surrounding the rock has been dedicated to the servicemen of World War I. During the Depression, W.P.A. workmen did considerable work on the project and a marker was placed at the rock by a 4-H Club. See Historical-Cultural map.

COLUMBIA RIVER
See Clark County.

COTTONWOOD ISLAND AREA STATE PARK
The park is located south of Longview between the Cowlitz and Kalama Rivers. It covers 1,100 acres, with approximately 7,000 feet of frontage on the Kalama River and 75,000 feet of frontage on the Columbia River, for a total of 82,000 feet of river frontage. See Environmental-Use map.

COWEEMAN MINERAL SPRINGS
These springs are on an important stopping place for migrating band-tailed pigeons. See Zoological-Terrestrial map.

COWEEMAN RIVER
The Coweeman River is troubled by low diesolved oxygen levels, bacteriological problems and nuisance aesthetic conditions. See Hydroigical map.

COWLITZ COUNTY HISTORICAL MUSEUM
Located at Kelso, Indian artifacts and pioneer items, Civil War, and World War I and II displays may be viewed. See Historical-Cultural map.

COWLITZ RIVER
A freshwater, free-flowing stream, it is valued as a major winter run steelhead stream and is also one of the main spawning streams of the Columbia River Smelt (eulachon). It is extensively used for kayaking. See Hydrological map.

DOUGLAS-FIR STUDY AREA
These Kelso grant lands are on Wild Horse Creek, between 600-1300 feet elevation. They are owned by the Department of Natural Resources. These stands are to be used as a Douglas-fir Study Area. See Botanical map.

FOUR MILE SPRINGS
This campground was a half-way stop 4 miles northwest of Jackson Inn. Marks still remain of the old campground where people stopped, rested, and camped overnight. The next stop for water was Rock Creek, 2 miles down the mountain. The property was owned by Northern Pacific Railroad in 1860 and was logged by Long-Bell Lumber Company in late 1920's. It is now owned by the International Paper Company, and is being reforested. See Historical-Cultural map.

FORT VANCOUVER - FORT BELLINGHAM ROAD
See Clark County.

FUNGI SITES
The following areas in this county are noted for their abundance and variety of higher fungi or important species: Yale Lake vicinity and North Fork of the Toutle River Area. The deadly-poisonous, white Amanita virna was found in a public campground near Battleground in 1969 and 1970. Amide from another collection made near Lake Kachess, this is the only time this virulent mushroom has been found - and identified - in Washington. Possibly the spores were brought in by tourists from the Midwest. See Botanical map.

GRAVE IN THE MIDDLE OF THE ROAD
The Grave in the Middle of the Road is that of Abel Ostrander who died at the age of 82 shortly after coming west from Missouri. He was buried on October 3, 1859 on the donation land claim of his son, Doctor Nathaniel Ostrander. The Cowlitz County Historical Society held a dedication at the grave, providing a bronze plaque for the stone monument and put a rail fence around the only grave in the middle of the road in the nation. See Historical-Cultural map.

GREEN RIVER VALLEY (UPPER) AND MINERS CREEK
This is an outstanding little river valley with a splendid stand of giant old-growth Douglas-fir, typical of what once covered much of the lowlands in this region. A tributary of the Green River, Miners Creek has even more impressive stands of such forest. There is very little of this forest left in this part of the state. and it is an unusual feature commented upon with awe by those who have seen it. See Botanical map.

HENRY JACKSON INN
The stage from Vancouver to Olympia stopped at the Jackson Inn and changed teams, and travelers spent the night for rest, food, and sometimes entertainment. The ten-room house is made of cedar and fir lumber and is well preserved. See Historical-Cultural map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Cowlitz County discussion are plotted on the Historical-Cultural map and listed in its index.

HOLLYWOOD GORGE
This is an unspoiled canyon, with rapids, and a recreation site. A campground operated by a private timber company is located at the head of the canyon. The stream contains a salmon run. See Geological and Zoologic-Aquatic maps.

KALAMA FALLS STATE SALMON HATCHERY
State Fisheries Department. Species propagated: chinook and sockeye salmon. See Zoological-Aquatic map.

KALAMA RIVER
A freshwater, free-flowing stream habitat, it is valued as a major winter and summer run steelhead stream and contains fall chinook and a large hatchery coho run. Because of extensive chinook spawning in the lower river, the Kalama is open only for adult coho and jack chinook. Coho fishing peaks in September. See Zoological-Aquatic and Hydrological maps.

KALAMA RIVER FALLS
This falls is located north and west of Lake Merrill on the Kalama river. See Hydrological map.

KALAMA SPRINGS
The Kalama Springs form the headwaters of the Kalama River. See Hydrological map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Cowlitz County section are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LAKE MERRILL
Found southwest of Mount Saint Helens, this lake does not have a visible outlet. One probably exists underground as the lake is always clear and fresh. It contains eastern brook trout. See Hydrological map.

LECKLERS LANDING, 1850
Located on the Cowlitz River at Lexington, Washington, the landing was one of a number of stopping places for steamboats hauling passengers and supplies from 1850 through 1915. In a period of poor roads and great need for transportation, the Cowlitz River furnished valuable service to the settlers. See Historical-Cultural map.

LEWIS RIVER
This free-flowing river is a major winter and summer run steelhead stream also used for kayaking. It is one of the main spawning streams of the Columbia River smelt (eulachon). See Hydrological and Zoological-Aquatic maps.

LOWER COLUMBIA COMMUNITY COLLEGE (JR)
Located at Longview, the college was established 1934. See Historical-Cultural map.

LOWER KALAMA STATE SALMON HATCHERY
State Fisheries Department. Species propagated: chinook and coho salmon. See Zoological-Aquatic map.

MONTICELLO CONVENTION SITE
Monticello was named by Darby and Rebecca Huntington after their old home in White County, Indiana. They established a store and hotel, and Darby built the first 12 miles of road in the county. On November 25, 1852, leaders of the early settlers of the Cowlitz Valley and Puget Sound areas met and signed a memorial petitioning Congress to divide the Oregon Territory and give those living north of the Columbia River a territorial government of their own. In March of 1853, Congress heeded the wishes of the people and divided this vast area thus creating the Territory of Washington. See Historical-Cultural map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Cowlitz County discussion are plotted on the Geological map and listed in its index.

MOUNT SAINT HELENS BAT CAVE AREA
This lava flow with lava tubes serves as winter hibernating sites for a local species of bat (Plecotus townsendii) and a few migratory species of Myotis (M. lutifugus, M. volans, M. yomanensis and M. evotis). These represent the only two known large (300+) colonies of Pelcotus townsendii remaining in Washington. This species has declined in number in recent years. See Geological and Zoological-Terrestrial maps.

OAK POINT BASALT PALISADES
There are large exposures of columnar basalt here, which appear from the Oregon side of the river to be palisades. See Geological map.

PLANT COMMUNITIES
The climax plant communities listed below occur in the county. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Pacific silver fir - Alaska huckleberry (common beargrass phase)
Pacific silver fir - Alaska huckleberry (Oregongrape phase)
Pacific silver fir - Alaska huckleberry - bunchberry dogwood
Pacific silver fir - common beargrass
Pacific silver fir - Oregon oxalis
Pacific silver fir - purple twistedstalk

SEAQUEST STATE PARK
Covering 154 acres, the park is 7 miles east of Castle Rock. Swimming, fishing, and camping trailer sites are available. See Environmental Use map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SILVER LAKE
There are marshlands at Silver Lake. The lake is nationally noted among sports fishermen for its largemouth bass. See Zoological-Terrestrial and Hydrological maps.

SPEELYAI STATE SALMON HATCHERY
State Fisheries Department. Species propagated: coho salmon. See Zoological-Aquatic map.

STRING CAVE
This small cave has a main entrance 8 feet wide and 4 feet high at about 1,100 foot elevation. The cave continues northeastward for about 60 feet as a stoopway and crawlway; about 25 feet from the entrance a chimney reaches the surface 10 feet above. Debris indicates that the cave is a seasonal watercourse. Tree casts and a few flow marks are present. See Geological map.

TOUTLE RIVER
A freshwater, free-flowing river, it is a major summer and winter run steelhead stream. The surrounding basin provides big game habitat. It is also a good kayaking stretch. See Zoological-Aquatic and Hydrological maps.

TOUTLE STATE SALMON HATCHERY
State Fisheries Department. Species propagated: chinook and coho salmon. See Zoological-Aquatic map.

WALNUT TREE
This 120-year old walnut tree grew from a nut planted by Arthur Burbank in 1853 in what was at that time Darby Huntington's yard. This was the site of the first county seat, the first post office in Cowlitz County, and the second post office in the state. The tree still stands. The gavel used by the Cowlitz County Historical Society President (Mrs. Earl Hammer) was made from a limb of the old tree. See Historical-Cultural map.

WILDLIFE
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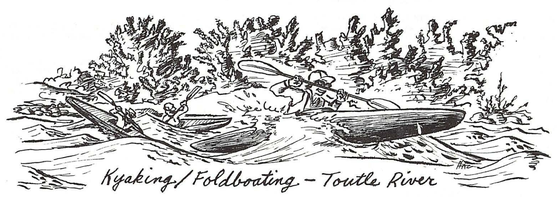
COUNTY DISCUSSION



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BIRDS. Bald eagles, ospreys, and falcon are found nesting in central Cowlitz County. Wood duck can be seen in the sloughs between Highway 4 and the Columbia River from Longview to Cathlamet. Kalama Pigeon Springs and Soda Springs are habitats for pigeons. The Swafford Valley and Perimeter Lands are a noted bird habitat.

MAMMALS. The western grey squirrel (Sciurus griseus griseus) inhabits the lowlands south of Puget Sound from Columbia River north to Tacoma and Elma. Other mammals noted in the county are cougar, black bear, black-tailed deer, beaver, river otter, and Roosevelt elk. The Abernathy Creek Valley, Coal Creek Valley, Coweeman River Valley, Germany Creek Valley, Green River Valley, Kalama River Valley, and Swift Creek Valley are all noted as providing big game habitat.

AMPHIBIANS. Dunn's and Van Dyke's salamanders have limited ranges in southwest Washington.

Douglas

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Douglas County discussion are plotted on the Archeological map and listed in its index.

BANKS LAKE WILDLIFE RECREATION AREA
One of the natural geologic wonders of North America is this gigantic cleft in basalt which forms the Grand Coulee and holds the waters of Banks Lake (43,541 acres). Located between Coulee City and Electric City, Banks Lake Wildlife Recreation Area is noted for its waterfowl and upland birds.

Banks Lake itself is one of the finest fishing waters in eastern Washington. Rainbow trout, kokanee, largemouth bass, perch, turbot, and walleyed pike provide exceptional variety for anglers.

The surrounding enormous basalt cliffs and scabrock range land are home of raven, chukar, pheasant, golden eagle, various hawks and owls, and some mule deer. See Zoological-Terrestrial and Environmental Use maps.

BOX CANYON
This canyon, a postglacial slot on the Columbia River, was a section that "short-circuited" the Omak Lake Trevak. See Geological map.

BREWSTER AND BRIDGEPORT BARS
An important waterfowl habitat. See Zoological-Terrestrial map.

CARIBOO TRAIL
See Okanogan County.

CHALK HILLS
This area of badlands has examples of eroded glaciolacustrine deposits. See Geological map.

CLIFFS ALONG THE COLUMBIA RIVER
A palisade in basalt, from 1,500-2,000 ft. high, is located along the eastern bank of the Columbia River above Rock Island Dam. See Geological map.

COLUMBIA RIVER
See Clark County.

DOUGLAS COUNTY HISTORICAL SOCIETY MUSEUM
At Waterville, pioneer and Indian articles are on display in the museum. There is also a Natural History Section displaying rocks and meteorites. See Historical-Cultural map.

DRUMLINS
A field of drumlins is found east and west of Jameson Lake. See Zoological-Terrestrial map.

ESKER AREA
Dozens of eskers are found in the area east of Mansfield and south of State Highway 174. See Geological map.

GLACIAL ERRATIC BOULDERS
These glacier-transported boulders are found east of Mansfield along State Highway 172. See Geological map.

GRAND COULEE DAM
Grand Coulee Dam is the largest and most important dam on the Comumbia River. A giant new power-plant, the third, is under construction and when put into operation will make this dam the world's greatest producer of hydroelectricity.

The Bureau of Reclamation maintains an information center near the dam and offers self-guided tours as operating conditions permit. Excellent views of the dam may be had from the canal head-works, above the west end, or from Croon Point, 2-1/2 miles north on Washington 174.

After irrigation water for the Comumbia Basin is pumped from Franklin D. Roosevelt Lake, impounded by Grand Coulee Dam, it flows into Banks Lake. This great storage reservoir lies in the Upper Grand Coulee, a scenic water-carved canyon of national significance. Both the Grand Coulee and spectacular 400-foot high Dry Falls are Registered Natural Landmarks. The State of Washington administers many recreation sites within the Grand Coulee.

Behind Grand Coulee Dam, Franklin D. Roosevelt Lake stretches 150 miles, almost to the Canadian border. Highways follow the lake northeastward and offer a variety of scenic views. Deer, coyotes, porcupines, marmots, and squirrels are common, while bear and skunks are only occassionally seen. On a secondary flyway, the lake has a variety of waterfowl as well as shore and upland birds. See Hydrological and Zoological-Aquatic maps.

HISTORICAL AND CULTURAL FEATURES.
Some historical and cultural features of the state which are not specifically mentioned here in the Douglas County discussion are plotted on the Historical-Cultural map and listed in its index.

JAMESON LAKE
This lake holds rainbow trout and is a nesting area for many bird species, including Canada geese and a large colony of cliff swallows. See Zoological-Terrestrial and Hydrological maps.

KAME TERRACES
An example of continental glaciation is located along the Columbia River in Douglas County. See Hydrological map.

LAKE LENORE CLIFFS AND CAVES
Twelve breeding pairs of Barrow's goldeneye inhabit this area. Cave shelters such as these were used by prehistoric man for temporary housing during hunting and gathering trips. The caves were formed by the plucking of basalt from the walls of the Coulee by the rush of melt waters during the Ice Age. A large routed wood marker is located in the parking area. The caves can be reached by a developed foot trail. See Zoological-Terrestrial map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Douglas County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LONG LAKE AND LENORE LAKE WILDLIFE RECREATION AREA
Long Lake (6,225 acres) and Lenore Lake (7,690 acres) are managed primarily for waterfowl. Long Lake, also known as "Stratford," attracts outstanding numbers of geese. As many as 45,000 geese, mostly lesser Canadas, use this area as a resting stop during the peak of fall migration.

Both areas are ringed by high, basalt scabrock cliffs, characteristic of coulee-type geologic formations developed during the Ice Age. Lenore lies adjacent to Highway 17, and about 5 miles directly north of Soap Lake. Long Lake is approximately 12 miles east of Soap Lake and north of Highway 7. See Zoological-Terrestrial and Environmental Use maps.

MOSES COULEE
Part of the scabland complex, Moses Coulee is a smaller copy of Grand Coulee with a great ragged compound cateract in mid-length, jutting cliffs, 800 to more than 900 feet high, and a welter of butt-and-basin topography in a central tract. Waterville Creek runs into the Coulee from its hanging valley more than 200 feet above the Coulee floor. A unique feature of Moses Coulee is the Withrow moraine, which marks the extreme southern limit of the northern ice sheet. The moraine's strongly expressed ridge, or series of ridge hills, of glacial drift lies at right angles to the Coulee (near Jameson Lake). The Coulee was formed and used by early floods coming from reservoirs of stored water which emptied over the area. See Geological and Hydro-logical maps.

MOSES COULEE BASALT CLIFFS & TALUS SLOPES
This is a habitat especially important for rare species including the following:
Peregrine falcon (Falco peregrinus), this bird lives in the vicinity of Jameson Lake; Prairie falcon (Falco mexicanus; Native cliff-nesting hawks; Golden eagle (Aquila chrysaetos); and Whitethroated swift (Aeronautes saxatalis). See Zoological-Terrestrial map.

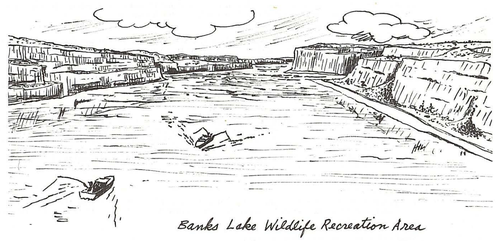
MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Douglas County discussion are plotted on the Geological map and listed in its index.

PANGBORN-HERNDON MEMORIAL
A National Historic Place 3 miles northeast of Wenatchee. See Historical-Cultural map.

PLANT COMMUNITIES
The climax plant communities listed below occur in the Douglas County. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Bitterbrush - bluebunch wheatgrass
Black greasewood - alkali saltgrass
Stiff sagebrush - sandberg bluegrass
Thyme buckwheat - sandberg bluegrass
Threetip sagebrush - Idaho fescue

POLISHED BEDROCK
Glaciation grooves, striations, and polishing can be found in road cuts along State Highway 174 about 5 miles west of Grand Coulee Dam. See Geological map.



SAINT ANDREWS AREA
Between 2,000 and 3,000 sandhill cranes utilize Saint Andrews as a staging area between February and April as they migrate north to breeding grounds. See Zoological-Terrestrial map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

WATERVILLE PLATEAU AREA
This is a large plateau area showing some of the finest displays of continental glacier features in the western United States. Large basalt erratics, kames, eskers, moraines, fluting and glacial polish are extremely well displayed. See Geological map.

WENATCHEE BOULDER FIELDS
This area is comprised of extensive fields of very large boulders of northern origin. The mechanism of their transport to their present location is unknown. They may have been asso-ciated in some way with the Bretz floods. See Geological map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide and national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wild-life range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wild-life with characteristic habitats found in the life zones of the state.

BIRDS. Sightings of golden eagles have been recorded regularly in Douglas County. The Columbian sharp-tailed grouse (Pediocecetes phasianellus) formerly widespread throughout eastern Washington's grasslands, inhabits the county. Other birds noted are Canada geese, sage grouse, and prairie falcon.

MAMMALS. Critical deer wintering grounds are at Nespelem River Valley from the headwaters to confluence with Columbia River, and Columbia River Valley from Brewster to Vantage, excluding small areas around Chelan and Wenatchee. The wolverine is increasing in numbers throughout the Cascades and northeast corner of the state. Sightings of these animals have also been made in Douglas County. Other species of note are Douglas squirrel, flying squirrel, fox squirrel, golden-mantled ground squirrel, hoary marmot, red squirrel, pygny rabbit, cony (pika), chipmunk, and cougar.

WILLIS CAREY HISTORICAL MUSEUM
At Cashmere, the museum features a pioneer village reconstructed on site. See Historical-Cultural map.

WITHROW TERMINAL MORAINE
The moraine forms a large crescent between Banks Lake and the City of Chelan. See Geological map.

Ferry

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Ferry County discussion are plotted on the Archeological map and listed in its index.

BALD SNOW AND THIRTEEN MILE, COLVILLE NATIONAL FOREST
It has been recommended that these contiguous units be studied for wilderness preservation. See Environmental Use map.

BIG AND LITTLE TWIN LAKES
These lakes are important fish producers. See Hydrological and Zoological-Terrestrial maps.

COLUMBIA RIVER
See Clark County.

COLVILLE INDIAN RESERVATION
In 1865 the first Indian Agent, George A. Paige, was appointed and stationed at Fort Colville in Kettle Falls. On April 9, 1872, President Grant, in accordance with a recommendation submitted by Commissioner E. S. Parker through the Secretary of the Interior, issured an Executive Order setting apart as a reservation a large area in the northeastern corner of Washington Territory. This tract was set aside for approximately 4,200 Indians of the Methow, Okanogan, San Poil, Lake Colville, Calispell, Spokane, Coeur d'Alenes, and scattering bands who were not parties of an treaties.

The Colville Reservation is considered to have been created by Executive Order, July 2, 1872, changing the boundaries of the area set aside in the order of April 9, 1872. A total of 2,886,000 acres were set aside by this order. The Colville Indians were never a party to any treaties with the Government, although treaties were made with certain tribes as a consideration for placing them on the Colville Reservation.

The Act of July 1, 1892 (27 Stat. 72) annexed the northern portion of the Colville Reservation, approximately 1,501,000 acres, opening it to white settlement. Stipulations were included forcing the Indians residing thereon to select homesteads for themselves, the titles of which would be held in trust by the Government.

On December 1, 1905, the McLaughlin Agreement was signed by 350 of the estimated 551 adult male Indians remaining on the diminished Colville Reservation. However, the Indians signed under great duress. Under the terms of this agreement, the Indians relinquished all rights, title, and interest to lands within the diminished southern half of the reservation to the United States provided that allotments of 80 acres be made to each Indian having tribal rights on the reserva-tion. Under the authority of the Act of March 22, 1906, and the Act of June 25, 1910 (36 Stat. 855) which modified the previous legislation by permitting the alloting of 80 acres of agricultural land or 160 acres of grazing land, the allotment of 333,275 acres of land within the south half to 2,505 Indians was completed during the year 1914, and the allotment rolls closed.

By Presidential proclamation of May 3, 1916 (39 Stat. P 58 of Proclamation) the unalloted, unreserved lands classified as irrigable, grazing or arid lands were opened to settlement in accordance with the Act of March 22, 1906. The Departmental Orders of September 19, 1934 and November 5, 1935 temporarily withdrew from further disposition or sale the undisposed of lands within the diminished reservation, approximating 818,000 acres. Legislation to gain tribal title to the undisposed portion of land opened to public disposition by the Act of March 2, 1906 was successfully introduced in the 84th Congress and enacted into Public Law 772 on July 24, 1956. See Historical Cultural map.

COTTONWOOD CREEK INDIAN TRAILS
Remnants of Indian travel routes are still visible in Cottonwood Creek area. This was once a major Indian trail between the Colville and Pend Oreille Valleys. See Historical-Cultural map.

COULEE DAM NATIONAL RECREATION AREA
Encompassing a 102,399-acre section in northeastern Washington, Coulee Dam National Recreation Area stretches from the Canadian border to the Grand Coulee Dam on the Columbia River. Geological formations in much of the region are the result of intense volcanic activity followed by great carving glaciers. Framed by the Cascades, the potentially fertile Columbia plateau has been brought to life by irrigation made possible by the dam.

Numerous wildflowers grace the southern lava flows and terraces on Roosevelt Lake. Deer are common in the recreation area and beaver and muskrat frequent the lakeshores. Roosevelt Lake abounds in waterfowl; Canada geese, mallard ducks and great blue herons are the species most often seen.

Hunting is permitted within the recreation area and on nearby Indian reservations; fishing for trout is good. State laws apply; licenses are required. Numerous scenic drives in the area and are dotted with picnic sites. The recreation area is open all year. Boating facilities are available May through November. See Environmental Use map.

CURLEW
Curlew began with a few trapper cabins in the 1880's and later grew with the influx of a few farmers and miners. Although gold was never discovered around Curlew, many of its citizens prospected in the hills hoping to make a strike. Curlew's biggest day was the anticipated coming of the Spokane-British Columbia Railroad. Surveys were made and the station build, but the railroad never came and the town slowly died. When the Great Northern finally put tracks down, Curlew was too far gone to become anything more than a whistle stop. See Historical-Cultural map.

CURLEW LAKE STATE PARK
The 130 acre park, 5 miles northeast of Republic on Curlew Lake, offers camp and trailer sites, fishing, swimming, and boat launching. See Environmental Use map.

CURLEW TRIASSIC FOSSIL SITE
Fossil clams are common at this site about 3.5 miles north of Curlew. See Geological map.

DEER CREEK (EAST), COLVILLE NATIONAL FOREST
This area was dropped from the 1973 list of previously inventoried roadless, undeveloped areas in the Colville National Forest. East Deer Creek has been recommended by conservation groups for wilderness study. See Environmental Use map.

DONALDSON DRAW
A glacier-carved canyon caused by meltwater and outwash from stream capture. See Geological map.

DONVILLE TRIASSIC FOSSIL SITE
Fossil clams are common at this site about 2 miles south of Donville and east of the Kettle River. See Geological map.

EAGLE ROCK
Rock of 4,600 foot elevation in the west-central part of the county. See Geological map.

FERRY COUNTY HISTORICAL SOCIETY MUSEUM
Mining equipment and relics are displayed in the Kaufman cabin, the first cabin built in Republic, 1896. See Historical-Cultural map.

GRAND COULEE
Volcanism, glaciation, and water erosion have shaped the Columbia Basin. Millions of years ago, successive floods of lava filled the basin, pressing against the older granite mountains to the north. Diverted into new channels by each additional lava flow, the Columbia River eventually made a big westward bend. About 10,000 years ago, a glacier blocked the bend in the vicinity of Grand Coulee Dam creating a natural lake larger in size than Franklin D. Roosevelt Lake. Evidence of this ancient lake can be seen in the gravel terraces lining the present lake. Fed by melting ice, the lake overflowed. Meltwater rapidly cut through the columnar jointed lava of the plateau, excavating the Grand Coulee and lesser channels. See Dry Falls and Grant County. See Geological map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Ferry County discussion are plotted on the Historical-Cultural map and listed in its index.

HOO DOO CANYON, COLVILLE NATIONAL FOREST
This 5,100 acre unit has wilderness characteristics considered worth studying for potential preservation under the National Wilderness Preservation System. The canyon was carved by glacial meltwater and outwash created by stream capture. See Environmental Use and Geological maps.

INDEPENDENT AND BOUNDARY, COLVILLE NATIONAL FOREST
These two contiguous areas, bordering on Canada in eastern Washington, have been recommended for wilderness study by conservation groups in that part of the state, although the areas were eliminated by the Forest Service from the 1973 inventory lists for the Colville National Forest. See Environmental Use map.

INDIAN ROCK CAIRNS (MOUNDS)
These mounds of rocks are found along the crest of the Kettle Mountains from White Mountain north to Snow Peak. See Archeological map.

INDIAN SALMON DERBY
The derby is held in June, at Keller. See Historical-Cultural map.

KETTLE RIVER
From Ferry to Danville, this is a scenic-pastoral setting with a fair population of rainbow and brown trout and whitefish. Deer are abundant and use the narrow valley floor as winter range. Other wildlife found here include pine marten and wintering bald eagles. This is good boating water.

From Laurier to Columbia River, some 25 miles, the river is very scenic and readily accessable with good camping and boating water. Fisheries resources are limited due to excessive numbers of coarse fish. See Hydrological, Zoological-Terrestrial and Zoological-Aquatic maps.

KETTLE MOUNTAINS
These mountains provide habitat for wolverine, cougar, black bear, coyote, mule deer, and golden eagle. See Zoological-Terrestrial map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Ferry County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LOWER SHERMAN CREEK POSTGLACIAL SLOT
Short slot paralleling its gravel-filled former course for several miles. See Geological map.

MACDONALD'S GRAVE
In this picturesque county cemetary on the Kettle River near the town of Toroda is buried Ronald MacDonald, the only son of Archibald MacDonald, Hudson Bay factor and Miss Spokane, daughter of Comcomly, the famous chief of the Chinooks. He was educated in the east, and as a young man ran away to sea. His adventures included a visit to Japan where he stayed for 7 years as the first English teacher in that country. It is believed that Admiral Perry's expedition to Japan was successful because of MacDonald's work in that country. He later returned to Fort Colville where his father had been a success in the fur trade. See Historical-Cultural map.



MOUNTAIN, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Ferry County discussion are plotted on the Geological map and listed in its index.

ORIENT
Orient was platted in 1900 by Alec Ireland, and Mr. and Mrs. George Temple were the first citizens in 1901. As the gold hopes rose, Orient grew. Many boarding houses sprang up to accommodate the miners, and later when the railroad came through, they fed the construction workers. As mining played out the town became less prosperous. Today its school, which formerly accommodated several hundred, has but a handful of students. Many old buildings are still standing with newer and more modern facilities sprinkled around. See Historical-Cultural map.

PLANT COMMUNITIES
The climax plant communities listed below occur in the Ferry County. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Douglas-fir - mallow ninebark
Douglas-fir - pinegrass
Subalpine fir - grouse huckleberry

PROFANITY, ALLIGATOR RIDGE, KING MOUNTAIN, JUNGLE HILL, COLVILLE NATIONAL FOREST
All of these areas listed separately in the 1972 Forest Service undeveloped inventory are contiguous; only Profanity appeared on the 1973 list. All are recommended for wilderness study by conservation-ists as one viable unit. See Environmental Use map.

COUNTY DISCUSSION

REPUBLIC
In February 1896, John Welty discovered gold in Granite Creek and touched off a rush. By May, Republic was a town with a newspaper, the Republic Pioneer. Within a year the town had many businesses, a school, dance halls, and saloons. After the gold played out the town became the small farming and vacation center it is today. See Historical-Cultural map.

SAN POIL RIVER
The area holds many deer and other mammals dependent on the river and its narrow valley for habitat. The San Poil is a beautiful stream, pastorial at its upper reaches and rapid in the lower portions. Its entire length is protected as a trout fishery. See Hydrological, Geological, Zoological-Aquatic and Zoological-Terrestrial maps.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SHERMAN CREEK
The glacial features in this creek include lacustrine terraces, an entrenched stream, and ice scour benches. The creek bottomlands also serve as important deer winter range. See Zoological-Terrestrial map.

SHERMAN CREEK KAME TERRACES
These terraces, in ice-blocked side valleys, are found in the upper South Fork Creek basin. See Geological map.

SHERMAN CREEK WILDLIFE RECREATION AREA
Nestled in the foothills between Lake Roosevelt and the Kettle Mountains, Sherman Creek (8,068 acres) has whitetail and mule deer, pheasant, and grouse as top wildlife attractions. Rainbow and cutthroat trout are found in Sherman Creek. Golden and bald eagle (winter only), Merriam's turkey, coyote, bobcat, and the Columbian ground squirrel are other residents.

Two creeks bisect this wildlife area. The level bench land is used for crops, while open grass slopes and scattered timber are prominent on southern slopes. Dense stands of timber cover the north slopes while steep, rugged rock outcroppings and cliffs are common throughout. See Environmental Use and Zoological-Terrestrial maps.

SHERMAN PEAK
Located south of State Route 30 near Sherman Pass, elevation of this peak is 6,998 feet. See Geological map.

SWAN LAKES
These small, high-elevation lakes are trout habitat and receive high use. See Hydrological and Zoological-Aquatic map.

VARNE TERRACES
There are two varne terraces - ice blocked side valleys - in this region of the state, one is in the Methow River valley near Methow, and the other is in Sherman Creek. See Geological map.

VULCAN MOUNTAIN
Rocky Mountain bighorn sheep were planted here in 1971 by the State Game Department. The area also provides habitat for deer, pine martem, wood duck, and possibly stray wolves from British Columbia. See Zoological-Terrestrial map.

WHITE MOUNTAIN
The mountain is in the central part of the county. The elevation is 6,921 feet. Rock cairns on the summit of White Mountain served as ritual grounds for young braves to establish their adulthood. See Geological and Archeological maps.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide and national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. Critical maigratory waterfowl areas in the county are Snake River Valley Bottomlands, Eagle Lake, and Columbia River Valley from Stevenson to Burbank. Other birds noted are prairie falcon, spruce (Franklin) grouse, and wood duck.

MAMMALS. The county's critical deer wintering grounds are Curlew Creek Valley from headwaters to Canadian border, Columbia River Valley from Canadian border to Kettle Falls and from Canadian border to Grand Coulee Dam, Torada Creek Valley from headwaters to Canadian border. Stray grey wolves enter the state from British Columbia. The wolverine ranges throughout the mountainous regions of northeastern Washington. Wolverines are increasing in numbers, a rare animal showing signs of a comeback. Moose are occasionally seen in the county near the Canadian border. Grizzly bear, bighorn sheep, black bear, cougar and other mammals inhabit the county.

REPTILES. Rattlesnakes are noted here in the lower elevations.

Franklin

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Franklin County discussion are plotted on the Archeological map and listed in its index.

BIG FLAT PARK
This is a riverside park located on the Franklin County bank of the Snake River upstream from Ice Harbor Dam. See Environmental Use map.

CARIBOO TRAIL
See Okanogan County.

CHANNELED SCABLANDS
See Lincoln County.

CHIWANA PARK
This is a riverside park located on the Franklin County bank of the Columbia River at Pasco. See Environmental Use map.

COLUMBIA BASIN COLLEGE (JR)
Established in 1855, the college is located at Pasco. See Historical-Cultural map.

COLUMBIA RIVER
See Clark County.

DEVIL'S CANYON
A canyon, about 5 or 6 miles in length, carved by the "Spokane Flood." See Geological map.

EAGLE LAKE
An important area for waterfowl. See Zoological-Terrestrial map.

FRANKLIN COUNTY DUNES
The unique botanical feature of these dunes is Juniperus ocidentalis, which forms tracts of savanna of variable size separated by tracts of moving dunes. See Botanical map.

HANFORD RESERVATION
See Benton County.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Franklin County discussion are plotted on the Historical-Cultural map and listed in its index.

JUNIPER FOREST
The area north of Pasco and east of Eltopia consists of sand dunes and a juniper forest. This is an outstanding area of high sand dunes and scattered juniper trees. Dunes are the shifting type found in eastern Washington. This is probably the largest remaining natural stand of western juniper (Juniperus occidentalis) in Washington. Franklin County represents the approximate northernmost limit of the range. The manner in which these plants must constantly struggle to maintain themselves within the shifting sand dunes can be studied here. This is also one of the few areas in the eastern Columbia Basin in which a substantial number of native trees are to be found outside of the river bands. The area has recently been closed to off-road vehicles to provide protection for the native plants growing on the dunes. A state park has recently been proposed for the area. Numerous contributor have stated that this unique forest should be protected and preserved. See Botanical and Environmental Use Maps.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Franklin County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

MARMES ROCKSHELTER
This National Historic Place is located 1 mile north of Lyons Ferry on the west bank of Palouse River. This site has yielded the oldest well-documented human skeletal material found thus far in the New World with a date of approximately 8,000 B.C. There was also a continuous cultural record of the past 10,000 years contained in the site. See Environmental Use, Archeological, and Historical-Cultural maps.

MCNARY NATIONAL WILDLIFE REFUGE
The refuge consists of 7,215 total acres with the Ringold Division of the refuge lying in this county. The Ringold Division totals 4,000 acres under primary control of the U.S. Atomic Energy Commission. A smaller portion of the Refuge lies on Strawberry Island in the Snake River. Waterfowl and pheasant are found here. See Benton County. See Environmental Use map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Franklin County discussion are plotted on the Geological map and listed in its index.

PALOUSE CANYON
The jagged canyon, a deeply eroded gorge cut through basalt, contrasts vividly with adjacent rolling wheat lands. Palouse Canyon was carved by the "Spokane Flood." The canyon is a noted raptor (bird of prey) nesting area. See Geological and Zoological-Terrestrial maps.

PALOUSE FALLS STATE PARK
This riverside park is located on the Palouse River in Franklin County, 17 miles southeast of Washtucna. It covers 105 acres and has 10 campsites.

PALOUSE RIVER
See Adams County.

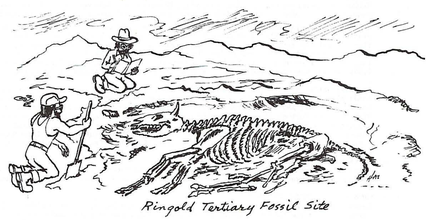
PLANT COMMUNITIES
The climax plant communities listed below occur in Franklin County. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Big Sagebrush - bluebunch wheatgrass
Bitterbrush - needle and threat
Bluebunch wheatgrass - sandberg bluegrass
Needle and thread - sandberg bluegrass

RINGOLD BLUFFS
Extensive beds containing fossil vertebrate remains dating from Pliocene, Pleistocene, and sub-Recent are found here. See Geological map.

RINGOLD REARING POND
State Fisheries Department. Species propagated: chinook and coho salmon. See Zoological-Aquatic map.

RINGOLD SPRINGS REARING POND
State Game Department. Species propagated: summer steelhead trout. Water source: springs. See Zoological-Aquatic map.


Ringold Tertiary Fossil Site

RINGOLD TERTIARY FOSSIL SITE
Fossil bones of such animals as the hipparian, bison, oreodont, camel, and various rodents can be found in the bedded silts, sands, and gravels along the east side of the Columbia north of Richland, especially near Ringold. See Geological map.

SACAJAWEA STATE PARK
This 275 acre state park was named for the Indian girl who accompanied Lewis and Clark on much of their journey. An Interpretive Center features an exhibit of Indian artifacts in her honor. The park is located five miles southeast of Pasco at the confluence of the Sanke and the Columbia Rivers. There is swimming, fishing, picnic facilities, and moorage and launches for boating enthusiasts. See Environmental Use and Historical-Cultural maps.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SNAKE RIVER
See Asotin County.

STRAWBERRY ISLAND
This is a proposed park in the Snake River a few miles upstream from the confluence with the Columbia River. See Environmental Use map.

WHITE BLUFFS
These bluffs are the only such sedimentary bluffs in eastern Washington, possibly in the Northwest. They average 300 feet high and are habitat for owls, hawks, herons, swallows, and other birds. The bluffs are very fragile geologic formations, a slight breeze can set off minor slides. Paleontological evidence is evident in certain layers of bluffs. The bluffs were formed by the Great Missoula Flood 12,000 years ago, when the Columbia River rushed between Rattlesnake Hills and present bluffs. See Geological and Zoological-Terrestrial maps.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide and national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. The Columbian sharp-tailed grouse (Pediocetes phasianellus columbianus) ranges along the grassy breaks of river canyons in the Palouse Hills. The lower Palouse River canyon is known as a nesting area for birds of prey including the prairie falcon (Falco mexicanus). Other species include the bald eagle, Canada goose, golden eagle, gulls, and the white pelican. The county is well noted for waterfowl habitat.

MAMMALS. The golden-mantled ground squirrel and mule deer are noted.

REPTILES. The ring-necked snake and the striped snake is found in Franklin County.

WINDUST CAVE
This cave yielded one of the first complete cultural sequences for the Plateau. The cave can be seen above the waters of Ice Harbor Reservoir. See Archeological map.

WINDUST PARK
This is a riverside park located downstream from Lower Monumental Dam. See Environmental Use map.

Garfield

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Garfield County discussion are plotted on the Archeological map and listed in its index.

ALPOWA CREEK
There is a native steelhead run up Alpowa Creek. See Zoological-Aquatic map.

ASOTIN CREEK WILDLIFE RECREATION AREA
See Asotin County.

BASALT BLUFFS ALONG SNAKE RIVER
These brown basalt bluffs along the Snake River are 1,000 feet high. See Geological map.

BLUE MOUNTAINS
See Asotin County.

GRANITE POINT
This hilltop was buried under 2,000 feet of lavas and later reexposed by the Snake River. It is now partly immersed in the reservoir behind Lower Granite Dam. See Geological map.

GROUSE FLATS STATE WILDLIFE RECREATION AREA
See Asotin County.

HISTORICAL AND CULTURAL FEATURES.
Some historical and cultural features of the state which are not specifically mentioned here in the Garfield County discussion are plotted on the Historical-Cultural map and listed in its index.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Garfield County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Garfield County discussion are plotted on the Geological map and listed in its index.

PATAHA BUNCHGRASS RESEARCH NATURAL AREA
The Pataha Area is an example of mountain bunchgrass vegetation occurring at the transition level from coniferous forest to steppe vegetation. A 51-acre tract consisting of 18 acres of Interior Douglas-fir, SAF-210, and 33 acres of Bluebunch wheatgrass. The elevation is 4,500 feet and topography is gentle slopes.

Rocky Mountain elk (Cervus canadensis) use the area as winter range and occasionally as spring or fall range during deeper snowfall. In general, they tend to move off the tract sufficiently early in the spring that grazing damage to grasses is prevented. Most forbs seem unpalatable to elk in this area. Other animals inhabiting this tract include mule deer, (Odocoileus hemionus), ground squirrels (Citellus columbianus), Douglas squirrel (Tamiasciurus douglasii), white footed deer-mice (Peromuscus maniculatus) and a few pocket gophers (Thomomys spp.) See Botanical map.

PLANT COMMUNITIES
The climax plant communities listed below occur in Garfield County. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Bluebunch wheatgrass - sandberg bluegrass
Subalpine fir - grouse huckleberry

RED WOLF'S CROSSING
Located where Alpowa Creek flows into the Snake River across from Steptoe's Canyon, this was a famous "swimming ford" used by the area's Indians to cross the Snake River. It receives its name from a Nez Perce chief, Red Wolf, whose tribe usually camped there.

Lt. Col. Edward J. Steptoe used this crossing to ford the Snake River enroute to Fort Colville where his men (some 156) were defeated by Indians on May 17, 1858. Most of the men escaped and fled toward the Snake River where with the help of the Nez Perce they recrossed the river and sought safety at Fort Walla Walla. Chief Timothy, the father of Jace Silcott who later guided the Perce party in the discovery of gold in the Oro Fino area, aided and directed the fleeing men to safety. See Historical-Cultural map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

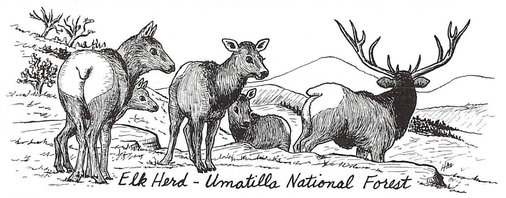
SNAKE RIVER
See Asotin County.

TUCANNON RIVER
This free-flowing stream is the last river in southeastern Washington to have salmon and steelhead spawning grounds. The Tucannon River is characterized by heavy sediment loads and coliform bacteria. Only a small segment of the upper reaches flows in southern Garfield County.
The Tucannon River carries heavy sediment loads during periods of maximum runoff (winter and early spring). This results mainly from lack of use of adequate soil conservation practices on the highly erosive loess topsoils of the area, but streambank and channel erosion is also important. See Hydrological map.

W. T. WOOTEN WILDLIFE RECREATION AREA
The area is located 13 miles south of Dayton in the rugged Tucannon Valley of the Blue Mountains (11,344 acres). It has sharp, steep ridges, talus slopes and broad-topped tablelands - generally timbered but with open south slopes covered by range grasses.

This spectacular mountain country has Rocky Mountain elk, whitetail and mule deer, bighorn sheep, black bear, cottontail and snowshoe rabbit, cougar, bobcat, ruffed and blue grouse, valley and mountain quail, chukar and Hungarian partridge, pheasant, Merriam's turkey and dove. Eight lakes and Tucannon River provide summer and fall fishing for trout and salmon. Many nonhunted birds and small mammals are found on Wooten. See Environmental Use and Zoological-Terrestrial maps.

WENAHA BACKCOUNTRY AREA, UMATILLA NATIONAL FOREST
See Asotin County.


Elk Herd - Umatilla National Forest

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the Atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide or national significance and reflect, in part, the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic Maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. The prairie falcon (Falco mexicanus) is found throughout eastern Washington. The Columbian sharp-tailed grouse (Pediocetes phasianellus columbianus) inhabits grassy breaks of river canyons in Palouse Hills. The pileated woodpecker is occasionally found in the Grouse Flats and Blue Mountains area. Other birds include the golden eagle and green-tailed towhee.

MAMMALS. This is a general area of importance to bighorn sheep (Ovis canadensis). The total sheep population in the state is about 445. Also noted is a critical elk wintering range running parallel to U.S. 12 on the east side from the Oregon border to northeast of Dayton, and in all Blue Mountain canyons in the Umatilla National Forest to approximately 1,800 feet in elevation. The pine marten (Martes americana) inhabits the upper mountain slopes throughout the state. The western jumping mouse (Zapus princeps) has a restricted range in Garfield, Asotin, Columbia, and Whitman Counties. The cougar (Felis concolor) is present in forests throughout the state. Other small mammals include the Douglas squirrel, red squirrel, chipmunk, hoary marmot, cony (pika), flying squirrel, fox squirrel, and golden-mantled ground squirrel.

REPTILES. The ring-necked snake is noted in Garfield County.

Grant

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Grant County discussion are plotted on the Archeological map and listed in its index.

BANKS LAKE
One of the natural geologic wonders of North America, a gigantic cleft in basalt which forms the Grand Coulee holds the waters of Banks Lake (43,541 acres). An abandoned channel of the Columbia River, it is located between Coulee City and Electric City. Banks Lake is the equalizing reservoir for Grand Coulee Dam.

The nesting site of Vaux's Swift and an important area for upland birds, gulls, hawks, kittiwake, waterfowl, white pelican, great blue heron and shorebirds. See Douglas County. See Hydrological and Zoological-Terrestrial maps.

BANKS LAKE WILDLIFE RECREATION AREA
See Douglas County.

BEEZLEY HILLS
Large remnant sagebrush community with one of the few breeding populations of sage grouse and pygmy rabbits left in the State. The pygmy rabbit was formerly widespread over eastern Washington in tall sagebrush areas. Their range is now greatly restricted. They are found in Beezley Hills approximately 8 miles northwest of Ephrata. See Botanical and Zoological-Terrestrial maps.

BIG BEND COMMUNITY COLLEGE (JR)
Located at Moses Lake, the college was established in 1962. See Historical-Cultural map.

BOULDER FIELD
These boulders were deposited by the flood waters surging through the Grand Coulee; the last flood was about 15,000 years ago. See Geological map.

CALICHE LAKES
The small short road into the lakes is scenic and winds around the sides of cliffs. Evidently this area was once a giant waterway--the deeply cut sides show exposed rock formations. The long-billed marsh wren dwells infrequently in Washington and is found in these swamp lakes. This lake is also home for both the red-wing and yellow-headed blackbirds and various waterfowl. The lakes, stocked with fish, were formed within the last 10 years when the equalizing reservoir raised the area's water table. See Hydrological, Zoological-Terrestrial and Zoological-Aquatic maps.

COUNTY DISCUSSION



CARIBOU TRAIL
See Okanogan County.

CHANNELED SCABLANDS
See Lincoln County.

CHIEF MOSES ENCOUNTER
The confrontation between the posse from Yakima and Chief Moses in 1878 occured just below Saddle Mountain Gap. Immediatley below Priest Rapids, Chief Moses met General Howard in conference in 1878. See Historical-Cultural map.

COFFIN LAKE
This lake provides habitat for the black-crowned night heron; 15-20 of these birds nest at the lake's outlet. See Hydrological map.

COLUMBIA BASIN FISH HATCHERY
State Game Department. Species propagated: trout. Water source: spring. See Zoological-Aquatic map.

COLUMBIA RIVER
See Clark County.

COLUMBIA NATIONAL WILDLIFE REFUGE
The refuge comprises 28,978 total acres managed primarily for waterfowl. Located on Crab Creek just below Potholes Reservoir, approximately 40 percent of the refuge is open to public hunting. It is an extremely important waterfowl breeding and resting area, and supports large numbers of native birds and mammals. Extensive rocky sagebrush areas exist below O'Sullivan Dam. See Environmental Use and Zoological-Terrestrial maps.

CRAB CREEK
Crab Creek is a free-flowing stream through the channeled scablands and central plains divisions of Columbia Basin. It is a rich upland bird and waterfowl habitat, and one of the important areas for hawks, eagles, falcons and owls in eastern Washington. It is one of the nesting areas of the rare long-billed curlew.

Several complete skulls of extinct bison along with horn cores and other fossils have been found here.

High coliform densities have been reported in lower Crab Creek, and it is believed that the bacteria are contributed by cattle dung from cattle pastured on lands through which the stream flows. See Hydrological, Archeological, and Zoological-Terrestrial maps.

CRAB CREEK WILDLIFE RECREATION AREA
Crab Creek (20,918 acres) and its nearby segment, Priest Rapids (2,153 acres), include some of the finest waterfowl habitat and trout-producing waters in the state. In addition, pheasant and chukar occur in abundance near Crab Creek. The creek is one of the finer brown trout waters in Washington. Lenice Lake consistently produces rainbow trout in the 2 to 6 pound class.

Crab Creek Wildlife Recreation Area, located about seven miles directly east of the town of Beverly, is typical eastern Washington desert country with sagebrush, rolling hills, and cattail marshes. The Priest Rapids segment along the Columbia River is primarily pastureland heavily used by geese. See Zoological-Terrestrial and Environmental Use maps.

DESERT WILDLIFE RECREATION AREA
Desert (10,410 acres), Potholes (40,508 acres) and Winchester Wasteway (1,936 acres) are in the general vicinity of the intersection of Interstate 90 and the Dodson Road, from three to ten miles west of the town of Moses Lake. Numerous access points and boat launching facilities are well marked. Potholes Wildlife Recreation Area, located south of Moses Lake, is considered the best single duck-hunting area in the state.
These wildlife areas receive heavy use from migrating waterfowl due to their central location near food crops in the Columbia Basin. In addition to the enormous variety of waterfowl, jackrabbit, beaver, mink, muskrat, coyote, and an occasional deer are residents.

This vast expanse of water, cattail marshes, swamps, sand dunes, and sagebrush flats offer the recreationist the chance to fish, hunt, or explore miles of hidden waterways. Fishing is outstanding, especially for bass, perch, and crappie. Fishermen at the Potholes Reservoir have caught rainbow to six pounds.

This is the only desert wilderness area in the State of Washington. This area is free of all motor traffic of any type and is to be preserved in a natural state for wildlife and plant life. The area has many sand dunes, small lakes, and the Winchester and Frenchmen Hill wasteways run through it. See Environmental Use and Zoological-Terrestrial maps.

DRUMHELLER CHANNELS
The Drumheller Channels contain one of the most spectacular portions of the butte and basin scablands of the Columbia River Plateau. Features of the area were formed by immense floods which eroded a complex network of channels, rock basins and small abandoned cataracts. Successive floods created gigantic cascades cutting 300 feet into a previously intact divide. The Drumheller Channels were the outlet for glacial melt water from the Quincy Basin, which served as a collecting basin for waters from Grand Coulee, Soap Lake, Dry Coulee and Long Lake Coulee. Additionally, a number of basaltic craters were formed by eruption beneath the lava of the Columbia River Plateau. These basaltic volcanoes, including their craters, are visible today. Site has been recommended as a Natural Landmark. See Geological and Environmental maps.

DRY FALLS
Dry Falls is part of the spectacular network of erosion scars known as the "Channelled Scablands." Glacial ice of the Pleistocene epoch advanced south from Canada and reached the lava plateau of central Washington where it dammed the Columbia River near the present site of Grand Coulee Dam. Thus dammed, the river overflowed its banks and spilled across the plateau in a series of huge floods. The tremendous volume of water had enormous eroding power and carved deep channels; the largest of which is the Grand Coulee, with Dry Falls as its central feature. The glacial melt-water in the previous course of the Columbia River some 10,000 years ago plunged over this 400-foot sheer rock wall with a flood of 100 Niagaras. After the glaciers retreated and the course of the river changed, the great cataract dried up, leaving a vast dry falls.

Dry Falls is located within the 3,710 acre Sun Lakes State Park, which offers picnic facilities, campsites, boat launches, swimming, fishing, hiking, and ice skating. It is six miles south of Coulee City. See Geological map.

DRY FALLS CAVE
This small rock shelter in basalt is near the trail. The opening extends about 60 feet back into the sheer cliff. See Geological map.

DRY FALLS INTERPRETIVE CENTER
Located at Sun Lakes State Park on State Route 17 four miles southwest of Coulee City, ancient artifacts and exhibits tell the story of the creation of Dry Falls. See Historical-Cultural map.

DRY FALLS STATE PARK
A plaque designating the Grand Coulee as a 1 acre Registered Natural Landmark is located in the small vista house at Dry Falls. See Environmental Use map.

FOSSIL CAVES
These caves are located south of Coulee City. See Geological map.

FRENCHMAN SPRINGS COULEE
This 3 or 4 mile coulee is found north of Vantage. The coulee was carved by the "Spokane Flood." See Geological map.

GINKGO PETRIFIED FOREST
This forest extends for several miles along the Columbia River. See Kittitas County.

GLOYD SEEPS WILDLIFE RECREATION AREA
Located just north of the town of Moses Lake, on the Stratford Road, Gloyd Seeps (6,176 acres) is managed for waterfowl and pheasant hunting. There is also fair cottontail hunting.

An uncommon nesting area of the American avocet, the area is also important to management for waterfowl and upland birds. Golden eagle nest here and white pelican occasionally utilize the area as a spring nesting ground. Magpie, raven, marsh and redtail hawk, mourning dove and snipe are all common. Coyote, jackrabbit, and muskrat are resident species.

The upper portion of Crab Creek flows through this wildlife area which consists of brushy scablands that slope from irrigated farmlands to the creek bottom. There are also shallow water areas of saltgrass flats and cattail patches. See Environmental Use and Zoological-Terrestrial maps.

GRANT COUNTY HISTORICAL SOCIETY MUSEUM
At Ephrata, this museum exhibits pioneer artifacts. See Historical-Cultural map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Grant County discussion are plotted on the Historical-Cultural map and listed in its index.

INDIAN CAMPSITES
There are Indian campsites where the town of Ephrata is now, at the mouth of Crab Creek, and at Rocky Ford. There is also an Indian burial ground at Rocherford. See Archeological map.

ITALIAN ROCK OVENS
These rock ovens were built by Italian bakers during construction of the Great Northern Railroad in 1893. See Historical-Cultural map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Grant County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LAKE LENORE
This lake is of interest because of the associated sagebrush around its margins and edge conditions. It is an important area for waterfowl and ring-billed gulls. See Botanical, Hydrological and Zoological-Terrestrial maps.

LAKE LENORE CAVES STATE PARK
The caves were formed by the plucking of basalt from the walls of the Coulee by the rush of melt waters during the Ice Age. The 120 acre park is undeveloped except for a foot trail which leads up to the caves. The park is on the east wall of the Coulee about 9 miles north of Soap Lake. See Geological and Environmental Use maps.

LONG LAKE AND LENORE LAKE WILDLIFE RECREATION AREAS
See Douglas County.

MARY LOUISE ICE CAVE
The Mary Louise ice cave is on the Lower Crab Creek. It was known to early pioneers who named it and used it for storing meat. See Geological map.

MOSES LAKE
Moses Lake covers 6,815 acres, and is 38 feet deep. This is an historically eutrophic lake. Blue-green algae form mats on the surface throughout the summer, washing ashore to create unpleasant conditions of considerable magnitude. These excessive algal growths have interfered with recreational and fisheries uses of Moses Lake. The profuse algal blooms are thought to be a result of nutrient inflow from ground-water domestic wastes, irrigation returns, and several tributaries.

The addition of lower-nutrient Columbia River water to dilute nutrients has been proposed, but not carried out because of objections of irrigators downstream from the lake. Flushing is still considered to have merit with the addition of surface skimmers to prevent algae from moving back to flushed out areas by wind-driven surface currents.

Two and one-half years of extensive data on nitrogen, phosphorus, chlorophyll, particulate carbon, community composition, secchi disk depths and oxygen-temperature profiles exist with which to compare post-treatment changes. In addition, extensive in situ experiments to determine the causative factors in the dilution water effects or algal growth and species succession are available. See Hydrological map.

MOSES LAKE MUSEUM
At town of Moses Lake, fossils, rocks and minerals are on display, as well as pioneer and Indian exhibits. See Historical-Cultural map.

MOSES LAKE, POTHOLES RESERVOIR, LOWER CRAB CREEK COMPLEX
This is a very important habitat area for waterfowl, and especially for certain shorebirds, waders, gulls terns, and white pelicans. The addition of irrigation water from the Columbia River Basin Project is causing an expansion and rise of the water table and is making this area increasingly attractive for these birds and should be considered valuable habitat. Important species include the following:

White pelicans (Pelecanus erythrirlynchos) range over the Potholes Reservoir area. The possibility of a breeding colony still existing in the area is presently being investigated; nesting colonies of great blue heron (Ardea herodias) exist at Potholes Reservoir; avocets, Wilson's phalarpoes, killdeers, and long-billed curlews breed throughout this habitat complex; breeding gulls and terns include the ring-billed gull, California gull, Caspian tern (rare species) and Forster's tern; wintering gulls include glaucous-winged gull (rare species) and black-legged kittiwake; and sightings of scaled quail have occurred at Beverly near the mouth of Crab Creek.

This entire area is a refuge for migrating waterbirds and an increasingly important stopoff on the Pacific Highway east of the Cascades. See Zoological-Terrestrial map.

MOSES LAKE SAND DUNE FIELDS
This is a nationally known sand dune area showing excellent barchan and parabolic dunes. See Geological map.

MOSES LAKE STATE PARK
This 78 acre park, 4 miles west of Moses Lake, offers fishing and swimming. See Environmental Use map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Grant County discussion are plotted on the Geological map and listed in its index.

NONTRONITE
Located north of State Highway 28 and 6 miles west of Quincy, this area has nontronite of unique purity. See Geological map.

NORTHERN POTHOLES RESERVOIRS
The Northern Potholes are a series of reservoirs of which Evergreen Reservoir is the largest. All of the Northern Potholes Reservoirs receive irrigation return flows from the Babcock Ridge area of the Columbia Basin Irrigation Project. These reservoirs are mesotrophic due to the inflow of moderate amounts of plant nutrients in the return flows. Updated hydrographic information of Evergreen Reservoir is available as well as three years of extensive data on the concentration of cholrinated hydrocarbon pesticides in the reservoir water. This area is the habitat of the white pelican; 50 to 100 may be seen here in spring. See Hydrological map.

NORTHRUP CANYON
This canyon was cut by a receeding waterfall during Pleistocene glaciation and the accompanying Spokane floods. The upper end is a dry falls. The canyon has excellent examples of granite-weathering phenomena and a nonconformity between Mesozoic granite and Miocene basalts. See Geological and Environmental Use maps.

O'SULLIVAN DAM, RESERVOIR AND ASSOCIATED POTHOLES
The reservoir and potholes (also known as Potholes Lake or Reservoir) were formed behind O'Sullivan Dam and the waste waters of the Columbia Basin Irrigation Project. Extremely important waterfowl breeding and resting area. Also has upland birds, shorebirds, gulls, phararopes, kittiwake, and quail.

This is an eutrophic body of water rich in algal nutients. The reservoir receives irrigation return flows from the northern half of the Columbia Basin Irrigation Project and Moses Lake. Updated hydrographic information of the lower half of the Reservoir is available. Three years of extensive data on the concentration of specific chlorinated hydrocarbon pesticides is available. See Hydrological and Zoological-Terrestrial maps.

PILLOW LAVAS
Area where lava flowed into a marsh and lake, southeast of Vantage. See Geological map.

PLANT COMMUNITIES
The climax plant communities listed below occur in Grant County. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Big sagebrush - bluebunch wheatgrass	Rock Buckwheat - sandberg bluegrass
Big sagebrush - needle and thread	Spiny hopsage - sandberg bluegrass
Big sagebrush - terebinth cymopterus	Stiff sagebrush - sandberg bluegrass
Bitterbrush - needle and thread	Thyme buckwheat - sandberg bluegrass
Black greasewood - alkali saltgrass	

PLANT COMMUNITIES (UNIQUE)
There are several unique physiognomic communities in the county, listed below. See Botanical map.

Community	Location	Elevation
Rockland/scabland	R23E, T16N, Sec. 9	1000'
" "	R23E, T19N, Sec. 16	1200'
Sand dunes succession	R23E, T17N, Sec. 6	600'
" " "	R23E, T11N, Sec. 34	960'
" " "	R23E, T16N, Sec. 36	510'
Arid scrub	R24E, T16N, Sec. 30	700'
Lower Crab Creek saline flat and marsh	R25E, T16N, Sec. 27	520'

POTHOLES CATARACT
This cresent-shaped cataract was carved by the "Spokane Flood." See Geological map.

POTHOLE LAKES
This series of potholes provide outstanding breeding habitat for the following birds: yellow-headed blackbird (Xanthocephalus xanthocepalms); red-winged blackbird (Xanthocephalus xanthocephalus); long-billed marshwren (Telmatodytes palustris); marsh hawk (Circus cyaneus); sora rail (rare species) (Porzana carolina); Virginia rail (Pallus limicola); coot (Fulica americana); pied-billed grebe (Podilymbus podiceps); rudy duck (Oxyura jamaicensis); and red-head duck (Aythya americana). See Zoological-Terrestrial map.

POTHOLES WILDLIFE RECREATION AREA
See Desert Wildlife Recreation Area.

PRIEST RAPIDS SPAWNING CHANNEL
State Fisheries Department. Species propagated: chinook salmon. See Zoological-Aquatic map.

PRIEST RAPIDS WILDLIFE RECREATION AREA
Priest Rapids has some of the finest waterfowl habitat and trout-producing waters in the state. The Priest Rapids segment, along the Columbia River, is primarily pastureland heavily used by geese. It encompasses 2,153 acres. See Environmental Use map.

QUINCY WILDLIFE RECREATION AREA
A vital link in the Columbia Basin's system of waterfowl resting areas. Quincy is 13,907 acres of towering cliffs, sagebrush coulees and a network of 25 lakes, directly across the Columbia River from the Colockum Wildlife Recreation Area and just west of the Quincy-George Highway.
A wide variety of ducks plus pheasant and chukar partidge are the most common game species. Excellent fishing for trout and bass is found in the larger lakes. Whistling swan make an annual spring stop-over, while great blue heron, red-tailed hawk, ring-billed gull, and canyon wren are common residents.

Quincy's cliffs rise to 600 feet and drop straight to the Columbia below or to intermediate benches from the main Columbia Basin plateau. The entire range of seabrock, sagebrush and bunchgrass pastures is cut with small coulees through which excess irrigation waters from adjacent farmlands fill this area's numerous lakes. See Environmental Use and Zoological-Terrestrial maps.

RHINOCEROS CAVE (BLUE LAKE RHINO CAVE)
The mold of a rhinoceros in pillow lava at the mouth of Jasper Canyon has been termed a "cave" in both popular and technical usage. (Chappell and others, 1951.) The mold is about 8 feet long and may be entered through a small opening in the left thigh. (Caves of Washington by William R. Halliday.) See Geological map.

ROYAL SLOPE REGION
This is an outstanding habitat area for the following species: prairie falcon (Falco mexicanus); red-tailed hawk (Buteo jamaicensis); horned owl (Bubo virginianus); cliff swallow (Petrochelidon pyrrhonota); barn swallow (Hirundo rustica); bank swallow (Riparia riparia); rock wren (Salpinctes obsoletus); Say's phoebe (Sayarnis sya); side-blotched lizard (Uta stansburiana); and sagebrush lizard (Sceloporus graciousus). See Zoological-Terrestrial map.

SADDLE MOUNTAIN PETRIFIED FOREST
Found southwest of Moses Lake. See Geological map.

SAND DUNES AND ASSOCIATED HABITAT
A fairly extensive area (several miles) of actively shifting dunes stretches along both shore areas of Lower Crab Creek. More dunes are on the north than the south shore. Besides being a significant geologic feature, the dunes are also habitat for the dune willows and various annual flowering plants and perennial grasses which are unique to dune areas. Shelter for migrating and nesting songbirds is afforded by the willows. See Geological and Botanical map.

SENTINAL GAP
Gap along the Columbia River between Beverly and Priest Rapids. See Geological map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SOAP LAKE
The largest brackish-water lake in Washington, Soap Lake supports a large variety of eutryaline organisms. This area is of interest because of the associated sagebrush around its margins and edge conditions. See Botanical and Hydrological maps.

STEAMBOAT ROCK
A massive basaltic rock resembling a large ship on the shore of Banks Lake in Grand Coulee. See Geological map.

STEAMBOAT ROCK STATE PARK
Covering 900 acres, it is 6 miles southwest of Grand Coulee on State 155. The park has swimming, fishing and boat launching. See Environmental Use map.

STRATFORD LAKE
Over 150 whistling swans use the area between the Lake and Wilson Creek in February and March. See Long Lake. See Long Lake Wildlife Recreation Area. See Zoological-Terrestrial maps.

SUN LAKES
This is an important area for golden eagle and waterfowl. See Dry Falls. See Zoological-Terrestrial map.

TROUT LODGE FISH HATCHERY
State Game Department. Species propagated: trout. Water source: Rocky Ford creek. See Zoological-Aquatic map.

WAHLUKE SLOPE ARID-DESERT SHRUBLAND
This is a sand and sand with gravel soil climax community of big sagebrush and other shrubs in an area having probably the lowest rainfall in the entire state (1972 total rainfall was 2-1/2 inches). This area provides habitat for the following species: side-blotched lizard (Uta stansburiana); short-horned lizard (Phrynosoma douglassi); gopher snake (Pituophis melanolencus); sage sparrow (Amphispiza belli); nighthawk (Chardeiles minor); blacktailed jackrabbit (Lepus californicus); and coyote (Canis latrans). See Zoological-Terrestrial maps.

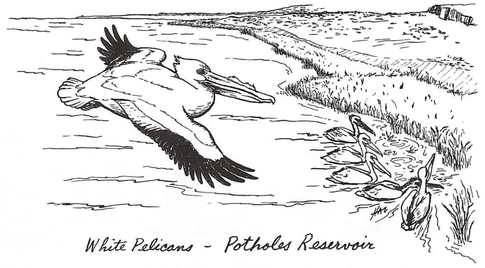
WHITE BLUFFS
Pleio-Pleistocene vertebrate fauna are found in three areas between Ringold and Hanford along 7 miles of the bluff. Findings include fossil of mastodon, horse, deer, camels and tortoise. See Geological map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the Atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide or national significance and reflect, in part, the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. The county is of general importance to the Columbian sharp-tailed grouse (Pedioecetes phasianellus columbianus) which was formerly widespread throughout eastern Washington's grasslands. The bird ranges along the grassy breaks of river canyons. The golden eagle is a regular nesting species in this county. Prairie falcons and other raptors are found throughout the county. A variety of resident and migrant bird species are found in the Grand Coulee area. Here, waterfowl, shorebirds, gulls and passerines occur in large numbers. Ring-billed gulls are found nesting at the southeast end of Lake Lenore. The county's sagebrush areas are of critical importance to the sage grouse.

MAMMALS. Kincaid's meadow mouse (Micratus pennsylvanicus kincaide) has a restricted range in Grant County. The pronghorn antelope (Antilocapra americana) is very limited in Washington. The county provides habitat for some of the state's 100 animals. The black bear, black-tailed jackrabbit, cougar, coyote, mule deer and pygmy rabbit are found in the county. Small mammals also include the chipmunk, Douglas squirrel, and golden-mantled ground squirrel.

REPTILES. The side-bloched lizard, short-horned lizard, spotted night snake, and striped whipsnake are noted in the county.



WINCHESTER WASTEWAY
This area is important to management of waterfowl (1,936 acres). Very high population area of coyote may be found from here to Frenchman Hill. See Zoological-Terrestrial map.

WINCHESTER WASTEWAY WILDLIFE RECREATION AREA
Important state-managed area whose water is carried into the Potholes Reservoir. See Desert Wildlife Recreation Area.

Grays Harbor

ABERDEEN FISH HATCHERY
State Game Department. Species propagated: trout and steelhead trout. Water source: Wynoochee River and Aberdeen Lake. See Zoological-Aquatic map.

ADALBERT SPALDING MUSEUM
This logging and farm equipment museum is housed in the old Elma High School gym which was moved to the site. See Historical-Cultural map.

AGATE EXPOSURE
Agate can be found along the Salmon River in the northern part of the county. See Geological map.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Grays Harbor County discussion are plotted on the Archeological map and listed in its index.

BIG CEDARS (KALALOCH)
These two enormous Red Cedars (Thuja plicata) are probably the biggest in the world. The trunk of the specimen at Kalaloch is approximately 60 feet in circumference, while the Quinault tree is slightly smaller. These specimens illustrate indeterminate growth in plants in the western Washington area. See Botanical map.

COUNTY DISCUSSION

BIG TREE GROVE
This Grove includes the "Big Acre," containing 390,190 board feet of Douglas-fir and western hemlock on one acre. This is the largest known volume of standing timber on one acre in the United States. See Botanical map.

BRECKENRIDGE BLUFF
In 1841, this bluff was named for a horticulturist with the Wilkes Expedition (survey that laid out the township and grid range still used). A monument placed by them was found here in 1969. See Historical-Cultural map.

BUNCH LAKE
This unique lake is in the Olympic National Park. See Hydrological and Historical-Cultural maps.

CAMP DELEZENE
Boy Scout Camp, 10 miles south of Elma. See Environmental Use map.

CAMP KALHANIE
Girl Scout Camp, 16 miles north of Hoquiam. See Environmental Use map.

CANYON RIVER
This free-flowing river is an anadromous fish route and is used for kayaking. See Hydrological map.

CAPE ELIZABETH
This is one of three series of rock faces, tide pools, tunnels, and reefs along the Washington seacoast. It ranks with Point of the Arches and Elephant Rock to the north in scenery. There is a proposal to relocate Highway 101 through the Quinault Indian Reservation adjacent to the coast. In cooperation with the Quinault tribe, if this planned road is built there must be no threat of destruction in any way to these tremendous scenic cliffs and rocks. See Geological map.

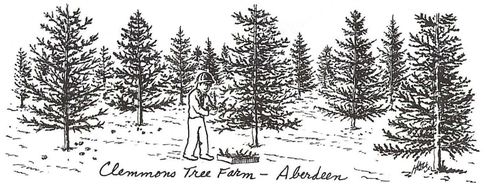
CARLISLE BOG
Located near Copalis Crossing, this bog is perhaps the most typical complex and flourishing acid bog in western Washington. The entire site comprises approximately 400 acres. It shows all the normal processes of the inter-relationships between organisms, including insectivorous plants. It dramatically illustrates adaptations of plants and animals to extremes of the environment. Trees encroaching along the edges of the system, because of their seed dispersal, show adaptive reactions from the normal soils to the acid content within the confines of the bog. Mosses and many seed plants show complete adaptations to the acid water. At the present time accessibility is limited, but there are rumors of area development. These small lakes, used for nesting and breeding by numerous wildlife, are rare. These lakes are the habitat of the Olympic muddminnow (Novumbra hubbsi). This minnow is only found in a few western Washington locations. Extensive bog vegetation also found here include Utricularia, Drosera, Menyanthes, Ledum, and other bog species. See Botanical, Hydrological, and Zoological-Terrestrial maps.

CHEHALIS INDIAN RESERVATION
Ethnic group. See Historical-Cultural map.

CHEHALIS RIVER
Low dissolved oxygen levels and high bacterial concentrations occur in the Chehalis River during the summer low-flow period. This poor water quality affects the migration and rearing of anadromous fish and participation in recreational activities. Where it enters Grays Harbor at Aberdeen, the Chehalis is a top salmon angling stream. It also contains sturgeon and shad. Much of the lower river is tidal and a boat is needed for good angling since in most places the banks are bushy and steep. The river is free-flowing and used for kayaking.

The Chehalis River and Nisqually River in western Washington renain as the only two river systems that were intimately associated with the Pleistocene period. The swampy slough areas along the Chehalis River are rare and important as habitats for waterfowl, swan, shorebirds, and other birds. Fish and wildlife cam also be found in the area. The estuary is a rearing area for juvenile salmon and trout. See Hydrological, Zoological-Aquatic, and Zoological-Terrestrial maps.

CLEMMONS TREE FARM
This was the first tree farm in the nation (350,000 acres). See Historical-Cultural map.


Clemmons Tree Farm - Aberdeen

CLOQUALLUM CREEK
This river is an anadromous (salmonid-steelhead) fish route and contains a resident trout population. This free-flowing river is also used for kayaking. See Hydrological map.

COLONEL BOB LOOKOUT
An overlook of the Quinault Valley and lake, this is one of the few forested hiking trails that can be used virtually year-around. See Historical-Cultural map.

COLONEL BOB WILDERNESS (PROPOSED)
The osprey inhabits or visits this area in small numbers according to the local Audobon Society. The pileated woodpecker, whose sources of food as well as nesting sites are often done away with by logging operations, is becoming rarer in the area. A subspecies of ermine (Mustella ermina olympica), the smallest ermine in the world, living only in the Olympic rain forest, is also threatened. The red tree mouse (Phenacomys longicaudus), which lives largely in trees and rarely appears in logged-off areas, lives in the proposed wilderness area. Aside from the larger mammals such as Roosevelt elk, plentiful in the Colonel Bob area are black-tailed deer (12 per square mile according to State Game Management-Forest Service report) mountain lions, black bears, coyotes, bobcats, and lynx. The area supports myriad small animal populations, suffering depletion in an area that has seriously been disturbed. Among these animals are the racoon, marten, mink, river otter, snowshoe hare, gray and flying squirrels, mice, shrew, and voles.

The proposed wilderness area is part of the migratory route for many large and small birds. The area is also rich in birdlife. Besides eagles and ospreys, sharp-shinned and red-tailed hawks abound. There are blue and ruffed grouse, grosbeaks, fox sparrows, rufous hummingbirds, possibly the horned lark (on Gibson slide according to the local Audobon Society), golden and ruby-crowned kinglets, belted kingfishers, short-eared and saw-whet owls, russet-back and hermit thrushes, vireos, Townsend and Audubon warblers, pileated woodpeckers, and canyon and winter wrens.

Three of the streams in the proposed area contain trout fisheries.

The plant life is always there to be seen. George Neville Jones, in his Botanical Survey of the Olympic Peninsula (University of Washington Press, 1936) states that the peninsula supports over 1,000 species of plants. Ruth Kirk, author of The Olympic Rain Forest, says that 71 species of mosses have been identified on the Peninsula. Many of these, if not all of them, grow in the proposed wilderness area. Ferns - sword, lady, maidenhair, licorice, and wood - grow in magnificent profusion in the lower reaches of the area.

Although many of the plants mentioned by Jones and Kirk grow throughout the peninsula and although some of the topographic features of the area can be found elsewhere, the Colonel Bob-Quinault complex presents a unique environment in that there is no other area elsewhere quite like it with the lake and wild Quinault River on its flank, its deep and steep gorges, its ancient trees, the profusion of mosses, ferns and the variety of its animal and plant life, large and small. See Zoological-Terrestrial, Botanical, and Environmental Use maps.


Pileated Woodpecker / Osprey - "Col. Bob" Wilderness Area

COLONEL BOB, SOUTH QUINAULT RIDGE, AND MOONLIGHT DOME, OLYMPIC NATIONAL FOREST
The Colonel Bob and South Quinault Ridge areas are separated by a logging road. Both of these units provide a scenic wilderness backdrop to Lake Quinault to the north and further on-the-ground wilderness pleasure for those hiking in the area. Easily reached from the Aberdeen area, it is a favorite place with local hikers. Together with the Moonlight Dome area (separated from Colonel Bob by another logging road) the areas are being recommended as a wilderness complex. See Environmental Use map.

COOK CREEK
The Erythronium revolutum species of lilies are only found in scattered locations, one being Cook Creek. Attention should be drawn to the site since road and logging activities threaten the species' preservation. The plant differs from other species in its genus in its color. It is a very striking pink in contrast to other species which are white or yellow. See Quinault River. See Botanical map.

COPALIS BEACH
Noncritical erosion is occurring in the vicinity of the Moclips River and at Copalis Beach. The State Highway Department has used riprap to protect the highways in the area from damage. See Hydrological map.

COPALIS NATIONAL WILDLIFE REFUGE
Land area of 5 acres in the 25 mile stretch of refuge. Leach's storm petrels, common murres, and tufted puffins are the most abundant pelegic birds. See Environmental Use map.

COSMOPOLIS TREATY GROUNDS
Governor Stevens signed the treaty with the Chehalis Indians here on February 25, 1854. See Historical-Cultural map.

ELEPHANT ROCK
A picturesque rock formation on the Pacific coast resembling an elephant with its trunk in the ocean. See Geological map.

FALLS CREEK FISH LADDER
Fish ladder affecting the movement of anadromous fish around a 20-foot falls in Falls Creek, a tributary to Quinault Lake. Three miles of new spawning beds were opened up by this ladder. See Zoological-Aquatic map.

FUNGI SITES
The following areas in this county are noted for their abundance and variety of higher fungi or important species: Quinault River and Upper Wishkah Valleys. See Botanical map.

GRAYLAND AND WESTPORT
There are sand dunes along the Pacific Ocean in southern Grays Harbor County. A heron rookery (great blue heron, Ardea herodias fannini) is located at Grayland. See Geological and Zoological-Terrestrial map.

GRAYS HARBOR AND VICINITY
Within Grays Harbor, several shoal islands are utilized by colonies of sea birds. In particular, the caspian tern now nests on Grays Harbor, and great care must be taken not to disturb these areas. This colony started in Grays Harbor about the same time the Moses Lake Colony disappeared.

This harbor is a significant feeding and resting area for waterfowl, wading birds, shorebirds, gulls, alcids, and on occasion for the pelagic sooty shearwater which may enter the inside waters of the bay in flocks of thousands. An important salicornia marsh is located east of the town of Westport. About 300 harbor seals occur on various accreted islands.

The Grays Harbor suffers from periodic low dissolved oxygen levels and sludge accumulations. Pulp and paper mill wastes are the major source of the problems, although the upwelling of deep ocean waters low in oxygen is believed to contribute to the oxygen depression. The estuary is deemed critical to the preservation of anadromous fish runs that pass through it. See Hydrological and Botanical map.

GRAYS HARBOR COLLEGE (JR)
Located in Aberdeen, the college was established in 1930. See Historical-Cultural map.

GRAYS HARBOR COUNTY COURTHOUSE
Built in 1910, this building was the site of Chehalis County government before the county was divided. This sandstone, 3 story building has a copper dome and a clock in its tower. The stairways and rotunda have murals by Rohrbeck and Biderstein of historical events. See Historical-Cultural map.

GROSSMAN HOUSE
Built in 1892, this example of Victorian architecture is a landmark on the hill overlooking Elk River and Grays Harbor. See Historical-Cultural map.

HIGLEY CREEK RESEARCH NATURAL AREA
The Roosevelt elk (Cervis canadensis roosevelti) is the most important animal present; their trails ease the problem of access through the area. Undoubtedly they have also affected the composition of the understory vegetation (Kirk 1966; Sharpe 1956). Other animals present in the area include the black-tailed deer (Odocoileus hemionus columbianus), black bear (Ursus americanus), snowshoe rabbit (Lepus americanus washingtonii), Douglas squirrel (Tamiasciurus douglasii), and white-footed deermouse (Peromyscus maniculatus).

These are stands of western hemlock (Tsuga heterophylla) on a mountain slope and valley bottom. 480 acres of western hemlock forest; cover type SAF-224; elevation: 400-1,800 feet; topography: level to steep; average height: 190 feet; average diameter 29 inches. See Botanical map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Grays Harbor County discussion are plotted on the Historical-Cultural map and listed in its index.

HONEYMOON FALLS
Named in 1890 by the O'Neil party for a honeymooning couple in the Wickersham party. See Hydrological map.

HOQUIAM PUBLIC LIBRARY
Built in 1911 with a Carnegie Grant, this building is still in excellent condition. It is believed to have been designed by Green Brothers who had great influence on Frank Lloyd Wright. See Historical-Cultural map.

HOQUIAM RIVER
The river enters Grays Harbor at Hoquiam and provides angling for jack chinook in September and October and for large coho in late November and December. This free-flowing river is important for cutthroat and steelhead as well. See Zoological-Aquatic and Hydrological maps.

HOQUIAM'S CASTLE
This site is a National Historic Place. See Historical-Cultural map.

HUDSON'S BAY LOG CABIN
This log cabin was built in the 1940's as a Hudson's Bay warehouse. The cabin is substantially in its original condition under the siding which covers it. See Historical-Cultural map.

HUMPTULIPS RIVER, EAST AND WEST FORKS AND TRIBUTARIES
The main river flows into Grays Harbor from the north. It produces chum, fall chinook, and coho salmon fishing. Chinook fishing begins in August and extends into October. Coho become abundant during October and continue through December. The Humptulips River area provides winter feeding area for bald eagles.

The East and West Forks of the Humptulips River are valuable anadromous fish streams originating within the Olympic National Forest. According to the Washington State Game Department, the Humptulips River yielded more steelhead than any other river on the Olympic Peninsula during the winter of 1970-71. The East Fork Humptulips River flows for approximately 18 miles before leaving the Olympic National Forest; the West Fork flows for approximately 21 miles within the National Forest.

Both streams are utilized for spawning and rearing by steelhead and sea-run cutthroat trout, and coho and chinook salmon. In addition to these anadromous fish, the East and West Forks also contain some native rainbows and cutthroat trout. The bottom lands and benches along these streams are also important calving grounds for the Roosevelt elk.

In order to protect the water quality of the East and West Fork Humptulips River, the Olympic National Forest has designated a 12 chain buffer or corridor to be left undisturbed along both forks, comprising a total of 3,260 acres.

Newbury Creek, a tributary of the West Fork Humptulips River, supports both anadromous and resident fish. This relatively short stream originates on the Olympic National Forest and flows for approximately 3 miles before emptying into the West Fork. The National Forest contains 2.5 miles of this stream. A buffer strip six chains wide has been designated for protection along this stream totaling 75 acres.

Rainbow Creek, a tributary of the West Fork Humptulips River supports both anadromous and resident fish. This stream lies entirely within the Olympic National Forest boundary, although it flows through minor inclusions of private land. Total length of this stream is approximately 2.5 miles. A buffer strip six chains wide has been designated for protection along Rainbow Creek totaling 60 acres. See Hydrological, Zoological-Aquatic, and Zoological-Terrestrial maps.

INDIAN DIG NEAR OCEAN SHORES
This dig occupies a band between 200 to 300 yards wide stretching from Bayside to Ocean shores on Point Brown Peninsula, beginning on Minard Ranch and going north. See Archeological map.

JASPER EXPOSURE
Exposure found near the city of Aberdeen. See Geological map.

JOHN'S RIVER WILDLIFE RECREATION AREA
As the name implies, the dominant feature of this Wildlife Recreation Area is John's River with its associated estuarine system. This popular recreation area encompasses over 12,000 acres located 12 miles southwest from Aberdeen in Grays Harbor County.

Boundaries of John's River Wildlife Recreation Area encompass the estuary at the river's mouth to four miles upstream. Water levels fluctuate as tides vary as much as 14 feet daily. A commanding view of John's River and Pacific Coast tidelands can be obtained along the 3-1/2 miles of graveled dikes - excellent for hiking and horseback riding. A new access road for entry to lands on the river's north side has now been completed. Boat launch facilities are available and usable even at lowest tides. This launch is widely used by cutthroat and steelhead fishermen during summer and winter months. Hunters make use of this facility for hunting the main island, isolated sloughs and creeks upstream. During summer many salmon fishermen take advantage of this launch to avoid congestion at nearby Westport ramps.

A portion of John's River Wildlife Recreation Area is set aside for quality hunting. A hike of more than one mile is required to reach upland bird and waterfowl hunting grounds. Special, year-round dog training grounds have been set up across from the adjacent Ocean Spray Cranberry Cannery.

Early Northwest pioneers settled along John's River as the only practical transportation available was by boat. A small cemetery is located on the property which can only be reached at high tide. Ancient stone markers list many local pioneer names. Many wooden markers have deteriorated so that only portions of names are legible. A ferry served the first wooden pavement road leading from Aberdeen to Westport and present boat launch facilities are located on the old ferry landing.

Black-tailed deer, black bear and Roosevelt elk are the most common big game animals occurring on this Wildlife Recreation Area. Upland game birds include blue grouse, ruffed grouse, band-tailed pigeon and ring-necked pheasant. The area is along a major waterfowl migration route. Dusky Canada geese, mallard, wigeon, green-winged teal, pintail and scaup are all common during fall and spring. Steelhead, silver salmon and cutthroat trout make annual fall spawning runs in John's River. Non-hunted wildlife include both the rufus hummingbird and the ruby-throated hummingbird. The varied thrush is a winter visitor, while killdeer and four species of gulls can be found year-round. Marsh hawk and great blue heron can be seen nearly every day and bald eagles occasionally visit the area. See Environmental Use and Zoological-Terrestrial maps.

KLONE LAKES, THREE PEAKS
The principal features are four lakes which comprise the "Klone Lakes," and the alpine mountain peak termed "Three Peaks." The lakes lie at the 3,200 foot elevation approximately one-half mile southeast of Three Peaks. The elevation of Three Peaks is 4,600 feet. Klone Lake, the largest of the group, is 9 acres in size. The maximum distance between any of the three lakes is 700 feet. The area not only includes the aesthetic environment of the alpine and upper forest resource zones, but also provides a view of adjacent high elevation areas. This area encompasses approximately 1,070 acres. See Hydrological and Geological maps.

LAKE ABERDEEN
This lake is a watershed and recreation area. See Hydrological map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Grays Harbor discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LAKE SYLVIA STATE PARK
This is a State Park recreation area. The 234 acre park is a mile north of Montesano off U.S. 410 in a wooded valley. Camping, swimming, fishing, and boat ramps are available. See Environmental Use and Hydrological maps.

LIONS PARK, WEST CHENAULT
This park is the original site of the Emerson Estate. It has a wide variety of different trees and shrubs,many 70 years old. See Environmental Use map.

LITTORAL CAVES
There are a number of littoral caves on the shores of the Quinault Reservation. One extends through a small island near Elephant Rock. See Geological map.

LONE TREE AT OCEAN SHORES, POINT BROWN
A marker at Ocean Shores Marina sets the site of a solitary sitka spruce on the tip of Point Brown used by mariners as a daymarker for a century and a half. It was felled by a winter gale in 1934. See Historical-Cultural map.

LONG BEACH PENINSULA AND GRAYS HARBOR COASTAL AREA
The whole peninsula is a rare ecological example of ocean inlet habitat. It has windswept and protected forest environment for both land and sea life. There is a mild zone along the coast with salal and menziesia. The area is particularly significant due to established stands of Myrica californica. See Botanical map.

MIDDLE AND LOWER EOCENE VOLCANIC ROCKS
These two small outcrops are located between Big Creek and Deep Creek and Humptulips Rivers. The two areas are widely separated from any similar formations. See Geological map.

MOCLIPS RIVER
Noncritical erosion is occurring in the vicinity of the Moclips River and at Copalis Beach. The State Highway Department has used riprap to protect the highways in the area from damage. See Hydrological map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Grays Harbor County discussion are plotted on the Geological map and listed in its index.

NEIL COONEY'S SPRUCE COTTAGE
Neil Cooney gave Cosmopolis the land used to entice Weyerhauser to build his pulpmill on the banks of the Chehalis. Cooney was manager of Grays Harbor Commercial Company, largest lumber mill in the world in early 1900's. The interior of the cottage was designed to show off local woods. See Historical-Cultural map.

NORTH RIVER
This is a free-flowing stream, used for kayaking. Anglers fish for steelhead, salmon, and cutthroat. See Hydrological map.

MOON ISLAND
The tidelands and shores of Moon Island provide sheltered winter grounds and feeding habitat for shore birds and ducks. Burrowing owls inhabit Moon Island year around. See Zoological-Terrestrial map.

OCEAN CITY STATE PARK
A 140 acre park at Ocean City offering camp and trailer sites, swimming, fishing and clamming. See Environmental Use map.

OCEAN SHORES VICINITY
On the coast of Grays Harbor, near Ocean Shores and Damon's Point, a colony of seagulls and a very small colony of Caspian terns have been destroyed or driven away because of the existing development. According to one wildlife specialist, future development around Damon's Point should be looked at carefully and expert investigation should determine the impact to the wildlife colonies of this area. The whistling swan winters on the North Beach shore lands from Ocean Shores to Copalis. See Zoological-Terrestrial map.

OCEAN SHORES SPIT
The spit, about 8 miles in length, lies between Grays Harbor and the Pacific Ocean. See Geological map.

OLIGOCENE-MIOCENE ROCKS
These Oligocene-Miocene marine rocks are of a conglomerate nature. This is their only coastal occurrence south of the Hoh River. See Geological map.

OLYMPIC WILDLIFE RECREATION AREA
The Olympic (962 acres) consists of small key areas located strategically within commercial tree farms in Wishkah Valley and the upper Wynoochee Valley, 15 miles north of Aberdeen. It lies in the Olympic's foothills where numerous streams wind through lush rain forests. High protein grass and clovers have been developed and used in a mixed pattern between brush and timber. This technique is used to encourage utilization by elk, black-tailed deer and black bear. Ruffed and blue grouse, band-tailed pigeon, varied hare, an occasional cougar, steelhead and cutthroat trout, beaver, cedar waxwing, and other wildlife typical of the Olympic Peninsula are all found here. Old skid trails, camp sites, splash dams, and other evidence of early logging are still in evidence. See Zoological-Terrestrial and Environmental Use maps.

OYHUT WILDLIFE RECREATION AREA
An ancestral gathering place for waterfowl, Oyhut (699 acres) is one of the first resting stops for Dusky Canada geese on their southern fall migration. Located at the southern end of Ocean Shores Peninsula, Oyhut features surf fishing for sea perch, bass, and flounder, as well as hunting for geese, mallard, pintail, wigeon, and green-wing teal. Oyhut is unique as it is a "sink," a large saltwater intrusion with sand dunes on three sides and the North Jetty of Grays Harbor on the north. The area is a mecca for beachcombers because it is littered with driftwood, logs, and several old shipwrecks. Here one can see the widest variety of shorebirds found on any wildlife recreation area. See Zoological-Terrestrial and Environmental Use maps.

PLEIOCENE ROCKS
Pleiocene marine rocks occur at few sites in Washington. The rocks are coarse, conglomerate shale and minor sandstone. See Geological map.

POINT BROWN INDIAN MIDDENS
Indian skulls and many other Indian objects have been found here. Professors and students from Washington State University dug here during August 1969. The site was on a private farm. See Archeological map.

POINT CHEHALIS - WESTPORT JETTY
A significant bird observation area since many seabirds, including shearwaters, cormorants, sea ducks, jaegers, gulls, terns, and alcids as well as many species of shorebirds and passerines are readily seen here. It is one of the few locations in Washington where migrations of small birds are readily discernible. See Zoological-Terrestrial map.

PORTER-MALONE TERTIARY FOSSIL SITES
Bluffs along U.S. Route 12 between Porter and Malone contain fossils of pelecypods, gastropods, echinoderms, foraminifera, and crabs. See Geological map.

PRAIRIE VEGETATION
Oak woodlands are found only in open parts of the Puget Trough in western Washington. Suggestions have been made to set the woodlands aside for public recreation and as study areas. Patches of open grass-covered prairie are often found near them, with a distinctive flora. Certain characteristic flowers are found only out on the open prairie, while others may grow under the oaks. See Botanical map.

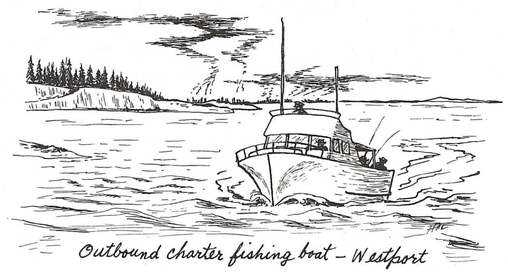
PRESS EXPEDITION ROUTE
See Clallam County.

PRE-VASHON GRAVEL
These occur at various areas: north side of Chehalis, 1 mile west of Oakville; red gravel can be seen at Wildcat Creek near Whites; red gravel can be seen 1-1/2 miles west of South Elma on the county road. The best examples of glacial gravel are found in the following areas: on top of the bluff at Grays Harbor City; James Rock (also known as Ned's Rock) is a stack of red gravel; and Ford Hounds, just below Cedarville. See Geological map.

PROMISED LAND PARK
Outdoor recreation area with camping facilities. See Environmental Use map.

QUINAULT INDIAN RESERVATION
Cape Elizabeth near Taholah, and Elephant Rock at the mouth of the Raft River are of value because of their remoteness, physiographic beauty, and abundance of wildlife and marine life in the area. See Zoological-Aquatic and Historical-Cultural maps.

QUINAULT LAKE
This large natural lake is in a wooded setting. The shoreline is within Olympic National Forest and Olympic National Park and other parts are private. It is the gateway to the Quinault valley rain forest. Activities include fishing, swimming, boating, and recreation. It is a rearing area for sockeye salmon and other salmonids. See Hydrological and Zoological-Aquatic maps.


Outbound charter fishing boat - Westport

COUNTY DISCUSSION

QUINAULT NATIONAL FISH HATCHERY
Species propogated are chinook, coho, and chum salmon, and steelhead trout. See Zoological-Aquatic map.

QUINAULT RESEARCH NATURAL AREA
The Roosevelt elk (Cervis canadensis roosevelti) is the most important animal present. Elk use the natural area as a wintering ground. The relatively open, park-like nature of most of the tract is a consequence of their activity; their trails ease the problems of access through the area. Undoubtedly, they have also affected the composition of the understory vegetation (Sharpe 1956). Other animals which are present in the area include the black-tailed deer (Odocoileus hemionus columbianus), black bear (Ursus americanus), snowshoe rabbit (Lepus americanus washingtonii), and Douglas squirrel (Tamiasciurus douglasii).

Invertebrates recorded by Shelford (1963) during a visit in 1945 included: millipedes (Harpaphe haydeniana), centipedes (Arctogeophilus malmonotus and Otocryptops sp.), spiders (Hesura picea and Antrodiaetus hageni), numerous brown silverfish, camel crickets (Pristoceuthophilus sp.), ground beetles (Scaphinotus angusticollis velutinus), click beetles (Ctenicera protracta), Sitka bumblebee (Bombus sitkensis), yellow jacket (Vespula arenaria), the lavaworld fly (Urophyra migricepa), and the boring beetle (Pidenia anathoides).

An example of "Sitka" spruce in its natural state is found here. 1,468 acres of western hemlock and associated species as follows: SAF-224 - Western Hemlock, 775 acres, average age - 300 years, average height - 150 feet, average diameter - 30 inches; SAF-225 - Sitka Spruce-Western Hemlock, 400 acres, average age - 400 years, average height - 180 feet, average diameter - 50 inches; SAF-227 - Western Redcedar-Western Hemlock, 200 acres; average age - 300 years, average height of redcedar 120 feet, average diameter - 50 inches; SAF-230 - Douglas-fir-Western Hemlock, 60 acres, average age - 300 years, average height of Douglas-fir - 200 feet, average diameter - 50 inches; elevation - 300-1,000 feet; topography - level to rolling to steep. See Botanical map.

QUINAULT RIVER AND TRIBUTARIES
The Quinault River is one of the major rivers of the Olympic Peninsula. This river originates in the glaciers of the Olympic National Park. Although most of the river lies within the National Park and Quinault Indian Reservation, it flows through the Olympic National Forest for approximately 9 miles. The Quinault River is renowned for its anadromous fisheries. Steelhead and sockeye, coho and chinook salmon ascend this river each fall seeking their spawning areas. In addition to anadromous fish, the Quinault supports native rainbow, cutthroat, and Dolly Varden trout. The Quinault possesses exceptional scenic qualities. The river is an integral part of the Quinault rain forest. This temperate rain forest is nationally significant. The Quinault Valley is one of the three major coastal valleys of the Olympic Peninsula possessing the characteristic rain forest vegetation.

Cook Creek is an important tributary of the Quinault River. Cook Creek supports both resident and anadromous fish. Resident fish are primarily cutthroat and rainbow trout; anadromous fish include rainbow trout (steelhead), sea-run cutthroat, coho salmon, chinook salmon, and some chum salmon. Approximately 7 miles of Cook Creek lies within the Olympic National Forest; the remainder flows through the Quinault Indian Reservation before emptying into the Quinault River. The Bureau of Sport Fisheries and Wildlife administers a fish hatchery on this stream within the Reservation. The water intake for the hatchery is within the National Forest. In order to protect this stream, the Olympic National Forest has designated a six-chain buffer strip to be left along Cook Creek.

Boulder Creek, a tributary of the Quinault River, supports resident and anadromous fish. It has a total length of approximately 5 miles. Boulder Creek originates on the Olympic National Forest and flows for 3.5 miles before entering the Quinault Indian Reservation. A six-chains-wide buffer has been designated for protection along this stream. See Hydrological map.

QUINAULT VALLEY
The valley possesses characteristic rain forest vegetation from 300-foot high, centuries old Douglas-fir to tiny mosses and delicate ferns. Besides the unique rain forest atmosphere, this area is valuable for wildlife. The valley bottom is an important wintering area for Roosevelt elk. The sloughs and ponds are used by wintering waterfowl; some ducks remain for nesting in the spring (wood ducks, common mergansers, harlequins, mallards). Many of the same streams and sloughs used by waterfowl provide spawning areas for anadromous fish. Anadromous fish streams in the lower valley include: Falls Creek, Ziegler Creek, Merriman Creek, Inner Creek, Fletcher Creek, Haas Creek, and many other less significant streams which are not named. Anadromous fish using these streams include steelhead trout and chinook, coho, and sockeye salmon. Coinciding with the upstream salmon migration is the arrival of many bald eagles which feed on the dying fish. See Botanical map.

RAFT RIVER
The river supports steelhead, salmon, and cutthroat. See Zoological-Aquatic map.

REBOTSKI HOUSE
This 1907 house was built by Grays Harbor Construction Company and designed by Green Brothers. See Historical-Cultural map.

ROCK ISLANDS
This is a breeding site for shorebirds and a stopping point for migrating birds. The headlands, bluffs, and rocky inlets provide the isolation needed by many birds: fork-tailed petrel, (Oceanodroma furcata), scattered breeder; Leach's storm petrel, (O. leucorhoa), breeds on rocky offshore islands; double-crested cormorant, (Phalacocorax avritus) permanent coastal resident; Brandt's cormorant, (P. penicillatus), permanent coastal breeder; pelagic cormorant, (P. pelagicus); breeds on offshore rocks; glaucous-winged gull, (L. glaucescens), common breeder from Copalis North; western gull, (L. occidentalis), rests on rocky offshore islets; common murre, (Uria aalge), common breeder on rocky islets; breeds in colonies; Cassin's auklet, (Ptychorhamphus aleutica), summer breeder on rocky islets; and tufted puffin, (Lunda cirrhata), summer breeder off coast.

There are a great many more birds that breed on the coast. An equally large number of species of shorebirds stop locally on their north or south migration at places such as the Willapa National Wildlife Refuge and Point Chehalis. See Zoological-Terrestrial Map.

SAILOR LAKE
There is a watershed and a public fishing recreation area. See Hydrological map.

SALMON RIVER
The Salmon River and its three forks (North, Middle, and South Forks) are important anadromous fish streams. The Salmon River is a tributary of the Queets River. Combined with its three forks, it totals approximately 18 miles within the Olympic National Forest. Steelhead and sea-run cutthroat and chinook and coho salmon utilize this network of streams. A six-chain buffer has been designated to be left undisturbed along the Salmon River complex in order to preserve its water quality. See Hydrological map.

SATSOP RIVER
The river drainage provides habitat for the Olympic mudminnow, a threatened species. Both the West and Middle Forks of the Satsop River are anadromous fish routes. The Middle Fork is used by kayakers. The West Fork is important to waterfowl. See Zoological-Aquatic and Hydrological maps.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SCHAFER MANSION, MONTESANO
An excellent example of mansions of the 1900 era, this mansion was moved from its original site after the Schafer family donated land to the county for a new courthouse addition. Its future is uncertain. See Historical-Cultural map.

SEVENTH STREET THEATER
This early-day movie theater, built in 1925 or 1926, has retained its original design. See Historical-Cultural map.

SITE OF SCAMMON HOUSE
This is the original site of the Chehalis County Courthouse (1860). The old Scammon Orchard still survives. See Historical-Cultural map.

STATE PARK NEAR LIGHTHOUSE BETWEEN COHOSSET AND WESTPORT
One contributor feels this should be preserved as a study area as it is one of the last remaining places where dune vegetation is still significantly intact. See Botanical map.

STEVENS CREEK HATCHERY
Established prior to 1900, this is one of the first salmon hatcheries in Washington State. It went out of service, but is to be rebuilt and reopened soon. See Historical-Cultural map.

TWIN HARBORS STATE PARK
This 89 acre park is 3 miles south of Westport. It offers camping and trailering, swimming, fishing, and clamming.

VAN DYKE'S "CATHEDRAL CEDAR"
For many years it was known as the largest of all western red cedars. A hollow shell, it looks like a cathedral from inside with light shining down from above. See Botanical map.

WALKER BOTTOM
Waterfowl habitat several miles from mouth of Big Creek on Humptulips River, along creek and river. Mink, weasel, and other small animals occur in the vicinity. See Zoological-Terrestrial map.

WASHINGTON COAST
Washington coast has 52G miles of marine shoreline, including 157 miles of ocean beach, 144 miles along the Straits of Juan de Fuca, 89 miles in Grays Harbor, and 129 miles in Willapa Bay. Longshore currents, rich upwelling ocean water and violent surf result in rapid water exchange along the coast. The ocean coast from Cape Flattery to the Quinault River is extremely rugged with high rocky bluffs interrupted by sandy beaches and small rivers. Dense coastal rain forests of first and second growth trees range from the water's edge inland to the Olympic Mountain range. Coastal conditions of the Olympic Peninsula include the hundreds of small rocky islands, reefs, turbulent ocean surf, and rich upwelling ocean currents which support a community of marine life comparable in diversity and productivity to the famed Monterey Peninsula of California. Rocky shorelines and shoals are bordered by expanses of brown kelp and red and green marine algae representing hundreds of species. These submarine plants support populations of herbiviorous marine invertebrates in an ecological balance yet unperturbed by human activity. Economically important ground fish such as rock fish, surf perch, Pacific Ocean perch and ling cod, as well as small salmon, rely on the productive coastal areas for shelter and feeding habitat. Isolated rocky coastal areas provide the last refuge for diminishing populations of marine mammals, including the Steller sea lion (Gamatopias jusatus), the harbor seal (Phoca vitulina) and sea otters (Enhydra lutris). The abundance of marine life and remnant communities of marine mammals are a result of the excellent water quality of the Olympic Peninsula area and the remoteness and protected status of these shorelands provided by the Makah, Ozette, Quillayute, Hoh, and Quinault Indian Reservations and 50 some miles of coastline included within the jurisdiction of the Olympic National Park. The remaining coast, southward to the Oregon-Washington border, typically consists of uniform sandy beaches, shifting dunes and grasslands rising into low coastal hills in Grays Harbor and Pacific Counties. Grays Harbor, Willapa Bay and the Columbia River are the primary estuaries along the Washington ocean coast. Willapa Bay is among the last unpolluted major estuaries in the United States. Many smaller rivers such as Ozette, Soleduck, Hoh and Quinault create local estuarine conditions along the ocean coast adding to the diversity of ecological conditions. For more information, see John Thompson's paper, Zoological Features: Aquatic. See Zoological-Aquatic and Hydrological maps.

WASHINGTON ISLANDS WILDERNESS AREA
See Clallam County.

WESTPORT HARBOR AND SOUTH BAY
This area is used by shorebirds and swans as wintering grounds. See Zoological-Terrestrial and Geological map.

WESTPORT LIGHTHOUSE
This historic lighthouse was built in 1897. See Historical-Cultural map.

WENZEL SPRINGS
Close to where Wenzel Creek enters Chehalis, approximately 1-1/2 miles west of South Elma Bridge. This is the first water works for Elma. See Hydrological map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide and national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. The snowy plover has been recorded as far north as Copalis Beach along the Washington coast. The upper Quinault is used extensively as a winter feeding area by bald eagles. The bald eagle (Haliaeetus leucocephalus) is found along the entire coast, and the golden eagle (Aquila chrysaetos) has been seen near the city of Grays Harbor. The Peale's peregrine falcon inhabits the area from Illwaco to Westport, possibly breeding offshore. Other birds of prey include the osprey and jaeger. The pileated woodpecker is becoming more rare in the Grays Harbor area due to reduced habitat from logging activities. The band-tailed pigeon (Columba fasciata) winters near the coast and in lower timbered areas. The burrowing owl (Speotyto curicularia) is becoming established in open areas near saltwater along Grays Harbor. The long-billed curlew (Numenius americanus) occurs along beaches as a migrant, and is noted at Westport and Acosta. The Hudsonian godwit (Limosa haemastica) is an irregular migrant along the coast. The trumpeter swan (Olor buccinator) has been recorded during winter on Grays Harbor in recent years. The Chehalis River Valley is noted as a wintering grounds for swans. The western brown pelican is a winter visitor along the coast. A colony of caspian terns nests on one small island in Grays Harbor and sea birds such as the shearwater, Foster's tern, gulls, and cormorant inhabit the waters of Grays Harbor.

MAMMALS. The golden-mantled ground squirrel, red squirrel, hoary marmot, coney (pika), Douglas squirrel, chipmunk, fox squirrel, and flying squirrel are noted as residents of Grays Harbor County. Many sightings of cougars (Felis concolor) are reported in various parts of the county by residents. The fisher (Martes pennanti) is found in forests of the Olympic Mountains, and the pine marten (Martes americana) occupies upper mountain slopes throughout the state. Other mammals include the black bear, black-tailed deer, river otter, and Roosevelt elk. Fur seals migrate along the coast and seal lions and sea otters are noted as residents along the coast. The following species range off the Pacific coast: Pacific beaked whale (Mesoplodon stejnegeri), gooseback whale (Ziphius catvrostcle), sperm whale (Physeter catodon), longmount dolphin (Stenellastyx), right whale dolphin (Lissodelphis borealis), Pacific white-sided dolphin (Lagenochyachus obliquidens), Pacific killer whale (Orcinus orca), grampus (Grampus griseus), false killer (Pseudorca crassidens), pilot whale (Globicephale macrorhynchus), dall porpoise (Phocoenoides dalli), gray whale (Eschrichtius robustus), fin whale (Balaenoptera borelis), piked whale (Balaenopiera acurotostrata), humpback whale (Megaptera novaeangliae), and Pacific right whale (Eunalaena sieboldi).

FISH. The Olympic mudminnow (Nuvumbra hubbsi) occurs in the Chehalis River Watershed and the northern drainage of Grays Harbor.

WISHKAH RIVER
The Middle Fork of the Wishkah is a free-flowing river used for kayaking, and steelhead, salmon, and cutthroat fishery. See Hydrological map.

WYNOOCHEE RIVER
This is a free-flowing river used for kayaking. It supports a salmon, steelhead, and cutthroat fishery. Wynoochee Dam, on the upper river, provides flood control and the Aberdeen municipal water supply. See Hydrological map.

Island

ALA SPIT
Ala is an estuarine spit. Freshwater springs and the Skagit River drain into it. Clam beds exist on state tidelands on the channel side; a shallow cove formed by the spit provides shelter and feeding grounds for thousands of ducks and other water birds. Anadromous fish use the area for reproduction including chinook, coho, pink, chum and sockeye salmon, searun cutthroat and steelhead trout, and Dolly Varden. Dungeness crab use the cove as a nursery and feeding area. Bald eagles feed in the privately-owned lagoon. See Hydrological and Zoological Aquatic maps.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Island County discussion are plotted on the Archeological map and listed in its index.

BLOCK HOUSES
These are significant historic spots along the beaches at Penn Cove. Other famous landmarks are: first store, hangman's tree, burial ground, and first mill. See Historical-Cultural map.

CAMANO HEAD
A 300 foot cliff with scenic view, it was a historical lookout, with Indian markings on a nearby tree stump. See Geological map.

CAMANO ISLAND STATE PARK
The 134 acre park on Camano Island offers camping, fishing, boat launching swimming and clamming. See Environmental Use map.

COUNTY PARKS
There are about 60 county parks in Island County. Most are less than 7 acres in size and many are road ends and tide washes. See Environmental Use map.

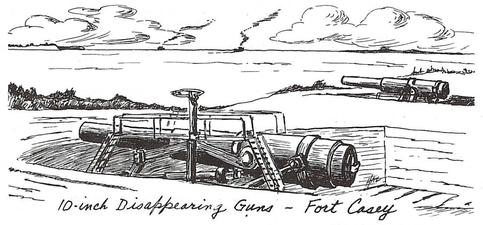
CRANBERRY LAKE
This lake is edged by a bog furnishing habitat to marsh birds and mammals. Nearby sand dunes contain other unique vegetation. Part of the lake is in Deception Pass State Park. See Hydrological and Botanical maps.

DECEPTION PASS STATE PARK
This 1,767 acre park is 18 miles northwest of Mount Vernon on Whidbey Island. Its 4-mile water frontage is notable for overhanging cliffs and intervening beaches. Activities available include camping, swimming, fishing, clamming and oystering, boat lauching and mooring. Fantastic array of plants from wildflowers, sedums, alliums to Tanus brevifolia and mountain maple. See Botanical, Zoological-Terrestrial, Geological and Environmental Use maps.

EBEY'S LANDING AND SEASHORE
This is an important area on Whidbey Island, both historically and esthetically. Colonel Ebey's pioneer home remains where he was murdered by Haida Indians from the Queen Charlotte Islands. It has a salt water lagoon and an unexcelled beach walk with views of the Olympic Mountains. Contributors have noted its potential as a land and sea walking loop between Fort Casey State Park and Fort Ebey (Partridge Point) Department of Natural Resources area. The average annual rainfall of only 16 inches encourages the growth of prickly pear cactus (Opuntia fragilis) and other plants favoring dry conditions.

This site is also important geologically as a bluff, unique along the Whidbey Island shoreline. It is a long, sloping gravelly bluff rather than the typical sheer clay. It was created by glacial action. This seashore is recommended as a protected seashore by the Northwest Seashore Alliance. See Historical-Cultural, Botanical, Hydrological, Geological and Environmental Use maps.

FORT CASEY INTERPRETIVE CENTER
This center is 3 miles south of Coupeville. The museum located in Admiralty Point Lighthouse has exhibits explaining coast artillery. At one time coast artillery was a type of defense installation which once dominated American military planning in the United States. It formed a vital part in the defense of the nation by guarding against raids by enemy vessels. During most of the history of the United States, harbors were provided with relatively strong seacoast defenses. Guns on shore were much less vulnerable than guns afloat. With the advent of the airplane and modern seapower, however, the coast artillery forts became more vulnerable to attack and in time were declared obsolete. See Historical-Cultural map.



FORT CASEY STATE PARK
Fort Casey is the northern and easternmost of the Worden-Flagler-Casey defense triangle. Together with the batteries of Forts Worden and Flagler, its guns guarded the entrance to Admiralty Inlet, the key point in the fortification system designed to prevent a hostile fleet from reaching prime targets such as the Bremerton Navy Yard, Seattle and others. An interpretive Center has been installed in the Admiralty Point Lighthouse to explain coast artillery. Two 3-inch rapid fire guns and two 10-inch disappearing carriage guns are on display. The 137 acre park is on Whidbey Island, 3 miles south of Coupeville.

This is also a popular skin diving area. See Environmental Use and Historical-Cultural maps.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Island County discussion are plotted on the Historical-Cultural map and listed in its index.

ISLAND COUNTY HISTORICAL SOCIETY MUSEUM
A fine Indian basket and artifact collection, regional historical items, and World War I momentos are shown. See Historical-Cultural map.

LAKE CROCKETT SALTMARSH
This marsh is an important feeding area for waterfowl, wading birds, gulls and especially for shorebirds (charadriiforms). It serves as a winter home for the great snowy owl and a haven for the great blue heron. The salicornia salt marsh represents a habitat type much diminished on the Pacific Coast and is especially vital to such species as the Pectoral and Sharp-tailed sandpipers which are seldom recorded in any other habitat type. It is important as an educational and recreational area. See Zoological-Terrestrial, Environmental Use and Hydrological maps.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Island County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrologic features covered by the Shoreline Management Act.

MOUNT CRATER
This peak is located on Whidbey Island near Cultus Bay.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Island County discussion are plotted on the Geological map and listed in its index.

NORTHWEST ENVIRONMENTAL EDUCATION CENTER
Located on the north end of Saratoga Passage near the town of Oak Harbor at end of Sleeper Road, the site is used for the outdoor environmental education of schoolchildren and teachers from northwestern Washington including Whatcom, Skagit, Island, San Juan, Snohomish, and northern King County schools. It contains 600 acres and is leased from the Department of Natural Resources.

A hilltop of approximately 490 feet slopes to the shoreline in a series of beaches. To the east, the hilltop offers a panoramic view of the Cascade mountains. To the north, the view is an industrial contrast of modern oil refining and ancient Indian fish trapping methods. The beach will be used for estuarine studies and extends along the entire eastern boundary for approxmately 1 mile. There are two well-developed bogs. Vegetation is mostly second-growth conifers up to 120 years of age. See Environmental Use map.

OAK HARBOR WILDLIFE RECREATION AREA
This 589 acre area provides habitat for waterfowl and pheasant. See Environmental Use and Zoological-Terrestrial maps.

PENN COVE
A significant remaining rocky-shore habitat for shore birds in Puget Sound, and one of the finest remaining in the state. In addition to many other species, surfbirds, ruddy and black turnstones, and rock sandpipers feed extensively along this shore during virtually all months of the year. Large numbers of these and other birds indicate a healthy and sizable food production at this area. See Zoological-Terrestrial and Environmental Use maps.

PERRIGO BLUFFS
These bluffs are rare along the Whidbey Island shoreline. They are long, sloping gravelly bluffs rather than the typical sheer clay. They were created by glacial action. See Ebey's Landing. See Geological map.

PUGET SOUND
See Kitsap County.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SKAGIT Bay
See Skagit County.

SMITH ISLAND NATIONAL WILDLIFE REFUGE
This 65-acre rafuge was established in 1915 to protect the colonial sea birds and other birds that use the area. Smith Island with its high, steep sides and thick layer of topsoil is a nesting place for tufted puffins. These birds nest in burrows on isolated marine islands. Such islands, not subjected to human disturbance, are becoming scarce. The birds nest in July and August. Pelagic cormorants nest on the steep cliffs of the island.

Minor Island, a small adjacent island included in the refuge, supports a small nesting colony of glaucous-winged gulls. The island is a gravel and sand bar that is awash during winter high tides.

Near Smith Island is an extensive kelp bed of some 2 square miles. Although brant do not feed on the kelp itself, the bed is a favorite feeding and resting area. Brant feed on the eelgrass among the kelp, and on marine organisms living on the kelp. A lighthouse is maintained on Smith Island by the Navy. See Environmental Use map.

SNOHOMISH VILLAGE
Archeological site. See Archeological map.

SOUTH WHIDBEY STATE PARK
This 85 acre park is 10 miles south of Coupeville on Whidbey Island, and provides camping, fishing, swimming and clamming. See Environmental Use map.

WHIDBEY ISLAND
This second largest island in the continental United States is located northwest of Seattle. Birds of prey inhabiting the island include marsh hawks, osprey, bald eagles, red-tailed and cooper's hawks. Deer and partridge utilize the upland areas and gulls, shorebirds and seals inhabit marshlands and coastal waters.

This is an excellent area for wildflowers such as: seaside lupine, beach pea, bordiaea, beach morning glory, sand verbena, thrift camas-purple death, woodland star, dog-tooth lily, Hall's violets, englrow, collinsia, filarie, chicory, oyster plant, wild rose, serviceberry, syringa, rhododendron, mimulus, wild iris, and fritillaria (chocolate lily). See Botanical and Zoological-Terrestrial maps.

WHIDBEY ISLAND GAME FARM
Located three miles east of Coupeville, this Game Farm has an average annual production of 12,000 Chinese and Sand Point pheasants. Additionally, approximately 1,000 French red-legged partridge are raised here yearly. This game farm supplies pheasants for release in Clallam, Island, Skagit, San Juan and Whatcom counties. The red-legs are released experimentally statewide. See Environmental Use Map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide or national significance and reflect, in part, the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zones Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. Bald eagles are usually active near Deception Pass bridge. In winter during the salmon runs as many as 20 may be seen at one time. They may also be seen there at other times of the year as there is a small breeding population of eagles in the area. The snowy owl is an Arctic predator and is rarely seen in Washington. In recent years however, snowy owls have been wintering in certain areas of the state in steadily increasing numbers. Whidbey Island appears to attract many of these spectacular birds. Other birds noted are Canada goose, great blue heron, osprey, partridge, swans, turnstones, and water ouzel.

MAMMALS. Mammals noted in this county are black-tailed deer, harbor seals, rabbits, chipmunk, Douglas squirrel, and flying squirrel.

Jefferson

ALPHABET RIDGE
This ridge is located north of Mount Constance. The ridge includes: Zee-Spire, Why-Spire, Ex-Spire, Curiosity Peak, Etcetera Spire and Infinity Tower. See Geological map.

ANDERSON AND ELL GLACIERS
These glaciers are at the Hydrologic center of the Olympic Mountains. See Geological map.

ANDREW'S BARN, OLYMPIC NATIONAL PARK
This barn is to be found on the Queets River, about two miles up the river trail after one crosses the river at the road's end. There is a meadow-clearing in the rain forest, and the barn is nearly intact. It probably was constructed sometime before creation of the National Park in 1938. It is an interesting example of early efforts to pioneer in the Olympic rain forest. See Historical-Cultural map.

ARCHEOLOGICAL SITES
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COUNTY DISCUSSION

BAILEY RANGE
This range parallels the upper Hoh River Canyon and includes the following peaks: Mount Ferry, Ludden Peak, Mount Scott, Mount Pulitzer (Snagtooth), The Ragmuffin, The Urchin, and Mount Childs. See Clallam County. See Geological map.

BARTLETT HOUSE
The Frank Bartlett House, 314 Folk Street, Port Townsend, is a National Historical Place. See Historical-Cultural map.

BEACH BETWEEN MOUTHS OF HOH AND QUEETS RIVERS
Between the Hoh and Queets River the beach is straight and sandy with sections of noncritical erosion. U.S. Highway 101 parallels the shoreline along this stretch. Visitors can reach the beach from the road by trails at several points. See Geological map.

BELLE DWER CANYON
This is on the tributary of the Elwha River containing many waterfalls here. See Hydrological map.

BENCHMARK RESEARCH AREA
These Forks Grant Lands (T. 27 N., R. 13 W.) total 14,060 acres. They are under Department of Natural Resources ownership, with some sections in the northwest corner proposed for study in the University of Washington College of Forest Resources' project "Benchmark Levels of Pollution." See Environmental Use map.

BIG CEDARS (RED)
See Grays Harbor County.

BIG HUMP
An unusual mossy cliff where the trail up the Duckabush River climbs over a spur of Mount Jupiter. See Geological map.

BLUE GLACIER
Blue Glacier is located on the north edge of Mount Olympus in the Olympic National Park. This glacier, with an impressive icefall from upper cirque, is the site of longterm glacial research. See Geological map.

THE BROTHERS
This highly scenic mountain is easy to see from Seattle (altitude 6,866 feet) and is popular with climbers. See Geological map.

CAMERON BASIN
This large alpine basin is near the headwaters of Gray Wolf Creek in Olympic National Park with beautiful displays of wildflowers in summer. See Botanical map.

CHIMACUM VALLEY
Along a wooded highway from Port Townsend to Chimacum are wild rhododendrons. South of Chimacum, the drive is through narrow, picturesque Chimacum Valley. The wild rhododendrons are tucked into the dense, dark forests, often growing 20 feet in height reaching for light. See Botanical map.

CHINESE GARDENS MARSH
This inland marsh is unique to this very dry peninsula. It was altered by Chinese landowners in early years for a large, productive garden, but has gradually gone back to a near-natural state. Countless ducks breed here. It has been suggested that this area be purchased by the State Parks Department to enrich the variety of vegetation of the Fort Worden Park. The marsh is accessible by trail from the Fort and has a view of the Straits. See Zoological-Terrestrial, Hydrological, and Botanical maps.

CLAM BAKE AND PIONEER DAY
This celebration occurs the first week of July at Port Townsend. See Historical-Cultural map.

CLEARWATER RIVER
This river provides steelhead, salmon and cutthroat fishery. See Hydrological map.

CLOUDY PEAK
This peak is located north of Mount Constance. See Geological map.

COOK SPIT AND PECKEM SPIT, SOUTH OF CHIMACUM CREEK
Except for two young girls who had been up the creek fishing, the entire Chimacum Tribe was annihilated by the combined forces of the Snohomish and Barclay Sound Indians in the spring of 1857. "All Snohomish and Barclay Sound warriors killed on the water in canoes were placed in their canoes and taken to Cook Spit where they were pulled up on the shore and back into the brush and covered with stones." There were about fifty canoes in this mass burial. "The Chimacum warriors killed in their canoes were taken to Peckem Spit and their remains treated the same as the other tribes'. The land fighters were buried on the battleground at the mouth of Chimacum Creek. Many of them were beheaded and the heads put on sticks where they were in evidence and examined by many people for years." The tribe numbered about 400. From With Pride in Heritage -- History of Jefferson County. See Historical-Cultural map.

COUGAR CREEK SPRUCE
This is the largest known spruce tree in Olympic National Park. See Botanical map.

CREAM LAKE SUBALPINE FIR
This is the largest known subalpine fir (also known as alpine fir, Abies lasiocarpa). See Botanical map.

CYNTHIA FALLS
A beautiful, small waterfall in a lovely rain forest grotto. See Hydrological map.

DABOB BAY
Unnusally beautiful specimens of Columbia manzanita are found here. The bay is also the habitat for harbor seals. Many are often observed on the floats of the Coast Oyster, Co. See Botanical and Zoological-Terrestrial maps.

DESTRUCTION ISLAND
Destruction Island is a solitary island just off the western coast of Jefferson County. The Island is a migratory bird refuge. It was visited by Captain Cook, the first site in Washington State to be touched by a white man.

This island is one of only two known nesting sites of the rhinoceros auklet in Washington. Other nesting seabird species include glaucous-winged and western gulls, common murre, pigeon guillemot, tufted puffin, and cormorants. A great many other birds occur in migrations and in winter. See Zoological-Terrestrial and Geological maps.

DISCOVERY BAY
On the east shore of Discovery Bay, near the old Discovery Bay Mill is the site of the sinking of the "Warhawk," which caught fire while loading timber and sank in 1883. The ship still sits on the bottom, a charred hull, a few fathoms down.

The bay is an important feeding area for seabirds, including large numbers of rhinoceros auklets. See Zoological-Terrestrial and Historical-Cultural maps.

DODWELL-RIXON PASS
The pass was used by surveyors Dodwell and Rixon about 1900. It was named in 1907 by the Explorers Club party (Belmore, Browne, Clarke and Parker) who thought Dodwell and Rixon were the first to use the pass. Actually it had been used in 1890 by O'Neil's Olympus party. See Geological and Historical-Cultural maps.

DOSEWALLIPS FALLS
This is a spectacular cascade on the Dosewallips River. See Hydrological map.

DOSEWALLIPS RIVER
A free-flowing stream and waterfall providing steelhead, salmon, and cutthroat fishery. See Hydrological map.

DOSEWALLIPS STATE PARK
This 425 acre park is 24 miles north of Hoodsport. Camp and trailer sites, swimming, fishing, clamming, and oystering are available. See Environmental Use map.

DUCKABUSH RIVER
This river offers steelhead, salmon, and cutthroat fishery. See Hydrological map.

DUNGENESS RIVER
This river is a major winter run steelhead stream. See Zoological-Aquatic and Hydrological maps.

ELWHA RIVER
Its lower reach is a major winter run steelhead and salmon stream. See Zoological-Aquatic and Hydrological maps.

ENCHANTED VALLEY HEMLOCK
This is the largest known Western hemlock (Tsuga heterophylla). See Botanical map.

FORT FLAGLER STATE PARK
Fort Flagler State Park is an 804 acre park on the north end of Marrowstone Island southeast of Port Townsend. Fort Flagler was a companion to Forts Casey and Worden which guarded the entrance to Puget Sound. It was established in the late 1890's and was representative of military planning prior to the advent of the airplane and nuclear weapons. A few years after World War I, Port Flagler was placed on caretaker status and in 1937, the barracks buildings and officers quarters were removed. With the outbreak of World War II it was reactivated, primarily as a training base, and was declared surplus in 1954. A display shelter, gun batteries and two 3-inch guns interpret the story for the visitor. Camping, boating, swimming, fishing, clamming and hiking are popular park activities. See Environmental Use map.

FORT TOWNSEND STATE PARK
Indian uprisings in the 1850's caused the people of Port Townsend to ask the U.S. Army for protection. In 1856 Major Granville O. Haller was ordered by the War Department to proceed with Company I, 4th Infantry to establish a post on Port Townsend Bay. A site just 3 miles south of Port Townsend was selected and named Fort Townsend. General William Harney inspected the Fort in 1859 and immediately ordered its evacuation. The Fort was under caretaker status until 1874 when it was reactivated. In 1895 fire destroyed the barracks and the post was abandoned; a display shelter interprets the story of this early fort. Recently an antique locomotive was unearthed at the fort. The 377 acre park offers camping, hiking, and all types of saltwater activities. See Historical-Cultural and Environmental Use maps.

FORT WORDEN STATE PARK
Fort Worden was the headquarters for the coast artillery harbor defenses of Puget Sound. Together with Forts Casey and Flagler, they were designated to prevent a hostile fleet from reaching such prime targets as the Bremerton Navy Yard and Seattle. Forts Worden, Casey and Flagler were major army installations during World War I, but during the 20's and 30's they were garrisoned by a small contingent of men. Fort Worden became a training center for National Guardsmen for two weeks each summer. During World War II the 248th Coast Artillery Battalion was called into active service and joined the 14th Coast Artillery Regiment for full time duty at Fort Worden. Today Fort Worden is a 209 acre state park which still has many of the original buildings and empty emplacements. The fort is one mile north of Fort Townsend. See Environmental Use map.

FOWLER HOUSE (LITTLE)
This National Historic Place is in Port Townsend at Folk and Washington Streets. The home of Captain Enoch S. Fowler, its wood construction is styled in mid-19th Century. Also known as the Big Fowler House. See Historical-Cultural map.

FUNGI SITE
The following areas in this county are noted for their abundance and variety of higher fungi or important species: Clearwater Vicinity and Dosewallips and Duckabush River Valleys. See Botanical map.

GEODETIC HILL
This is the site of the largest known silver fir tree. See Botanical map.

GOODMAN CREEK
Coho and chinook salmon and winter run steelhead trout spawn in this free-flowing stream. See Zoological-Aquatic and Hydrological maps.

HADES CREEK RESEARCH NATURAL AREA
The area was established to exemplify Pacific silver fir-western hemlock forest as it occurs at lower elevations in the Olympic Mountains.

Primary forest cover type, SAF-226, pacific silver fir-hemlock (560 acres). Elevation: 500-1,850 feet. Topography: steep, mountainous. Average height of silver fir, 169 feet, average diameter, 33 inches. Average height of hemlock, 154 feet, average diameter, 30 inches.

Animal species known to occur within the natural area include the Roosevelt elk (Cervus canadensis roosevelti), blacktail deer (Odocoileus hemionus columbianus), black bear (Ursus americanus), Douglas squirrel (Tamiasciurus douglasii), and white-footed deermouse (Peromyscus maniculatus). See Botanical map.

HALL'S TIDAL MARSH
This significant tidal marsh provides rich habitat for numerous wildlife species. See Hydrological map.

HARLOW BOTTOM STAND OF SITKA SPRUCE
This is probably the finest stand of large, old-growth Sitka spruce in the Olympic National Park. See Botanical map.

HAYES RIVER
This tributary of the Elwha was named for Christopher Hayes of the Press Expedition. See Hydrological map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentiond here in the Jefferson County discussion are plotted on the Historical-Cultural map and listed in its index.

HOH INDIAN RESERVATION
Ethnic group. See Historical-Cultural map.

HOH RIVER
This is a free-flowing stream, used by kayakers and fishermen. It is an important steelhead and searun cutthroat stream. Spring and fall chinook arrive at the Hoh in April and continue through November. This is a great stream for chinook fishing from June through September and some very large specimens are taken. Coho appear in numbers during September with peak abundance occuring in October. Jack chinook are also very important to Hoh River anglers. Small runs of pink salmon have recently been discovered in the Hoh River. See Zoological-Aquatic and Hydrological maps.

HOH RIVER CANYON
About 15 miles from the Hoh Road end, the Hoh River trail crosses over a spectacular gorge on its way to Mount Olympus in Olympic National Park. See Geological map.

HOH RIVER RAIN FOREST
This area is considered the world's foremost example of a rain forest. See Botanical map.

HOOD CANAL
This land-water interface area parallels Puget Sound. See Puget Sound entry. See Geological map.

HOOD HEAD PENINSULA
This peninsula encompasses 300 acres projecting eastward into the Hood Canal near its entrance, forming Byewater Bay and connecting to the Olympic Peninsula by a narrow sand spit. Byewater Bay and the adjacent waters are one of the richest areas for marine life on Hood Canal. Oysters hatch well in the warm waters of the lagoon. A significant growth of eelgrass makes it a regular stopping place for black brant. There is an important run of searun cutthroat trout on the east side of Hood Head. See Geological map.

INDIAN ISLAND BETWEEN MARROWSTONE ISLAND AND QUIMPER PENINSULA
This island attracts a harbor seal colony. See Zoological-Terrestrial and Zoological-Aquatic maps.

INTERRGREM GUARD STATION
The Interrorem Guard Station was believed to have been built in 1907 and is believed to be the second oldest Forest Service building still in existence. This structure is in fair condition and could be refurbished to its original condition without much effort. The building is in an open setting with some fruit trees planted around it. See Historical-Cultural map.

JACKSON CREEK RESEARCH NATURAL AREA
This area exemplifies the Douglas-fir forest type as it occurs on the western Olympic peninsula. A 160 acre tract of Pacific Douglas-fir, SAF-229 forest cover type. Trees average 230 feet in height with an average diameter of 50 inches. Elevation: 550 to 1,250 feet; Topography: steep.

The most important mammal within the area is the Roosevelt elk (Cervus canadensis roosevelti) which is particularly common during the winter and spring. Other animals known to occur within the Natural Area include the blacktail deer (Odocoileus hemionus columbianus), black bear (Ursus americanus), Douglas squirrel (Tamiasciurus douglasii), whitefooted deermouse (Peromyscus maniculatum), raccoon (Procyon lotor), and river otter (lutra canadensis pacifica). See Botanical map.

JAMES HOUSE
This National Historic Place is at Port Townsend at Washington and Harrison Streets. It was the house of Francis Wilcox James. See Historical-Cultural map.

JEFFERSON COUNTY COURTHOUSE
This building, at Jefferson and Cass Streets in Port Townsend, is a National Historic Place.

JEFFERSON COUNTY HISTORICAL SOCIETY MUSEUM AND LIBRARY
Located at Port Townsend, it has pioneer exhibits, Indian artifacts, and one room devoted to Fort Worden. In 1891, it was the City Hall building. See Historical map.

KAH TAI LAGOON
The lagoon was once connected to the Sound, but was cut off by highway fill. Its size was further reduced by a dredge and fill project in the area. The uniqueness remains however, as this is a very dry area, and ponds and creeks are few. The presence of reed beds on one side supports pond life, including heron. See Zoological-Terrestrial map.

KLOOCHMAN ROCK LOOKOUT
At the time the Park was created, the view was unrivaled in the United States for virgin timber untouched by forest fires or lumbering. The view is predominantly of lands outside the Olympic National Park, and has been successively modified by timber harvesting. See Botanical map.

LA CROSS BASIN
This basin was first explored by the O'Neil and Wickersham parties in 1890. It is a lovely subalpine area with lakes and flowers. See Botanical map.

LAKES MARY AND MARGARET
These two small lakes at Low Divide were named by the Press Expedition. They mark where the expedition finally departed from the Elwha watershed and crossed over to the Quinault. See Hydrological maps.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Jefferson County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LEADER BUILDING
This National Historic Place in Port Townsend at 226 Adams Street is also known as the Fowler Building. It has two stories of stone consatuction in late 19th Century style. See Historical map.

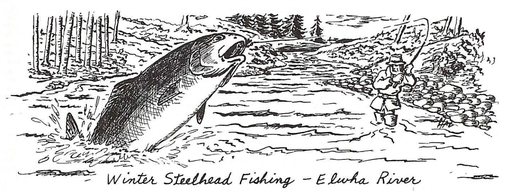
LEE HALL ARBORETUM
It contains numerous species of native and exotic plants including madrone, Oregon white oak, eucalyptus and palms. See Botanical map.

MACY SPRUCE
A 12 foot Sitka spruce, its name is not official; however, the giant tree was pointed out many years ago by Preston Macy when he was superintendent of Olympic National Park. See Botanical map.

MANRESA HALL
A National Historic Place at Port Townsend on Sheridan Street, it is also known as Eisenbeis Castle. See Historical-Cultural map.

MATHENY CREEK
Matheny Creek and one of its tributaries, Hook Branch Creek, are important anadromous fish streams originating in the Olympic National Forest. The two streams combined total approximately 13 miles. Matheny Creek is a tributary of the Queets River. Steelhead and searun cutthroat trout and Coho and chinook salmon utilize Hook Branch and Matheny Creeks.

A corridor 12 chains wide has been designated to be left undisturbed in order to protect the water quality of Matheny Creek and Hook Branch Creek. This buffer contains approximately 1,590 acres. See Zoological-Aquatic and Hydrological maps.



MATHENY RIDGE, OLYMPIC NATIONAL FOREST
Logging north and south of Matheny Ridge (abutting Olympic National Park north of Lake Quinault) has been extensive. Conservationists recommend deferral of further logging operations in this roadless area until wilderness studies are completed. See Environmental Use map.

MARROWSTONE WILDLIFE RECREATION AREA
Encompassing 16 acres, it is managed for waterfowl. See Zoological-Terrestrial and Environmental Use maps.

MCCARTNEY PEAK
This peak is located at the head of Lillian River. See Geological map.

MOUNTAINS BETWEEN THE DUCKABUSH RIVER AND HAMMA HAMMA RIVER
The mountains in this area include: The Bandersnach, Mount Brethenton, Mount Duckabush, Mount Hopper and Mount Steel. All are noted mountain climbing areas. See Geological map.

MOUNTAINS BETWEEN THE QUEETS AND QUINAULT RIVERS
The mountains in this area includes: June 10th Peak, Kimta Peak, Mount Barues, Mount Christie, Mount Dana, Mount Lawson, Mount Meany, Mount Norton, Mount Noyes, Mount Queets, Mount Seattle, Mount Wilder, Mount Zindore, and Peak 6049. All are noted mountain climbing areas. See Geological map.

MOUNTAINS BETWEEN THE SOUTH FORK OF THE HOH RIVER AND THE QUEETS RIVER
The mountains in this area include: Aphrodite, Aries, Athena, Athena's Owl, Circe, Hermes, Mount Mathias (Apollo), and Mount Tom. All are noted mountain climbing areas. See also the Valhallas, this county. See Geological map.

MOUNTAINS NORTH OF THE DOSEWALLIPS RIVER ROAD
The mountains in this area includes: Boulder Ridge, Buckhorn Mountain, Desperation Peak, Hawk Peak, Iron Mountain, Mount Townsend, Mount Worthington (Cooper Peak), Rotten Rockel-Pitz, Warrior Arm, and Welch Peak. All are noted mountain climbing areas. See Geological map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Jefferson County discussion are plotted on the Geological map and listed in its index.

MOUNT COLONEL
Endemic botanical species (Synthyris, Schizantha, etc.) are found here. See Clallam County. See Botanical map.

MOUNT CONSTANCE
This is the highest peak in the Olympics as seen from Seattle, according to Climbers Guide To The Cascade And Olympic Mountains Of Washington, 1960. It has an altitude of 7,743 feet. It is a noted mountain goat habitat. See Geological and Zoological-Terrestrial maps.

MOUNT JUPITER
A heavily climbed mountain in the Olympic range. White rhododendron and dwarfed bushes of rhododendron macrophyllum are found along the Mount Jupiter Trail. See Geological and Botanical maps.

MOUNT OLYMPUS
Snow-capped and glacier covered Mount Olympus, 7,965 feet, is the tallest peak in the Olympic Mountains. It is one of a group of monadnocks rising 2,000 to 3,000 feet above other summits. See Geological map.

MOUNT ZION AND GREEN MOUNTAIN, OLYMPIC NATIONAL FOREST
See Clallam County.

THE NEEDLES
This ridge contains the highest collective group of peaks and spires in the Olympic Mountains and offers some of the most interesting mountain climbing in the area on fair rock.

The Needles range contains the following peaks: Martin Peak, Incisor, Mount Johnson, Sweat Spire, Gasp Pinnacle, Mount Clark (Belvidesre), Adelaide Peak, Arrowhead, Sundial, Mount Walkinshaw (The Citadel), Petunia Peak, and the Royal Shafts.

An uncovered glacial cirque shows all bottom details of an extinct glacier. See Geological map.

OLD GERMAN CONSULATE
This is a National Historic Place in Port Townsend at 313 Walker Street. It is also known as the Olson-Hastings House. See Historical-Cultural map.

OLYMPIC MOUNTAINS, EAST SIDE
Many wild rhododendrons are found along logging roads and in lower forest areas on the east side of the Olympic Mountains. See Botanical and Zoological-Terrestrial maps.

OLYMPIC NATIONAL PARK WILDERNESS AREA AND COASTAL STRIP
Olympic National Park has been recognized as a "wilderness" park since its establishment in 1938. Conservationist organizations recommend that the Queets River Corridor should be designated wilderness to the edges of the road; this will assure continuation of the Queets as a wilderness river. This Coastal Strip of Olympic National Park is recommended for wilderness, with the exception of the area traversed by U.S. Highway 101. North of the Coastal Strip and south of the Makah Indian Reservation, the area known as Point of the Arches is recomended for addition to Olympic National Park and wilderness designated for the major portion without development at the present time. The eastern boundary should allow for substantial forested environment to be retained east of Seafield and Willoughby Lakes, with the eastern boundary extending southerly to include the eastern shore of Lake Ozette. The west shore of this lake is part of the Coastal Strip. See Clallam County. See Environmental Use, Zoological-Terrestrial and Botanical maps.

O'NEIL PASS
This pass is located between the headwaters of Duckabush and Quinault Rivers. It was used by Lt. O'Neil to cross from the Duckabush basin to the Quinault basin on his explorations in the summer of 1890. See Historical-Cultural map.

PACIFIC COASTAL SHORELINE
See Pacific County.

PACIFIC SILVER FIR
This noted Pacific silver fir (Abies amalbilis) is found approximately 7 miles up the Bogachiel River from the Olympic National Park boundary. This is the largest silver fir in the park. See Botanical map.

PORT TOWNSEND CITY HALL
This building in Port Townsend at Water and Madison Street is a National Historic Place. See Historical map.

POINT WILSON LIGHTHOUSE
A National Historic Place in Port Townsend on Point Wilson lying between Juan de Fuca Strait and Admiralty Inlet. See Historical-Cultural map.

PORT DISCOVERY
This estuary has freshwater sediments free of pollution. It is used by students and faculty in marine geology and marine biology study. See Hydrological map.

PORT LUDLOW
Cyrus Walker became the manager (with a 10 percent interest) in the Pope and Talbot Mill at Port Gamble in 1862. After he built a mill at Port Ludlow, and his home burned at Port Gamble, he and his wife, the daughter of Captain Talbot, moved to Port Ludlow where Walker's fabulous mansion was built. The building was called Admiralty Hall after the inlet it faced and took up nearly a city block. Most of the Walkers resided at Admiralty Hall. Port Ludlow became the lumber capital of the world. After a shutdown caused by overproduction and a drastic price drop of lumber, Port Ludlow became king of lumber production, shipping to ports all over the world. When trees became less plentiful, the mill was dismantled and taken to Port Gamble. The mansion became a hotel and later burned to the ground. Today there is little evidence of the huge lumber and shipbuilding industry's former operation. The area has been developed into a resort. See Historical-Cultural map.

PRESS EXPEDITION ROUTE
See Clallam County.

PROTECTION ISLAND
This island is described in the May 7, 1792 entry in George Vancouver's Journal: ". . . nearly perpendicular cliff . . . a landscape as enchantingly beautiful as the most elegantly finished pleasure grounds of Europe . . . a beautiful variety of an extensive lawn covered with luxuriant grass and diversified with an abundance of flowers . . . a coppice of pine trees and shrubs of various sort . . . stems as if it had been planted for the sole purpose of protection from the Northwest winds . . . we gathered some gooseberries and roses in a considerable state of forwardmess. Had this insular production of nature been designed by the most able engineer, it could not have been placed more happily for the protection of the port, not only from the Northwest winds to the violence of which it would otherwise be greatly exposed, but against all attempts of an enemy when fortified properly; hence, I called it Protection Island. A number of fossil mastodon bones and teeth have been exposed as the high cliffs gradually erode away . . . proving that this Island was once part of the mainland." From With Pride in Heritage.

The island is a significant nesting site of the rhinoceros auklet, a penguin-like seabird that comes ashore only to breed. The auklet is only known to nest in one other place in Washington, Destruction Island, also in Jefferson County. It burrows 2 to 10 feet into the cliffside, and lays one egg at the back of the burrow. It must nest in high cliffs, since a poor flier, it requires a lot of room to take off. Building on the beach would endanger these birds. Cormorants, murrelets, and puffins also nest here. Protection Island has high cliffs and a dry vegetative cover. Two-thirds of the island has been subdivided for sale, threatening the bird population. The remaining third is the location of the auklet's largest colony. This colony is unique, in that it is readily accessible for study. Fossils, notably mastodon bones, are found on the island. See Zoological-Terrestrial and Geological maps.

PUGET SOUND
See Kitsap County.

QUEETS RIVER
This free-flowing stream is a great salmon angling stream with salmon migration patterns similar to those occurring in the Hoh River. Searun cutthroat and steelhead trout and coho and chinook salmon also utilize this river. See Hydrological and Zoological-Aquatic maps.

QUILCENE GLACIER
This easternmost glacier on the Olympic Peninsula is visible from north Seattle. See Geological map.

QUILCENE RIVER
This is a free-flowing stream. See Hydrological map.

QUILCENE NATIONAL FISH HATCHERY
Species propagated: chum salmon, coho salmon, chinook salmon, rainbow trout, and cutthroat trout. See Zoological-Aquatic map.

COUNTY DISCUSSION

QUILLAYUTE NEEDLES NATIONAL WILDLIFE REFUGE
Total land area of 117 acres includes all islands off the coast within the delineated area, a total distance of more than 30 miles. Fork-tailed storm petrels, Leach's petrels, pelagic cormorants, glaucous-winged gulls, Cassin's auklets, common murres, and tufted puffins commonly breed here. See Washington Islands Wilderness, Clallam County. Environmental Use and Zoological-Terrestrial maps.

QUINAULT INDIAN RESERVATION
Ethnic group. See Historical-Cultural map.

QUINAULT RIVER
The Quinault River is one of the major rivers of the Olympic Peninsula. This river originates in the glaciers of the Olympic National Park. The river lies within the National Park and Quinault Indian Reservation and flows through about 9 miles of the Olympic National Forest.

The Quinault River is renowned for its anadromous fisheries. Dolly Varden, searun cutthroat and steelhead trout, coho, chum and chinook salmon ascend the river seeking their spawning areas. In addition to anadromous fish, the Quinault supports native rainbow and cutthroat trout.

The Quinault River also possesses exceptional scenic qualities, since the river is an integral part of the Quinault Rain Forest. This temperate rain forest is nationally significant. The Quinault Valley is one of the three major coastal valleys of the Olympic Peninsula possessing the characteristic rain forest vegetation.

The upper fork of the Quinault River is a free-flowing stream used by kayakers. See Hydrological, Zoological-Aquatic and Botanical maps.

QUINAULT VALLEY
The valley possesses characteristic rain forest vegetation from 300-foot high, centuries old, Douglas-fir to tiny mosses and delicate ferns. Besides possessing the unique rain forest atmosphere, this area is valuable for wildlife. The valley bottom is an important wintering area for Roosevelt elk. The sloughs and ponds are used by wintering waterfowl. Some ducks remain for nesting in the spring (wood ducks, common mergansers, harlequins, and mallards). Many of the same streams and sloughs used by waterfowl provide spawning areas for anadromous fish. Anadromous fish streams in the lower valley include: Falls Creek, Ziegler Creek, Merriman Creek, Inner Creek, Fletcher Creek, Haas Creek, and many other less significant streams which are not named. Anadromous fish using these streams include steelhead trout and chinook, coho, and sockeye salmon. Coinciding with the upstream salmon migration is the arrival of many bald eagles which feed on the dead fish. See Botanical, Zoological-Aquatic and Zoological-Terrestrial maps.

RAINBOW FALLS
This unusually scenic site is located several hundred yards north of the road. See Hydrological map.

RED CEDAR
This is the largest known red cedar in the Olympic National Park strip. See Botanical map.

RHODODENDRON FESTIVAL
This takes place at Port Townsend, in late April. See Historical-Cultural map.

RIDGE OF THE GARGOYLES
This ridge is located north of the Dosewallips River road. It includes: Upper Gargoyle, Lower Gargoyle, Minaret and Turret. See Geological map.

ROTHSCHILD HOUSE
A National Historic Place in Port Townsend at Taylor and Franklin Streets, the Rothschild House was built in 1868 for D. C. H. Rothschild, a prominent merchant of Port Townsend. While neither Rothschild nor his fine house are known for their contribution to Northwest history, they do reflect the quiet respectability that made up the stable communities of Puget Sound. The Rothschild House is significant because it represents most accurately a way of life that has long since disappeared from the current American social form.

Rothschild was a German immigrant. Apparently he was related to the powerful European banking family, but as he himself said, "Just enough to get the name, not the money." He was, however, an able businessman and did quite well with mercantile stores in California and Bellingham. In 1858 he established the Kentucky Store in Port Townsend. The two-story building was on a pier that ran out into Port Townsend Bay so that ships could load and unload directly. The Kentucky Store was a general store and carried everything from needles to anchors. Today, a remnant of the old building is being used as a grocery store.

Rothschild sold his Kentucky Store in 1881 and began a shipping business with his two eldest sons as partners. The competition was keen in the port city and the business was lagging in 1886 when Rothschild died. Partly out of respect for the deceased patriarch and partly because of the family's faltering commercial venture, the house remained virtually unchanged.

As time passed, all of the children moved away from home, leaving the aging Mrs. Rothschild under the care of Emilie, the youngest daughter. Emilie remained a spinster all of her life and after the death of her mother in 1918 kept the house as her parents had for the previous half-century.

When Emilie died, Eugene, the youngest son, was the sole remaining member of the family. He did not wish to leave his home in Seattle but neither did he want to put the family home on the open market. In 1959 he gave the house to the City of Port Townsend and it was later transferred to the Washington State Parks and Recreation Commission.

The Rothschild House has been restored through the efforts of local citizens, the Jefferson County Historical Society and the Washington State Parks and Recreation Commission. Thanks to constant care by the family for almost a century, the house is still sound. Minor repairs and changes have been made to restore the building to its original condition. The parlor and hall still have the original wall and ceiling paper. The original carpet exists in the guest bedroom and both upstairs and downstairs halls.

The Rothschild House was built at a time when labor was cheap, craftsmanship high and time plentiful. The combination resulted in careful construction. All of the upstairs woodwork is hand-grained. The effect simulates oak and it takes a careful eye to tell the difference. The stair banister is of Honduras mahogany, its gentle curves made by steaming and slowly bending the wood.

Most of the family furniture is still in the house. Some of it was brought from San Francisco before the house was built. One of the most striking pieces is the imposing walnut desk in the entry. Probably the home office of the Rothschild business, it is over five feet high and almost as long. There is a large oak table in the dining room along with four chairs that still have tack marks from the original horsehair padding. On the dining room wall is Mrs. Rothschild's favorite picture, a drawing of her birthplace in Germany. The sewing room has two sewing machines; one, a Florence patented in 1860, that is quite rare.

Although the furniture and accessories of the house are striking, the impact of the Rothschild House lies in the family that gathered these things around them. This is no idle collection of antiques, but the image of the life style of an actual family before the turn of the century. See Historical-Cultural map.

SALMON RIVER
The Salmon River and its three forks (North, Middle, and South Forks) are important anadromous fish streams. The Salmon River is a tributary of the Queets River. Combined with its three forks, the river totals approximately 18 miles within the Olympic National Forest. Steelhead and searun cutthroat trout and chinook and coho salmon utilize this network of streams.

A 6-chain buffer has been designated to be left undisturbed along the Salmon River complex in order to preserve water quality. See Hydrological map.

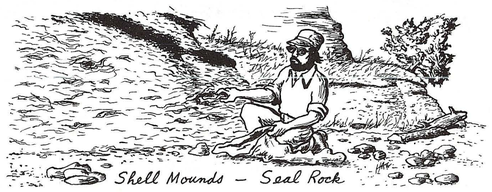
SAMS RIVER
Sams River supports both anadromous and resident fish. Originating in the Olympic National Park, it flows for approximately 11 miles through the Olympic National Forest before re-entering the National Park. Sams River is a tributary of the Queets River. Searun cutthroat and steelhead trout and coho and chinook salmon utilize this river. Sams River also supports resident trout throughout its entire length within the National Forest.

A 12-chain-wide strip has been designated to be left along Sams River within the Olympic National Forest in order to maintain its water quality. This corridor contains 970 acres. See Hydrological map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SEAL ROCK SHELL MOUNDS
The area of the present Forest Service Seal Rock Campground is believed to have been a camping area for Indians of the Hood Canal area. Piles of oyster shells have appeared in the bank along the beach. These shell mounds were covered by many feet of soil until recent years. They now appear as pockets in the eroded bank along the west shore of Hood Canal. The two major sites are dated locally back 500 years. Erosion destroyed 5 feet of bank last year with normal erosion about 1 foot per year.

The area was a gathering point for all Puget Sound Indians until the Point-No-Point Treaty (1885). Indian name Ble-wa-div means "rich spirit" as well as "fishing and clamming." Old fish backbones can be found. Normal mounds are 16 feet in diameter and up to 8 feet in depth. See Archeological and Historical-Cultural maps.



STARRETT HOUSE
This house is a National Historic Place in Port Townsend at 744 Clay Street. See Historical-Cultural map.

ST. PAULS EPISCOPAL CHURCH
A National Historic Place in Port Townsend at Jefferson and Tyler Streets, its wood structure and spire was built in the mid-19th Century. See Historical-Cultural map.

THORNDYKE BAY SALT MARSH
The marsh area at Thorndyke Bay is a typical example of a closed estuary, the result of weak stream flow from Thorndyke Creek entering the bay and subjected to strong parallel shore currents and wave action. A sand spit has formed, enclosing a mud-flat lagoon which fills and empties with the rise and fall of the tide. This area, influenced daily by tides, occupies about half the marsh area. The rest, on higher ground, is composed of advancing marsh plants and is flooded only on extreme winter tides. The creek brings silt and nutrients to combine with the salt waters from Hood Canal creating this diverse and complex ecosystem, one which has been developing since the last ice age. As a unique landwater interface in the form of an estuarine zone, Thorndyke deserves special attention. Estuarine areas are noted for their biological productivity and diversity, and Thorndyke salt marsh provides a notable example of such biological importance. As habitat for shorebirds, ducks, several species of raptors, and small mammals including river otters, Thorndyke should be considered very important. Many species of songbirds nest along the edge between the woods and the marsh, while wood ducks and hooded mergansers nest near a beaver pond along the edge of the marsh. As a winter resting and feeding area, Thorndyke is used by a large number of waterfowl. See Hydrological and Zoological-Terrestrial maps.

THOUSAND ACRE MEADOW
This huge subalpine meadow is south of Dosewallips with an abundance of wildflowers in summer. See Botanical map.

THRUST FAULT
According to 1961 Geologic map of Washington this is the only thrust fault in the Olympic Peninsula. It is located partially in the proposed Colonel Bob wilderness area in the Quinault Ranger District of Olympic National Forest. See Geological map.

TUBAL CAIN MINE, IRON MOUNTAIN BETWEEN HEADWATERS OF DUNGENESS AND QUILCENE RIVERS
"The Iron Mountain area . . . was to have been the mining metropolis of Jefferson County . . . By the end of 1902, hundreds of claims had been filed . . . The summer of 1904 was one of anthill activity." A sawmill with log dam, cookhouse, two-story bunkhouse with quarters for thirty-five men, office building, machine shop, blacksmith shed, storage sheds for dynamite and carbide, and club house were built at the site; two pelton wheels hooked to air compressors provided water power, forcing compressed air through a two-inch iron pipeline from a steep canyon a mile below "Copper City" to run drills and provide ventilation for miners deep in the mountain. "Tubal Cain never really quit, it just sort of rusted away . . . Geologists say that the huge mother load of copper the miners expected to find did not exist . . ." From With Pride in Heritage, History of Jefferson County. See Historical-Cultural map.

TUCKER (HORACE) HOME
Having constructed this home in 1867 for his bride, Horace Tucker later resided here as a coffin maker, city official and mayor. To A. Horace Tucker belongs credit for many old Port Townsend's best vintage houses. It is named in the National Register of Historic Places. See Historical-Cultural map.

TWIN CREEK RESEARCH NATURAL AREA
Examplifies Sitka spruce (Picea sitchensis) forests as they occur under the "rain forest" conditions found in river valleys on the west side of the Olympic Peninsula. Represents 100 acres of Sitka spruce; forest cover type, SAF-223. elevation: 490-650 feet; topography: level river bottom; average height: 200 feet; average diameter: 46 inches.

The Roosevelt elk (Cervis canadensis roosevelti) is the most important animal present. Elk use the natural area particularly heavily during the winter and spring. Other animals known to occur within the natural area are blacktail deer (Odocoileus heminous), black bear (Ursus americanus), douglas-squirrel (Tamiasciurus douglasii), whitefooted deer mouse (Peromyscus maniculatus, and racoon (Procyon lotor). River otter (Lutra canadensis pacifica) have been observed in the vicinity. See Botanical and Zoological-Terrestrial maps.

UPPER DUNGENESS RIVER, OLYMPIC NATIONAL PARK
This is a free-flowing stream. Virgin stands of timber are located here. See Botanical and Hydrological maps.

UPPER GREYWOLF RIVER, OLYMPIC NATIONAL PARK
Virgin stands of timber are located here. See Botanical and Hydrological maps.

THE VALHALLAS
This range is located between the Queets River and west of the south fork of the Hoh River. It is southwest of Olympus Massif. It includes the following peaks: Thor, Loki, Spire, Hugin, Woden, Munin, Baldur and Friggs. See Geological map.

VIRGIN DOUGLAS-FIR STAND
Impressive stand of large, old-growth Douglas fir. See Botanical map.

WARRIOR PEAK
This is located north of Mount Constance. See Geological map.

WASHINGTON COAST
See Grays Harbor County.

WASHINGTON ISLANDS WILDERNESS AREA
See Clallam County.

WESTERN HEMLOCK
This western hemlock (Tsuga heterophylla) has a circumference at 4-1/2 feet above ground of 27 feet 2 inches; height: 125 feet; spread: 47 feet. See Botanical map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part the year. These species were identified as being of statewide or national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. The western brown pelican (Pelecanus occidentalis) winters along the Pacific coast. Crocker Lake is habitat of osprey. Other birds noted in the county are spotted owl, Peale's perigrine, auklets, puffin, caspian tern, cormorant, guillemots, murre, murrelets, petrel, oystercatchers, grouse and pileated woodpecker.

MAMMALS. Marine mammals noted along the coast of the county are sea lions, harbor seals, sea otter, dolphins, porpoises, elephant seal, fur seal and various whales. (See Grays Harbor County.) The northern flying squirrel (Glaucomys sabrinus) is indigenous to the Pacific coastal counties of the Olympic peninsula. The flying squirrel is protected by Washington State. The Olympic marmot (Marmota olympus) is found only in the Olympic Mountains. The fisher (Martes pennant) inhabits the forests of the Olympic and Cascade Mountains. The yellow-pine chipmunk (Eutamias amoenus caurinus) has a restricted range in Jefferson and Clallam Counties. Pine marten (Martes americana) inhabit the upper mountain slopes throughout state. Other mammals noted in the county are cougar, golden-mantled ground squirrel, hoary marmot, cony, fox squirrel, chipmunk, douglas squirrel, black bear, black-tailed deer, coyote, mountain goat, and Roosevelt elk.

WOLFE PROPERTY
North of Hood Canal Floating Bridge, it is a possible state park. See Environmental Use map.

King



A CONTEMPORARY THEATER (ACT)
This professional theater features contemporary plays. See Historical-Cultural map.

ALKI POINT
This is the landing site of the first white settlers in the area (November, 1851). The site includes a beach and lighthouse as well as a monument. See Historical-Cultural map.

ALASKA TRADE BUILDING
This National Historic Place in Seattle is located at 1915-1919 First Avenue. It is also known as the Union Record Building. See Historical-Cultural map.

ALLEN THOMPSON RESEARCH CENTER
This is one of the most intensely monitored biological field stations in the world; tree physiology, climate effects on plants and soils, mineral cycling, and water quality are studied. It is operated with the cooperation of the Seattle Water Department by the College of Forest Resources, University of Washington, and is located on the Cedar River watershed. See Botanical map.

ALPINE LAKES WILDERNESS AREA, SNOQUALMIE AND WENATCHEE NATIONAL FORESTS
The Alpine Lakes area is about 50 miles east of Seattle, Washington, in the Snoqualmie and Wenatchee National Forests, in King, Kittitas and Chelan Counties. The area encompasses 162,400 acres of National Forest and 500 acres of private land. Numerous alpine lakes, meadows and streams with topography of sharp ridges and peaks are typical of the area.

The area straddles the crest of the Cascade Mountains and is dotted with numerous small lakes. It includes 251,000 acres along both sides of the Cascade Divide; 120,000 of which are in the Snoqualmie National Forest. Elevation ranges from 2,500 feet in the heavily timbered Foss River Valley to over 8,000 feet in the barren Chiwaukum Range. Water, wildlife, and timber are important resources. There are many mining claims in the south portion; several are patented, with some activity near La Bohm Gap.

Since the 1950's, conservation groups have been seeking wilderness status for this region. In 1963, a prospectus was published by the Mountaineers, the North Cascades Conservation Council, the Mazamas, and the Sierra Club for an Alpine Lakes Wilderness Area. Some of the valleys they sought protection for have since been penetrated by roads and logging. In 1973, the Forest Service issued three proposals for alternative designations in the Alpine Lakes area; none of them included all of the identified undeveloped areas. However, they did include the possibility of acquiring part of the private lands in the "checkerboard" ownerships (where the Forest Service holdings alternate by sections with private lands). Omitted from any of the Forest Service proposals were valleys with old growth forests, particularly on the north side at Deception Creek and in the Chiwaukum and Coulter Creek area in the northeast segment. Several of the conservation groups recommend closing most of the roads penetrating into the Alpine Lakes, where wilderness exists on both sides of the roads; among these are the Eightmile Road up from the Icicle River Road. This, together with the Cooper Lake Road on the south, is an area where attempts had been made to have the Forest Service delay logging sales pending final determination as to their potential for inclusion as wilderness. These areas were logged; nevertheless, the conservation organizations are recommending that they be allowed to revert to a natural state without further logging and be included in the Alpine Lakes Wilderness. Other proposed road closures, with a return to a trail state, include the Middle Fork of the Snoqualmie River, the Taylor River Road, Lennox Creek, both forks of the Miller River, and Foss River, as well as the upper part of the Chiwaw River Road. Several groups advocate closure of the Icicle River Road at different points, with ultimate return to a wilderness state in its vicinity.

In conjunction with an Alpine Lakes Wilderness is the proposal for an outer area to be the Alpine Lakes National Recreation Area. In this latter type of area, under Forest Service administration in this central part of the Cascades, non-wilderness types of recreation and controlled commodity uses would be the expected and customary activities.

Forest Service roadless areas within the Alpine Lakes region are Alpine Lakes, Miller River, Lake Dorothy, Mount Thompson-Rampart Ridge; all in the Snoqualmie National Forest, and Alpine Lakes, Enchantment, and Kitan in the Wenatchee National Forest.

The Enchantment area, often called the "Lost World Plateau," contains jagged granite spires, glacially polished slopes, and scenic lake basins interspersed with lush mountain meadows. Glaciers and small wind-blown snow and ice fields continue their activity. Elevation ranges from 3,000 feet to 9,415 feet at Mount Stuart. See Environmental Use map.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the King County discussion are plotted on the Archeological map and listed in its index.

ASAHEL CURTIS NATURAL AREA
This old-growth coniferous forest stand is characteristic of the midmountain zone. Wildflowers may be seen on the Nature Trail. The area is named for a locally prominent, early 20th Century photographer. Some of his pictures appear in the Historical-Cultural section. See Botanical map.

ASSAY OFFICE
A National Historic Place in Seattle located at 613 Ninth Avenue. See Historical-Cultural map.

AUBURN GAME FARM
This game farm is three miles east of Auburn. The average annual production of pheasants is around 7,000 birds. Several exotic game bird species are also raised here such as the bamboo partridge and Chilean tinamou. Pheasant production in recent years has been devoted to the development of the Sand Point (a subspecies of the Chinese ringneck) for broodstock purposes. This game farm supplies birds for under-the-gun shooting in King, Kitsap and Snohomish Counties. Experimental releases of Sand Point pheasants, bamboo partridge and tinamou originate with birds raised here. See Environmental Use map.

BEAR CREEK
From Paradise Lake to Sammamish River the Bear Creek area provides habitat for migratory waterfowl, great blue heron, thrush, blackbirds, and woodducks. The creek itself provides spawning habitat for Dolly Varden, kokanee, cutthroat, and steelhead trout, and sockeye, chinook, chum, and coho salmon. Freshwater clams and crayfish abound in the upper reaches. It is reported to be the only stream in the Seattle area which has not been seriously degraded or the fish runs seriously diminished by encroachments. Bear Creek meets the 20 cubic feet per second requirement and falls under Shoreline Management Act. See Zoological-Terrestrial and Zoological-Aquatic maps.

BELLEVUE AREA
An uncommon native plant, Ceanothus valutinus, is found here in unusual size and abundance. See Botanical map.

BELLEVUE COMMUNITY COLLEGE (JR)
Located at Bellevue, it was established in 1965. See Historical-Cultural map.

BELLEFIELDS NATURE PARK
Located north of I-90 on Mercer Slough, this City Park has guided walks through marsh area. See Environmental Use map.

BOB PEPPER'S WILD BIRD SANCTUARY (PRIVATE)
A 100-acre farm on the Snoqualmie River near Carnation, the Pepper Family has created a sanctuary for thousands of wild ducks and waterfowl. With matching funds provided by the federal government 20 shallow ponds have been dredged out and connected by creeks and waterways to the river. Discharge of firearms during hunting season is prohibited. See Zoological-Terrestrial map.

BOTHELL HISTORICAL SOCIETY MUSEUM
This furnished Victorian house formerly belonged to the Hannon family. Also on the museum site is an 85-year-old pioneer cabin. See Historical-Cultural map.

BOTHELL-LAKE FOREST PARK BRICK HIGHWAY, 1913
Historic Route. See Historical-Cultural map.

BRIDLE TRAILS STATE PARK
This park is 480 acres of horse trails, cedar, and open spaces. See Environmental Use map.

BUILDING NO. 105, BOEING AIRPLANE COMPANY
A National Historic Place in Seattle at 200 Southwest Michigan Street, it is also called the E.W. Heath Shipyard. See Historical-Cultural map.

BUTTERWORTH BUILDING
This National Historic Place in Seattle is located 1921 First Avenue. See Historical-Cultural map.

CEDAR RIVER
A free-flowing stream used for kayaking, it includes state administered shorelands from Renton to north Maple Valley. It is a major watershed for the city of Seattle. Waterflow is regulated by the city of Seattle. The sockeye salmon run has increased dramatically in recent years. This stream, with Lake Washington, produces more sockeye than the rest of the state. It also produces cutthroat, steelhead trout, and coho and fall chinook salmon. See Zoological-Aquatic map.

CEDAR RIVER MORRAINS
Till grading upstream into river channel has blocked the channel, forming a lake. See Geological map.

CHARLES AND EMMA FRYE ART MUSEUM
In Seattle, this museum features a large collection of Munich School paintings, 1850-1900, and American School, 19th and 20th centuries. See Historical-Cultural map.

CLARK'S CAVE
This tiny cave is at the base of the slopes on the south side of a hanging valley at an elevation of about 4,750 feet on the south side of Mount Snoqualmie, just upstream from a small pond. It consists of about 35 feet of tight crawlways. It and a small fissure serve as resurgences after periods of heavy rain and are dry only in late summer. See Geological map.

CLIFF CAVE
This small cavern is hardly more than a rockshelter on the south end of the small ridge forming the eastern border of Cave Ridge. At about an elevation of 5,200 feet, it is south of Red Cave. See Geological map.

COLMAN BUILDING
This National Historic Place in Seattle is at 811 First Avenue. See Historical-Cultural map.

CORNISH SCHOOL OF ALLIED ARTS
Founded in 1914, this private school is dedicated to the study of the arts - dancing, music, and visual arts. Many public performances and exhibits are given each year. See Historical-Cultural map.

DANGER CAVE
This cave is treacherous, deep and of moderate size, with about 250 feet of passage and chambers; it reaches a depth of about 150 feet. The cave, at about a 5,200 foot elevation, is on the southeast side of the area locally called Sinkhole Amphitheater. See Geological map.

COUNTY DISCUSSION

DANGER CAVE ANNEX
This small cavern is about 50 feet southeast of Danger Cave and 20 feet lower. It is aligned parallel to Danger Cave and consists of a steeply sloping passage about 30 feet long with a single short, tight crawlway to one side. See Geological map.

DECEPTION FALLS
The botanical area is typical and representative of the type of flora on the west side of the Cascades. This beautiful fall is close to the highway on Deception Creek in the central Cascade Mountains. See Hydrological and Botanical maps.

DES MOINES MARINE SHORELINE
Shoreline along East Passage south of Seattle, including the Des Moines state recreation area. See Environmental Use map.

DON'S CAVE
A talus slope cave 111 feet long is roofed almost completely by an enormous boulder. It is located on the western face of Mount Issaquah. See Geological map.

DUMAS BAY
This gently sloping sandy beach is of great value for recreational use. It has excellent day-use park potential. See Environmental Use map.

DUWAMISH RIVER
This river is called the Green River above river mile 10. The lower stretches of the Duwamish River exhibits coliform densities above the limit recommended for safe water-contact recreation. In addition, the Duwamish River suffers from a dissolved oxygen deficiency during the summer low streamflow periods. This has been partially corrected by conservation water releases at Howard Hanson Dam. The lower portion of the river is dredged, contributing to a dissolved oxygen deficiency. See Green River. See Hydrological and Zoological-Aquatic maps.

ELLSWORTH STOREY RESIDENCES
This National Historic Place in Seattle is at 260 and 270 East Dorffel Drive. See Historical-Cultural map.

ENUMCLAW NATURE MUSEUM OF THE CATHERINE MONTGOMERY INTERPRETIVE CENTER
Exhibits feature the contrasts in nature in Washington State. See Historical-Cultural map.

FALL CITY THEATER AND PARK AREA
Most famous for the annual Passion Play, the Fall City players perform plays throughout the summer. The area also hosts a Renaissance Fair and other activities during the summer. See Historical-Cultural map.

FEDERATION FOREST STATE PARK
The park consists of 612 acres of virgin timber and an Interpretive Center 18 miles east of Enumclaw on Route 410. The Center displays the seven life zones of vegetation which can be found in the state of Washington: the coast forest, mountain forest, sub-alpine, alpine, yellow pine forest, bunchgrass, and sagebrush zone. Two nature trails have been established within the park: the East Trail, about three-eights of a mile long, and the West Trail, about nine-tenths of a mile long. Each winds past several distinctly different major forest communities. Evidence of the historic Naches Trail is visible. See Environmental Use and Botanical maps.

FIRE STATION NO. 25
This National Historic Place in Seattle is at 1400 Harvard Avenue. See Historical-Cultural map.

FIRE STATION NO. 23
A National Historic Place in Seattle located at 18th and Columbia Streets. See Historical-Cultural map.

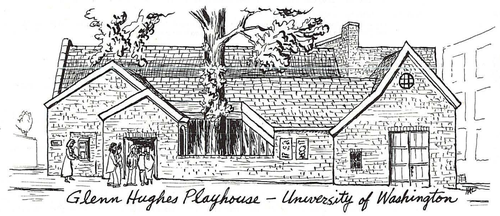
FORT LAWTON PARK
After use as a military base, part of this fort property was returned to Seattle for use as Discovery Park. Part of the property will be used as a site of an Indian cultural center. Both park and center are still undeveloped. See Environmental Use map.

FRANKLIN FALLS
These falls are located on the South Fork of the Snoqualmie River near Snoqualmie Pass. See Hydrological map.

FUNGI SITES
The following areas in this county are noted for their abundance and variety of higher fungi or important species: Grass and Huckleberry Mountains Vicinity and Stampede Pass Vicinity. See Botanical map.

GARFIELD MOUNTAIN
The mountain is northwest of Snoqualmie Pass. See Geological map.

GLENN HUGHES PLAYHOUSE
One of three University of Washington theaters offering performances throughout the year. See Historical-Cultural map.



Glenn Hughes Playhouse – University of Washington

GOLDEN GARDENS
Located at the western perimeter of Seattle along Puget Sound, this beach is an open textbook of sea zoology and botany. It is accessible and full of sea life making it an ideal area for learning about the sea. Schools, colleges, groups of all sorts use this area. There is a growing concern over damage from overuse. See Environmental Use map.

GORDON MARCKWORTH EXPERIMENTAL FOREST
Cooperatively managed by the State of Washington and the College of Forest Resources, University of Washington. It is approximately 7,200 acres, with interesting glacially-influenced topography at the base of the Cascade foothills being developed as a multiple-use area with emphasis on education and research into practical forestry operations. See Environmental Use map.

GREEN LAKE
Covering 255 acres, with a depth of 24 feet, Green Lake is heavily used for recreation and lies completely within a developed residential area of north Seattle. It had a long history of algal blooms resulting from extensive drainage of streets and lawns and natural springs. Increased algal blooms, swimming restrictions due to high coliform counts and "swimmer's itch," turbidity and loss of clarity from dead algal cells, semi-domesticated waterfowl, and storm overflows led to a program of investigation and rehabilitation by the Seattle Park Department. Seattle presently flushes the lake with water from its municipal supply system, resulting in elimination of most of the water quality problems.

Not only does Green Lake provide swimming and boating, but also lawns and paths for cycling, jogging, resting, people-watching and picnicking. It is a very popular year-round outdoor spot. The new Bath House Theater features a variety of plays; the Aqua Theater, on the south shore of the lake, has been the scene of many outdoor performances. See Environmental Use map.

GREEN RIVER
A free-flowing stream used for kayaking, this includes state administered shorelands from Tukwila to Black Diamond. This river is unique because of the deep canyons through which it passes. The canyons show the glacial carving that formed so many of the valleys of the Puget Sound Basin. Indian petroglyphs can be seen on some of the canyon walls. The river is also important because of the fish and other aquatic life that inhabit it. A few adult bald eagles winter on the shores and sandbars of the river, and people traveling on the river or by road beside the river have a chance to observe these birds in the wild. Other animals also depend on the Green River in its present state. The river is within reach of the people of the greater Seattle area, providing greenbelts and open space. This river, with scenic whitewater stretches is also a major steelhead, cutthroat, and salmon stream. The lower stretches of the Green River exhibit coliform densities above the limit recommended for safe water-contact recreation. In addition, the river suffers from a dissolved oxygen deficiency in its lower reach during the summer low streamflow period. (See also Duwamish River.)

The Green is the only river in western Washington with any appreciable extent of river gorge with the typical cliffs, potholes, and rock formations. The headwaters of this river flow from the watershed that supplies the drinking water for the city of Tacoma. Howard Hanson Dam controls flooding in the river and has encouraged the industrialization of the lower valley. The water is clear, cold, and relatively pure except for the lower reaches where industry has developed. See Hydrological, Zoological-Terrestrial, Zoological-Aquatic, and Environmental Use maps.

GREEN RIVER COMMUNITY COLLEGE (JR)
Located at Auburn, it was established in 1965. See Historical-Cultural map.

GREEN RIVER GORGE
A 12-mile tortuously-winding gorge with vertical to overhanging walls of tertiary rock 150-300 feet high. Almost 2 miles of Eocene sediment rocks and fossils are exposed, revealing one of the most complete stratographic sections in the region. It is often used for geological field trips. One of the few aesthetic gorges near Seattle. See Green River. See Geological map.

GREEN RIVER REARING PONDS
State Game Department. Species propagated: winter steelhead trout. Water source: Green River and springs. See Zoological-Aquatic map.

GREEN RIVER STATE SALMON HATCHERY
State Fisheries Department. Species propagated: fall chinook and coho salmon. See Zoological-Aquatic map.

GREENWATER LAKES AREA
The Greenwater area is a part of the historic Naches Trail, which has been suggested be preserved and marked as a hiking trail. All the shade-loving lily-family flowers native to the region can be seen blooming together in the dense forest along the early part of the trail. This is good mushrooming country also. See Botanical map.

HALL OF FIRE ENGINES
In Seattle is located the largest single collection of fire service equipment and memorabilia in the U.S.A. See Historical-Cultural map.

HELLHOLE CAVE
At the bottom of a sink about 600 feet west of Red Cave, the entrance to the cave is a triangular orifice about a foot on each side, barely admitting a slender person. Below the entrance is a 60-foot drop to the floor of a large sloping chamber about 100 feet long, 35 feet wide, and 20 to 60 feet high. There are several narrow, roughly parallel side passages, none more than 100 feet long. Pits leading to a total depth of more than 100 feet below the surface have been partially explored. See Geological map.

HIGHLINE COMMUNITY COLLEGE (JR)
Located at Midway, it was established in 1961. See Historical-Cultural map.

HINMAN AND LYNCH GEOLOGICAL AREAS
These areas are noted for their numerous glacial formations. See Geological map.

HIRAM M. CHITTENDEN LOCKS, THE GARDENS (LAKE WASHINGTON SHIP CANAL)
The Lake Washington Ship Canal, lying wholly within the City of Seattle, connects Puget Sound with a large fresh-water harbor composed of Salmon Bay, Lake Union and Lake Washington. All have the same level and are connected by free and unobstructed channels 30 feet deep at low lake level. This inland harbor has a total area of 25,000 acres and a shoreline of about 100 miles. It is protected from storms and is free from tidal fluctuations and currents. This, together with the salt water harbor of Elliott Bay, affords Seattle navigation facilities which are regarded as among the best in the United States. Prior to construction of the canal and locks, there was no connection between Lake Union and Lake Washington, and Lake Union had no navigable connection with Salmon Bay.

Before construction of the locks, Lake Washington's elevation fluctuated between 29 and 33 feet above mean lower low water in Puget Sound, and its outlet was at the south end of the lake through the Black River and into the Duwamish River. Lake Union was regulated at about its present elevation (mean 21 feet) by spillway gates at the extreme westerly end. Salmon Bay and Shilshole Bay were navigable at high tide, but both bays were practically dry at extreme low tide.

When the canal was constructed, a channel was dredged, making Shilshole Bay navigable at all times. Salmon Bay was raised and Lake Washington was lowered to the level of Lake Union. Cedar River, which entered the Black River about one-half mile below the old outlet of Lake Washington now discharges into Lake Washington. The outlet through the Black and Duwamish Rivers no longer exists.

The spillway dam and two locks, one large and one small, about 1-1/2 miles up the canal from the Puget Sound entrance maintain the elevation of the lakes within the required range of 1 foot above and 1 foot below the normal elevation of Lake Union.

The lock and dam structures evidently offer no considerable obstruction to the passage of migratory fish from salt to fresh water, or vice versa. The Washington State Department of Fisheries reported in 1964 that annually as many as 190,000 salmon may enter the Canal from tidewater. A very large majority of them pass through the locks; others use the fish ladder provided for them at the southern end of the spillway dam.

Many people have the impression that these locks still are second only to the Panama Canal locks in size. Truth is, there are now several locks in the United States which are larger than these in Seattle; but it is likely that few, if any, handle more vessels each year. Length of the large lock here is 825 feet and its width is 80 feet. The small lock is 150 feet long and 28 feet wide. On the Ohio and Mississippi Rivers, for example, are much newer sets of locks in which the large chambers are 1,200 x 110 feet and the small ones are 600 x 110 feet. Their walls are as much as 92 feet high.

The walls of our large lock in Seattle are 55 feet high above the floor and the small lock's walls are 42 feet high. Vessels going through the locks from salt water to fresh water, or vice versa, are lifted or lowered between 6 and 26 feet. The exact raise depends upon the tide in the Puget Sound entrance to the locks and the water level in the lakes.

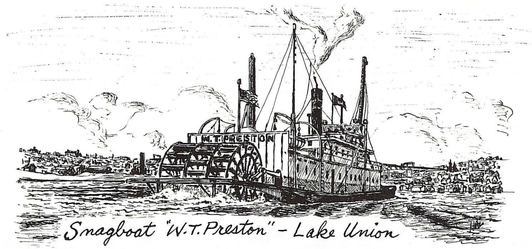
On 24 July 1956, the President of the United States signed Public Law 779, 84th Congress, 2d Session, which named the locks of the Wake Washington Ship Canal the "Hiram M. Chittenden Locks" in honor of the man who was the Corps of Engineers' District Engineer from April 1906 to September 1908. Major Chittenden was primarily responsible for design of the locks and a detailed workable plan for the project. He is credited with having accelerated greatly the construction of the canal and development of the Port of Seattle, even pursuing these interests after being retired in 1910 because of ill health. He was given the rank of Brigadier General in recognition and reward for his outstanding service to the Nation.

The canal and the Hiram M. Chittenden Locks, built by the U.S. Army Corps of Engineers, were opened to traffic in 1916. At the present time, the Corps of Engineers maintains public use facilities of three locations along the canal: The Hiram M. Chittenden Locks and Gardens, the Fremont Cut, and the Montlake Cut. See Botanical and Environmental Use maps.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the King County discussion are plotted on the Historical-Cultural map and listed in its index.

HUMPBACK
This botanical area is noted for the impressive stand of mature Douglas-fir and western hemlock. See Botanical map.

INDIAN FESTIVAL
This festival takes place in Auburn, put on by the Muckleshoot tribe the third week in April. See Historical-Cultural map.



Snagboat "W.T. Preston" – Lake Union

INTERNATIONAL DISTRICT
This is an older section of the city of Seattle in which many Orientals live and work. Colorful shops and unusual restaurants give this area a special significance. Oriental theaters give visitors an insight into this culture. See Historical-Cultural map.

IRON PERGOLA
This National Historic Place in Seattle is at First Avenue and Yesler Way. See Historical-Cultural map.

ISSAQUAH COAL MINES
Coal mine subsidence problems have become acute at Issaquah. Subdivisions have been plotted over abandoned mines. Recently, 4 large openings have appeared in the ground; two in 1967 and one in 1969 within a particular subdivision. Another hole appeared in May, 1970. (Not mapped)

ISSAQUAH DELTAS
These are part of a series of deltas formed during the last glaciation in the Puget Lowland. Rivers flowing west into small temporary lakes formed many of these features throughout the eastern edge of the Puget Trough. They are currently being exploited for gravel. See Geological map.

ISSAQUAH STATE SALMON HATCHERY
State Fisheries Department. Species propagated: chinook and coho salmon. See Zoological-Aquatic map.

KELLY BUTTE
This butte is located midway between Mount Rainier and Snoqualmie Pass. See Geological map.

KENNYDALE MUD SLIDE AND UNDERWATER FOREST
A forest slid into Lake Washington as part of a mud slide 1,000 years ago. The trees are still intact underwater and are perfectly preserved upright. See Botanical and Geological maps.

KERRISTON
This is an old mining town near North Bend. See Historical-Cultural map.

KING STREET STATION
The King Street Railroad Station in Seattle, at Third Street South and South King, is a National Historic Place. See Historical-Cultural map.

KIRKLAND HISTORICAL MUSEUM
The museum exhibits early Lake Washington boats and the Lake Washington Shipyard. Located in a 1889 building, it was built by Peter Kirk, founder of Kirkland. See Historical-Cultural map.

KUMMER
At the mouth of Green River Gorge, this is an historic coal mining town. See Historical-Cultural map.

LAKE HANCOCK
One section in size with interesting and varied habitat types including old growth forest and lake habitat. See Hydrological map.

LAKE SAMMAMISH
Encompassing 4,997 acres, with a maximum depth of 100 feet, Lake Sammamish discharges directly into Lake Washington, and is showing symptoms of eutrophication. Its condition corresponds to that of Lake Washington in the 1950's before extensive sewage interception. Lake Sammamish has been adversely affected by municipal waste and by flow and land management practices, which have resulted in bacterial contamination as well as excessive nutrient enrichment, causing excessive algal activity.

The lake holds sockeye, coho and chinook salmon and steelhead trout runs which spawn in the lake's tributaries. Trout, bass, and other fish populations are resident. The north end of Lake Sammamish is a low swampy area and plays a major role in the lake's ecosystem. This is a good area for study of many facets of aquatic biology. See Hydrological and Zoological-Aquatic maps.

LAKE SAMMAMISH STATE PARK
Lake Sammamish State Park, 432 acres 2 miles north of Issaquah, affords picnicking, swimming, fishing and boating ramps. See Environmental Use map.

LAKE WASHINGTON
This 21,650 acre lake averages 100 feet deep with a maximum depth of 210 feet, and is located east of Seattle. It is one of a number of freshwater lakes in the Puget Sound Subregion which have been adversely affected by waste discharges and by flow and land management practices, tending to increase eutrophication.

With the postwar boom in Seattle and the growth of communities around the lake, increasing volumes of sewage were being discharged into the lake. During the 1950's, limnological work at the University of Washington showed that the condition of the lake was deteriorating, and it was possible to predict that its usefulness for recreation and other purposes would be seriously impaired by conditions associated with excessive growths of algae. By a remarkable public action in 1958, the Municipality of Metropolitan Seattle (METRO) was created to improve the sewerage system of the entire metropolitan area, including the diversion of sewage from Lake Washington to Puget Sound in such a way as not to generate a corresponding problem there. Diversion started in 1963 and was completed in 1968. As a result, the condition of the lake improved promptly, and in 1971 the transparency of the water exceeded that in 1950.

This lake is the major rearing area for the excellent sockeye salmon (and other anadromous fish) runs into this watershed. Some sockeye salmon spawn around the lake shore. Sport-caught sockeye salmon are becoming a major attraction, and fall chinook are taken off the mouths of the Cedar and Sammamish Rivers from late August through early October. Coho salmon provide good angling from late September through early November off the mouth of the Sammamish River. In addition, the lake holds excellent populations of largemouth and smallmouth bass, assorted panfish species, and trout. See Zoological-Aquatic, Hydrological, and Zoological-Terrestrial maps.

LAKE WASHINGTON SHIP CANAL
See Hiram M. Chittenden Locks entry.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the King County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LAKEVIEW CEMETARY
Here can be found a pioneer graveyard. Incorporated in 1882, Lakeview is the oldest burial ground in Seattle and is on the second highest point in the city. Many names of Seattle history are found here including the Denny family, Horton, Phinney, and Mercer. Also buried here are Doctor Maynard, the city's first doctor, Henry Yesler, and Princess Angeline, daughter of Chief Sealth. See Historical-Cultural map.

LEA HILL ENVIRONMENTAL STUDY LABORATORY
The laboratory, established in 1969, is a natural area of grassy meadows, low brush, swamp and forest directly adjoining the Lea Hill Elementary School. There is a good trail system, bridges, amphitheater, and other minor developments which are constructed so as not to intrude on the natural scene. The 10-acre site is used by all classes of the school, by the local college, and on request by organized youth and adult groups. See Environmental Use map.

LEARY HOUSE
National Historic Place in Seattle at 1551 East 10th Street. It was the home of Eliza Ferry Leary. See Historical-Cultural map.

LEDGE PIT
At about 4,950-foot elevation, a pit 10 feet deep has been formed in limestone at the base of a ledge about 200 feet above Clark's Cave. The entrance is about 2 feet wide, and the pit widens at the bottom to form a room about 5 feet wide.

LINCOLN BEACH AND PARK
With the reduction of sewage pollution, this area is coming back as an excellent area for the observation of intertidal sea life. The beach and park are found in the extreme southwestern part of Seattle. See Environmental Use map.

LITTLE MOUNT SI
This is a popular climbing mountain. See Geological map.

LOOKOUT CAVE
This cave, about 300 feet southeast of Hellhole Cave, contains about 200 feet of passageways, 2 large chambers and reaches a depth of 125 feet. Because of loose rock and difficult conditions of explorations only competent speleogists should enter this cave. See Geological map.

MACINTYRE PARK
MacIntyre Park, in the Weyerhauser Snoqualmie Tree Farm, is the site of a virgin humid transition forest. See Botanical map.

MAGNOLIA BLUFFS
These cliffs are 100-300 feet high. Sediments of the last glaciation are exposed. It is used extensively for geology field trips and also as a salt water recreation area. See Geological and Environmental Use maps.

MARYMOOR MUSEUM
Pioneer implements and Indian artifacts are exhibited in a 3 room mansion furnished in Victorian style. The Museum is located in the former Clise mansion, built in 1907. See Historical-Cultural map.



Marymoor Museum – Redmond

MARYMOOR PREHISTORIC INDIAN SITE
This National Historic Place in Redmond at 6046 West Lake Sammamish Parkway Northeast is located in Marymoor County Park. It should be suitable for state system of educational and scientific preserves. The archeological site contained artifacts 2,500 years old. See Archeological and Environmental Use maps.

MONTE CRISTO, GRIZZLY PEAK, SNOQUALMIE AND MOUNT BAKER NATIONAL FOREST
See Snohomish County.

MOON VALLEY FALLS
These waterfalls on the North Fork of the Snoqualmie are of aesthetic value. See Hydrological map.

MOUNT INDEX, SNOQUALMIE NATIONAL FOREST
This extraordinarily scenic area has been recommended by the Forest Service for its in-service designation as a "Scenic Area, U-3." Although not recommended for immediate wilderness authorization, it has been recommended that the area be studied for wilderness. See Environmental Use map.

MOUNT SI
This popular climbing peak is east of Seattle near the city of North Bend. Because of its proximity to major urban centers, it receives heavy recreational use year round. The mountain supports a small herd of mountain goat. See Geological map.

MOUNTAINS NORTH OF THE NORTH FORK OF SNOQUALMIE RIVER, SOUTHEAST OF TOLT RESERVOIR AND SOUTH OF MONEY CREEK
The mountains in this area include: Mount Phelps, McLain Peaks, Lennox Mountain. See Geological map.

MOUNTAINS BETWEEN MONEY AND INDEX CREEK, WEST OF HIGHWAY #2
The mountains in this area include: Crosby Mountain and Palmer Mountain. See Geological map.

MOUNTAINS NORTH OF U.S. HIGHWAY #2 AND SOUTH OF BARCLAY CREEK
The mountains in this area include: Baring Mountain and Grotto Mountain. See Geological map.

MOUNTAINS NORTH OF U.S. HIGHWAY #2, SOUTH OF RAPID RIVER AND EAST OF BECKLER RIVER
The mountains in this area include: Mount Fernow, Captain Point and Scorpion Mountain. See Geological map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the King County discussion are plotted on the Geological map and listed in its index.

MUCKLESHOOT INDIAN RESERVATION
Ethnic group. See Historical-Cultural map.

MUD MOUNTAIN DAM
Located on the White River, a tributary of the Puyallup, Mud Mountain Dam is operated as a single-purpose flood control structure, storing the winter and spring floods. See Hydrological and Zoological-Aquatic maps.

MUSEUM OF FLIGHT
Located in Seattle, the emphasis is on airplanes, old and new. See Historical-Cultural map.

MUSEUM OF HISTORY AND INDUSTRY
Located in Seattle, the museum has three divisions:
History and Industry Museum: History of Pacific Northwest from time of the Indian; transportation and fire engines; aerospace exhibit; fashions and furnishings.
Maritime Museum: Outstanding collection of figureheads, ship bells, ship models.
Natural History Museum: Dioramas and specimens of wildlife. See Historical-Cultural map.

NAVY CREW REGATTA
This takes place in Seattle, during the third week of July. See Historical-Cultural map.

NEELY MANSION
Located south of State Highway 18 near junction of Black Diamond and Green Valley Roads, this Victorian style mansion was built in 1894. See Historical-Cultural map.

COUNTY DISCUSSION

NEWTON CAVE, RED CAVE
Although not fully explored, Newton Cave is the second largest limestone cave discovered in Washington, with a total slope length of about 500 feet of explored passageway and an estimated depth of about 180 feet. It is a complex of narrow passageways. Newton Cave is located in the same lapies trench as Red Cave and is about 100 yards north of that cave, close to the rim of the hanging valley that separates Cave Ridge from Mount Snoqualmie. Newton Cave is formed in a marble member of the Denny formation. The stratigraphy of which is complex. Prospector's Cave also called Miners Cave and Steinburns or Adairs Cave are small caves with 200 feet of narrow linear passages. (From Caves of Washington by William R. Halliday.) See Geological map.

NORTHWEST COLLEGE
Located in Kirkland, it was established 1934. See Historical-Cultural map.

OLD SNOQUALMIE PASS WAGON ROAD
This historic route has cedar logs dating to 1867. The old road begins near the Denny Creek campground and ends near Franklin Falls. The hike is steep in places, but not difficult. A number of points of interest have been marked along the way to show the obstacles that the early settlers had to overcome as they came to the Puget Sound area. See Historical-Cultural map.

OSCEOLA ARCHEOLOGICAL SITE
This site of a prehistoric Native American village may possibly date to 5,000 years B.C. Over 3,000 artifacts were excavated in 1972 by an archeology class from Green River Community College. The site is located amidst the old pioneer community site on property of Osceola Pickle Company. See Archeological map.

OSCEOLA MUD FLOW
This debris may represent the original top of Mount Rainier. See Geological map.

PACIFIC NORTHWEST ARTS AND CRAFTS FAIR
The Bellevue Fair is the largest of its kind in the United States. It covers about 40 acres. It was begun in 1947, and includes a variety of artistic works, including enamals, batik, paintings, pottery, sculpture and glasswork. See Historical-Cultural map.

PACIFIC SCIENCE CENTER MUSEUM
Located in Seattle, the exhibits deal primarily with mathematics, space, astronomy, and physical science, with developing programs in life science and Northwest Indians. See Historical-Cultural map.

PARK DEPARTMENT DIVISION OF PLAYGROUNDS
National Historic Place in Seattle at 301 Terry Avenue. See Historical-Cultural map.

PENTHOUSE THEATER
This "theatre-in-the-round" is based on the original theater of this type housed in the Meany Hotel. It is one of three University of Washington operated theaters. See Historical-Cultural map.

PIKE PLACE MARKET HISTORIC DISTRICT
National Historic Place in Seattle is bounded roughly by First Avenue and Stewart Street on the northeast, News Lane on the east, Union Street on the southeast, Western Avenue on the west, and Virginia Street on the northwest. A haphazard of arcades and stalls, Pike Place Market sits under the nose of Seattle's modern skyline. A jumble of sights, smells and accents, it suggests at once a 19th century immigrant neighborhood amid the grayness of the Pacific Northwest.

Since opening in 1906 as a place for truck farmers to sell their goods without a middleman, the market has served as the great equalizer, equally available to skid road inhabitants and housewives. Vegetables and fruit dominate the main concourse of stalls, but fish counters contain barrels of fresh clams and crabs, and even salmon. See Historical-Cultural map.

PINE LAKE
This 88 acre lake has a maximum depth of 39 feet. The lake is highly eutrophic, probably as a result of septic tank drainage from surrounding houses. The lake is stocked with trout annually, and supports a scrub population of bluegill. See Hydrological map.

PIONEER HALL
National Historic Place in Seattle at 1642 43rd Avenue East. See Historical-Cultural map.

PIONEER SQUARE, SKID ROAD HISTORIC DISTRICT
National Historic Place in Seattle with a boundary starting at the intersection of Alaskan Way Viaduct and Columbia Street, proceeding east to the midpoint between First and Second Avenues; then south to Cherry Street and east on Cherry to the midpoint between Second and Third Avenues; then south to a point about 75 feet north of Washington Street, then east to Third Avenue South; and south to a point about 75 feet south of Washington Street; proceeding west to Second Avenue South, then south to the midpoint between South Jackson and South King Streets; west to the midpoint between Occidental Avenue South and First Avenue South, then south to South King Street and west to First Avenue South; then south to a point about 125 feet south of South King Street, then west to the Alaskan Way Viaduct and north to the intersection with Columbia Street. Seattle's most important historical site, Pioneer Square was once a little island (later filled in) on which Arthur A. Denny established the city on February 15, 1852. The square's worldly atmosphere is enhanced by a restored glass-roofed Victorian pergola that stands side by side with a soaring totem pole. Pioneer Square was the center of Seattle during the city's first few decades when it was a bustling mill town. The massive old buildings in the surrounding blocks were built immediately after the disastrous fire of 1889. See Historical-Cultural map.

PUGET SOUND
See Kitsap County.

PUGET SOUND POWER BOAT RACE
Seattle (alternating with Namaimo, British Columbia), sponsors the race in July. See Historical-Cultural map.

QUARTERMASTER HARBOR
There is a county park protecting part of this area; but the sea life inside the harbor, especially near Burton, is unusual and notable. See Environmental Use and Zoological-Terrestrial maps.

RAGING RIVER
This is a free-flowing river used for kayaking and steelheading. The state administers some shorelands. See Hydrological map.

RAILROAD MUSEUM
A small outdoor museum at North Bend with an emphasis on old engines. See Historical-Cultural map.

SAINT EDWARDS SEMINARY
This site includes forest land preserved in its natural state within a metropolitan area and also a continuous strip of Lake Washington shoreline. See Botanical map.

SALAL MORAINE
This very large arcuate terminal moraine was formed by the continental ice sheet pushing up into the Snoqualmie River Valley. See Geological map.

SALMON DERBY FINALS
This final takes place in Seattle in mid-September. See Historical-Cultural map.

SALTWATER STATE PARK
This 88 acre saltwater park is 18 miles south of Seattle, off U.S. 99. It has a beach on Puget Sound, camping, trailering, swimming, fishing, and boat launching. See Environmental Use map.

SAMMAMISH RIVER, AND BOISE AND ISSAQUAH CREEKS
The lower reaches of the Sammamish River, Issaquah and Boise Creeks exhibit coliform densities above the limit recommended for safe water-contact recreation. The state administers the shoreline from Hollywood to Lake Washington. See Hydrological and Environmental Use maps.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SEATTLE ART MUSEUM AND PAVILLION
This museum houses collections in all fields of Asiatic art; it also has a pre-Columbian collection, and numerous European and American paintings. The building is one of best preserved and most complete examples of new "modernism" in architecture of the 1930's. See Historical-Cultural map.

SEATTLE CENTER
This 74-acre complex, built for the 1962 World's Fair, includes a large number of buildings of cultural significance such as: Opera House, Playhouse Theater (home of Seattle Repertory), Exhibition Hall, Display Hall, Arena, Coliseum, Northwest Arts and Crafts Center, Pacific Science Center, Seattle Art Museum Pavilion, variety of meeting rooms used for conferences, exhibits, and the Space Needle. See Historical-Cultural map.

SEATTLE CENTRAL COMMUNITY COLLEGE (JR)
Located in Seattle, it was established 1966. See Historical-Cultural map.

SEATTLE MARINE AQUARIUM
The largest display of native marine life in the State of Washington is here. See Historical-Cultural map.

SEATTLE PACIFIC COLLEGE
Located in Seattle, it was established in 1891. See Historical-Cultural map.

SEATTLE UNIVERSITY
Located in Seattle, it was established in 1891. See Historical-Cultural map.

SEWARD FISH HATCHERY
State Game Department. Species propagated: trout. Water source: Lake Washington. See Zoological-Aquatic map.

SHOWBOAT THEATER, UNIVERSITY OF WASHINGTON
Built like an old showboat, this theater offers excellent performances throughout the year. The theater is one of three operated by the University of Washington. See Historical-Cultural map.

SITKA SPRUCE STAND
This is a 64 acre stand of large Sitka spruce in moist forest habitat. See Botanical map.

SKYKOMISH RIVER
The South Fork is a free-flowing river used for kayaking. It is an excellent steelhead stream. See Hydrological and Environmental Use maps.

SNOQUALMIE FALLS
Produced by cutting of the Snoqualmie River across a bedrock spur which was uncovered by erosion at the distal edge of the valley fill made by the Tokul Creek Delta. See Hydrological map.

SNOQUALMIE NATIONAL FOREST
The Delaware-sized Snoqualmie National Forest stretches from Stevens Pass southward along the scenic Cascade Mountains to White Pass, encompassing more than 1.2 million acres of dense lowland Douglas-fir forests, azure alpine lakes, mountain meadows, and clear streams cascading through open, sunny pine forests. This land supports a vast array of wildlife. Of the animals in the big game category, deer, bear, and mountain goat abound in this area. On the southern portion, elk are becoming more numerous. The name "Snoqualmie" is a softening of the Indian term Sdoh-dwahlb-bbuh, meaning Moon People. In the vivid legends of the Indians who settled the lower Snoqualmie valley, the inhabitants of the moon came to earth and settled the rugged mountains that are now the Snoqualmie National Forest.

But the historical events that followed were every bit as romantic as Indian mythology. The rude paths used by the Indian in pursuit of wild game, berries and trade guided the steps of the Hudson Bay trappers to the Snoqualmie valley in the early 1800's. A determined band of pioneers made the perilous journey westward to Puget Sound over the steep-cliffed Naches Trail in 1853. A year later, Lt. Abiel Tinkham found a more favorable route over Snoqualmie Pass, and this route was later followed by a wagon road (1868), railroad (1883) and, in time, a transcontinental highway.

In 1908, just nine years after Washington's statehood, the Snoqualmie National Forest was established, and is administered by the U.S. Forest Service. See Zoological-Terrestrial and Environmental Use maps.

SNOQUALMIE PASS PEAKS
The following mountain areas are located on the ridge south of I-90 and west of Snoqualmie Pass: McClellan Butte, Mount Gardner, and Humpback Mountain. See Geological map.

These mountain climbing areas are located on the Cascade Crest south of Snoqualmie Pass and west of Keechelus Lake: Abiel Peak, Silver Peak, Chikamin Peak, Lemah Mountain, Chimney Rock, Overcoat Peak, Summit Chief Mountain, Little Big Chief, and Middle Chief.

The area north of Snoqualmie Pass and south of the Middle Fork and Snoqualmie Rivers contains the following mountain climbing areas: Guye Peak, Snoqualmie Mountain, Lundin Peak, Red Mountain, and Mount Thompson. See Geological map.

SNOQUALMIE RIVER
The river is used by anadromous fish below Snoqualmie Falls. The upper river is planted with juvenile salmon for rearing purposes. The river also contains a trout population. It is a free-flowing stream, used by kayakers. The area around the river north of the city of North Bend supports a healthy population of black bear. The Snoqualmie River, Middle Fork, is a free-flowing mountain stream. See Hydrological, Zoological-Aquatic, Zoological-Terrestrial, Environmental Use, and Geological maps.

SNOQUALMIE SUMMIT AND HIGHWAY
The Alaska yellow cedar appears unusual in this region. See Botanical map.

SNOQUALMIE VALLEY HISTORICAL SOCIETY MUSEUM
At North Bend, Indian baskets and artifacts and pioneer family collections can be seen. See Historical-Cultural map.

SPHAGNUM BOG
Rare bog plants: labrador tea and kalmia. See Botanical and Hydrological maps.

SPIDER LAKE
The lake area contains blue heron and large aspen. See Botanical map.

SQUAK MOUNTAIN
Second-growth hemlock and alder provide shade for a rich stand of typical low elevation wildflowers and shrubs - coltsfoot, elderberry, bleeding heart, huckleberry, fringe-cup, an assortment of ferns and mosses - plus some rare flowers (in this area): shooting star, star flower, and a fragile anemone "wind flower." Recently 500 acres near the top were donated to the state by the Bullitt family of Seattle. It is hoped this will form the nucleus of an undeveloped park or natural area. See Botanical map.

STILLWATER WILDLIFE RECREATION AREA
Stillwater (450 acres) 2 miles north of Carnation is typical of Puget Sound River floodplain. Its 2 miles of Snoqualmie River streambank offers access to outstanding steelhead and searun cutthroat fishing.

It is used for pheasant releases in the fall and for dog training and field trials in other parts of the year. Stillwater is ideally suited for recreational use from nearby large cities. This wildlife area is prime habitat for duck, rabbit, snipe, mink, goldfinch and a host of other animals. Black-tail deer and bear are occasional visitors.

A slough of the Snoqualmie River, two small ponds, two creeks, cattail swamps, open grasslands, heavy brush areas, and farmland are all included on Stillwater. See Environmental Use and Zoological-Terrestrial maps.

STRAWBERRY FESTIVAL
The local festival takes place in Bellevue, in June. See Historical-Cultural map.

SULPICIAN SEMINARY OF THE NORTHWEST
Located at Kenmore, it was established in 1930. See Historical-Cultural map.

TIGER MOUNTAIN
Located in the central part of the county near Issaquah, its elevation is 3,044 feet. The mountain contains many old mines, now abandoned, and provides excellent wildlife habitat despite its proximity to urban centers. See Geological map.

TOKUL CREEK FISH HATCHERY
State Game Department. Species propagated: trout and steelhead trout. Water source: Tokul Creek and springs. It also has rearing ponds for steelhead trout.

TOLT RIVER
This is a free-flowing river used for kayaking. It is a good steelhead stream. Portions of its shorelands are administered by the state. See Hydrological map.

TURLAKE SUNSET COUNTY PARK
The carpit, one of as few left in the area, contain the fyeating Drolera rotundifolia, sundew. See Botanical map.

TWIN FALLS
These falls are on a state administered recreation area on the South Fork of the Snoqualmie. See Hydrological and Environmental Use maps.

UNION BAY MARSH
This urban fresh-water marsh and wildfowl habitat is much reduced in size by sanitary landfill on one side of ship canal and by the Evergreen Point bridge approach on the other side. It is still a valuable habitat and nature study area. See Zoological-Terrestrial and Hydrological maps.

UNIVERSITY OF WASHINGTON
Located in Seattle, it was built on site of the Alaska-Yukon Exposition 1909. The University was established in 1861, and is the oldest in the state. See Historical-Cultural map.

UNIVERSITY OF WASHINGTON, ARBORETUM
It is the intent of the University, within the space and environmental limitations of the Arboretum, to establish and maintain collections of all the types of ornamental woody plants that the climate and soils of the Pacific Northwest can support, and to disseminate knowledge gained about their cultivation and care. Beyond the accepted attainments of an arboretum and the express purposes for its creation, the University of Washington Arboretum is dedicated to fostering public knowledge in such areas as natural history, ecology, interrelation of environmental factors, outdoor-recreation management, urban-related studies, and conservation. Research and educational programs will continue to be conducted and expanded to enhance these community services.

This land mass of several hundred acres contains examples of nearly every botanical element which will grow in the local climate. It is located on the south side of the Lake Washington Ship Canal where it interfaces with Lake Washington. See Botanical and Environmental Use maps.

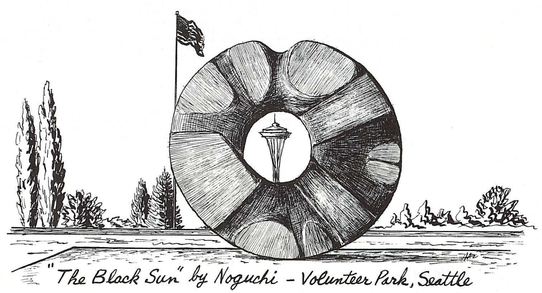
UNIVERSITY OF WASHINGTON COSTUME AND TEXTILE STUDY CENTER, TEXTILE DISPLAY
Located in Seattle, extensive collection of textiles from all parts of the world are on display. See Historical-Cultural map.

UNIVERSITY OF WASHINGTON, HENRY ART CENTER
In Seattle, it houses 19th century American and European paintings, 20th century fine prints and American pottery, and Japanese folk pottery. The Gallery, built in 1926, is included on the American Institute of Architects list of buildings of historical architectural significance. See Historical-Cultural map.

UNIVERSITY OF WASHINGTON, THOMAS BURKE MEMORIAL WASHINGTON STATE MUSEUM
Located in Seattle, the museum has a unique collection of Northwest Coast Indian material, ethnology of the Pacific Rim, geology and paleontology of the Pacific Rim, zoology, and human evolution. See Historical-Cultural map.

VIRGINIA V
Berthed at 4250 21st West, Seattle, this is the last active passenger steamer of the inland waters on the West Coast. It was an honorary fleet flagship of Puget Sound and is on the National Register of Historical Places. The ship is 125 feet long with a steam triple expansion engine; it was built in 1922 at Olalla, Washington. See Historical-Cultural map.

VOLUNTEER PARK
In addition to being a scenic park, Volunteer Park also houses a fine plant conservatory, the Seattle Art Museum, water reservoir and observation tower. See Environmental Use and Botanical maps.



"The Black Sun" by Noguchi - Volunteer Park, Seattle

W. T. PRESTON (SNAGBOAT)
The National Historic Place is located in Seattle at the Hiram Chittenden Locks on the Lake Washington Ship Canal. See Historical-Cultural map.

WARD HOME
National Historic Place in Seattle at 1427 Boren Avenue. See Historical-Cultural map.

WAWONA (SCHOONER)
This National Historic Place in Seattle is at the Police Harbor Patrol Dock at the foot of Densmore Street. See Historical-Cultural map.

WHITE RIVER
A free-flowing stream with some state-administered shorelands. It is used for kayaking. See Hydrological and Environmental Use maps.

WHITE RIVER MASSACRE
This is the site of the White River Massacre of October, 1855. It is located 1-1/2 miles north of Auburn. A marker was erected by the Washington State Historical Society in 1973. See Historical-Cultural map.

WHITE RIVER VALLEY HISTORICAL MUSEUM
Located at Auburn, pioneer artifacts and documents of White River Valley are emphasized. See Historical-Cultural map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide or national significance and reflect, in part, the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitles "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zones Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. The spotted owl (Strix occidentalis) may inhabit the Cascade Mountains of King County. Golden eagle are also noted in small numbers. Individual bald eagles have been seen wintering along the lowland river valleys. The rare pileated woodpecker is found throughout the county's forests. Great blue heron nest in the county's wetlands. Other birds noted in this county are ruffed and spruce (Franklin) grouse, band-tailed pigeon, Canada goose, osprey, hawks, and dipper.

MAMMALS. The wolverine (Gulo gulo) is increasing in numbers in the Cascades. Rare individuals may range into the county. Sizeable populations of black bear, black-tailed deer and coyote are noted. Cougar (Felis concolor) are known to range throughout this part of the state. Other important mammals noted in King County are beaver, mountain red fox in the higher elevations, fisher, mink, mountain goat, muskrat, river otter, Roosevelt elk, chipmunk, cony (pika), Douglas squirrel, fox squirrel, flying squirrel, and golden-mantled ground squirrel. Nutria were introduced to parts of the state. It is originally a South American mammal. A number of these animals inhabit the north end of Lake Sammamish.

AMPHIBIANS. The tailed frog (Ascaphus truei) inhabits rapid Cascade mountain streams of King County.

REPTILES. Pacific pond turtle (Clemmys marmarata) has a very localized breeding range in Washington.

WING LUKE MEMORIAL MUSEUM
In Seattle, the rotating exhibits emphasize Chinese history and culture. See Historical-Cultural map.

WOODLAND PARK
Seattle's zoo which includes almost 2,000 birds, animals and reptiles, picnic area and Poncho Theater where plays and dances are performed. See Environmental Use map.

YELLOWSTONE ROAD (SR 522)
Remnants of old (1910) red brick road leading to Yellowstone National Park. Historic Route. See Historical-Cultural map.

Kitsap

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Kitsap County discussion are plotted on the Archeological map and listed in its index.

BIG BEEF CREEK
The creek is located 2 miles east of Seabeck; it serves as a fisheries research area. Two hundred ninety acres are owned by the University of Washington. See Zoological-Aquatic, Hydrological, and Environmental Use map.

BLAKE ISLAND STATE MARINE PARK
This park is 425 acres in size. See Environmental Use map.

CHIEF SEATTLE'S GRAVE STATE PARK
The park is one quarter acre in size. Actually named Chief Sealth, "Seattle" was as near as the early settlers got to the Indian pronunciation of the Chief's name. He was of Salishan stock and Chief of the Duwamish tribe, occupants of the Puget Sound Region. He was born in 1786 and his life spanned the period from exploration of Puget Sound to its settlement. He died in 1866. Chief Sealth showed his friendship for the new settlement on Puget Sound during the Indian disturbance of 1855. In gratitude for his stand and respect for his leadership, the new city was named "Seattle." Chief Seattle surrendered his land, on which the city of Seattle is now located, in 1855 in the Fort Elliott Treaty. At the signing of the treaty, he addressed Governor Isaac Stevens: "My people are few. They resemble the scattering trees of a storm-swept plain....There was a time when our people covered the land as the waves of a wind-ruffled sea cover its shell-paved floor, but that time long since passed away with the greatness of tribes that are now but a mournful memory...To us the ashes of our ancestors are sacred and their resting place is hallowed ground. You wander far from the graves of your ancestors and seemingly without regret. Your religion was written on tables of stone by the iron finger of your God so that you could not forget. The Red Man could never comprehend nor remember it. Our religion is the traditions of our ancestors - the dreams of our old men, given them in the solemn hours of night by the Great Spirit; and the visions of our sachems, and is written in the hearts of our people. Your dead cease to love you and the land of their nativity as soon as they pass the portals of the tomb and wander away beyond the stars. They are soon forgotten and never return. Our dead never forget the beautiful world that gave them being....When the last Red Man shall have perished, and the memory of my tribe shall have become a myth among the white man, these shores will swarm with the invisible dead of my tribe, and when your childrens' children think themselves alone in the field, the store, the shop, or in the silence of the pathless woods, they will not be alone...At night when the streets of your cities and villages are silent and you think them deserted, they will throng with the returning hosts that once filled them and still love this beautiful land. The White Man will never be alone. Let him be just and deal kindly with my people, for the dead are not powerless. Dead - I say? There is no death. Only a change of worlds." See Environmental Use map.

DYE'S INLET
This site contains a notable shellfish population not currently certified for commercial use. See Zoological-Aquatic map.

FAY BAINBRIDGE STATE PARK
The 17 acre park is on Bainbridge Island. Camping, swimming, fishing, clamming, and boat launching are offered and trailer sites are available. There is a great blue heron rockery in the vicinity of the park. See Environmental Use map.

FERN LAKE
This 2,000 acre study area is used by Washington Department of Game, University of Washington, and U.S. Atomic Energy Commission for studies of nutrient cycling in both terrestrial and lake environments. The area's soils and the lake are very low in nutrients, and constitute an excellent long-term research site for a low productivity ecosystem. One hundred fifty acres are a watershed site. See Environmental Use and Hydrological maps.

FUNGI SITE
The area in the vicinity of Belfair is noted for its abundance and variety of higher fungi. See Botanical map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Kitsap County discussion are plotted on the Historical-Cultural map and listed in its index.

HOOD CANAL
See Puget Sound. See Mason County.

ILLAHEE STATE PARK
This 75 acre park is 3 miles northeast of Bremerton on State 306; camping, picnicking, swimming, fishing, clamming, boat launching and moorings are offered. See Environmental Use map.

KITSAP COUNTY HISTORICAL SOCIETY MUSEUM
The museum is housed in an old telephone building, built in 1910. See Historical-Cultural map.

KITSAP MEMORIAL STATE PARK
This 45 acre park is 6 miles north of Poulsbo, and affords camp and trailer sites, picnicking, swimming, fishing and clamming. See Environmental Use map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Kitsap County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrologic features covered by the Shoreline Management Act.

LONG LAKE
The lake is 314 acres, shallow, and of uncertain depth. The lake is in an advanced state of eutrophication, with dense blooms of blue-green algae occurring. This is probably a natural condition since concentrated sources are not apparent. See Hydrological map.

MANCHESTER FUEL DEPOT
East of Bremerton, the area has been identified as a possible state park. See Environmental Use map.

MILLER BAY
Swans, Canada geese, brant, and numerous duck species use this marine area on the Kitsap Peninsula for resting and feeding. See Hydrological map.

MISSOURI (BATTLESHIP) U.S.S.
National historic place at Bremerton. See Naval Facilities. See Historical-Cultural map.

MOUNTAINEERS' RHODODENDRON PRESERVE AND FOREST THEATER
The original 74-acre Rhododendron Preserve was purchased in 1916. Further acquisitions, mostly by gift, have increased the size to 170 acres of woodland near Chico Creek. Kitsap Lodge was built and other buildings have been added since, as well as the open air Forest Theater where the Mountaineer Players present an annual production on several weekends each summer. See Botanical map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Kitsap County discussion are plotted on the Geological map and listed in its index.

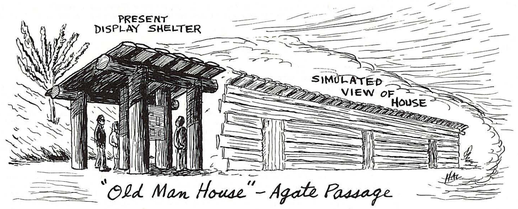
COUNTY DISCUSSION

NAVY VIEW APARTMENTS/SIDNEY HOTEL
Constructed in the late nineteenth century, Hotel Sidney Clater (renamed Navy View Apartments) was an early center of eastern culture in a primitive western environment. Long noted for its fine appearance the building has often been associated with various social and community affairs. Listed on the National Register of Historic Places as the Sidney Hotel/Navy View Apartments. See Historical-Cultural map.

NAVAL FACILITIES
The naval shipyard at Bremerton is the berthing site of the U.S.S. Missouri, site of the Japanese surrender ending World War II. A National Historic Place, other facilities include the naval torpedo station at Keyport, and the Naval Ordnance Depot at Bangor. The latter includes a nuclear submarine base that is being expanded to support the Navy's Trident submarine program. The Naval Shipyard Museum is administered by the Kitsap County Historical Society. See Historical-Cultural map.

OLD MAN HOUSE
Located in Kitsap County near Agate Pass Bridge, Old Man House is believed to have been the largest Indian dwelling on Puget Sound. Known as Tsu-Suc-Cub to the Indians, the site was the home of Chief Sealth (Seattle). Old Man House was exttremely long, variously reported to be anywhere from 500 to over 1,000 feet long and 60 feet wide. It was built of cedar logs and slabs with a shed-type roof and at one time housed eight great Indian chiefs and their people.

None of the original structure remains but the Washington State Parks and Recreation Commission has reconstructed a small section of the house which is used as a display shelter. Located one-half mile southwest of Suquamish at the north end of Agate Passage across from Bainbridge Island, it is now operated by the State Parks and Recreation Commission. Future development is being planned for an interpretive exhibit explaining the significance of Old Man House and related subjects to the public. See Archeological and Environmental Use maps.



"Old Man House" - Agate Passage

OLYMPIC JUNIOR COLLEGE
Located in Bremerton, the college was established in 1946. See Historical-Cultural map.

PORT BLAKELY
In 1863, the Port Blakely mill was put into operation, and with the help of a railroad man named Sol Simpson, the mill became the largest in the world at that time. At one time the mill employed 1,200 men and cut 400,000 feet of lumber a day. Its shipyard built the "S.S. Julia" and the gunboat "Piiotokofsky," which was converted to a log ship in later years. By the beginning of World War II, the town was almost dead and except for a short pickup during the war, the town was reduced to a suburban area for ferry commuters to Seattle. See Historical-Cultural map.

PORT GAMBLE
In 1853, A. J. Pope and Captain William Talbot of the schooner "Junis Pringle" from Maine, landed at the site later named Port Gamble, to start a sawmill. They made a mill foundation and installed a saw they brought from Maine. They sold a shipload of lumber brought from Maine to start their mill which produced 2,000 feet of lumber a day. During the next 4 years, the mill increased six times the original production. In 1857, a new mill was built with twin circular saws that could produce ship spars and timbers 60-feet long. Men were paid $30 per month for 11-1/2 hour days, 6 days a week, with few holidays. By 1870, the town had 326 people, a townhall, and a church built by the lumber company. Later a library was constructed and the town saw many attractions such as plays and circuses. After 1885 the town began to fade. Today the mill operates - the oldest operating mill west of the Mississippi River - but on a much smaller scale than before. Still standing are some Greek Revival cottages, New England boxlike houses, Victorian houses, a church, a community center, and the company store. The sawmill and docks were rebuilt in 1926.

The Port Gamble Historic District has been named a National Historic Place. The Port Gamble cemetary is being reclaimed by the wild. Those buried here are some of the first settlers in Kitsap County. See Historical-Cultural map.

PORT MADISON INDIAN RESERVATION
Ethnic Group. Reservation is in two parts. The southern part contains the grave of Chief Sealth, Chief of the Suquamish tribe and namesake of the town of Seattle. See Historical-Cultural map.

PORT MADISON MARINE SUBTIDAL AREA
This is an area of sandy muddy sediments with extensive marine life due to tidal mixing. See Hydrological map.

PUGET SOUND
Climatic, oceanographic and ecological conditions of the outer Washington coast differ significantly from conditions on protected bays and fjords of the Puget Sound and coastal estuaries. While the ecological conditions of the Washington coast are similar to those of the entire north Pacific coast, the biological diversity, the productivity and the magnitude of the Puget Sound basin are unique, both on the West Coast and the entire United States.

The Puget Sound system was carved by glaciers and the inland waters of Puget Sound and the Strait of Georgia comprise some 1,800 miles of shoreline. The major sub-basins consist of the following: North Sound and the San Juan Island groups; the Strait of Juan de Fuca; the Whidbey Island basin; Admiralty Inlet; Puget Sound from south Whidbey Island to Tacoma; South Puget Sound basin; and Hood Canal. Puget Sound has a maximum depth of 930 feet, an average depth of 220 feet and includes literally hundreds of shallow estuaries which drain portions of the Olympic and Cascade Mountains and surrounding low hills. The average fresh water inflow to Puget Sound is some 10,500 billion gallons (32.1 million acre-feet) annually. Near shore, ocean waters are exchanged rapidly by long-shore currents, tidal action and upwelling ocean currents. Deeper waters of Puget Sound are replaced several times annually, while surface waters which depend on fresh water inflow and tidal mixing are exchanged more frequently. Certain areas in Hood Canal, which are typified by limited water circulation, have poor flushing characteristics and water replacement occurs about once a year.

Most waters of Puget Sound exhibit ebb and flood currents of approximatly one knot. Channels such as Boundary Pass and Haro Strait are typified by turbulent flood and ebb tides of 4 to 6 knots. Narrow passages such as Rosario Strait in the North Sound basin and the Tacoma Narrows in the Puget Sound basin exhibit turbulent rips and whirlpools, and ebb and flood currents of 5 to 7 knots.

The Strait of Juan de Fuca from Dungeness to Cape Flattery is typified by narrow beaches and steep, high bluffs with intertidal rock outcrops. Isolated, submerged shoals protrude from depths of 60 to 80 fathoms up to depths of 2 to 8 fathoms along the easterly 30 miles of the Strait.

The marine ecology of Puget Sound as a total system is far more varied than any other marine environment along the West Coast of the United States. The water quality of Puget Sound is generally excellent although localized industrial activities around the urban centers of Tacoma, Seattle and Anacortes have created limited water quality problems. Industrial activity around the cities of Everett and Bellingham have seriously degraded water quality conditions for purposes of recreation or fish production.

Within the North Sound and San Juan Island basin, oceanographic and ecological conditions strongly resemble the outer coast region due to the presence of well-mixed, productive waters from the Strait of Georgia and the Strait of Juan de Fuca. The San Juan Island group is well known for its abundance and diversity of marine life. Dense communities of marine invertebrates inhabit the rocky shores and reefs of some 170 islands in this group. Marine algae, kelp and marine spermatophytes such as eelgrass (Zostera marina) and glasswort (Salicornia spp.) are distributed throughout the archipelago reflecting varied environmental and oceanographic conditions.

The marine environment of mainland shores bordering the North Sound sub-basin are strongly influenced by fresh water inflow from the Nooksack, Samish and Skagit River systems. Skagit and Padilla Bay are among the most valued remaining estuaries in the Puget Sound system. Estuarine marshlands and long-shore waters of the North Sound basin provide feeding habitat for large numbers of loons, grebes, cormorants, seaducks, gulls, and alcids like pigeon guillemonts, representing one of the highest densities for a similar habitat anywhere in Washington state. The water is relativvely shallow, clean and productive and abounds with marine plants, crustaceans and herring-like fish.

The remaining portions of Puget Sound and Hood Canal are isolated from the cool, saline ocean waters of the Strait of Juan de Fuca. Wave climate, currents and water exchange are much reduced in lower Puget Sound; many organisms typical of ocean coast conditions are replaced by species tolerant of brackish water and moderate temperature variations.

Ecological conditions vary from pristine salt marsh estuaries such as Nisqually flats to near outer coast conditions such as the Tacoma Narrows. Typically, the majority of the Puget Sound basin consists of rocky sand and gravel beaches. Subtidal areas are covered by expanses of marine algae, and attached invertebrates such as barnacles, anemones, sea stars, and mollusks produce tremendous quantities of zooplankton.

Explored by George Vancouver, Puget Sound was named for Peter Puget, a member of his crew. Puget Sound provided nourishment and transportation means for an extensive and prosperous Indian population before the 19th century. Today its salmon runs must be sustained by hatcheries but the natural fishery provides substantial quantities of shrimp, flounder, hake and sea bass. Fish and shellfish culture is a rapidly growing industry with enormous potential if water quality can be sustained. See the entry "Trotten, Eld and Case Inlets" in Thurston County for discussion of the oyster industry. See Hydrological map.

RESTORATION POINT
This is the site of a tilted, stratified rock formation. See Geological map.

SCENIC BEACH STATE PARK
The 71 acre park is 12 miles northwest of Bremerton, and offers camping, swimming and fishing. See Environmental Use map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

S.S. SAN MATEO (FERRYBOAT)
This National Historic Place is at Eagle Harbor on Bainbridge Island. See Historical-Cultural map.

VIKING FEST
A Norwegian Independence Day Celebration held on the weekend closest to May 17th. See Historical-Cultural map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide and national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. Bald eagle, band-tailed pigeon, ducks, geese, great blue heron, and spotted owl inhabit Kitsap County.

MAMMALS. Beaver, black-tailed deer, cougar, mink, and muskrat are known in the county. Common Red fox (Vulpes vulpes fulva) are frequently seen throughout lowlands in north Kitsap County. Coyotes frequent most of Kitsap County. The chipmunk, coxy, Douglas squirrel, fox squirrel, flying squirrel, and golden-mantled ground squirrel are noted as resident small mammals.

Kittitas

AGATE AND PETRIFIED WOOD EXPOSURE
Blue agate and petrified wood are found east of Ellensburg. See Geological map.

ALPINE LAKES WILDERNESS AREA, SNOQUALMIE AND WENATCHEE NATIONAL FOREST
See King County.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Kittitas County discussion are plotted on the Archeological map and listed in its index.

BLEWETT PASS
See Chelan County.

CACTUS HILL
A large community of Cactus coryphantha (formerly Mammalaria) are found here. While this is not an uncommon species, this hill has an unusually large community. See Botanical map.

CENTRAL WASHINGTON STATE COLLEGE.
Located at Ellensburg, the college was established in 1890. See Historical-Cultural map.

CLE ELUM LAKE
This is a large irrigation reservoir. Recreational activities include fishing, swimming, boating, water skiing, and picnicking. See Hydrological map.

CLE ELUM RIVER
This free-flowing river is used for kayaking and canoeing. It contains a resident trout population. See Hydrological map.

COLOCKUM WILDLIFE RECREATION AREA
One of eastern Washington's most important elk wintering areas, the Colockum (115,527 acres) is the largest single land holding of the Game Department. It lies west of the Columbia River, south and east of Colockum Pass Road, and north of State Highway 10.

The Colockum is famous for Rocky Mountain elk, and also has mule deer, pronghorn antelope, chukar, valley quail, Merriam's turkey, ruffed grouse, sage hen, pheasant, and dove. This area supports a population of California highorn sheep, (Ovis canadensis californiana). It is important to management for big game and upland game, and its grain fields, flats, and protected bays along the Columbia are excellent waterfowl habitat.

Rolling, open sagebrush hills drop off to steep cliffs along the Columbia where Indian artifacts and petrified wood may be found. At higher elevations, timbered draws give way to ponderosa pine stands near the Colockum's boundary with Snoqualmie National Forest and state-owned lands. See Zoological-Terrestrial map and Environmental Use maps.

COLUMBIA RIVER
See Clark County

CRESCENT BAR
This large gravel bar located on the Columbia River near the mouth of Moses Coulee, shows enormous ripple marks created by the Missoula floods of the late Pleistocene. Downstream from Crescent Bar, on the west bank of the River, is a standing petrified tree. See Geological map.

DENNY MOORE FOREST
Located in the upper Cle Elum River Valley, the forest covers 450 acres. It is owned by the University of Washington. See Environmental Use map.

DEROUX CREEK CAMPGROUND AND END OF THE ROAD
Campground and trails up valley and up hillside offer a unique combination of coniferous trees, as well as unusual flowers. See Botanical map.

ENGLEHORN POND
The 1.5 acres of cattail-willow marsh in an urban setting (Ellensburg) is owned by the Nature Conservancy. See Botanical and Hydrological maps.

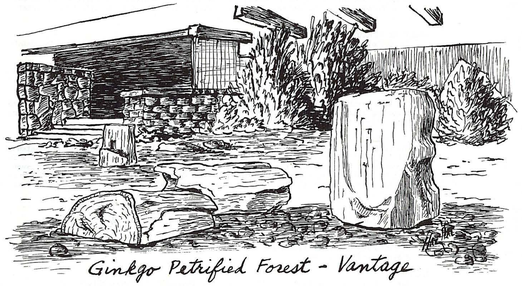
ELLENSBURG GAME FARM
The Game Farm is 3 miles north and east of Ellensburg. This farm produces an average yearly crop of 10,000 pheasants and 2,000 chukar partridge. Following a severe winter when wild stock is depleted, the Ellensburg Game Farm ups its chukar production to 6,000 birds. This game farm supplies pheasants for release in Kittitas, Yakima, Benton and Chelan counties. All released chukars in eastern Washington are raised on this game farm. See Environmental Use map.

FUNGI SITES
The following areas in this county are noted for their abundance and variety of higher fungi or important species: Stampede Pass Vicinity, Keechelus Area, and Cle Elum River and Upper Teanaway River Valleys. See Botanical map.

GIANT RIPPLES
These giant gravel ripples, up to 20 feet high and 100 feet apart, were formed by ancient glacial floods. See Geological map.

GINKGO PETRIFIED FOREST INTERPRETIVE CENTER
Located near town of Vantage along Route 90 on Columbia River, petrified wood and Indian relics may be seen. See Historical-Cultural map.

GINKGO PETRIFIED FOREST STATE PARK
The park is located 29 miles east of Ellensburg on Highway 10(I90). This petrified forest represents one of the most unusual fossil localities in the world. Few fossil beds yield a flora so diverse--over 200 varieties of wood have been identified, and unlike most other petrified forests in the world, the trees were entombed and petrified in once molten lava. Because of its unique character, this 7,500-acre park has been designated a Registered Natural Landmark by the U.S. Department of the Interior. Fossilized trees and others date back 15 million years. The fossil trees, including the ginkgo, occur in interbedded lacustrine sediments of Miocene age deposited during intervals of basaltic lava extrusions. Among the varieties of wood represented, including ginkgo, are: fir, spruce, Douglas-fir, redwood, dawn redwood, swamp cypress, yew, maple, buckeye, alder, birch, hickory, persimmon, beech, ash, bay, witch hazel, walnut, red gum, mountain ash, sour gum, sycamore, cottonwood, oak, and elm. The presence of ginkgo in fossil form and the diversity of other genera and species of wood in the deposits are factors contributing to the national significance of this site and its eligibility as a Natural Landmark. See Enviromental Use and Geological maps.


Ginkgo Petrified Forest - Vantage

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Kittitas County discussion are plotted on the Historical-Cultural map and listed in its index.

JOHNSON CREEK
Rich desert flora including ribes, clematis, and sage are on this site. See Botanical map.

KACHESS LAKE
This is a large irrigation reservoir. Recreational activities include fishing, swimming, boating, water skiing and picnicking. See Hydrological map.

KEECHELUS LAKE
This is a large irrigation reservoir. Recreational activities include fishing, swimming, boating, water skiing, and picnicking. See Hydrological map.

LAHAR DEPOSIT
Exposure in road cut bluff of several beds of volcanic derived sediments which represent a mud and earth flow slurry called a lahar. See Geological map.

LAKE EASTON STATE PARK
The 158-acre park is just off U.S. 10 at Easton. It has camping, picnicking, swimming, fishing, and boat launching. See Environmental Use map.

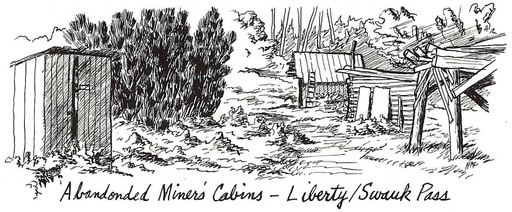
LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Kittitas County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

L. T. MURRAY STATE WILDLIFE RECREATION AREA
See Oak Creek Wildlife Recreation Area.

LIBERTY
Liberty became a ghost town in much the same way it became a boom town. When the mining operations which spawned it slowed down, and stories of the Yukon strike reached the town, the entire population left for those greener pastures. Some people returned and some newcomers stayed awhile, but by the late 1930's the town had died, leaving only memories of the yearly dances marking the beginning of deer season which attracted people from as far away as Montana. These celebrations usually turned into a brawl. Today, Liberty stands as a quiet reminder of the past with some of its cabins being used by summer dwellers, but no business is carried on along its streets. See Historical-Cultural map.

MANASTASH RIDGE
An abundance and variety of wildflowers are located here, including Lewisia redeviva and Lewisia tweedyi (bitterroots), the rather rare Hesperochiron pumilus and dozens of others. See Botanical and Geological maps.

MISSION CREEK
Proposed Wilderness Area. See Environmental Use map.


Abandonded Miner's Cabins - Liberty/Swauk Pass

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Kittitas County discussion are plotted on the Geological map and listed in its index.

NACHES PASS WAGON ROAD
There are some 80-year old blazes on trees and route markers on the Naches Pass Wagon Road. These blazes are especially vulnerable to vandalism. The continuous 7-mile section of wagon road may be the longest remaining section of undisturbed pioneer road left in the United States. See Pierce County. See Historical-Cultural map.

NACHES RIVER
This river is an anadromous (salmonid-steelhead) fish route and contains a trout population. See Zoological-Aquatic map.

NORTHWESTERN IMPROVEMENT COMPANY STORE
This building, at First Street and Pennsylvania Avenue in Roslyn, is a National Historic Place. Not mapped.

MOUNTAINS NORTH OF DUTCH MILLER GAP-WAPTUS RIVER AND SOUTH OF THE CLE ELUM RIVER.
The mountains in this area include: Cathedral Rock, Mount Daniel, Mount Hinman, Bears Breast Mountain and the Citadel. See Geological map.

OAK CREEK, WENAS, AND L. T. MURRAY WILDLIFE RECREATION AREA
L. T. Murray (103,461 acres), Wenas (17,099 acres) and Oak Creek (85,598 acres) comprise the largest land complex owned by the Game Department. Over 200,000 acres of typical eastern slopes Cascade timberland and grassy rangeland are included in this complex, located west and and north of Yakima and stretching along the entire Yakima River to Ellensburg.

The western portions, bordering national forest lands, are primarily heavy ponderosa pine timber. Timber gives way to more open forest and rangeland farther east and in the extreme eastern section one finds the typically rugged and hilly cheatgrass covered country of chukar and bighorn sheep. There is excellent elk hunting in the timbered and semi-open areas, while some of the region's finest chukar hunting occurs along breaks of the Yakima and Naches Rivers. Outstanding opportunities are available for all outdoorsmen who may wish to snowmobile, camp, hike or fish in the numerous trout streams found throughout this vast complex.

Famous nationwide is the elk winter feeding operation at Oak Creek headquarters. During severe winters as many as 4,000 elk may utilize various feed stations and public viewing at Oak Creek headquarters may attract 2,000 persons daily during peak of feeding operations. See Zoological-Terrestrial and Environmental Use maps.

OLALLIE MEADOWS
The meadow trail begins above the ski slopes on the south side of Snoqualmie Pass. Rare high-mountain bog plants can be found growing in the area. See Botanical map.

OLD DURR WAGON TRAIL
This historic route contains prime habitat for sage grouse (Centrocercus urophasianus) and white-tailed jackrabbit. See Zoological-Terrestrial and Historical-Cultural maps.

OLD STAGE COACH ROAD (COLOCKUM PASS TRAIL)
Historic Route. See Historical-Cultural map.

OLMSTEAD PLACE STATE PARK
This National Historic Place is 4 miles east of Ellensburg on the east side of Coleman Creek and south of Kittitas Highway on Squaw Creek Trail Road. The park encompasses the original 2.18-acre farm homesteaded in 1875 by Samuel Bedient Olmstead. Included is the original log cabin, dairy barn, granary, wagon shed, hay barn and a 1908 family house.

This farm was homesteaded in 1875 by Samuel Bedient Olmstead and is a good example of pioneer agriculture in the State of Washington. Several historic buildings remain standing; the most impressive is the original log cabin built in 1875. Present plans for the park include: restoration and preservation of existing buildings, development of an Interpretive Center on agriculture, construction of shelters to store and display farm equipment, and development of recreational facilities. The park is managed by the Washington State Parks and Recreation Commission. See Environmental Use and Historical-Cultural maps.

PETRIFIED WOOD TREE
Located near Vantage. See Gingko Petrified Forest State Park. See Geological map.

PLANT COMMUNITIES
The climax plant communities listed below occur in the county. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Big sagebrush - bluebunch wheatgrass
Bitterbrush - Idaho fescue
Stiff sagebrush - sandberg bluegrass

QUARTZ MOUNTAIN, SNOQUALMIE NATIONAL FOREST
See Environmental Use map.

ROSLYN
Roslyn sprang up almost overnight when the Northern Pacific ran a line to the outcropping of coal along Smith Creek east of Stampede Pass in 1886. Three years before, mining had started and Roslyn came into being. Until 1898 the mines and the town were run by the railroad company. After that time private owners were installed due to anti-trust legislation. The people had good and hard times, depending on the mines and their operation. In 1904 the population was 4,000, but fell to 2,289 by 1930. Today many buildings and mining evidences are left, but few people remain. The Northwestern Improvement Company Store is on the National Register of Historic Places. See Historical-Cultural map.

ROSLYN HISTORICAL SOCIETY MUSEUM
Located in Roslyn, it exhibits early mining and life in a pioneer mining town. See Historical-Cultural map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SENTINAL GAP
This is a gap along the Columbia River between Beverly and Priest Rapids. See Geological map.

SNOQUALMIE PASS SKI MEET
This meet takes place at the Snoqualmie Summit in mid-March. See Historical-Cultural map.

COUNTY DISCUSSION

SNOQUALMIE PASS PEAKS
The ridge east of Gold Creek and North of Keechelus Lake contains Mount Margaret, Rampart Ridge and Alta Mountain, noted climbing areas.

The following mountain climbing areas are located on the Cascade Crest or just east of the crest from Snoqualmie Pass to Dutch Miller Gap: Kendall Peak, Alaska Mountain, Huckleberry Mountain, Chikamin Peak, Lemah Mountain, Chimney Rock, and Overcoat Peak. See Geological map.

TANEUM LAKE
The 1,260 acres surrounding Taneum Lake contain excellent examples of succession in the Ellensburg area containing pine, larch and Douglas-fir; drainage characteristics of this area are an example of eastside Canadian Life Zone. See Botanical map.

TEANAWAY RIVER
This is a free-flowing stream, used for kayaking. The river contains trout populations and is a popular big game area. See Hydrological map.

UMTANUM CANYON
This is an important habitat of endangered, rare and otherwise important species, including the following: prairie falcon (Falco mexicanus); red-tailed hawk (Buteo jamaicensis); western rattlesnake (Crotolus viridis); racer (Coluber constrictor); gopher snake (Pituophis melanoleucus); southern alligator lizard (Gerrhonotus multicarinatus - this is the farthest northern extension of this species' range); sharp-tailed snake (Contia tenuis); and the long-toed salamander (Ambystama macrodactylum). See Zoological-Terrestrial map.

UMTANUM FALLS
This is a secluded waterfall about 25 feet high with an abandoned waterflow about 100 feet downstream. The falls occupy a deep trench in the basalt and their setting is surprising, containing humid vegetation amidst the semi-arid vegetation of adjacent upland. See Hydrological map.

UMTANUM ROAD LEWISIA
A good community of apricot bitterroot (Lewisia tweedyi) is located along the Umtanum Road. See Botanical map.

VERTICAL DIKES
Many north-trending vertical dikes can be found on both slopes of Swauk (Blewett) Pass. See Geological map.

WANAPUM TOUR CENTER
At Wanapum Dam, mementos from early Indian, trapper, miner and pioneer homestead days to present times are displayed. See Historical-Cultural map.

WENAS CREEK VALLEY
In vicinity north of Naches, it is a critical elk wintering grounds. See Oak Creek entry. See Zoological-Terrestrial map.

WHISKEY DICK-BOYLSTON MOUNTAIN AREA
This is a big sagebrush-bluebunch wheatgrass community providing outstanding habitat for the following species: Swainson's hawk (Buteo swainsoni); Townsend ground squirrel (Citellus townsendi); least chipmunk (Eutamias minimus); sage thrasher (Oreoscoptes montanus); sage grouse (Centrocercus urophosianus); Brewer's sparrow (Spizella breweri); loggerhead shrike (Lanius ludovicianus); racer (Coluber constrictor); gopher snake (Pituophis melanoleucus); Great Basin spadefoot toad (Scaphiopus intermontanus); short-horned lizard (Phrynosama douglassi). This area is also a winter feeding ground for elk from the Colockum Wildlife Recreation Area during especially harsh winters. See Zoological-Terrestrial map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide or national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled, "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled, "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. The spotted owl occurs in the Cascade Mountains. Prairie falcon are noted nesting within the Yakima River canyon. Bluebird, Brewer's sparrow, buzzard, Swainson's hawk, sage grouse, Herriam's turkey and partridge are noted in Kittitas County.

MAMMALS. Kittitas County is a general area of importance to bighorn sheep (Ovis canadensis) whose total state population in this and other counties is 440. Drainages which contain critical elk wintering range consist of a narrow band 2 to 5 miles west of the Columbia River Valley from Taneum Creek to Manastash Creek, the Manastash Creek Valley, the Wenas Creek Valley in the vicinity north of Naches, and scattered ranges from the Teanmway River Valley southeast to a point about 10 miles east of Kittitas, and the Yakima River Valley about 10 miles west of Cle Elum. Other elk wintering grounds include a narrow band 2-5 miles west of Columbia River, from Rock Island Dam to I-90. Critical mule deer wintering grounds within Kittitas County include: Manastash Creek Valley; Taneum Creek Valley; Umtanum Creek Valley (from the Teanmway River southeast along a narrow belt to about 5 miles east of Kittitas); and the Yakima River Valley (from northwest of Cle Elum to confluence with Wenas Creek, and from Taneum Creek to Manastash Creek). Kittitas County is part of the limited range of some 100 pronghorn antelope (Antilocapra americana oregon). The wolverine, badger, fisher and pine marten occupy the forests of the Cascade Mountains, and are noted in Kittitas County. Cougar, coyote, and Rocky Mountain elk are also noted. The Douglas squirrel, fox squirrel, flying squirrel, whitetailed jackrabbits, golden-mantled ground squirrel, and hoary marmot are some of the small mammals noted. Merriam's shrew (Sorex merriami), the rare sage vole (Lagurus curtatus) are found in Badger Pocket, Saddle Mountain and east of Saddle Mountain. A subspecies of the coast mole (Seapanus orarius yakimensis) has a restricted range in Yakima and Kittitas Counties. The least chipmunk (Eutamias minimus scrutator) has a restricted range in Yakima, Benton, and Kittitas Counties.

REPTILES. The sharp-tailed snake (Contia tenuis) and western alligator lizard are noted in the county.

YAKIMA CANYON
An area of importance for the prairie falcon, white-tailed jackrabbit, and sharp-tailed snake. Yakima River cuts across several anticlines of northwest-southeast trending ridges. See Geological and Zoological-Terrestrial maps.


Yakima River Canyon - State Route 821

YAKIMA FIRING CENTER
See Yakima County.

YAKIMA RIVER
See Yakima County.

YAKIMA RIVER WATERGAP
The watergap is on the Yakima River between the cities of Yakima and Ellensburg. See Hydrological map.

Klickitat

ALDER CREEK, PINE CREEK, WOOD GULCH AND ROCK CREEK DRAINAGES
Cultural and paleontological evidence, exposed minerals, remnants of bunchgrass prairie, and waterfowl, upland bird and big game hunting are found throughout these drainages. All drainages provide key wildlife habitat and trout fishing in several streams. See Geological, Hydrological, Botanical and Zoological-Terrestrial maps.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Klickitat County discussion are plotted on the Archeological map and listed in its index.

BASALT DIKES
Seven dikes on the north side of the Columbia are possible feeders for some of the ancient lava flows of the Columbia Plateau. See Geological map.

BICKLETON OAK GROVE
This is an unusual stand of oak. See Botanical map.

BIG LAVA BED
The bed has ropy lava surfaces. See Geological map.

BIG WHITE SALMON RIVER CANYON
Canyons of the little White Salmon River, Big White Salmon River and the Klickitat River are particularly important as winter range for big game animals and anadromous fish runs. Most of the area in these river canyons remains undeveloped. See Geological, Zoological-Terrestrial and Zoological-Aquatic maps.

BINGEN ANTICLINE, COLIMBIA RIVER GORGE
East of Bingen is an east-dipping stratum which represents part of the Bingen Anticline. This exposed formation contrasts dramatically with the generally horizontal Columbia River Basalt formations which characterize most of the gorge. The point where the anticline crosses and then dips below the river level is quite obvious when viewed from Interstate 80-N. See Geological map.

BROOKS MEMORIAL STATE PARK
The park covers 700 acres. See Environmental Use map.

COLUMBIA RIVER
See Clark County.

COLUMBIA RIVER GORGE
Columbia River Basalts represent the largest accumulation of basalts in the world. Petrified wood and diatomaceous earth are found between some layers. See Geological and Botantical maps.

CONBOY LAKE NATIONAL WILDLIFE REFUGE
In the process of acquisition and now containing 6,200 acres, the area will ultimately contain some 9,300 acres of marsh, meadows, uplands and forest located five miles south of Glenwood. Management will be directed at restoring the area to its historic prominence as an abundant wildlife area being particularly important to migrating and nesting waterfowl. Hunting for upland game, big game and waterfowl; fishing for trout and bullhead as well as wildlife observation are the area's most popular public uses. See Environmental Use and Zoological-Terrestrial maps.

DEAD CANYON
An important area for deer, upland birds, and waterfowl. See Zoological-Terrestrial map.

FUNGI SITES
The following areas in this county are noted for their abundance and variety of higher fungi or important species: Glenwood—Trout Lake Area and Nestor Peaks. See Botanical map.

GIANT EROSIONAL SCARP
A large cliff, resembling a fault, is an erosional feature produced by flood waters during "Missoula floods." See Geological map.

GOLDENDALE FISH HATCHERY
State Game Department. Sepcies propagated: trout and steelhead trout. Water source: springs. See Zoological-Aquatic map.

GOLDENDALE JAMBOREE
The Jamboree takes place in Goldendale the fourth week of July. See Historical-Cultural map.

HOOD RIVER SYNCLINE
This structural syncline forms a valley. See Geological map.

HORSETHIEF LAKE
The basalt cliffs on the northeastern corner of this lake still contain unflooded early Indian petroglyphs. Since many of the petroglyphs have been inundated by the numerous Columbia River dams, the few remaining sites are particularly important. See Archeological map.

HORSETHIEF LAKE STATE PARK
The 293 acre park is 6 miles east of Lyle on U.S. 830. It offers swimming, picnicing, fishing, and boat-launching facilities. See Environmental Use map.

JUNIPER STAND
A distinctive stand of juniper may be found north of the town of Alderdale in Klickitat County. See Botanical map.

KLICKITAT COUNTY HISTORICAL SOCIETY MUSEUM
At Goldendale the museum is housed in a 20-room Victorian mansion furnished with pioneer items of the area. See Historical-Cultural map.

KLICKITAT RIVER
Nearly the entire length of this river is valuable for its steelhead fishing, particularly the summer run. Also many species of wildlife occur in the Klickitat Wildlife Recreation Area through which the Klickitat River flows. Some of these are blacktail deer, Merriam's turkey and bighorn sheep. A few of the more than 100 nonhunted species which are resident there are the bald and golden eagle, prairie falcon, foothill alligator lizard and marmot.

The river contains spring chinook providing angling from April through June, and fall chinook during late August and September and coho salmon from September through late October. Jack salmon are abundant.

The Klickitat River Canyon area includes the canyons of the Little White Salmon River, Big White Salmon River, and the Klickitat River. It has been suggested these areas be preserved as winter range for big game animals and anadromous fish runs. The Klickitat River Valley up to White Creek is a valued big-game habitat. Most of these river canyons remain undeveloped.

The Klickitat River Gorge is one of the most spectacular basalt gorges on the Columbia River system. This gorge is also the last spot on the Columbia River where the Indians are able to fish using their traditional dip-net method. See Hydrological, Geological, Zoological-Terrestrial, Zoological-Aquatic and Botanical maps.

KLICKITAT STATE SALMON HATCHERY
State Fisheries Department. Species propogated: spring chinook and coho salmon. See Zoological-Aquatic map.

KLICKITAT WILDLIFE RECREATION AREA
The Klickitat (11,103 acres) lies along the Klickitat River breaks off the main county road between Glenwood and Goldendale. It is known for blacktail deer, Merriam's turkey, chukar, black bear, bighorn sheep, valley quail, bandtail pigeon and dove. Bald and golden eagle, prairie falcon, kingbird, mountain bluebird, alligator lizard and marmot are a few of the more than 100 non-hunted animal species living here. Steelhead fishing is outstanding; the Klickitat River ranks as a top summer-run stream. The rare Lazuli Bunting has been recorded there.

The Klickitat's semi-open oak forests are interspersed with stands of ponderosa pine. Steep, basalt cliffs and talus slopes lead from highlands to the river below. See Environmental Use and Zoological-Terrestrial maps.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Klickitat County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LAVA TUBES AT TROUT LAKE VALLEY
Located south of Mount Adams, this lava flow with lava tubes serves as winter hibernating sites for a local species of bat Plecotus townsendii and a few migratory species of bats- M. lutifugus, M. volans, M. yomanensis, and M. evotis. These represent one of the only two known large (300+) colonies of Plecotus townsendi remaining in Washington. This species has declined in number in recent years. See Geological map.

LEWIS AND CLARK TRAIL
See Clark County.

LITTLE KLICKITAT RIVER
This river is an anadromous (salmonid-steelhead) fish route and contains a trout population. The Little Klickitat River Canyon from High Prairie to its mouth is a valued big-game habitat. See Zoological-Aquatic and Zoological-Terrestrial maps.

LITTLE WHITE SALMON RIVER VALLEY
See Big White Salmon Valley and Klickitat River.

LOG CABIN, APPLETON
Residents of the isoloated town of Appleton in the early 1900's joined together to build a place for entertainment and community gatherings. Six acres of land were bought in 1910. The Appleton Progressive Club set up a corporation in 1913 with residents of Appleton buying shares in the corporation. Those who could not afford to buy shares earned them building the club. Construction of the log cabin was started in late 1913, using local Douglas-fir, and was finished the following Spring. Residents used the building for dances, potlucks, school programs and many other uses. It was the focal point for town life for many years. See Historical-Cultural map.

MAJOR CREEK CANYON
A valuable big game habitat from Mountain Brook School and Snowden vicinity to mouth of canyon. On west Major Creek, deer winter in surrounding 120 acre area, 80 acres of it are owned by the Department of Natural Resources. See Zoological-Terrestrial map.

MARYHILL
The community was first named Columbus, but was later renamed by Samuel Hill, son-in-law and employee of railroad tycoon James Hill. Sam Hill studied law at Harvard and worked for James Hill as a legal consultant. He married Mary Hill, the oldest daughter of James Hill in 1888. After World War I, Sam Hill purchased 7,000 acres along the Columbia, including Columbus, to start a Quaker colony. The colony failed bacause of adverse weather conditions and poor land, but in 1913 construction began on what would be the most conspicuous structure anywhere along the Columbia, an imposing feudal castle. Sam Hill supervised both the structure of the castle and a replica of England's Stonehenge, dedicated in 1926 by Queen Marie of Romania. Within 2 years of its dedication, the castle was finished and included electricity, plumbing, and other refinements foreign to the traditional castle. Maryhill Castle was never seen by its namesake. Her mind was failing and she was kept in the Seattle mansion. Sam Hill died in 1931 leaving an endowment in the hands of trustees of the state to perpetuate the building as a museum. Maryhill was opened to the public in 1940 and has attracted an increasing number of visitors each summer since then. See Historical-Cultural map.


Mushroom Harvesting - Glenwood

MOSIER SYNCLINE
This structural downwarp is partially occupied by the Columbia River. See Geological map.

MOUNT BROOK
West Major Creek Canyon enters the Columbia River as Major Creek. Camas beds used for food by the Indians are here. The area was once rich with wildflowers, but heavy grazing has destroyed many of them. Orchids abound under Douglas-firs, and calypso beds are in swathes of several hundred feet. Mountain bluebirds nest here. This 120 acre area contains the only stand of old-growth Douglas-fir left in the area. See Botanical, Archeological, and Zoological-Terrestrial maps.

MOUNTAINS, PEAKS, ETC.
Some of the geological feautres of the state which are not specifically mentioned here in the Klickitat County discussion are plotted on the Geological map and listed in its index.

ORTLEY ANTICLINE
East of Lyle, Washington, this large flexure thrust westward crumpling and fracturing the western limb. See Geological map.

PETRIFIED WOOD, AGATE, AND JASPER EXPOSURE
Located west of the city of Bickleton in the north-central part of the county. See Geological map.

PINE CREEK CANYON
An important area for deer, upland birds, and waterfowl. See Zoological-Terrestrial map.


Columbia River Gorge

PLANT COMMUNITIES
The climax plant communities listed below occur in the county. Some of the species are briefly mentioned in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Douglas buckwheat - sandberg bluegrass
Rock buckwheat - sandberg bluegrass
Thyme buckwheat - sandberg bluegrass
Pacific silver fir - deerfoot vanillaleaf
Stiff sagebrush - sandberg bluegrass

ROCK CREEK CANYON
From Box Canyon to the mouth of the Klickitat, including parts of Squaw Creek drainage, this is valued big-game habitat. Important animals include deer, upland birds, and waterfowl. See Zoological-Terrestrial map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SKI AND TOBOGGAN TOURNAMENT
Taking place at Guler, it is sponsored by Klickitat County in January. See Historical-Cultural map.

STONEHENGE REPLICA
This World War I memorial was built to honor the dead of Klickitat County by Samuel Hill, founder of the Maryhill Museum of Fine Art. It is an outstanding landmark and an engineering triumph of early concrete construction technology. See Maryhill. See also Historical-Cultural map.

THE DALLES SYNCLINE
A down-fold east of Ortley anticline, it shows tilted beds of syncline; also the basalts show scabland topography cut by "Missoula floods." See Geological map.

TROUT LAKE
The lake is near the headwaters of White Salmon River. See Hyrological map.

TROUT LAKE BAT CAVE AREA
See Lava Tubes at Trout Lake Valley.

WAKEMAP MOUND
A portion of a mound of cultural midden, very large and very rich in Indian artifacts, may still be seen above the water of the Dalles Dam Reservoir. See Archeological map.

WEST MAJOR CREEK CANYON
Rattlesnake dens are in this canyon. See Zoological-Terestrial map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part the year. These species were identified as being of statewide and national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Geological section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitles "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. Prairie falcon, bald eagle, golden eagle, Merriam's turkey, ring-necked pheasant, and wood duck are indentified as species of Klickitat County.

MAMMALS. The Status Creek Valley upstream from the confluence with Logy Creek is noted as critical deer wintering grounds. Bighorn sheep, mule deer, rocky mountain elk, cougar, wolverine, pine marten, mountain red fox, chipmunk, cony (pika), western gray squirrel, red squirrel, Douglas squirrel, fox squirrel, flying squirrel, golden-mantled ground squirrel, hoary marmot, and bats have been identified within the county.

REPTILES. The foothill alligator lizard has a restricted range in Washington. The best habitat for this lizard seems to be near the lower part of the Klickitat River. The California mountain king snake (Lampropeltis zonata) is apparently a rare species with an isolated and restricted range in the lower Klickitat River valley. The striped whipsnake (Masticophis taenitus) is restricted to a range in south-central Washington. The ring-necked snake (Deadophis punctatus), and the sharp-tailed snake (Contia tenius) are found in Klickitat County. An occurrence of the Pacific pond turtle (Clemmys marmorata) is noted near Lyle.

AMPHIBIANS. The tailed frog (Ascophus truei) inhabits the rapid mountain streams of the Cascades, and the woodhouse toad (Bufo woodhouset) is noted in the upper Columbia River Gorge.

WISHRAM INDIAN VILLAGE SITE
This is a National Historic Place, 5 miles northwest of The Dalles. See Historical-Cultural map.

WOOD GULCH
An important area for deer, upland birds, and waterfowl. See Zoological-Terrestrial map.

YAKIMA INDIAN RESERVATION
Ethnic group. See Environmental Use and Historical-Cultural maps.

Lewis

AGATE EXPOSURE
The exposure is found near Centralia. See Geological map.

ANDESITE FORMATION
This major mass of "clean" crystalline lava is visible from the White Pass Highway. See Geological map.

COUNTY DISCUSSION

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Lewis County discussion are plotted on the Archeological map and listed in its index.

BASALT PALISADES
These tall basalt palisades form part of the deep canyon wall along the river. There is a good view from the lookout. Some folding and horizontal displacement of the columns is also visible. See Geological map.

BUTTER CREEK RESEARCH NATURAL AREA
This area has been classified as a research natural area by the Forest Service. It exemplifies a mosaic of subalpine communities including closed forest, parkland, shrubfields and meadows.

Primary forest cover type, SAF-226, Pacific Silver Fir-Hemlock (1,000 acres). Other important forest cover types: SAF-205, Mountain Hemlock-Subalpine Fir (250 acres). Total area of natural area: 2,000 acres. Elevation: 3,400 - 6,900 feet.

A variety of animals inhabit the natural area. Mammals include blacktail deer (Odocoileus hemionus columbianus), black bear (Ursus americanus), raccoon (Procyon lotor), hoary marmot (Marmota caligata), chipmunks (Eutamias spp.), golden-mantled ground squirrel (Citellus saturatus), Douglas squirrel (Tamiasciurus douglasii), varying hare (Lepus americanus), mink and weasel (Mustela spp.), pocket gophers (Thomomys spp.), pika (Ochotona princeps brunnescens), pine marten (Martes americana), cougar (Felis concolor), and beaver (Castor canadensis). Important resident birds include blue grouse (Dendragapus obscurus), spruce grouse (Canachites canadensis), white-tail ptarmigan (Logopus leucurus), gray jays (Perisoreus canadensis), and Clark's nutcrackers (Nutcifraga columbiana); the last species named is an important carrier for the distribution of whitebark pine seeds. See Botanical and Zoological-Terrestrial maps.

CENTRALIA COLLEGE (JR)
The college was established in Centralia in 1875. See Historical-Cultural map.

CHEESE DAY
The fair takes place in Toledo the second week of July. See Historical-Cultural map.

CHEHALIS RIVER
Low dissolved oxygen levels and high bacterial concentrations occur in the Chehalis River during the summer low-flow period. This poor water quality affects the migration and rearing of anadromous fish is well as public recreational activities. It is a major winter run steelhead stream. See Grays Harbor County. See Hydrological map.

CISPUS RIVER
This is a free-flowing river used for kayaking. See Hydrological map.

CLAQUATO
Claquato was a pioneer settlement on the south side of the Chehalis River, founded by the Lewis Hawkins Davis family in 1854. With the idea of building a new home in a new country, the Davis family set out from Missouri and headed westward to Portland, but continued north after finding Oregon too crowded. After the village began to grow, Davis had a surveyor named Henry Stearns lay out a town site. Davis constructed a sawmill and the lumber it produced became hotels, houses, stores, stables, a courthouse and a church. The church still stands today in memory of the fine workmanship and design of John Clinger. A protective stockade was built during the Indian scares of the 1850's, but was never used. The Indians were never hostile to the Claquato people and both whites and Indians lived together in harmony. After the railroad line was laid through Saundersville, the main traveled military road through Claquato was shrugged off. Chehalis took the county seat from Claquato which was officially vacated in county record August 6, 1902. See Historical-Cultural map.

CLAQUATO CHURCH
This building, located in Claquato off Washington Route 12, is a National Historic Place.



Unusual church steeple - Claquato

COAL STRIP MINES
Strip mining is conducted here. See Geological map.

COLUMNAR BASALTIC CLIFFS
These dramatic cliffs of Columnar basalt are easily accessible to motorists on a short turn-out. Recomendations have been made to consider addition of these cliffs to Mount Rainier National Park. See Geological map.

COUGAR LAKES WILDERNESS AREA
The area lies along the crest of the Cascades in Yakima and Lewis Counties east of Mount Rainier National Park and is mostly rugged mountains with many lakes and open basins. It includes 71,000 acres in Snoqualmie National Forest and 17,000 acres in the Gifford Pinchot National Forest. The area is typically steep, and rough with many narrow valleys and mountain lakes. The area totals 127,000 acres.

About 14 percent is in the principal forest zone, 75 percent in upper forest zone and the remainder in the alpine zone. Elevations range from about 4,000 feet to 7,776 feet at Mount Aix. Summer ranges for big game and fishing streams and lakes are important values. The Pacific Crest National Scenic Trail crosses the area and other trails provide adequate access. See Yakima County. See Environmental Use map.

COWLITZ FALLS
The falls on the Cowlitz River are southwest of Mount Rainier. See Hydrological map.

COWLITZ FISH HATCHERY
State Game Department. Species propagated: trout. Water source: Cowlitz River, Blue Creek and wells. See Zoological-Aquatic map.

COWLITZ RIVER
This freshwater, free-flowing stream habitat is utilized by fall chinook, coho, and chum salmon, and steelhead and cutthroat trout. See Hydrological map.

COWLITZ STATE SALMON HATCHERY
State Fisheries Department. Species propagated: chinook salmon, coho salmon. See Zoological-Aquatic map.

FUNGI SITES
The following areas in this county are noted for their abundance and variety of higher fungi or important species: Packwood Vicinity, Randle Vicinity, Hamilton Buttess Area and Upper Cispus River Valley. See Botanical map.

JULIA FALLS
The falls are on a tributary to the upper Nisqually River. See Hydrological map.

GOAT ROCKS
The Goat Rocks are a portion of the volcanic Cascade Mountain Range built up during Miocene times. The jumble of needles and spires along with the lava cones are the result of volcanic storms followed by periods of rapid cooling. These probably occurred on older folded and currently folding geo-synclinal rocks. The lava-cone range is nearly independent of the previous history of the outer crust beneath it.

Geologic erosion of the soft volcanic rocks is rapid where exposed to the elements above timberline. Wind, rain, snow and ice continue to change and develop this land. It has been eroded so that only sharp resistant rocks are now present. See Geological map.

GOAT ROCKS WILDERNESS
This 82,680 acre alpine area is located in southwestern Washington between Mount Rainier and Mount Adams. The Wilderness, 18 miles long and 12 miles wide, derives its name from the bands of mountain goats which inhabit its rocky crags. The terrain is mountainous with elevations ranging from 3,000 feet to the 8,201-foot Gilbert peak. Much of the area within the central portion of the Wilderness lies above timberline, thus providing outstanding alpine scenery. Flinty pinnacles rise abruptly from dazzling snowfields and glaciers surround beautiful mountain meadows carpeted with alpine flowers and weather-worn conifers. Streams are abundant, meandering through meadows or cascading down rocky hillsides.

The Tieton and Klickitat River systems drain the east side of the Wilderness to feed the arid, eastern valleys. Streams of the Cowlitz River system feed from the west side of the Wilderness to provide water for city and town dwellers. Two large lakes, each more than a mile in length, lie adjacent to the Wilderness boundary. Packwood Lake is nestled in a pocket of heavy timber near the northwest corner. Walupt Lake, partly within the area, occupies about a square mile in the headwaters of the Cispus River, a valley badly scorched by forest fires many years ago.

The Yakima Indian Reservation borders the Goat Rocks area on the southeast side, but is closed to the general public.

A Forest Service designated wilderness, the Goat Rocks area lies in eight parcels adjoining the Goat Rocks Wilderness in the Gifford Pinchot and Snoqualamie National Forests in Lewis and Yakima Counties. The 7,500 acres are National Forest with 360 acres owned by others. Hawkey Point Mountain, Johnson Peak and Chimney Rock are several of the prominent features. The parcels vary in character but are generally rugged and forested. About 33 percent is in the principal forest zone, 60 percent in upper forest, and the remainder in the alpine resource zone. Elevation ranges from 3,000 to over 7,000 feet.

Plant ecologists have identified three vegetative life zones in the Wilderness: the Canadian, the Hudsonian and the Arctic-Alpine. The Canadian Zone is essentially a forested zone supporting such species as Pacific silver fir, Alaska yellow-cedar, noble fir and western white pine. Also within this zone are numerous associated plants such as princess pine, pipsissewa, mountain blueberry, boxwood and bunchberry dogwood. This zone occurs throughout the Wilderness extending up stream drainages and up mountain slopes to the Hudsonian Zone. This is the zone through which the hiker-rider usually travels in reaching the scenic alpine country of the Artic-Alpine Zones. The Hudsonian Zone supports broad meadows, sparkling streams and exquisite flower gardens. Clumps of alpine fir and mountain hemlock dot the area and here and there a twisted white-bark pine struggles to survive. This zone occurs below the Arctic-Alpine Zone surrounding the higher mountain peaks and extends out along the ridge tops throughout the Wilderness. The Arctic-Alpine Zone is a land of barren rocky soils, rock conglomerate slopes, expansive snowfields and creeping glaciers. The climate is so rigorous that only a few hardy perennials exist. One of the most attractive is the deep blue lyall lupine. These leguminous plants have an important position in this region for they take the nitrogen from the air and introduce it to the soil. The story of the Arctic-Alpine Zone is one of a complicated struggle for existence. This zone occurs mostly within the central portion of the Wilderness surrounding the numerous mountain peaks.

Summer is short-lived in the Goat Rocks, thus the flowering season is rapid. One week the meadows are white with snow, the next they are white with avalanche fawnlily and elkslip marsh-marigold. As the season advances (late July), the early white varieties give way to the more colorful blooms. The meadows are bathed in masses of reds, blues and yellows. The sub-alpine lupine in the meadows and the volcanic lupine in the drier volcanic soils are familiar to all. Then there are the masses of Indain paintbrush, both scarlet and magenta paintedcup. The latter variety varying in color from deep reddish-purple or magenta to yellow or white. Another common flowering plant is the red mountian heath, known locally are red heather; occasionally the rare white blossoms of the Alaska heath may be seen. Most mountain travelers are familiar with the featherbed characteristics of the heather. On the drier, rocky soils bounding the meadows, the attractive white-to-violet spreading phlox provides a natural border to the mountain meadows. There are many other flower species to be found in the Goat Rocks as well.

There are 95 miles of trail within the Wilderness which make it possible for the hiker to visit most alpine areas within the Wilderness. The Cascade Crest Section of the Pacific Crest National Scenic Trial System traverses the Wilderness from north to south beginning at White Pass and leaving the southern boundary of the Wilderness north of Midway. Because of the many feeder trails leading in from the perimeter of the Wilderness, several one-day trips are possible. Weather in the Wilderness is always unpredictable. Trails are usually open to foot travel around July 15, but may not be completely free from snow until mid-August at higher elevations such as along the Pacific Crest National Scenic Trail in the vicinity of Old Snowy Mountain.

Eighty-five miles of trail provide horseback riding opportunities. The Pacific Crest Trail with its many feeder trails provide numerous opportunities for horse travel. However, natural feed for livestock is scarce and campsites with adequate horse feed are rare.

Receding snows during the summer months uncover succulent grasses in Nannie Basin and upper Lake Creek Valley. Herds of Rocky Mountain elk may be observed feeding in these basins in comfort, for cool summer breezes keep the high meadows relatively free of the insects that are so annoying at the lower elevations. Mountain goats are native to the less accessible sections of this land. These rugged animals nibble on lichens, mosses and grasses among the rock ledges and ridges. Other wildlife of particular interest include black-tailed deer, bear, coyotes and an occasional mountain lion. From his rocky domain, the whistling marmot challenges all intrusions by man. His shrill whistle is a warning to all neighbors within hearing distance to be on the alert. The pika or cony, resembling a small guinea pig, is often observed sitting motionless on a rock. These little animals generally live in slide rock and can be located by their characteristic short bleating call.

Many of the streams and lakes within the Wilderness are stocked with native cutthroat, rainbow and eastern brook trout. Washington State game and fishing regulations apply within the Wilderness as on other National Forest lands. Access to some of the fishing areas may be difficult. See Yakima County. See Geological and Environmental Use Maps.

GREEN RIVER VALLEY
A large elk herd winters in the valley. See Zoological-Terrestrial map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Lewis County discussion are plotted on the Historical-Cultural map and listed in its index.

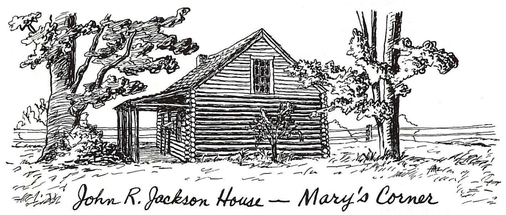
INDIAN GORGE ON COWLITZ RIVER
Located at Randle, this is the site of a footbridge across the Cowlitz River. It leads to a lovely spot used as a campsite by the Indians during the 1920's. Remains of these old camps can still be found. The Cowlitz Indians have no reservation and much of their history is unknown. Possible archeological sites were inundated when dams were constructed on the Cowlitz River. See Archeological map.

JOHN R. JACKSON HOUSE
Built in 1845 by John R. Jackson, it was the first pioneer home constructed north of the Columbia River. Many famous persons of early days were guests here. In November 1850, the United States District Count convened at the home. It continued to convene there for some time, thus giving background for the case so often attached to the structure -- Jackson Court House. The original meeting concerning the formation of Washington territory was held there. A portion of the original structure remains intact, although the building has largely been restored. The house is surrounded by a 0.5 acre state park. See Historical-Cultural map.

MATILDA JACKSON STATE PARK
A one acre state park. See Environmental Use map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Lewis County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of hydrological features covered by the Shoreline Management Act.

LEWIS COUNTY GAME FARM
Located 5 miles west of Centralia, the Lewis County Game Farm has an average annual production of 12,000 Chinese ringneck pheasants and approximately 250 exotic white-crested kalij. Pheasants from this farm are released in all southwestern Washington counties, as are experimental releases of white-crested kalij. See Environmental Use map.



John R. Jackson House — Mary's Corner

LEWIS COUNTY HISTORICAL SOCIETY MUSEUM
Located at Chehalis, the museum features Chehalis Indian art and culture, and children's toys and dolls. See Historical-Cultural map.

LEWIS RIVER
The East Fork joins the main Lewis River at tidewater. The movements of salmon into the stream are considerable smaller than those in the main river but occur at a similar time. See Zoological-Aquatic map.

LINCOLN CREEK BOTTOMS
From upper drainage downstream to vicinity of Centralia, this area is valued as big game habitat. See Zoological-Terrestrial map.

MORTON LOGGER'S JUBILEE
Combining all of the techniques of modern logging, the festival draws world champions from all corners of the world for one big show the second weekend every August. It is one of the last remaining shows of its type in the country. See Historical-Cultural map.

MOSSYROCK FISH HATCHERY
State Game Department. Species progagated: trout. Water source: springs. See Zoological-Aquatic map.

MOSSYROCK RESERVOIR AND CERTAIN PERIMETER LANDS
Bird habitat. See Zoological-Terrestrial map.

MOUNT RAINIER NATIONAL PARK
See Pierce County.

MOUNT RAINIER PARK ADDITION AND TATOOSH, SNOQUALMIE NATIONAL FOREST
These are contiguous to the south boundary of Mount Rainier National Park. One contiguous unit, with some adjoining roadless area, is not included in the roadless area inventory. This has been proposed as an addition to the National Park by conservation organizations. In 1965, the North Cascades study team also recommended the area be added to Mount Rainier National Park. See Environmental Use map.

MOUNT RAINIER NATIONAL PARK, PROPOSED WILDERNESS AREA
Conservation groups have recommended Wilderness status for all of Mount Rainier National Park except for the major roads; here they recommend wilderness should extend to the road rights-of-way and to the edge of the developed areas now present. Nonmajor roads recomended for closure and seeding to return to a natural state are the West Side Road and the Mowich Lake Road. Continued inclusion of the climbers' huts at Camp Muir and Steamboat Prow are permissible under the provisions in the Wilderness Act for pre-existing, established uses of a nonconforming nature.

In 1965, the North Cascades Study Team appointed by President John F. Kennedy recommended the addition of the Tatoosh Range to the south portion of Mount Rainier National Park. See Environmental Use map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Lewis County discussion are plotted on the Geological map and listed in its index.

MUDDY FORK GORGE
Approxinately 2 miles of deep, narrow gorge have been carved through lava rock by the Muddy Fork of the Cowlitz River as it tumbles from Mount Rainier towards Packwood Valley. Mount Rainier National Park has developed interpretive facilities on the gorge north of this section of the river. See Geological map.

NARADA FALLS
This falls is south of Mount Rainier. See Hydrological map.

NEWAUKUM CREEK
Used extensively by "rock hounds," this creek and lands surrounding the creek contain carnelian agate. See Geological map.

NEWAUKUM RIVER
This river is an anadromous (salmonid-steelhead) fish route and contains a resident trout population. See Zoological-Aquatic and Hydrological maps.

NISQUALLY RIVER
See Pierce County. See Zoological-Aquatic map.

NOBLE FIR
Reportedly, the world's largest recorded noble fir tree is located in Lewis County. Circumference at 4-1/2 feet; 38 feet, 4 inches; height 278 feet, crown spread; 47 feet. See Botanical map.

PACIFIC YEW
This Pacific yew (Taxus brevifolia) is believed to be the largest in the United States: 14 feet, 8 inches circumference, 60 foot height, and a 57 foot crown spread. Reported in 1959, American Forests, April, 1973. See Botanical map.

PACKWOOD LAKE
This major lake is located within the proposed Packwood Lake Roadless Area adjacent to Goat Rocks Wilderness. The lake lies on a key trail into the Wilderness. Outstanding scenery and good fishing attract many people. This proposed unusual-interest area provides a high quality back-country recreation experience away from the sight and sound of road travel. See Environmental Use, Hydrological and Zoological-Aquatic maps.

PALISADES
Spectacular columnal basalt cliffs line the south side of Clear Fork of the Cowlitz River. Parking, picnic facilities and interpretive signs have been developed for travelers of the White Pass Highway. See Geological map.

PIONEER DAYS CELEBRATION
The celebration takes place at Centralia in July. See Historical-Cultural map.

PLANT COMMUNITIES
The climax plant communities listed below occur in the county. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Alaska-cedar - Cascades azalea
Pacific silver fir - Alaska huckleberry
Pacific silver fir - (common beargrass phase)
Pacific silver fir - common beargrass
Pacific silver fir - mountain hemlock - big huckleberry
Pacific silver fir - Oregongrape
Pacific silver fir - purple twistedstalk

POMPEY PEAK AND DAVIS MOUNTAIN, SNOQUALMIE AND GIFFORD PINCHOT NATIONAL FOREST
These areas are not as well known to conservationists as other areas. Preliminary reconnaissance indicated that they may be recommended for retention in a wilderness condition as a roadless area without mechanical access or use. They are separated by a road. Some additional roadless area has been added to Pompey Peak. See Environmental Use Map.

QUARTZ CREEK BIG TREES BOTANICAL AREA
This 62 acre site is an excellent example of a virgin, Douglas-fir timber stand. Many of the trees are over 250 feet in height and have diameters of up to 7 feet. The entire area is in the Gifford Pinchot National Forest. See Botanical map.

RAINBOW FALLS STATE PARK
This 124 acres park 18 miles west of Chehalis on State 6, has opportunities for camping, swimming and fishing. See Environmental Use map.

RAINBOW CREEK BOTTOMS
The bottom is a valued big game habitat. See Zoological-Terrestrial map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SILVER FALLS
Silver Falls is one of many waterfalls in Mount Rainier National Park. See Hydrological map.

SKOOKUMCHUCK RIVER
This anadromous fish stream has a rudimentary run of spring chinook. It is utilized by fall chinook, coho, and chum salmon, and steelhead and searun cutthroat trout. See Hydrological and Zoological-Aquatic maps.

SOUTHWEST WASHINGTON FAIR
Occuring at Chehalis and Centralia, it takes place the last week of August. See Historical-Cultural map.

STEWART'S EXPRESS ROUTE
Historic Route. See Historical-Cultural map.

STRAWBERRY ROADLESS AREA, GIFFORD PINCHOT NATIONAL FOREST
Although not included in the most recent proposal for a Mount Saint Helens National Monument, the Strawberry Roadless Area is recognized by conservationists as deserving wilderness standing. See Environmental Use map.

SWOFFORD LAKE BEARING POND
State Game Department. Species propagated: winter steelhead trout. Water source: Swofford Creek, Sulphur Creek and Davisson Lake. See Zoological-Aquatic and Zoological-Terrestrial maps.

TATOOSH RIDGE
This highly scenic alpine ridge adjoining Mount Rainier National Park has been proposed as an addition to the Park. See Environmental Use and Geological maps.

VADER
Vader was first known as Little Falls and started near a small set of falls on Olequa Creek, a tributary of the Cowlitz River in the 1880's. The Northern Pacific Railroad stopped about a mile away and named the station Sopenah. As business moved closer to the railpoint, conflict arose between the railroad and business men as to the name of the town. After no solution came, the businessmen and railroad met and decided to rename the town Vader after one of its oldest citizens. Today the town is nearly a ghost town with only a few of the old time buildings left. The hotels and saloons are gone and the streets are quiet. See Historical-Cultural map.

VADER TERTIARY FOSSIL SITE
Pelecypods and gastropods are very abundant along the banks of the Olegua and Stillwater Creeks at Vader. See Geological map.

WALUPT LAKE
The eastern half of this lake is in the Goat Rocks Wilderness Area. The lake itself has good trout fishing, and the scenery is beautiful. See Hydrological map.

WHITE PASS RECREATION AREA
This is a highly developed winter sports area, and also a popular area with summer recreationists because of its proximinity to the Goat Rocks Wilderness and the Cougar Lakes Limited area. Administered by the Snoqualmie National Forest. See Environmental Use map.

WHITE PASS
This pass through the Cascade Mountains is on U.S. Route 12. Elevation of pass is 4,500 feet.



Winter Recreation - White Pass

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide or national significance and reflect, in part, the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) Overview papers by various authors in the Biological Section; (2) Small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the "Life Zones of the State."

BIRDS. Birds of prey including bald eagles, osprey, spotted owl, and peregrine falcon are found nesting in central and south-central Lewis County. Grouse, including blue grouse, spruce grouse, and ruffed grouse, and ptarmigan, are noted in Lewis County. Other resident birds include Clark's nutcracker and the gray-crowned rosy finch.

MAMMALS. Pigeon Springs, on the south fork of the Newaukum River, is valued big game habitat, as are the Stearns Creek bottom, Winston Creek Valley, and Curtis-Boistfort areas. A rare subspecies of pocket gopher (Thomomys mazama lovisi) has a critical habitat in this county. Other mammals noted are the black bear, black-tailed deer, mountain goat, pine marten, wolverine, Roosevelt elk and the western gray squirrel.

AMPHIBIANS. The tailed frog (Ascaphus truei) is found in rapid mountain streams of the Cascades in Lewis County.

COUNTY DISCUSSION

Lincoln

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Lincoln County discussion are plotted on the Archeological map and listed in its index.

BIG BEND HISTORICAL SOCIETY MUSEUM
Located in Wilbur, the history and records of the Big Bend Area are displayed. See Historical-Cultural map.

CHANNELED SCABLANDS
The name "Channeled Scablands" was first used in the early 1920's by geologist J. Harlen Bretz of the University of Chicago, who made a comprehensive study of the region and proposed the idea that the erosional features were the result of a gigantic flood. Although Bretz' concept sparked a lively controversy, most geologists today agree that the Scablands were carved by a flood of unprecedented proportions that took place 18,000 to 20,000 years ago during the great ice age.

The Spokane Flood left its mark along a course of more than 550 miles, extending from western Montana to the Pacific Ocean, but the most spectacular flood features were carved into the black volcanic rock terrain in eastern Washington. This rock, the "floor" of the Scablands, is basalt-a dense crystalline lava that covers more than 100,000 square miles in parts of Washington, Oregon, and Idaho. The part of the lava field that underlies the Scablands in eastern Washington is a saucer-shaped area of about 15,000 square miles almost completely surrounded by mountains and nearly encircled by three rivers the Columbia, the Spokane, and the Snake.

Most of the lava erupted during the Miocene Epoch of the Tertiary Period between 30 million and 10 million years ago. At times, one flow followed another at short intervals, but at other times, tens of thousands of years intervened between flows. Erupting from long wide fissures, the molten rock flowed onto a hilly terrain of older rocks that probably looked much like the present-day country north of the lava field. The molten material crystallized in the fissures to form dikes. In places, erosion has exposed swarms of dikes that cut older rocks. These places are believed to be major sources of the lava.

Early flows filled the valleys and subsequent flows covered most of the high hills as layer upon layer of lava eventually formed a solid sea of basalt, in places more than 10,000 feet thick. Several individual flows, with thickness more than 75 feet, have been traced for more than 100 miles.

Around the edges of the lava field a few hills poke up, island-like, through the basalt. One of the most prominent of these, Steptoe Butte, near Colfax, Washington, has given its name to all such features. Any island of older rock surrounded by lava is called a "steptoe."

Molten lava occupies a greater volume than solidified lava. As fresh lava slowly cools and crystallizes, a hexagonal pattern of shrinkage joints commonly develops at right angles to the cooling surface. These joints break up the lava into vertical columns of rock. Many basalt flows in eastern Washington display this feature called "columnar jointing."

Where basalt encroached upon a pond or lake, the quickly-quenched lava formed rounded blobs called "pillows" instead of columnar joints. In the western part of the lava field, a flow of basalt engulfed a swamp forest but, because of the water, the molten rock formed pillows and did not completely consume the plants. Among the fossilized remains of these plants are logs of the famous Ginkgo tree, a species that has survived for 250 million years. At a different time, but less than 50 miles northeast of the site of the swamp forest, another advancing lava flow encountered a shallow pond containing the floating body of a dead rhinoceros. Again, water prevented the molten rock from completely consuming the flesh; instead, pillows of lava enclosed the body forming a crude mold. In 1935, the site of the incident was discovered as a cavity in a basalt cliff. The cavity contained several teeth and numerous pieces of fossilized bone. Studies of the shape of the cavity and the fossil remains showed the rhino to be one of an extinct species of Diceratherium.

After the eruptions ended, the lava field was tilted as a unit to the southwest. Today the northeast tip of the saucer-like field is about 2,500 feet above sea level whereas its lowest point, near Pasco, Washington, is less than 400 feet above sea level. In addition to regional tilting, the lava field was deformed in places to yield a series of fold ridges. Saddle Mountain, Frenchman Hills, and Horse Heaven Hills are examples. Several of these can be seen along the west side of the lava field between Wenatchee and Pasco. Of particular interest is the Coulee Monocline, an asymmetric fold that trends across the north-central part of the lava field. The physical features of this monocline were to play an important role in determining the nature of the erosional features of Grand Coulee carved during the great flood.

Some time after the flow of lava ended, a cover of windblown silt or "loess" began to accumulate over much of the lava field, eventually producing the fertile soils of the Palouse country of southeastern Washington. The loess attained its maximum thickness in the Pullman-Colfax area where it is locally as much as 200 feet thick and displays a distinctive rolling surface with steep north-facing slopes.

The source of the silt was the western part of the lava field where temporary lakes had formed during the folding. Also incorporated in the Palouse soils is volcanic ash, derived from some of the western volcanoes scattered along the Cascade Mountains of Washington and Oregon.

Although glaciation began throughout the northern hemisphere at least two million years ago, the important chapter in the glacial history of the Scablands began about 100,000 years ago. At that time glaciers were moving southward from great ice fields in southern British Columbia, following major south-trending valleys leading into the United States. From west to east the valleys are Okanogan, San Poil, Columbia, Colville, Pend Oreille, and Priest River Valleys and the Purcell Trench, a great valley that in places contains the Kootenai River.

The Okanogan ice lobe encroached far out onto the lava field, and in so doing dammed the Columbia River. This diverted the stream from its course and forced it to flow southward along the Coulee Monocline. Farther east the Colville lobe reached the edge of the lava field and dammed the Spokane River, creating Glacial Lake Spokane whose surface reached an elevation of about 2,300 feet. The Purcell lobe scoured its way into a basin that now holds Pend Oreille Lake, and from there moved southwestward across Rathdrum Prairie and Spokane Valley to a point very near the eastern city limits of Spokane.

Glacial debris was deposited along the edges of the Purcell lobe, forming lateral moraines and kame terraces. This debris dammed the mouths of side valleys along the glacier's path and created many lakes. Spirit Lake, Twin Lakes, and Newman Lake on the northwest side of the glacier near Spokane are remnants of larger lakes that existed while the ice occupied the main part of the valley. On the southeast, Hayden Lake, Coeur d'Alene Lake, and Liberty Lake are other examples of lakes formed when the stream valleys became partly or entirely blocked by dams of glacial debris.

The largest lake that formed in the Pacific Northwest during the Great Ice Age was Glacial Lake Missoula. As the Purcell lobe moved southward within the Purcell Trench, glacial ice plugged the Clark Fork Valley like a giant cork, with the 2,000-foot cliff at the extreme northern end of the Bitterroot Range serving as a buttress. The ice dammed the Clark Fork River near the point where it empties into Pend Oreille Lake.

The water that was impounded behind the dam filled the tributary valleys for many miles to the east. At its highest level Glacial Lake Missoula covered an area of about 3,000 square miles and contained an estimated 500 cubic miles of water half the volume of present day Lake Michigan. Its surface stood at 4,150 feet above sea level, giving the lake a depth of nearly 2,000 feet at the ice dam (more than twice the depth of Lake Superior).

While ice plugged the mouth of the Clark Fork River at the Idaho-Montana border, other glaciers contributed meltwater to the growing lake. A large lobe of ice from Canada reached the south end of present-day Flathead Lake, and at this point its rate of melting was greater than its rate of advance. Its terminus became part of the north shore of Glacial Lake Missoula, and its meltwater poured in the lake. Alpine glaciers in the Bitterroot Range added their meltwater, and summer rains and snowmelt also helped to raise the level of the lake.

Eventually, the lake level reached the lip of the ice dam and began to overflow. The overflowing stream must have cut deeply into the ice. As the outlet was quickly lowered, the water roared through the breach, probably widening the channel very rapidly by undercutting the sides until the dam collapsed. No doubt huge icebergs were ferried away by the stream. Within a very short time, perhaps no more than a day or two the ice dam was destroyed and the contents of the lake were released.

When the ice dam at the mouth of the Clark Fork River failed, the lake drained at a rate unmatched by any flood known, and the water had only one place to go south and southwestward across Rathdrum Prairie and down the Spokane Valley which by this time was probably ice free. As the lake basin drained, the water had to pass through narrow parts of the Clark Fork Canyon where current velocities are calculated to have reached 45 miles per hour. The maximum rate of flow is estimated to have been 9-1/2 cubic miles per hour a rate of 386 million cubic feet per second, or about 10 times the combined flow of all the rivers of the world.

From fragmentary evidence it appears that the Purcell lobe advanced and blocked the Clark Fork River and impounded water at least four times, perhaps as many as seven times. The largest lake, however, was formed about 18,000-20,000 years ago, and its draining produced the last great flood. The enormous volume of water and the violent currents of this flood modified or destroyed much of the evidence of earlier floods.

As the vast basin of Lake Missoula drained, local deposits were formed that bear striking testimony to the power of the moving water. Perhaps the most dramatic of these are the "giant ripple marks" that formed in many places. These gravel ridges are plainly visible on aerial photographs, but went unnoticed for many years simply because their immense size makes their pattern and symmetry almost indistinguishable from the ground.

The water that poured out of the mouth of the Clark Fork Valley swept through Pend Oreille Lake, spread across Rathdrum Prairie, and roared down Spokane Valley. An arm of the flood surged up Coeur d'Alene Lake and spilled across the divide between Lake Creek and Rock Creek, but most of the water flowed down Spokane Valley to the north rim of the lava field.

As noted earlier the lava field is shaped somewhat like a giant saucer, tilted to the southwest. Slopes (gradients) down the tilted field are as much as 25 to 35 feet per mile. When the flood reached the lava field and started down this sloping surface, the enormous volume, velocity, and turbulence of the water provided the erosional energy required to sweep away the loess and expose the jointed basalt underneath. The currents were so turbulent and so powerful that they were able to pluck out and transport blocks of basalt, some measuring more than thirty feet across. Deep canyons were eroded into the basalt and, where cascades developed, plunge pools and cataracts formed. Some of these depressions are more than 200 feet deep. Many of the lake basins in the northeastern part of the area were formed in this manner. In other places, great amounts of stream-borne rock debris were dumped to form immense gravel bars and deltas.

Three giant rivers raced across the lava field. The easternmost stream, 20 miles wide in places and locally 600 feet deep, carved the widest channel, the Cheney-Palouse Tract. A middle river carved the Crab Creek Channel and its tributaries, a tract about 14 miles wide crossed near its head by U. S. Highway 2 between Davenport and Creston. The third and westernmost river, which may have carried the greatest volume of water, carved Grand Coulee.

These three major torrents, together with dozens of smaller streams, flowed simultaneously, and at times criss-crossed their channels until the 500 cubic miles of water stored in Glacial Lake Missoula had drained away.

At Sprague, in part of the Cheney-Palouse Tract, flood waters swirled along a channel eight miles wide and more than 200 feet deep. Here it stripped away 100 to 150 feet of Palouse soil and parts of jointed lava flows, leaving a wild rough wasteland in its wake. This jumble of mesas and depressions is so irregular that an area of more than 70 square miles contains no throughgoing streams.

The sides of the scabland channels in the eastern part of the lava field are marked in many places by steep slopes cut in the Palouse soil revealing in spectacular fashion the depth of the soil. South of Ewan, Washington, for example, eroded scarps are nearly 200 feet high.

The largest of the scabland channels is Grand Coulee, a two-stage canyon 50 miles long and as much as 900 feet deep. Its ancestral channel was cut by the Columbia River when it was forced to flow across the lava field by the Okanogan ice lobe. When flood waters cascaded down the steep southeast-facing slope of the monocline, this fold was eroded upstream across the zone of broken rocks and into the higher, flat-lying basalt, forming a typical recessional gorge now called Upper Grand Coulee. Erosion and cataract retreat continued in Upper Grand Coulee until the basalt flows at the head of the Coulee were completely removed. This exposed the granitic rocks that form the Coulee floor and the foundations for Coulee Dam today. The granite is tough and hard, but most importantly, it is not jointed like the basalt, and therefore could not be plucked and removed by the flood. But erosion did lower the divide between the Columbia and the Coulee to a point where the falls essentially destroyed itself.

Lower Grand Coulee, cut along the foot of the monocline, also developed a series of falls and plunge pools as erosion regressed upstream. Dry Falls, a 350-foot high, 3 mile-wide group of scalloped cliffs shows today the position of the falls at the end of the flood.

South of Grand Coulee the water from the Coulee channel was joined by the great river that boiled down Crab Creek. Together they surged into Quincy Basin, spread, slowed, and dumped a great blanket of boulders, sand, and gravel material mostly derived from flood erosion upstream. This flood debris now covers an area of about 500 square miles to a depth of at least 125 feet. As Quincy Basin filled, some of the water overflowed through two large cataracts into the Columbia River Valley at the Potholes and Frenchman Springs dischargeways. But most of the water escaped to the south around the east end of Frenchman Hills.

At the east end of Frenchman Hills the flood crossed a 50 square mile area covered by a layer of weak sedimentary rocks called the Ringold Formation which was deposited during early Pleistocene time (2 to 3 million years ago). This part of the Scablands, called the Drumheller Channels, is perhaps the most spectacularly eroded area of its size in the region. The erosional features can be seen especially well from the road built on the crest of O'Sullivan Dam, along the north edge of the Channels (Wash. State Highway 11G). South of the dam is a wild jumble of cliffs, depressions, ponds, and remnants of lava flows. This channel area has a local relief of 150-200 feet.

South of Frenchman Hills another branch of the flood flowed eastward in Lower Crab Creek Valley along Saddle Mountain, and near here this branch was joined by more flood waters from Washtucna and Lind Coulees. These surging torrents cut the Othello Channels at the east end of Saddle Mountain.

All the scabland rivers led to Pasco Basin, a down-warped area of more than 500 square miles at the southwest corner of the lava field. The southwestern edge of Pasco Basin is marked by the Horse Heaven Hills, which was an effective barrier to the escape of water except for a single outlet Wallula Gap. Because all flood waters from the lava field had to pass through this narrow squeezeway, a huge lake formed in Pasco Basin and extended more than 100 miles upstream in the valley of the Snake River. At the junction of the Snake and Clearwater Rivers at Lewiston, Idaho, this impounded water was almost 600 feet deep.

Leaving the Gap the flood waters flowed westward through the Columbia River Gorge and on past the Cascade Mountains to the Portland, Oregon area. There the great stream created a large delta and continued on up the Willamette Valley to form a short-lived lake nearly 400 feet deep.

The duration of the flood is not known, but a reasonable guess is that at any one point on the lava field it consisted of a series of surges, and that the crest was short-lived perhaps lasting only a day or two. At Wallula Gap, where the maximum flow was calculated at nearly 40 cubic miles per day, the main part of the flood probably lasted 2 to 3 weeks. The maximum rate of flow at the site of the ice dam has been estimated at 9.5 cubic miles of water per hour. If this rate were maintained, Glacial Lake Missoula would have drained in little more than two days. The maximum rate of flow at Wallula Gap has been estimated at 39.5 cubic miles per day, which would drain the lava field in about two weeks. But these maximum rates of flow probably could not have been maintained for that long. A realistic estimate of the duration of the flood, from the time when water first spilled over the ice dam to the time when scabland streams returned to normal flow, was probably about a month.

The unique combination of geologic events, beginning with a vast series of lava flows, then regional tilting of the land, followed by deposition of a one hundred-to-two-hundred-foot layer of windblown silt, and ending with a glacial lake dammed and suddenly released to form earth's greatest known flood, involved such a large area that only parts of the scabland picture can be seen at one time. Now, as a result of the detailed studies of many geologists working in the area for more than fifty years, the many fragments of evidence have been pieced together to support Bretz' concept of the Great Spokane Flood. See Geological map and ERTS Photograph.

COLUMBIA RIVER
See Clark County.

COULEE DAM NATIONAL RECREATION AREA
Encompassing a 102,399-acre section in northeastern Washington, Coulee Dam National Recreational Area stretches from the Canadian border to Grand Coulee Dam on the Columbia River. Geological formations in much of the region are the result of intense volcanic activity followed by great carving glaciers.

Numerous wildflowers grace the southern lava flows and terraces on Roosevelt Lake. Deer are common in the recreation area and beaver and muskrat frequent the lakeshores. Roosevelt Lake abounds in waterfowl, Canada geese, mallard ducks and great blue herons are most often seen.

Hunting is permitted within the recreation area and on nearby Indian reservations; fishing for trout is good. Numerous scenic drives rim the area and are dotted with picnic sites. The recreation area is open all year. Boating facilities are available May through November. See Environmental Use map.

CRAB CREEK
A free-flowing stream through the Channeled Scablands and Central Plains areas of the Columbia Basin. The Crab Creek Valley from Odessa west to Grant-Lincoln County line, then about 15 miles north along county line and 10 miles southeast of Harrington is a critical deer wintering grounds. See Grant County. See Zoological-Terrestrial and Hydrological maps.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Lincoln County discussion are plotted on the Historical-Cultural map and listed in its index.

LAKE CREEK COULEE
This is a distinctive coulee area southwest from Rocklyn including Coffeepot Lake and Twin Lakes. It coveres about 4 square miles. See Geological map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Lincoln County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Lincoln County discussion are plotted on the Geological map and listed in its index.

ODESSA FESTIVAL
The festival is put on by the German Community in late August. See Historical-Cultural map.

PLANT COMMUNITIES
The climax plant communities listed below occur in the county. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Big sagebrush - Idaho fescue
Ponderosa pine - bitterbrush
Rock buckwheat - sandberg bluegrass
Stiff sagebrush - sandberg bluegrass
Threetip sagebrush - Idaho fescue

PLANT COMMUNITIES (UNIQUE)
There are freshwater, saline, alkali, and saline-alkali lake communities of scabland tracts in Section 36 of R38E, T21N. See Botanical map.

REARDAN SLOUGH
This slough is an important waterfowl and shorebird breeding and resting habitat, encompassing 340 acres of brackish water and mud flats. It is recommended in a contract study to the National Park Service as a Natural Landmark for preservation. See Environmental Use and Zoological-Terrestrial maps.



SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SEATON CANYON
The extensive north-facing slope from the highway south to the ridgetop has the largest essentially undisturbed area of threetip sage prairie left in Washington (Artemisia tripartita-Festuca type). A remnant of the former, huge sharp-tailed grouse population is said to be present in the canyon. See Zoological-Terrestrial and Botanical maps.

SPOKANE ARM OF ROOSEVELT LAKE
One of two locations in which walleye pike are found. See Zoological-Aquatic map.

SPRAGUE LAKE
The lake is an important waterfowl winter habitat. See Zoological-Terrestrial map.

SYLVAN LAKE
The shallow marshy lake is an important waterfowl breeding area located 5 miles east of Odessa. See Hydrological and Zoological maps.

WHITES BLUFF ROAD
Historic route. See Historical-Cultural map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the Atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide or national significance and reflect, in part, the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. Noted birds in this area include sage grouse, sharp-tailed grouse, other upland birds and waterfowl. The county is a general area of importance to the columbian sharp-tailed grouse (Pedioecetes phasianellus). A remnant population of this formerly widespread grouse is noted in Seaton Canyon. A sage grouse display ground is reported about 10 miles southwest of Creston. The preservation of sufficiently large stands of sagebrush is vital to this species.

MAMMALS. Important deer wintering grounds are reported 5 miles north of Spokane to Deer Park and west from U.S. 395 to the confluence of the Spokane River with Roosevelt Lake. Coyote habitat for Lincoln County is the area north of Odessa. Other mammals include mule deer, rocky mountain elk and cougar.

Mason

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Mason County discussion are plotted on the Archeological map and listed in its index.

BELFAIR STATE PARK
This 81 acre park, 3 miles west of Belfair, affords camping, trailering, swimming, fishing, and clamming. See Environmental Use map.

BIG ROCK OR NORTH BAY PETROGLYPHS
There are two known carved rocks of this type in lower Puget Sound. The North Bay carvings on a large granite glacial boulder remain intact and untouched. A similarly carved granite boulder was removed several years ago from the west shore of Hartstene Island, about 5 miles from North Bay. The Hartstene carving is now the property of the Washington State Department of Parks and Recreation and is located in Tumwater Falls State Park at Olympia.

About 1909 there was an attempt to move the North Bay specimen to the Alaskan Yukon Exposition in Seattle. The equipment of the day was not sufficiently strong and the boulder was not disturbed. It rests today on private property, undisturbed by man and should be watched carefully so that there will be no threat to its archeological integrity See Archeological map.

BUFFINGTONS LAGOON
The lagoon is one of few good anchorages in the lower Puget Sound area. No parks or special facilities are here, but boaters can go ashore and build fires. See Environmental Use map.

CLOQUALLUM CREEK
This river is an anadromous (salmonid-steelhead) fish route and contains a trout population. See Zoological-Aquatic map.

DALBY WATERWHEEL
The property of the Ed Dalby family, this waterwheel has been located at its present site for about 40 years. It is reputed to have come from Seattle where it was used in the operation of the Madison Street Trolley-Cable Car. See Historical-Cultural map.

DEWATTO ESTUARY
A pristine and unpolluted estuary is located on the east side of Hood Canal across from Lilliwaup. Its values are both scenic and educational. Some dredging has occurred in the estuary. See Hydrological map.

DOSEWALLIPS RIVER AND DUCKABUSH RIVER
The Dosewallips River and the Duckabush River support anadromous fish and are classified 'AA' for water quality by the State of Washington. The Duckabush River supports between 6 and 7 miles of anadromous fish habitat. The Dosewallips River supports approximately 14 miles of such habitat. See Hydrological and Zoological-Aquatic maps.

FARMERS DAY
Located at Shelton, the festival takes place the fourth week of August. See Historical-Cultural map.

FUNGI SITE
The following areas in this county are noted for their abundance and variety of higher fungi or important species: Upper Satsop River Valleys and Belfair Vicinity. See Botanical map.

GEORGE ADAMS STATE SALMON HATCHERY
State Fisheries Department. Species propagated: chinook and coho salmon. See Zoological-Aquatic map.

GOLDEN CHINQUAPIN STAND
Golden Chinquapin is a unique tree species to this state. The origin of this species in the area is unknown, but there are stumps up to 24 inches in diameter and there are many small living trees in the area. The chinquapin is native to the southeastern United States where it is grown as a crop tree, and it is found in northern California and southern Oregon as well. See Botanical map.

HAMMA HAMMA ESTUARY
A pristine and unpolluted estuary located on the east side of Hoods Cannal, across from Lilliwaup. It is both scenic and educational. See Hydrological map.

HAMMA HAMMA RIVER
The Hamma Hamma River is rated 'AA' for water quality by the State of Washington. It supports between 6 and 7 miles of anadromous fish habitat. The Hamma Hamma is free-flowing, with steelhead, salmon, and cutthroat fishing. See Hydrological map.

HOOD CANNAL STATE SALMON HATCHERY
State Fisheries Department. Species propagated: chinook salmon, coho salmon, chum salmon, and pink salmon. See Zoological-Aquatic map.

HOOD CANAL
A 60-mile long inlet of Puget Sound, Hood Canal drains numerous rivers which rise in the Olympic Mountain Range and is noted for its beauty and recreational qualities. Shrimp, crabs, and oysters are abundant. See Kitsap County entry for "Puget Sound." See Hydrological map.

INDIAN KITCHEN MIDDEN
Historic site of Indian potlatches, there are several of these sites in Mason and Kitsap Counties. See Archeological map.

JARRELL COVE STATE MARINE PARK
The 46 acre park at the north end of Hartstene Island has swimming, fishing, clamming, boating, and limited camping. See Environmental Use map.

LAKE CONSTANCE
This is a beautiful subalpine lake frequented by mountain goats. "A classic tarn, the deep blue waters ringed by alpine trees and heather...the trail is super-steep, somewhat dangerous in spots, gaining 3,400 feet in altitude in only 2 miles," (from 102 Hikes in the North Cascades). See Hydrological map.

LAKE CUSHMAN
Construction of a dam stopped use of this stream by anadromous fish. Landlocked chinook have been caught, and resident trout are available. See Hydrological and Zoological-Aquatic maps.

LAKE CUSHMAN STATE PARK
The 581 acre park, 7 miles west of Hoodsport, offers camp and trailer sites, picnicking, swimming, fishing, and boat launching. See Environmental Use map.

LAKES MARY AND MARGARET
These beautiful mountain lakes were named by the Press Expedition. See Hydrological map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Mason County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LILLIWAUP SWAMP
Habitat of the fisher, (Martes pennanti) a rare mammal, an adult male was accidently taken in a coyote trap in 1969. See Hydrological map.

MASON COUNTY LAKES
Five lakes in Mason County have been sampled by a cooperative effort between a local citizens committee, Washington State University, Sanitary Engineering Section and the Mason County extension agent. The enrichment states of the lakes range from early mesotrophy to beginning eutrophy. Island Lake is in this latter state, it is highly productive but has no persistent algae blooms.

Limerick Lake is a newly created body of water. It is highly productive and has had some record of swimmers itch problems; this situation is now being corrected. Cranberry Lake is a shallow, uninhabited lake with a large diatom population. Mason Lake has had several diatom blooms but has not developed a blue-green algae problem to date, probably due to the fact that both nitrogen and phosphorus are reduced to a limiting state by the beginning of the summer growth period. Phillips Lake has had some minor blue green algae growth problems but appears to be in good condition with moderate diatom growth in late winter. See Hydrological map.

MILL CREEK
The area around the creek is a blue heron nesting area. See Zoological-Terrestrial map.

COUNTY DISCUSSION

MOUNTAINS BETWEEN THE HAMMA HAMMA RIVER AND LAKE CUSHMAN
The mountains in this area include: Copper Mountain, Mount Ellinor, Mount Pershing, Mount Rose, Mount Washington, Thorson Peak, and Tran Spire. See Geological map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Mason County discussion are plotted on the Geological map and listed in its index.

MOUNT ELLINOR
This mountain located between the Hamma Hamma River and Lake Cushman was named for Ellinor Fauntleroy in 1856. See Geological and Botanical maps.

MOUNT STONE
This peak is located between the Duckabush River and the Hamma Hamma River. See Geological map.

OLYMPIC NATIONAL PARK WILDERNESS AREA
See Jefferson County.

POTLATCH STATE PARK
The 57 acre park, just off U.S. 101 south of Hoodsport, offers limited camping, trailering, swimming, fishing, and clamming. See Environmental Use map.

PUGET SOUND
See Kitsap County.

QUILCENE, THE BROTHERS, MILDRED LAKES, OLYMPIC NATIONAL FOREST
See Clallam County.

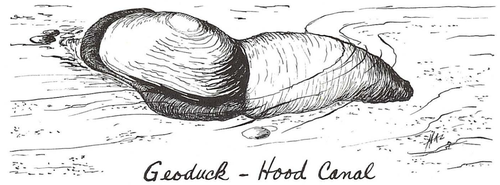
SATSOP SPRINGS SPAWING CHANNEL
State spawning channel. See Zoological-Aquatic map.

SAWTOOTH RANGE
This mountain climbing area is located west of the Hamma Hamma River, Mildred Lakes, and east of the north fork of the Skokomish River and Flapjack Lakes. It includes the following peaks: Mount Henerson, Mount Lincoln, Mount Skokomish, Trylon Peak, Picture Pinnacle, Rectagon Peak, Slab Tower, Cleaver Peak, The Horn, The Fin, Castle Spires and The Needle. See Geological map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SCHAFER STATE PARK
The 119 acre park, 8 miles north of Satsop by country road, fronts on the Satsop River. Camping, limited trailering, swimming, and fishing are offered. See Environmental Use map.

SHELTON FISH HATCHERY
State Game Department. Species propagated: trout and steelhead trout. Water source: springs. See Zoological-Aquatic map.


Geoduck - Hood Canal

SUMMIT LAKE, KENNEDY FALLS
Scenic falls on Department of Natural Resources recrestion area. See Hydrological map.

SUNDOWN LAKE
Subalpine lake lying in a deep cirque. See Hydrological map.

TROTTEN, ELD, AND CASE INLETS
These inlets are important oyster and shellfish areas. See Thurston County. See Zoological-Aquatic map.

TWANOH STATE PARK
The 175 acre park, is 5 miles east of Union on State 106, on the southern arm of Hood Canal. Camping, trailering, swimming, fishing, clamming, and boating facilities are offered. See Environmental Use map.

UNION
Located along Hood Canal, Union began as a trading post, and was well patronized by lumber camps and fur traders. With 50 or so logging camps nearby, the post was platted and called Union City in 1876. Around 1890 rumors spread that Union City would be a crossroads for several railroads and people flocked to the place. The town boomed until news that the Baring Brother Bank of London refused further payments of its outstanding debt. With this news came immediate cancellation of railroad work which in turn cancelled Union City's dream. The "City" was dropped and the town was thereafter called Union. Today Union is prosperous, but on a much smaller scale than once planned. See Historical-Cultural map.

UNION FLATS DOSEWALLIPS
Geoducks (king clams) are found in abundance on intertidal and subtidal areas. See Zoological-Aquatic map.

WEBB HILL HISTORIC TRAIL
Near Union, this scenic historic trailway was originally a wagon trail from Hood Canal to Shelton. See Archeological map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide and national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. Birds of the county include the spotted owl, bald eagle, Canada goose, swan, great blue heron, grouse and hawks. McMiken Island is noted as a bald eagle nesting site.

MAMMALS. Beaver, flying squirrels, mink, muskrat, river otters, and cougar are noted in this county. Lilliwaup Swamp provides habitat for the fisher (Martes pennanti). The pine marten (Martes americana) inhabits the upper mountain slopes in Mason County.

WONDER MOUNTAIN, OLYMPIC NATIONAL FOREST
Located just outside the southeast corner of Olympic National Park and overlooking Lake Cushman, Wonder Mountain is a potential wilderness addition to buffer the Lake Cushman Recreation Area. See Environmental Use map.


Forest Festival - Shelton

SIMPSON STATE SALMON HATCHERY
State Fisheries Department. Species propagated: chinook salmon, coho salmon, and chum salmon. See Zoological-Aquatic map.

SKOKOMISH ESTUARY
The Skokomish River entering into Hood Canal is a natural habitat for migrating birds and year round wildlife use. This area is a flyway for migratory waterfowl and shore birds. Mallards, buffleheads, pintails, geese and swans use the estuary during fall and winter. Bald eagles, great blue herons and numerous shore birds use the area. Mammals such as flying squirrels, river otters, muskrats, beavers and mink live on the estuarine islands. See Hydrological and Zoological-Terrestrial maps.

SKOKOMISH GORGE HIGH STEEL BRIDGE
This area is 110 acres and consists of a canyon gorge 400 feet deep cut by the South Fork Skokomish River, through solid rock. In most places the walls of the gorge are vertical. The terrain adjacent to the gorge is relatively gentle to flat. In order to cross the gorge for logging purposes a steel truss bridge, 685 feet long, was constructed. The gorge is a unique geological feature, because the deep gorge was formed in a relatively short period of geological time. A possible explanation for this phenomenon is that cutting action was taking place while the glacier was still present. This would be possible if subsurface flow was occuring beneath the glacier. Thus, when the glacier receded, all or most of the present gorge was already formed. See Geological map.

SKOKOMISH INDIAN RESERVATION
Ethnic Group. See Historical-Cultural map.

SKOKOMISH RIVER
Fossils occur in the river valley. See Hydrological map.

SKOKOMISH RIVER DELTA
The Skokomish River delta is a major undeveloped delta supporting the mixed uses of agriculture and providing a salt/fresh water marsh for a waterfowl habitat. See Hydrological map.

SPHAGNUM BOG
Rare bog plants, (kalmia, ledum) may be found in Mason County. See Botanical map.

SQUAXIN ISLAND INDIAN RESERVATION
Ethnic Group. See Historical-Cultural map.

SQUAXIN ISLAND STATE PARK
This is a 5 acre marine state park, with picnicking, clam digging, boating and crabbing areas. See Environmental Use map.

STANDSTILL LAKE REARING POND
State Game Department. Species propagated: trout. Water source: seepage and well. See Zoological-Aquatic map.

STRETCH ISLAND
Located northeast of Hartstene Island, it is a possible state park. See Environmental Use map.

Okanogan

AENEAS LAKE
This is an important fish-producing lake. See Hydrological map.

ALTA COULEE
The coulee was caused by melting of an iceberg jam and contains pitted outwash. See Geological map.

ALTA LAKE
Major fishing and recreation site. See Hydrological and Zoological-Aquatic maps.

ALTA LAKE STATE PARK
The 175 acre park is 2 miles southwest of Paterce. Activities offered are camp and trailer sites, swimming, fishing, boating and boat ramps, riding, ice skating in winter. See Environmental Use map.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Okanogan County discussion are plotted on the Archeological map and listed in its index.

BADGER MOUNTAIN LOOKOUT
A localized population of white-tailed jackrabbits are found near Methow. See Zoological-Terrestrial map.

BIG CRAGGY PEAK
This peak is located between Eightmile Creek and the Lost River. It is popular with mountain climbers. See Geological map.

BLUE LAKE
The lake is an important fish producer and recreational site. See Hydrological and Zoological-Aquatic maps.

BONAPARTE LAKE
This is an important fish producing lake and recreational site. See Hydrological and Zoological-Aquatic maps.

BOOKER LAKE
Snail shells are abundant in the marl around Booker Lake. It is a Quaternary fossil site. See Geological map.

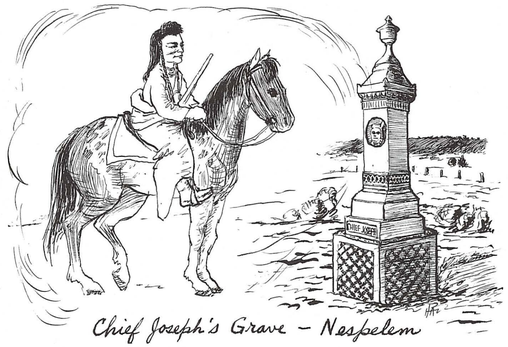
BOULDER CREEK PARK
The 870-acre park is mostly ponderosa pine stands, 300-350 years old. It has been recommended for preservation as a natural area. See Botanical map.

BOX CANYON
This canyon, a postglacial slot on the Columbia River, was a section that "short-circuited" the Omak Lake. See Geological map.

BRIDGEPORT STATE PARK
The 826-acre park is northeast of Bridgeport off State 17. Camping, golfing, and fishing are featured. See Environmental Use map.

BUFFALO LAKE
This extremely alkaline lake has unique and characteristic animal life. See Hydrological map.

BURIAL GROUND OF CHIEF JOSEPH AND YELLOW WOLF
Chief Joseph is one of the best known of the Indian leaders. Joseph had striven to maintain peaceful relations between his people and whites, in spite of increasing encroachments on Nez Perce lands in the Wallowa Valley by white ranchers. His statesmanship and eloquent speaking won the Nez Perce much sumpathy in the east. Eloquence and sympathy, however, were not sufficient to enable the Nez Perce to retain their ancestral lands. Several of the tribe's young men slew a number of whites in revenge for past offenses against the tribe, and the tribe was declared to be "at war." Knowing they could not win a war against the United States, the Nez Perce banded together and attempted to flee to the safety of Canada. The U.S. Army was ordered to intercept and quell the uprising. Constantly fighting rearguard actions, the Indians managed to elude the Army for 3 months and 1,700 miles. Eastern newspapers played up the generalship of Joseph as the "Red Napoleon." Joseph was a Peace Chief however, acting as a guardian of the noncombatants as well as a fighter. The Nez Perce had no single "warchief;" decisions were made in council. The Nez Perce were surprised and surrounded in the Bear Paws Mountains of Montana by a command of soldiers under General Miles, less than 60 miles from the Canadian border. After a 3-day siege, Joseph surrendered to spare the women, children and wounded, after receiving promises that he and his people would be returned to a reservation in their own country. Instead, the Nez Perce were taken to the Oklahoma Territory and interned. There many of the Indians sickened and died. In 1885, Chief Joseph and 150 of his people were allowed to be placed on the Colville Reservation near Nespelem, Washington. He was never allowed to return to his ancestral valley, despite numerous pleas. He died on the Colville Reservation September 21, 1904. Near his grave at Nespelem is buried his nephew, Yellow Wolf, whose history of his people and the Nez Perce War was published in 1940. See Archeological map.


Chief Joseph's Grave - Nespelem

CARIBOO TRAIL
This trail, which parallels the Okanogan River for much of its distance, was used during the 1860's. See Historical-Cultural map.

CATHEDRAL PEAK
This peak is located between the Chewack River and the east fork of the Pasayten River. It is popular with mountain climbers. See Geological map.

CHELAN MOUNTAINS
See Chelan County.

CHEWACK RIVER
Three scenic, free-flowing rivers (Chewack, Methow, Twisp) provide both a geologic and an aesthetic setting. The rivers are important as anadromous fish-spawning grounds and are historically significant as late nineteenth century mining sites. The rivers are used for white-water boating. See Hydrological and Zoological-Aquatic maps.

CHOPAKA LAKE
This is an important fish producer and recreation site. See Hydrological and Zoological-Aquatic maps.

CHOPAKA MOUNTAIN
This easternmost peak of the North Cascades owned by the State of Washington Department of Natural Resources is probably the most spectacular state-owned terrain. It has been suggested the mountain be set aside as a natural preserve to take advantage of its scenic and recreational values. Right now cattle are inflicting serious damage to the area. See Environmental Use map.

COLVILLE INDIAN RESERVATION
Ethnic Groups. See Historical-Cultural map.

COLUMBIA RIVER
See Clark County.

CONCONULLY
Conconully received its name in 1888 after becoming the Okanogan County seat. Until that time, the small town located on Salmon Creek near Conconully Lake was called "Salmon City." The Indian name "Conconully" referred to a monster residing in the lake. Its history is flavored with stories of jail breaks, a lynching, and the hardships of miserable winters and disasterous floods. Conconully was never more than a thriving camp and by 1914, when Okanogan became the new county seat, Conconully had virtually died. The courthouse was torn down and a city hall was constructed from the lumber. The jail and other buildings were destroyed in the early years, but the delivery stable and newspaper shack remained until 1958. Today, a small town still exists, but much of the area is a state park with modern campground facilities and excellent fishing in the nearby lake. See Historical-Cultural map.

CONCONULLY LAKE
The lake is an important fish producer and recreational site. See Hydrological and Zoological-Aquatic maps.

CONCONULLY STATE PARK
The 43-acre park at Conconully offers camping, swimming, fishing, boating, rental boats and cabins. See Environmental Use map.

FISH LAKE
This lake is an important fish producer and recreational site. See Hydrological and Zoological-Aquatic maps.

FORT OKANOGAN
David Stuart of John Jacob Astor's Pacific Fur Company established a fur-trading post in 1811, at the confluence of the Okanogan and Columbia Rivers near present-day Brewster, Washington. The post was named Fort Okanogan, and is considered to be the first American settlement in what is now the State of Washington. During this period, there was great competition in the fur-trading business between the three major fur companies: Astor's Pacific Fur Company, the North West Company, and Hudson's Bay Company. The latter two fur companies were British-operated. In 1813, Astor's partner became apprehensive of British claims to the Pacific Northwest, and sold his share of the fur company to the rival North West Company, who subsequently forced Astor to relinquish his holdings as well. Fort Okanogan was then operated as a North West Company post until 1816. At this time, a new post was built on the east bank of the Okanogan, one-half mile above the confluence with the Columbia. In 1821, the North West Company merged with the Hudson's Bay Company, taking the name of the latter. Under this new management, the fort was operated until 1860.

Today, little remains of the original buildings and stockade. The area is a 46-acre state park, 5 miles east of Brewster. An interpretive center on the park features Indian and pioneer relics, pictures and a diorama relating to the fur-trading industry. See Archeological, Historical-Cultural and Environmental Use maps.

FOURTEEN MILE, OKANOGAN NATIONAL FOREST
This 5,800-acre area adjoins part of the Pasayten wilderness and is contiguous with that roadless, undeveloped area. Fourteen Mile is a candidate for further study as to potential inclusion in wilderness status. See Environmental Use map.

GOAT MOUNTAIN
This is located between Eightmile Creek and the Lost River. It is popular with mountain climbers. See Geological map.

GRAND COULEE DAM.
See Douglas County.

HEE-HEE STONE
Found in the northeastern part of the county between Chesaw and Oroville. See Geological map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Okanogan County discussion are plotted on the Historical-Cultural map and listed in its index.

HUNGRY RIDGE AND BLACK CANYON, OKANOGAN NATIONAL FOREST
These are two separate areas located in the same general region east of the confluence of the Methow River and Columbia River. A road separates the Hungry Ridge unit from the area to the north. See Environmental Use map.

KAME TERRACES
Examples of continental glaciation along the Columbia River. See Geological map.

LAKES, STREAMS, ETC.
Some hydrological features of the state which are not specifically mentioned in the Okanogan County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of hydrological features covered by the Shoreline Management Act.

LIBERTY BELL AND EARLY WINTERS SPIRES
See Chelan County.

LIBERTY BELL I AND II AND DRIVEWAY BUTTE, MOUNT BAKER AND OKANOGAN NATIONAL FORESTS
See Whatcom County.

LOOMIS
Loomis was started as a trading post to service the Phelps Wadleigh and Company's cattle ranch in the early 1870's. The winter of 1879-1880 put the enterprise out of business when all their cattle perished. Many ranch hands had started small farms and stayed on after the company folded to make up the trading post of Loomis, named after a rancher, J. H. Loomis, who established the trading post, and then operated a general store. A post office was established in 1888, marking an official townsite. Many mines were operated around Loomis for gold, silver, copper, and lead and tungsten during World War I. Miners and ranchers kept the town lively until the last of the mines, the Palmer Mountain Tunnel mine, was depleted in 1927. Today only a handful of people remain in the peaceful town, and its many decaying structures mark a once active townsite. See Historical-Cultural map.

LUCKY JIM, WOLF CREEK, MIDNIGHT MOUNTAIN, SAWTOOTH, TWISP RIVER, MIDDLE CREEK, LAKE CHELAN, OKANOGAN NATIONAL FOREST
See Chelan County.

MCLAUGHLIN CANYON
This canyon is near the Okanogan River. See Geological map.

METHOW RIVER KAME TERRACES
These terraces, in ice-blocked side valleys, are found near Methow. Some kettle lakes are found in the area. See Hydrological map.

METHOW RIVER VALLEY
From northwest of Winthrop to confluence with Columbia River, the valley is a critical deer-wintering grounds, and habitat for bald eagle, golden eagle, and the harlequin duck. See Zoological-Terrestrial map.

METHOW WILDLIFE RECREATION AREA
Methow (11,756 acres) lies near the town of Twisp and provides key winter range for north-central Washington's mule deer herds. Numerous roads lead into the Methow from State Highway 153 and at higher elevations, from adjacent National Forest lands.

Methow lands are open sage and bitterbrush at lower elevations, and semi-open yellow pine forests in the higher country. Trout fishing is good on the area's several small lakes and ponds. Game species include Merriam's turkey, ruffed and blue grouse, spruce grouse, valley quail, cougar, bear, and ducks. See Environmental Use and Zoological-Terrestrial maps.

METHOW VALLEY TERMINAL MORAINE
This crescent shaped moraine is near the city of Winthrop. See Geological map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Okanogan County discussion are plotted on the Geological map and listed in its index.

MOUNTAINS BETWEEN EARLY WINTERS CREEK AND THE NORTH FORK OF THE METHOW RIVER
The mountains in this area include: Tower Mountain, The Needles, Golden Horn, Mount Hardy, Methow Pinnacles, Azurite Peak, Hollitway Mountain and Tatie Peak. See Geological map.

MOUNTAINS BETWEEN LAKE CHELAN AND METHOW RIVER
The mountains in the area include: Foggy Dew Ridge, Hoodoo Peak, Oval Peak and Lookout Mountain. See Geological map.

MOUNTAINS BETWEEN THE MIDDLE FORK OF THE PASAYTEN RIVER AND LOST RIVER
The mountains in this area are: Blackcap Mountain, Devil's Peak, Lake Mountain, Last Chance Point, Lost Peak, Many Trails Peak, Monument Peak, Mount Carru, Mount Lago, Osceola Mountain, Ptarmigan Peak, Robinson Mountain, and Three Pinnacles. All are popular mountain-climbing areas. See Geological map.

MOUNTAINS BETWEEN TWISP RIVER AND METHOW RIVER
The mountains in this vicinity include: Midnight Mountain, Abernathy Peak, Gilbert Mountain, Gardner Mountain, North Gardner Mountain, Silver Star Mountain, Soagtooth Ridge, Vasiliki Ridge, Kangaroo Ridge, Early Winters Spires, Lexington Tower, Concord Tower, Liberty Bell and Storey Peak. See Geological map.

MOUNTAINS NORTH OF HARTS PASS AND WEST OF THE MIDDLE FORK OF THE PASAYTEN RIVER.
The mountains in this area are: Blizzard Peak, Haystack Mountain, Holman Peak, Mount Winthrop, Pasayten Peak, Tamarack Peak, and Three Fools Peak. All are popular mountain-climbing areas. See Geological map.

COUNTY DISCUSSION

MOUNT BONAPARTE, CLACKAMAS MOUNTAIN, AND JACKSON CREEK, OKANOGAN NATIONAL FOREST
These areas are some distance from each other. Varying between 9,600 acres and approximately 14,000 acres each, they are the last wild areas in the eastern segment of the Okanogan National Forest in north-central Washington. A great deal of first hand knowledge is yet to be gained about the general area. These units do provide natural habitat for many smaller forms of wildlife. See Environmental Use and Geological maps.

NESPELEM RIVER
This river contains a trout population. This is a free-flowing stream. See Zoological-Aquatic and Hydrological maps.

NESPELEM VARVED SILTS
These silts contain a year-by-year record of glacial retreat. They have not yet been analyzed. The area near Nespelem is of special concern. See Geological map.

NIGHTHAWK
Nighthawk began as a supply center for the gold mines along the Similkameen, most of which were operated by James M. Haggerty, a lawyer from Portland who came to this area to untangle the estate of one Hiram Smith, who had died and left no will. Haggerty stayed on to establish three prosperous mines. The town was named for the nighthawks, sometimes called "bull bats," which were very prevalent in the area. Haggerty was not a well-liked man. He was run out of Loomis after making a bad remark about a mine which was that town's life. He never afterward came near the place. When he died, he was taken to Nighthawk to be buried, but as had been his request, his body was not taken through Loomis. The town thrived after the Vancouver, Victoria and Eastern railroad ran a line into the town and most of the mining equipment was shipped to Nighthawk by rail, then by freight wagons to the mines. By 1950, only two trips a week were made to the town and today even those have ceased. The single general store is the only business in a once prosperous town. Access to Nighthawk is via footbridge, although a ferry formerly ran across the Similkameen River. See Historical-Cultural map.

OKANOGAN RIVER
This free-flowing river empties into the Columbia River from the north. The total coliform bacteria counts in excess of recommended criteria occur in the lower reaches of the Okanogan River. Inadequately treated municipal wastes and septic tank drainages are generally responsible for the problem. The Okanogan River, upstream from Omak to near Oroville, has a high summer-water temperature as a result of natural causes and water diversions. A few breeding pairs of bobolink reside south of Oroville along the river. This river is an anadromous (salmonid-steelhead) fish route and contains a resident trout population. See Zoological-Aquatic and Hydrological maps.

OKANOGAN RIVER VALLEY
From Canadian border to Omak, bounded on the west by Conconully Reservoir, Blue Lake and Palmer Lake, and extending eastward 2-5 miles, the valley is a critical deer-wintering grounds. It is also an important area for waterfowl, long-billed curlew, grouse, grasshopper sparrow, canada geese, and the white-tailed jackrabbit.

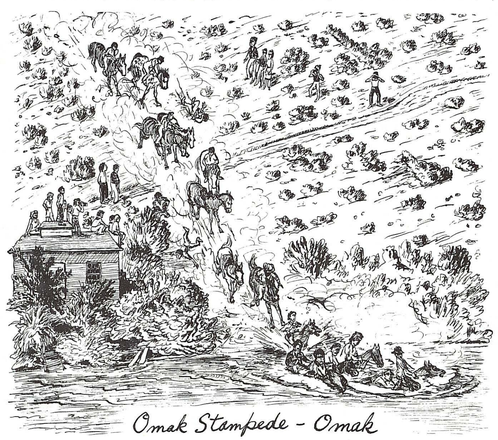
The derivation of the name is interesting. Okanogan is an Indian word meaning "rendezvous." It was originally applied to the section of Okanogan Valley around Osoyoos Lake, where the Indians of British Columbia and Washington often gathered for their annual potlatch and to lay in supplies of fish and game. See Zoological-Terrestrial and Geological maps.

OMAK FISH HATCHERY
State Game Department. Species propagated: trout. Water source: springs. See Zoological-Aquatic map.

OMAK LAKE
This 7-mile lake is located southeast of the city of Omak. Its alkaline waters are being cooperatively stocked by the Colville Indians and the Bureau of Sport Fisheries and Wildlife with the rare Lahontan cutthroat trout. This species is tolerant of highly alkaline waters. See Zoological-Aquatic map.

OMAK LAKE TRENCH
A preglacial section of the Columbia River which is now largely an abandoned valley. See Geological map.

OMAK STAMPEDE
This nationally famous stampede takes place the third week of August. See Historical-Cultural map.



Omak Stampede - Omak

OSOYOOS LAKE
This lake is an important producer of anadromous fish in addition to spiny rays. See Hydrological and Zoological-Aquatic maps.

OSOYOOS LAKE STATE PARK
This 46 acre park, a mile north of Oroville, offers camping, swimming, fishing, boat launching, and ice skating in winter. See Environmental Use map.

OWHI LAKE
This is an alkaline lake with characteristic alkaline-tolerant fauna. See Hyrological map.

PALMER LAKE
The lake is an important fish producer and recreational site. See Hydrological and Zoological-Aquatic maps.

PARSON SMITH TREE
This National Historical Place on the Canadian border is 40 miles north of Winthrop. Smith was a powerful mountain man who had tried prospecting in the vicinity of Hope, British Columbia. In June of 1886, Smith passed through what is now the Pasayten Wilderness, pausing to carve some doggerel into this tree. He died on the coast in about 1920. The tree still stands and Parson's poetry is plainly legible. The site is marked by the Okanogan National Forest and the Okanogan County Historical Society. See Historical-Cultural map.

PASAYTEN WILDERNESS, OKANOGAN AND MOUNT BAKER NATIONAL FORESTS
A virtually unbroken fortress of wilderness extends 40 miles west to east and 20 miles deep. Within this vastness is found all of the variety in topography and cover identified with the North Cascade mountain region, with outstanding examples of each type. The Pasayten Wilderness is administered by the Okanogan National Forest.

Virtually every wilderness experience can be found here. The wide range of topography, plant cover, and elevations invites the mountaineer seeking a challenging climb as well as the senior citizen out for a guided horseback tour. Foot and horseback trails give access to major drainages and the entire length of the Pacific Crest.

Most of the 94 mountain lakes are stocked with fish as are the Paysayten River, its tributaries, and the streams flowing west into Ross Lake. The most common and popular fish is the rainbow trout. Other trout species are cutthroat, eastern brook, Montana blackspot, German brown, and the Dolly Varden. The current High Cascades buck-deer season, and the concurrent mountain goat permit season in September results in a modest harvest of deer, goat, and bear.

In 1968 the North Cascades National Park Act designated the eastern portion of the former North Cascades Primitive Area as the Pasayten Wilderness. The western segments of the former primitive area were included in the northern unit of the North Cascades National Park and in the Ross Lake National Recreation Area.

Conservationists have recommended inclusion of two parcels into the Pasayten Wilderness. The smaller parcel, Long Draw, is a narrow strip adjacent to the extreme eastern boundary of the Pasayten Wilderness. The larger parcel, Long Swamp, borders the southeastern corner of the Wilderness, and is bordered on the east by the road to Irongate trailhead. They contain 23,300 acres, all National Forest land. The smaller, Long Draw parcel is remote, rugged land similar to the adjacent Wilderness. Elevation ranges from about 5,200 to 7,408 feet at Goodenough Peak. The Long Swamp parcel is even more remote and rugged, with limited trail access. The Chewack River Valley traverses the western portion of Long Swamp and Touts Coulee Creek. Elevation ranges to 5,685 feet, with about four percent in the alpine zone. There is summer range for big game. Fishing is an important activity in the Chewack River.

The roadless, undeveloped Forest Service inventory lists several contiguous area to the Pasayten wilderness. Other contiguous areas, also recommended for addition to the Pasayten Wilderness are Disaster, Farewell, and Falls Creeks, and Sherman Peak. See Environmental Use and Zoological-Terrestrial maps.

PATTERSON LAKE
The lake is an important fish producer and recreational site. See Hydrological and Zoological-Aquatic maps.

PEARRYGIN LAKE
This lake is an important fish producer and recreational site. The south end of the lake is the residence of the American bittern, which breeds here in May. See Hydrological and Zoological-Aquatic maps.

PEARRYGIN LAKE STATE PARK
This park of 578 acres is located 5 miles northeast of Winthrop. It has camping, swimming, fishing and boat launching. See Environmental Use map.

PEBBLE CREEK, GRANITE MOUNTAIN AND BEAVER CREEK, OKANOGAN NATIONAL FOREST
These three areas are part of one larger area. The area was not familiar to the conservation groups, who have recommended deferral of all activity until a full study of its 34,000 acres can be made. See Environmental Use map.

PEEPSIGHT MOUNTAIN
This is located between the Chewack River and the East Fork of the Pasayten River. It is popular with mountain climbers. See Geological map.

PIPESTONE CANYON
This precipitous canyon contains exposed conglomerate between sedimentary rock. It is an extremely coarse, colorful deposit with an abundance of exposed Broyophitec fossil beds. See Geological map.

PLANT COMMUNITIES
The climax plant communities listed below occur in the county. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Big sagebrush - bluebunch wheatgrass
Bitterbrush - bluebunch wheatgrass
Bitterbrush - needle and thread
Douglas-fir - pinegrass
Needle and thread - sandberg bluegrass
Threetip sagebrush - Idaho fescue
Big sagebrush - needle and thread
Bitterbrush - Idaho fescue
Bluebunch wheatgrass - Wyeth buckwheat
Idaho fescue - Wyeth buckwheat
Threetip sagebrush - bluebunch wheatgrass
Threetip sagebrush - needle and thread

REMMEL MOUNTAIN
This is located between the Chewack River and the east fork of the Pasayten River. It is popular with mountain climbers. See Geological map.

RIVERSIDE
Located along the Okanogan River just north of Okanogan, Riverside was at one time a thriving town large enough to make its try for county seat. Riverside couldn't take the seat from Conconully and later the county seat went to Okanogan. The town was located on the river. It was accessible by stern-wheelers and derived much of its livelihood from freighting goods. See Historical-Cultural map.

RUBY
Ruby was born in the same fashion as many early towns, getting life from gold discoveries. By 1892, Ruby was a booming town with its schools, businesses and general welfare being the best in the county. It thrived for many years, but when the gold was gone, Ruby was left by many to become one more town of memories. See Historical-Cultural map.

SAWTOOTH RANGE
See Chelan County.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SHAFER MUSEUM
In Winthrop, pioneer artifacts are exhibited in the former home of Guy Waring, founder of the town. See Historical-Cultural map.

SHEEP MOUNTAIN
This is located between the Chewack River and the east fork of the Pasayten River. It is popular with mountain climbers. See Geological map.

SILVER
Silver ore can be found in an area east of State Highway 153 and north of Carlton. See Geological map.

SIMILKAMEEN RIVER
This is a major tributary to Okanogan River, holding significant numbers of anadromous and native fish. Numerous bald and golden eagles winter along the river's drainages. See Hydrological, Zoological-Aquatic and Zoological-Terrestrial maps.

SINLAHEKIN COULEE
The Coulee was a glacial spillway when the Okanogan Valley was ice-filled. It is now an abandoned valley. See Geological map.

SINLAHEKIN CREEK AND RIVER
The drainages provide habitat for bald eagle, golden eagle, deer, and bighorn sheep. The Sinlahekin River provides valuable big game winter range (12,491 acres) within the State Wildlife Recreation Area there.

SINLAHEKIN WILDLIFE RECREATION AREA
Three miles south of Loomis is Sinlahekin Wildlife Recreation Area (12,491 acres). The area is an important winter range for the entire Sinlahekin Valley mule deer herd. It is bordered by four mountains in the foothills of the eastern slopes of the Cascades. Sparsely-timbered grassland in these rolling foothills provide habitat for mule and whitetail deer, bighorn sheep, black bear, pheasant, Merriam's turkey, quail, chukar and waterfowl. This area supports a population of California bighorn sheep, (Ovis canadensis californiana), introduced by the State Game Department. Nonhunted species include pine squirrel, badger, porcupine, skunk, beaver, several types of swallow, and many other common eastern Washington songbirds. See Environmental Use and Zoological-Terrestrial maps.

SOAP LAKE MOUNTAIN AREA AND SOAP LAKE
There are many small salt lakes in this area, of scientific and recreational importance. See Botanical map.

SOUTH RIDGE, OKANOGAN NATIONAL FOREST
This unit is separated from Pebble Creek, Granite Mountain and Beaver Creek. Its 6,400 acres are relatively unknown, and study is recommended before any major changes are effected. See Environmental Use map.

SUNRISE PEAK
This is located between Eightmile Creek and the Lost River. It is popular with mountain climbers. See Geological map.

THIRTYMILE, TWENTYMILE AND TIFFANY, OKANOGAN NATIONAL FOREST
Thirtymile and Twentymile are one continuous unit; Tiffany is separated from them by a road. The Forest Service had announced plans (1969) for approximately 200 miles of roads, together with timber harvest in much of this area. A "Roadless Area" was also proposed in the vicinity of Tiffany Mountain. Reports about this area to conservation representatives have resulted in a recommendation for wilderness study in the Twentymile and Thirtymile area to assure that it receives full consideration for that potential classification. The area around Tiffany has been recommended for wilderness status. See Environmental Use map.

TIFFANY MOUNTAIN
Found in Okanogan National Forest, this 430-acre mountain contains 400 year old timber stands representing pioneer and climax stages. It contains extensive larch stands (Larix lyallii). See Botanical map.

WAGONROAD COULEE
The coulee is a post-glacial slot, paralleling gravel-filled, former courses for several miles. It is found along the Okanogan River north of Riverside. See Geological map.

WANMACUT LAKE
This lake is an important fish producer and recreational site. See Hydrological and Zoological-Aquatic maps.

WASHBURN ISLAND REARING POND
State Game Department. Species propagated: summer steelhead trout. Water source: Columbia River. See Zoological-Aquatic map.

WASHINGTON PASS
Pass through the northern Cascade Mountains, at a 5,477 foot elevation, on State Route 20. See Geological map.

WEST CRAGGY PEAK
This is located between Eightmile Creek and the Lost River. It is popular with mountain climbers. See Geological map.

WHITESTONE LAKE
This is an important fish-producing lake. See Hydrolgical, Botanical and Zoological-Aquatic maps.



Tailed Frog - Pasayten Wilderness Area

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the Atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide and national significance and reflect, in part, the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. Harlequin duck, long-billed curlew, and waterfowl such as Canada geese inhabit Okanogan County. Prairie falcons and ptarmigan are also noted. Many areas along riverbanks and road cuts provide nesting habitat for colonies of bank swallows. The golden eagle is present in the mountainous areas and numerous bald and golden eagles are found feeding along drainages of the Methow River in the winter. The county is of general importance to Franklin's grouse and the columbia sharp-tailed grouse. The bunchgrass habitat of Okanogan County is an area of relative abundance for the long-billed curlew which nests near Tonasket, in the highlands east of the Okanogan River and other areas. Other species dependent on preservation of this much diminished vegetation type are sharp-tailed grouse and grasshopper sparrow; the latter is recorded in few locations in Washington.

MAMMALS. Grizzly bear (Ursus arctos) is a rare species here. There are remnant populations in the North Cascades National Park, and the current estimated population is 10 bears, including both the North Cascades National Park and the Pend Oreille habitat areas. Moose (Alces alces andersoni) is an uncommon species in Washington, wandering down from British Columbia. Marshlands and riverbottoms of upper Okanogan County and northern Pend Oreille County provide most of Washington's available moose habitat. The total state population of bighorn sheep (Ovis canadensis) is 440. Their habitat centers in the area between Okanogan and Yakima Counties. Critical deer wintering habitat consists of the Sanpoil River valley from the head waters of Roosevelt Lake to the west fork of the Sonpoil River; Omak Creek valley from the headwaters of Omak Creek; Curlew Creek and Kettle River valleys from the headwaters to the Canadian border and the Chewack River valley 10 miles north of Winthrop. The Okanogan Mountains are important habitat areas for the mountain goat (Oreamnos americanus) Okanogan, Chelan, Ferry, Stevens, and Pend Oreille counties comprise the range of the Canada lynx (Lynx lynx canadensis). The rare white-tailed jackrabbit (Lepus townsendi) is found in the Okanogan River valley.

AMPHIBIANS. The tailed frog (Ascaphus truei) is found in rapid mountain streams of the Cascades and noted for Okanogan County.

WINTHROP NATIONAL FISH HATCHERY
Species propogated: rainbow trout and brook trout, 110,000 pounds were produced in 1972. See Zoological-Aquatic map.

WOLF CREEK RESEARCH NATURAL AREA
The area is an excellent example of the bitterbrush (Purshia tridentata)-bunchgrass vegetation which occurs on grantic soils at low elevations on the east slope of the Washington Cascades.

The 150-acre tract consists of: 40 acres of SAF 237, interior ponderosa pine, and SAF 214, ponderosa pine-larch-Douglas-fir (20 acres). Bitterbrush-wheatgrass-Idaho fescue comprise 80 acres. Elevation: 2600-3200 feet; Topography: gentle; sloping.

The area is important winter range for mule deer (Odocoileus hemionus). In general they move off the tract sufficiently early in the spring to prevent grazing damage to grasses. Other animals inhabiting the tract include occasional rocky mountain elk (Cervis canadensis), chipmunks (Eutamias spp.), Douglas squirrels (Tamiasciurus douglasi), whitefooted deermice (Peromyicus maniculatus), and a few pocket gophers (Thomomys spp.). See Botanical and Zoological-Terrestrial maps.

Pacific

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Pacific County discussion are plotted on the Archeological map and listed in its index.

BEARD'S HOLLOW SITE
This area is presently used for archeological excavation. Featured is a well-preserved shell midden, 2 meters deep by 50 meters square. One contributor suggests this be included in the state system of educational and scientific preserves. See Archeological map.

BROOKLYN
A large exposure of fossil bearing concretions and loose fossils may be viewed along road-cuts in the area. See Geological map.

BUSH PACIFIC PIONEER STATE PARK
This park encompasses 42 acres. See Environmental Use map.

CAPE DISAPPOINTMENT
This rock formation protrudes into the Pacific Ocean at the mouth of the Columbia. The Washington State Division of Mines and Geology reports that it is an agglomerate. (1959) Near Cape Disappointment lighthouse is a littoral cave about 40 feet long and 15 feet in dimeter at its entrance. (From Circular #40, Washington Department of Conservation, 1963). See Geological map.

CAPE SHOALWATER
A complex interaction of natural forces, such as the tidal currents, littoral drift, and the wind waves and swells of southwest ocean storms, is critically eroding about 3 miles of the beach and undermining the upland areas at Cape Shoalwater. The shoreline has moved about 11,500 feet northward since 1887. The current rate of erosion averages about 150 feet per year and the erosion will continue if uncontrolled. The erosion is undermining an existing low bank and debris held against the bank by waves creates a potential hazard to visitors. The erosion has destroyed valuable recreational beaches, public highways and roads, a school, many residences, and other public and private buildings, and forced the relocation of a Coast Guard Lighthouse Station. It is also threatening other public and private lands and buildings, including the relocated Coast Guard Lighthouse Station and State Highway 105, the direct highway link between the urban and recreational areas to the east and south with those to the north. Eroded material at Cape Shoalwater contributes to the shoaling of the navigation channel across the harbor's outer bar. Efforts by local interests to control the erosion by a series of groins constructed of timber-piles and automobile bodies have been unsuccessful as the groins have completely disappeared. About 1 mile of the eastern end of the eroded shoreline is owned by the Federal Government as a wildlife refuge. The rest is privately owned.

The Cape Shoalwater area is proposed for a waterfowl preserve. See Zoological-Terrestrial and Environmental Use maps.

CHINOOK POINT
This National Historic Place is north of the Columbia River, south of Chinook, and 0.5 miles southeast of Fort Columbia Historical State Park. See Historical-Cultural map.

CHINOOKVILLE
Chinookville, known also as Baker's Bay, was a Chinook Indian village near the mouth of the Columbia River in the early 1800's inhabited by 300-400 natives. The community had existed many years before the advent of the white man. Lewis and Clark stayed in the village during part of their journey.

After being shipwrecked, an explorer named Captain James Scarborough took up a homestead on the bluff above Baker's Bay and found employment with the Hudson's Bay Company. During the years that followed, Captain Scarborough had his hand in many business ventures such as shipping fish to England and serving as river pilot. A mystery lies with the story of his having been paid for these efforts over the years in gold ingots, and that he buried his fortune somewhere on his homesite. The captain died in 1855 without divulging the location of the ingots, presently estimated to be worth about $120,000. In 1864 the government bought the Scarborough estate and in 1894 Fort Columbia was built on the site, becoming a state park after the end of World War II. See Historical-Cultural map.

COASTAL PLAIN WESTERN RED CEDAR STANDS
These virgin red cedar stands adjoin the Willapa National Wildlife Refuge on Long Island. The trees have considerable value to forestry and wildlife research. See Botanical map.

COLUMBIA RIVER
See Clark County.

DIAMOND POINT RESEARCH NATURAL AREA
The area provides an example of second-growth sitka spruce (Picea sitchensis)-western hemlock (Tsuga heterophylla) forest growing on a peninsula in a coastal estuary. Primary forest cover type, SAF-225, sitka spruce-western hemlock (45 acres). Other important forest cover: SAF-224, western hemlock (25 acres); SAF-221, red alder (18 acres). Elevation 0-200 feet. See Botanical and Zoological-Terrestrial maps.

FORT CANBY STATE PARK
Fort Canby State Park, 1,666 acres, is located at the mouth of the Columbia River on Cape Disappointment, two miles west of Ilwaco. The park offers trailer sites, a boat launch, swimming and fishing. It was here that Lewis and Clark first reached the Pacific Ocean in November of 1805. Although an executive order in 1852 set aside lands on Cape Disappointment for military purposes,it wasn't until 1862 that Congress appropriated funds to begin permanent defensive works. Since that time Fort Canby has experienced various stages of activity through the Civil and Spanish American Wars and World Wars I and II. In 1865, eight guns were in place. The battery used as a coastal defense during World War I may be seen. The battery never saw action and in 1957, with the remainder of the fort, became a state park. The North Jetty is an important area for the observation of sea birds of many species and for landbirds migrating along the coast. See Environmental Use and Historical-Cultural maps.

FORT COLUMBIA
The fort is located near the mouth of Columbia River across from Astoria, Oregon. Fort Columbia was one of three forts built during the Spanish-American War. It covers 240 acres with numerous buildings, gun emplacements, and support facilities. Fort Columbia, along with Forts Canby and Stevens, was built to guard the mouth of the Columbia River. It was declared obsolete after World War II. This area was the home of the Chinook Indians and their famed chief, Comcomly. The natives guided fur traders over the treacherous bars of the Columbia River. Captin Robert Gray dropped anchor near here after his discovery of the Columbia River in May, 1792. For years Chinook Point and adjacent Scarboro Hill served as vital landmarks for navigating the dangerous entrance of the Columbia. The old gun embankments, some of the buildings and an Interpretive Center featuring exploration are open to visitors at this Registered Historic Landmark. A few of the fort's buildings are being furnished and restored. See Historical-Cultural and Environmental Use maps.

FRANKFORT
Accessible only by water, Frankfort is located along the west side of the Columbia River across from Astoria, Oregon. There is a Lewis and Clark campsite in the vicinity. The village was started as a fishing and logging village in 1890 by promoters Frank Bourn and Frank Scott. People were attracted by stories of a railroad being built over the steep and rugged slopes to Frankfort, but those stories died and soon after Frankfort also began to die. By 1900, the population had dropped to 150 people who made a living off salmon fishing. River steamers made regular stops in the early years, but after most of the population left, the regular runs were stopped. In 1947, only 11 residents remained. The Navy sent crash boats to the isolated area with medical aid and supplies. In 1953 the townsite was auctioned by Pacific County with the surrounding foreastland for $74,918 to E. J. Mell, a logger. In 1960, Dr. Ralph Isaac and his son-in-law, while exploring, walked along the Columbia to the forgotten village during low tide. They found two inhabitants. The rest of the deserted town was intact and unmolested by vandals or curists. Before Crown Zellerbach logging company constructed a road to within one mile of Frankfort in 1964, the river had been the only link with the outside world. See Historical-Cultural map.

FRANKFORT GRAYS BAY PARK
This is the proposed site of a 2,000 acre park. The site includes the old historic townsite of Frankfort. See Environmental Use map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Pacific County discussion are plotted on the Historical-Cultural map and listed in its index.

KNAPPTON
Knappton began when the R. N. Knapp family and J. H. Busl settled near Job Famley and George Hopkins on a narrow strip of land on the north shore of the Columbia River near its mouth. One of Knapp's sons, Jabez, discovered how to make cement from a limestone outcropping nearby and the town began to grow with the influx of cement workers. First called Cementville, "Knappton" became the settlement's

COUNTY DISCUSSION

official name when a post office was established in 1871. As the limestone deposit ran out, logging took over with fishing and trapping adding to the town's economy. The Knappton Mill, built in 1870, was one of the largest on the Columbia River. For 70 years the logging industry flourished into a lumber exporting operation shipping to U.S. and foreign ports. In July of 1941, the Knappton Mill burned to the ground taking with it 85 percent of the jobs. The post office closed November 15, 1943 and the town was officially vacated. Today a state highway runs through the deserted site with the old quarantine buildings used to check new immigrants remaining as the only evidence of a once prosperous town. See Historical-Cultural map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Pacific County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrologic features covered by the Shoreline Management Act.

Lakes on Long Beach Peninsula are vital nesting and breeding areas for many forms of wildlife. They are possibly very important to the water table of the area. These lakes are: Skating Lake, Loomis Lake, Mallard Lake, Tape Lake, Site Lake, Brisco Lake, Clear Lake, Blaik Lake, Clam Lake, Lost Lake, Island Lake, Freshwater Lake, Cranberry Lake, Deer Lake, Breaker Lake, Tinker Lake, Holman Lake. See Hydrological map.

LEADBETTER POINT
Leadbetter Point, a recent addition to Willapa National Wildlife Refuge, is located on the northernmost point of Long Beach Peninsula, which stretches for 20 miles along the southwestern coast of Washington State in Pacific County. The peninsula is a narrow finger of sand separating the turbulent waters of the Pacific Ocean from generally placid Willapa Bay. Along the southern portion are several oceanside communities, the largest being Ilwaco, Long Beach and Seaview. Willapa National Wildlife Refuge is located opposite the Peninsula, across Willapa Bay, beginning approximately 6 miles southeast of Leadbetter Point.

A hard-surfaced road follows Long Beach Peninsula north to Oysterville, then gravel and dirt trails continue to within 3.5 miles of the tip of the Point. Motor vehicle access is also possible along the ocean beach.

Picturesque sand dunes support sparse stands of beach grass, lupine, wild strawberry, sand verbena, sea rockets, and beach peas. Between the sand and Willapa Bay is a thin edge of tideland cut by tidal channels and covered by bay water a part of each day. This salt marsh with its characteristic growth of pickleweed (salicornia) and arrow grass is an extremely important wildlife zone. Leadbetter Point has one of the finest examples of salt-marsh left in the Pacific Northwest.

The waters of Willapa Bay, in conjunction with the salt marshes of Leadbetter Point, are important feeding and resting areas for black brant. During April and May, thousands of them may be seen feeding and loafing in the marsh or resting on nearby mudflats. Smaller numbers occur in winter. Joining the brant on Leadbetter are all the species of shorebirds found on the Oregon and Washington coasts, including sandpipers, turnstones, yellowlegs, sanderlings, and plovers. They occur by the ten of thousands during the migration peaks in late April and early May, and from late August into October. Leadbetter Point is the single most important area for shorebirds (Charadriiformes) in the state. The variety of habitat types - mud flats, sand dunes, open sand beach, grassy uplands, salicornia salt marsh - and their sheer extent makes the area significantly valuable. The salt marsh provides feeding habitat for pectoral and sharp-tailed snadpipers. Other species also utilize this habitat type. Leadbetter Point is one of the very few areas where red knots occur in sizeable numbers during migration. Snowy plover nest in the dry sand flats below the dunes at the northwest tip of the peninsula. Herons, waterfowl, gulls and raptors are always present in season. Some birds rarely seen in the Pacific Northwest, are regularly seen on the refuge, such as the American golden plover, and the Lapland longspur.

Southern parts of Long Beach Peninsula are timbered and supported luxurious growths of huckleberry, salal, salmonberry and other common coastal forest plants. North of this older land, the area is biologically "young," and still in a constant state of change. Beach pines and other trees are invading here and there, but this is still a sand, grass and small shrub world. Potholes in the sand collect water in the winter and grow up in spring with sedges, rushes and other waterloving plants. See Willapa Bay and Estuary. See Hydrological, Zoological-Terrestrial and Environmental Use maps.

LEWIS AND CLARK CAMPSITE AND TRAIL
Frankfort Vicinity. See Clark County.

LONG BEACH PENINSULA AND GRAYS HARBOR COASTAL AREA
See Grays Harbor County.

LONG ISLAND
A major part of the Willapa National Wildlife Refuge is Long Island, 6 miles long and from 0.5 to 2 miles wide. The island is approximately 70 percent Federal property; a private timber company owns the remainder. The entire island has protection as a wildlife refuge under an agreement with the timber company.

Blacktail deer, black bear, and raccoon are abundant on the island. A small herd of elk fluctuates in number as its members swim back and forth between the island and the mainland. Plant succession on logged areas provides an abundance of wildlife food: evergreen huckleberry, blackberry, thimbleberry, salmonberry, elderberry, maple alder, cascara, salal, fern, and seedling conifers. Bobcats and coyotes are there, but are rarely seen. Blue and ruffed grouse are abundant. Band-tailed pigeons commonly nest and usually can be seen from May through September.

The timbered portion of Long Island is managed much like that of a private tree farm. Mature timber is sold under bid, with part of the receipts going to Pacific County and the balance to the Federal treasury. Each year about 50 acres on the south end of Long Island are sown to winter grains for waterfowl food. Winter wheat and oats are planted in the early fall, and by the time the southbound birds arrive, the tender, grain plants have sprouted providing browse. See Coastal Plain Western Red Cedar. See Botanical map.

LONG LAKE
This wildlife habitat area is used as a research area. See Hydrological map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Pacific County discussion are plotted on the Geological map and listed in its index.

NAHCOTTA
Before the arrival of the first white, J. A. Morehead, in 1890, Nahcotta was an Indian camp. The area was densely populated because of the availability of oysters for food. When the whites moved in, a town was started, and the Indians moved to the outskirts. By 1899, a railroad was built to Nahcotta to connect with the ferry from Astoria, Oregon, and the town had a weekly newspaper edited by John Phillips. The name of the railroad changed so often that the station master, A. P. Osborne was never sure who he was working for. From 1908 to 1930, the train ran on a regular schedule, but since 1930 the tracks have slowly disappeared. Today, the town is a resort settlement with two small industries: a sweater knitting "factory," and one to punch and string oyster shells for nurturing baby shellfish. See Historical-Cultural map.

NASELLE RIVER
This free-flowing stream is used by kayakers. It enters a southeastern arm of Willapa Bay. Fall chinook are taken from August through early October and coho salmon from late September through December. Jack chinook and coho are important to anglers here. A few white sturgeon are taken from the deeper pools of the estuary of the lower Naselle from late fall through early spring. A great blue heron rookery containing 5 nests is located there. See Zoological-Aquatic map.

NASELLE RIVER TIDELANDS
This estuarine area is valued as wildlife habitat. See Hydrological map.

NEMAH RAIN FOREST
This is a rare example of virgin rain forest in southwestern Washington. See Botanical map.

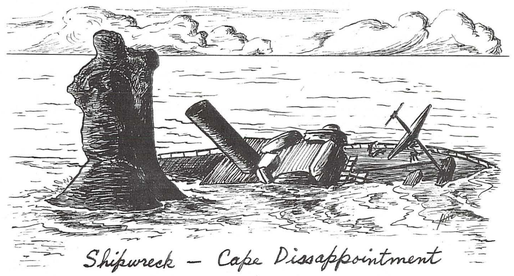
NEMAH STATE SALMON HATCHERY
State Fisheries Department. Species propogated: chinook, coho, and chum salmon. See Zoological-Aquatic map.

NORTH HEAD
A promontory extending into the ocean, this rock formation is crowned with an historic 19th century lighthouse. The beach area here has private and commercial development. Leadbetter Point and Fort Canby are designated for public use. See Geological, Historical-Cultural, and Environmental Use maps.

OYSTERVILLE
In 1854, R. H. Espy of Wisconsin came to the bay to locate supplies of piling logs. Espy took on a partner, L.A. Clark, and while looking for logs they decided oysters might have good commercial possibilities. Others came to share in their rapidly expanding oyster business, and by 1865 Oysterville was a town and had a post office. A 110-foot passenger and mail ship was run by Lewis Loomis between Astoria, Oregon, and Ilwaco, Washington, where passengers were picked up on the beach by the stage. Oysterville was the county seat of Pacific County until 1893 when a new and rival town across Willapa Bay took the seat by force after a rigged vote. When the oysters began disappearing, Oysterville lost its prosperity. The courthouse was made into a college which also didn't pan out and later became a cow barn. Today Oysterville has few residents; most are descendants of early pioneers. Its old cannery is used infrequently during the winter to process a limited oyster catch. See Historical-Cultural map.

PACIFIC COAST SHORELINE
The area between the ordinary high water mark and the western boundary of the state from Cape Disappointment on the south to Cape Flattery on the north, including harbors, bays, estuaries and inlets, is a designated shoreline of statewide significance under the State Shoreline Management Act.

PACIFIC COUNTY HISTORICAL SOCIETY MUSEUM
Located in South Bend, pioneer artifacts of the area are featured emphasizing Willapa Bay industries: oysters, cranberries, logging. Indian artifacts are also displayed. See Historical-Cultural map.



PALIX RIVER
This river draining into Willapa Harbor below South Bend is a significant estuarine area and reportedly has seven falls between highway and the forks upstream. The Palix River tidelands are a significant estuarine habitat for shorebirds and other water fowl. See Zoological-Terrestrial and Hydrological maps.

RADAR PONDS AND ROARING CREEK SLOUGH
These ponds provide important habitat for wildlife. See Hydrological and Zoological-Terrestrial maps.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SHOALWATER INDIAN RESERVATION
Ethnic Group. See Historical-Cultural map.

TOKE POINT
Toke Point is a narrow peninsula extending about 13,000 feet in a southeasterly direction from the north shore of Willapa Bay, about 5 miles east of the estuary entrance from the ocean. Approximately 1.3 miles of the southern end of the point have eroded, at an average rate of 12 feet per year for the past 50 years. Toke Point has a shrimp, oyster, and crab processing plant, a small-boat basin and Coast Guard facilities, many summer homes, and a population of about 700. Economic activity and population have been decreasing, primarily attributed to the beach erosion which has resulted in the loss of 17 city blocks of developed property, has destroyed a beach area along the southern shore, and is presently threatening a county highway. Storm waves threaten to breach the lower part of the point and form a tidal slough which would be gradually enlarged by each subsequent storm. Breaching would result in the loss of a small-boat basin, Coast Guard facilities, 7 platted city blocks, and approximately 10 acres of land. The area north of Toke Point would also be exposed to action by breaching of the Point. This area includes 800 acres of fertile farmland, and a new section of State Highway 105 which skirts the shoreline.

A system of rock groins and a rock revetment has been considered for protecting Toke Point from further erosion. See Geological map.

WASHINGTON COAST
See Grays Harbor County.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the Atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide or national significance and reflect, in part, the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the "life zones of the state."

BIRDS. Ornithologists have recorded over 150 species of birds at Leadbetter Point between 1963 and the present. The waters of Willapa Bay and salt marshes of Leadbetter Point are important feeding and resting areas for the black brant, a sea goose that migrates along the Pacific coast between Alaskan breeding grounds and Mexican wintering grounds. During April and May thousands of these birds may be seen feeding and loafing in the salt marsh or resting on nearby mud flats. Lesser numbers occur during winter. The sharp-tailed sandpiper (Erolia acuminata) comes to the Point from the Siberian tundra and winters in the southwest Pacific. Similarly, the American golden plover, which carries on another spectacular migration extending nearly from pole to pole, regularly seeks out Leadbetter Point as a resting and feeding site. Hundreds of cackling and white-fronted geese, moving along the coast in the spring from California to Alaska, rest in the rain pools between the dunes and feed on the saltgrass flats. Several varieties of ducks are also commonly seen in the dunes, along with flocks of wimbrels, a large long-billed shore bird. The rare snowy plover (Charadrius alexandrinus nivosus) seeks out the barren moving sands at the north end of the Point and Grassy Island as its home. It probably reaches the northernmost point of its Pacific Coast breeding range here. In these same sands, thousands of sandpipers rest in sheltered depressions when high tides inundate their tidal flat feeding areas. Masses of sooty shearwaters pass the end of the point each August in the course migration between summering waters in the Aleutians and nesting islands off the coast of New Zealand. Another Leadbetter Point species exciting to both amateur and professional ornithologists is the Lapland longspur, a colorful songbird which nests on the Arctic tundra. A few of these birds occur in the grasslands of the dunes in winter, hundreds of miles from normal wintering territories. Bald eagles, osprey and falcon are found nesting in the Wilson Creek area and Palix River area of Pacific County. The Peale's peregrine falcon (Falco peregrinus pealI) is a resident along Pacific coast and a migrant elsewhere. The western brown pelican (Pelecanus occidentalis) is a winter visitor along the Pacific coast and in Willapa Bay. The Alaskan short-billed dowitcher, (Limnodromus griseus caurinus), winters along the Pacific coast. Other noted birds include alcids, band-tailed pigeon, cormorant, fork-tailed storm petrel, gulls, heron, jaeger, red knot, shearwaters, snow bunting and whistling swan.

MAMMALS. Concentrations of Roosevelt elk are found in the Willapa Hills. The coastal lowland areas in Pacific County are among the last strongholds of the Columbia white-tailed deer. At one time, these deer reigned from southern Oregon to British Columbia. This tidewater deer is in danger of extinction, and there are approximately 200 left. Future industrial development in the lower Columbia basin would contribute to further loss of these animals unless precautions are taken. Since these deer depend upon open fields at the tidewater elevation where they feed on salt grasses and other grasses upon which cows and grazing animals feed, any compatible development must include maintenance of this type of habitat. The northern flying squirrel (Glaucomys sabrinus) is indigenous to the Pacific coastal counties of the Olympic Peninsula. The elephant seal (Mirounga angustirostris) is occasionally noted along the Pacific coast. The numerous species of Pacific coast marine mammals listed under the wildlife of Grays Harbor apply equally to Pacific County. Other mammals include black bear, black-tailed deer, and cougar.

AMPHIBIANS. Dunn's salamander (Plethodon Dunni) has a limited range in Washington. The northernmost official record of Dunn's salamander is near South Bend, Pacific County.

REPTILES. The Pacific pond turtle (Clemmys marmorata) is found in the Willapa region.

WILLAPA BAY AND ESTUARY
This area is an extremely important feeding and resting area for herons, waterfowl (especially black brant), eagles, shore birds, gulls, terns, alcids, and, on occasion, for sooty shearwaters in flocks of thousands. The red knot is found in season in sizeable flocks, feeding at a number of areas in the bay. The bay is a biologically healthy and productive environment at present but is potentially subject to degradation by development activities.

The estuary is deemed critical to the preservation of anadromous fish runs that pass through, and actually controls upstream fish runs. It is an oyster spat area and major oyster-producing area. The estuary has been named a "Wilderness Area." Important clam beds are also located here. This harbor is of huge economic importance to local fisheries. It is of crucial environmental concern as a relatively unspoiled natural estuary. Industrial pollution, oils, wood, bark and sawdust, local municipal solid waste and sewage degrade water quality. Sediments are created by shoaling beach erosion and by logging operations. The bay provides valuable estuarine habitat, supporting extensive shellfish and other marine species populations. The Willapa River holds spawning runs of salmon, steelhead, and sturgeon, and the bay acts as a holding and gathering area for these as well as other fish species. See Willapa National Wildlife Refuge, Leadbetter Point, and Long Island. See Hydrological, Zoological-Aquatic, Zoological-Terrestrial maps.

WILLAPA NATIONAL WILDLIFE REFUGE
Willapa National Wildlife Refuge in the State of Washington was established in 1937 to provide a protected wintering area for Pacific black brant. The extensive beds of eelgrass in Willapa Bay supply these birds with their preferred food, and protection afforded by the refuge allows them to utilize it unmolested. Black brant nest on the arctic tundra of Alaska and Canada, and winter at the refuge from October through May.

The refuge is also an important wintering ground for the dusky Canada goose. This bird nests on the Copper River Delta in southeastern Alaska. Many kinds of dabbling and diving ducks either winter on the refuge or rest and feed there during fall and spring migrations. The many tide flats on the perimeter of Willapa Bay attract shore birds by the thousands.

The refuge is in southwestern Washington on Willapa Bay, about 12 miles from the town of Ilwaco. It consists of 9,600 acres of Federally-owned land and water and about 10,000 acres of State tidelands and water. The Federal portion of the refuge includes marsh and water, upland timber, and partially stabilized sand dunes, with small amounts of grassland and croplands.

A waterfowl display pond is maintained at refuge headquarters. The principal attraction is a captive flock of dusky Canada geese. These birds, and their goslings in season, can be viewed at close range. Several species of ducks are normally present also. During late evening and early morning hours, large numbers of free-flying ducks feed on this fresh-water pond.

Hunting is allowed on the refuge whenever it is consistent with primary wildlife objectives. Long Island is open to archery hunting during the regular state deer season. Hunters may take deer, bear, and raccoon. This type of hunting is intended to remove the current year's increment, and maintains the deer herd at a healthy level. Hunters provide their own boat transporation to and from the island and camp in designated campgrounds. Waterfowl hunting is permitted on two separate units of the refuge. One is managed primarily as a goose-shooting area and is open only on Wednesdays, weekends, and Federal holidays. The other unit is basically a duck-hunting area, and shooting is permitted daily throughout the waterfowl open season. Maps delineating the public hunting areas can be obtained at refuge headquarters.

Seven campgrounds are maintained on Long Island. Each campground contains picnic tables, fireplaces, restrooms, and trash disposal pits. Camping is restricted to designated campgrounds and may not be permitted during periods of extreme fire hazard. Maps showing campground locations are available at refuge headquarters. Campers must furnish their own boat transportation to and from the island. See Environmental Use and Zoological-Terrestrial maps.

WILLAPA RIVER
This free-flowing stream is an important feeder stream of the Willapa Estuary. There is a waterfall about 18 miles from Raymond. Fall chinook ascend the river from August through October, and coho salmon ascend from late September through December. White sturgeon are taken from the lower river between Raymond and South Bend. Shad occur in the estuary of the lower river during late spring and summer months, which is also utilized by chum salmon. A fish ladder has been proposed for anadromous fish use. See Hydrological, Zoological-Terrestrial and Zoological-Aquatic maps.

WILLAPA STATE SALMON HATCHERY
State Fisheries Department species propagated chinook and coho salmon. See Zoological-Aquatic map.



WILLIE KEIL'S GRAVE STATE PARK
This 1-acre park has one the most unusual histories of any in the state. Willie Keil was a 17 year old Missouri boy, whose parents, Dr. and Mrs. William Keil, leaders of the Bethel Colony, were gathering a wagon train together in 1855 to move west. Willie was especially excited as he had been promised the position of honor as driver of the lead wagon. The boy died a few days before the trip was to begin, but the father kept his word to his son. The boy's body was sealed in a lead-lined box and set in the front wagon. Word spread among the Indians encountered along the way that a dead man led the train, which was never attacked. When they arrived in Washington, Willie was buried atop a hill near Menlo, overlooking the farmland where members of the Colony settled. See Environmental Use map.

WIKKALA PONDS
These areas provide habitat for wildlife in Pacific County. See Hydrological map.

Pend Oreille

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Pend Oreille County discussion are plotted on the Archeological map and listed in its index.

ABERCROMBIE-HOOKNOSE, COLVILLE NATIONAL FOREST
This 30,000-acre unit is recommended by conservation groups for wilderness study. See Environmental Use map.

BOGS AND FENS
Fens and bogs in northern Pend Oreille County contain many rare and unusual plants found nowhere else in Washington. This vegetation has strong coastal and boreal affinities. See Botanical and Hydrological map.

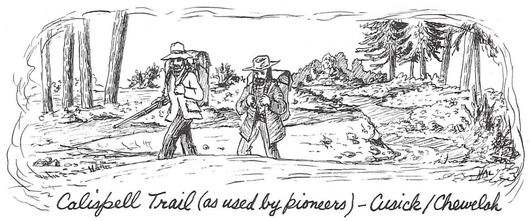
BOUNDARY CREEK FALLS
The falls were created as Boundary Creek passes over the east side of the Pend Oreille River gorge. See Hydrological map.

BUNCHGRASS MEADOWS
This bog community contains many plants with boreal affinity unique or rare for this area. Some moss species present are reported nowhere else in the western United States. This is also a native cutthroat trout fisheries and spawning area. See Botanical, Zoological-Aquatic, and Hydrological maps.

CALISPELL LAKE AREA
The area provides habitat for osprey and waterfowl. See Zoological-Terrestrial map.

CALISPELL TRAIL
This trail was used by the local Indians, and later by Hudson's Bay traders and settlers, to travel from Cusick on the Pend Oreille to Chewelah in the Colville Valley. See Historical-Cultural map.

CEDAR CREEK
The creek passes through and supports an exceptionally large virgin cedar stand. See Botanical map.



CRAWFORD STATE PARK
Gardner Cave is the principal feature at Crawford State Park. The cave has a total slope length of 1,050 feet and is the largest limestone cavern in Washington. Contemporary accounts indicate the cave was discovered in 1903 by Ed Gardner, the owner of the property. Except for the trail up to the cave entrance and some illumination and handrails within the cave, the 40-acre park is not developed. See Environmental Use map.

CROWELL RIDGE
The ridge has a virgin stand of whitebark pine. See Botanical map.

FENCE CREEK DEVONIAN FOSSIL SITE
This site is a good source for Devonian fossils, commonly brachiopods and corals. It is a limestone outcrop on the hillside just off the road that crosses Fence Creek. See Geological map.

FLUME CREEK
The South Fork drainage contains stands of virgin cedar, hemlock, spruce, and Douglas-fir. See Botanical map.

FUNGI SITE
Fungus flora is remarkably diverse in northern Pend Oreille County. See Botanical map.

GARDNER CAVE
This is the largest limestone cavern in the state, extending 260 feet into the ground; stalactites, stalagmites, and columns are common features. The cave has 1,050-foot slope length, and is located in Crawford State Park. See Crawford State Park entry. See Geological map.

GYPSY AMPITHEATERS
Located in the Gypsy Peak area, these ampitheaters contain alpine glaciation features such as cirques, horns, thresholds, and walls. See Geological map.

GYPSY PEAK
The highest peak in northeastern Washington with an elevation of 7,318 feet, Gypsy has many communities of arcctic-alpine plants which are rare or unique. Mountain caribou use this area for winter range. See Zoological-Terrestrial and Botanical maps.

HALL MOUNTAIN AND HARVEY CREEK, COLVILLE NATIONAL FOREST
Located east of Sullivan Lake, it features Ice scour benches. Wilderness study has been advocated for these contiguous areas. See Environmental Use, Geological, and Zoological-Terrestrial maps.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Pend Oreille County discussion are plotted on the Historical-Cultural map and listed in its index.

HOOKNOSE MOUNTAIN
Alpine glaciation features such as cirques, horns, thresholds, walls, and tarns may be seen. See Geological map.

HUFF LAKE BOG
The site is recommended as a Natural Landmark. It contains relic Ice Age flora including carnivorous plants of genus Drosera. See Botanical and Hydrological maps.

INDIAN MISSION CAVES
This is the location of early Indian Missions. There are three separate caves, one is still used for ceremonial occasions. See Archeological map.

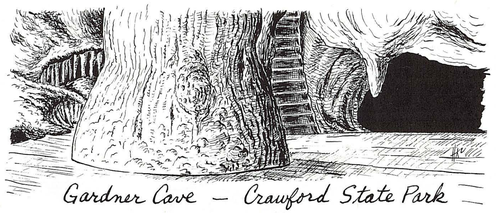
KALISPELL INDIAN RESERVATION
Ethnic group. See Historical-Cultural map.

KETTLE LAKES
Numerous kettle lakes are found in southern Pend Oreille County, including: Bead, Marshall, Browns, Calispell, Diamond, Sacheen, and Deer. See Hydrological map.

KETTLE TOPOGRAPHY
Unusual kettle topography can be seen west of the city of Tiger. See Geological map.

KINGS LAKE
The lake contains cutthroat brood-stock. See Zoological-Aquatic map.

COUNTY DISCUSSION



Gardner Cave — Crawford State Park

LACUSTRINE TERRACE
The terrace is found in northern part of the county at 2,100-foot and 2,500-foot levels. See Geological map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Pend Oreille County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LE CLERC CREEK WILDLIFE RECREATION AREA
The Wildlife Recreation Area contains significant winter habitat for deer and elk. Osprey nest on pilings in the creek. It is similar to Little Pend Oreille Wildlife Recreation Area. See Environmental Use map.

LE CLERC RIVER
The entire length is protected as a trout fishery. See Zoological-Aquatic map.

LEOLA AND DEEMER CREEKS INTERFLUVE AREA
The area features virgin cedar and hemlock. See Botanical map.

LITTLE PEND OREILLE WILDLIFE RECREATION AREA
This 44,788 acre area is 13 miles east of Colville. About 80 percent of this mountainous yellow-pine forest is managed to benefit its excellent whitetail deer and hunting opportunities. Habitat is also managed for other wildlife: black bear, mink, grouse, bald and golden eagle, and many song and water birds. Active beaver colonies can be seen from roads; muskrat live around Bayley and McDowell Lakes.

Little Pend Oreille has a network of nearly 200 miles of roads and trails, 7 established campgrounds. 62 miles of trout streams and 2 lakes furnish a variety of year-round recreation. See Environmental Use and Zoological-Terrestrial maps.

MARL BOTTOMED LAKES
At Calligerion bog, moss species present are found nowhere else in the state. See Botanical map.

MONK FORMATION
This belt of rock formation found nowhere else in the state consists of quartzitic limestone and phylite. It is located in the northern part of the county. See Geological map.

MORGANS MARSH
This area provides an outstanding example of succession, including a large climax community. See Botanical map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Pend Oreille County discussion are plotted on the Geological map and listed in its index.

NORTH METALINE ORDOVICIAN FOSSIL SITE
Graptolite fossils can be found in highway cuts about a mile south of Leadbetter Lake. See Geological map.

NORTHEAST METALINE ORDOVICIAN FOSSIL SITE
Graptolite fossils are found in the stream banks at the confluence of State Creek and Pend Oreille River. See Geological map.

NORTHEASTERN PEND OREILLE COUNTY
This section of the county provides important habitat for moose, caribou, grizzly bear, wolverine, black bear, fisher, Canada lynx, white-tailed deer, bog lemming, boreal chickadee, pine grosbeak, crossbills, bobolink and possibly the grey wolf. See Zoological-Terrestrial map.

PEE WEE FALLS
These falls are on the upper Pend Oreille River. See Hydrological map.

PEND OREILLE RIVER
This free-flowing river flows north into Canada and into the Columbia River. It is an outstanding trout fishery with a valuable waterfowl pothole area in vicinity of Calispell Lake.

The American osprey (Pandion haliaetus carolinensis) is known to breed along the Pend Oreille River. About 15 nests have been located between Newport and Metaline Falls. A concentration of nesting osprey exists north of Metaline Falls as well. The river's entire length is protected (in Washington) as outstanding wildlife habitat and trout fishery. In the Pend Oreille River below Metaline Falls, deposits from mining wastes and drainages exert a blanketing effect on the stream channel and are a potential source of toxic materials. During an August 1963 study, live box tests with rainbow trout fingerlings indicated there is no toxicity problem in the Pend Oreille River resulting from the mine effluents. However, the effect of the mine tailing wastes on the bottom fauna of the river is significant. Above the zinc and lead mines, the bottom gravel was clean and a large number of organisms were found. Below the mines there was an almost complete absence of organisms, and the bottom is covered with mine tailings to an unknown depth. See Zoological-Terrestrial and Zoological-Aquatic maps.

PEND OREILLE RIVER GORGE
Rare or unique communities of calciphilic vegetation, especially musci, are located north of Metaline Falls. The post-pleistocene gorge runs from Metaline Falls north to the International boundary. Exposed rock layering and anticlines are found in the gorge. See Botanical map.

PEND OREILLE STATE PARK
The 430-acre park is 15 miles southwest of Northport. Camping spaces are available. See Environmental Use map.

PLANT COMMUNITIES
The climax plant communities listed below occur in the county. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Subalpine fir - common beargrass
Subalpine fir - Oregon boxwood
Western hemlock - Oregon boxwood
Western redcedar - devilsclub

PRIEST LAKE AND RIVER TRIBUTARIES
The lake and river offers a native cutthroat trout fishery and spawning areas. See Zoological-Aquatic map.

ROOSEVELT GROVE OF ANCIENT CEDARS, KANIKSU NATIONAL FOREST
Two groves of western red cedar with trees up to 12 feet in diameter and 150 feet tall and average ages of 800 years are located here. Granite Creek with cataracts and falls passes through the area which totals 420 acres in the Kaniksu National Forest. See Botanical and Environmental Use maps.

SALMO PRIEST, CROWELL, SALMO, AND SHEDPROOF DIVIDE, COLVILLE NATIONAL FOREST
The Forest Service has proposed a part of this area for immediate wilderness study and consideration. Washington conservationists, and those in Idaho recommend study for the larger roadless area, including the contiguous areas of Crowell, Salmo and Shedproof Divide. This proposed wilderness is within both the Colville and Kaniksu National Forests and crosses the state line into Idaho. See Environmental Use map.

SALMO RIVER
The South Fork of the river holds stands of virgin cedar, hemlock, alpine fir, and spruce. The river is also a native cutthroat trout fishery and spawning area. See Zoological-Terrestrial, Hydrological, and Botanical maps.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SHEDROCK CONGLOMERATE FORMATION
An unusual type of conglomerate of glacial origin. See Geological map.

SHEDROOF DIVIDE
A rare and unique community of Festuca viridula (dominant bunchgrass) can be found. See Botanical map.

SULLIVAN CREEK AND TRIBUTARIES
This free-flowing creek sustains native cutthroat trout fisheries and spawning areas. See Zoological-Aquatic and Hydrological maps.

SULLIVAN LAKE
Sullivan Lake is the center of abundance for eastern bird species like the American redstart and the northern waterthrush which have a limited distribution within the State of Washington. This is a significant area for its variety of fauna and the greatest diversity of breeding passerine species in the state. Noted for scenery and clean waters, it occupies a rock-carved depression between two ice-scoured walls and is dammed at one end by a glacial debris blockade. See Geological, Zoological-Terrestrial, and Zoological-Aquatic maps.

SULLIVAN MOUNTAIN
This is a caribou winter range. See Zoological-Terrestrial map.

SULLIVAN RIVER
The river is protected as a scenic river and trout fishery. See Zoological-Aquatic map.

THREE-MILE CREEK FALLS
The falls are created where the creek passes over the east side of the Pend Oreille River gorge. See Hydrological map.

TROUT LAKE
The area around the lake has a stand of virgin ponderosa pine. See Botanical map.

WATCH AND GYPSY LAKES
See Gypsy Amphitheatres.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide and national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. Noted species include the bald eagle, bobolink, boreal chickadee, crossbill, finches, sparrows, pine grossbeak, and eastern songbirds.

MAMMALS. The only resident breeding population of moose (Alces alces andersoni) in the state is located in northern Pend Oreille County. This stable moose population was established several years ago when a group of moose migrated from Canada to Idaho. The habitat and isolation allowed the moose to establish themselves. Individual moose have been reported using the North Cascades National Park by National Park Service Rangers and other individuals. The northern remote areas of Pend Oreille County are of general importance to the mountain caribou (Rangifer tarandus montanus). Their only population within the state is a small herd of 15 to 20 animals in this county. There is no evidence that this species ever ranged in other sections of Washington. Deer wintering habitat consists of 20 miles along the Little Spokane River valley north of Chattaroy and the Pend Oreille River valley from the Canadian border to the Idaho border. Bottomland areas southeast of Boundary Dam and east of Box Canyon Dam provide elk winter ranges. Bighorn sheep are found in the county. The grizzly bear (Ursus arctos) is found only in North Cascades National Park and in the extreme northeast corner of state. The total state grizzley population is estimated at 10 bears. The northern bog lemming (Synaptomys borealis) has a restricted range in Pend Oreille and Whatcom Counties. The red-tailed chipmunk (Eutamias ruficaudus) has a restricted range in Pend Oreille, Spokane, and Stevens Counties. Wolverine (Gulo gulo) is increasing in numbers, and is found in the Cascades and northeastern Washington. The grey wolf (Canis lupis) ranges into the state from British Columbia. The Canada lynx (Lynx lynx canadensis) is found in Pend Oreille, Chelan, Okanogan, Ferry, and Stevens Counties.

"Z" CANYON
This canyon is cut 400 feet into the earth between sheer rock walls, only 20 feet apart in some places. See Geological map.

Pierce

ALASKA CEDAR
This record Alaskan Cedar (Chamaecyparis nootkatensis) has a circunference at 4-1/2 feet of 25 feet 6 inches, a height of 34 feet, and a crown spread of 25 feet. See Botanical map.

AMERICAN LAKE
This 1,125 acre lake has a 90 foot maximum depth. Residential developments and intensive land use around American Lake, south of Tacoma, presently contribute excessive phosphorus and other nutrients to this lake. See Hydrological and Zoological-Aquatic maps.

ANNIE WRIGHT SEMINARY
This private school is composed of buildings in the Tudor style of architecture. The grounds have also been beautifully landscaped. See Historical-Cultural map.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Pierce County discussion are plotted on the Archeological map and listed in its index.

BELJICA RHODODENDRONS
These are the northernmost rhododendrons in the Cascade chain. Although the native rhododendron is Washington's state flower (Rhododendron macrophyllum), it is found only in the Olympics. There are many huge bushes, almost trees, in bloom near ridges in late June. At the same period, the banks of Copper Creek at lower elevations (near the highway) offer a glorious variety of typical shade-loving wildflowers, including the "inside-out flower" (Vancouveria hexandra), climbing orange-flowered honeysuckle vines, and the showy pink corydalis. See Botanical map.

BOND'S BLUEBERRY FARM
The back side of this farm is a small area, still in its natural state. A stream and two ponds provide a place for local life science students to observe plants and animals in a natural setting. This area has been proposed as an extension of adjacent Wildwood Park. See Botanical map.

BOX CANYON OF THE COWLITZ
This is the site of the headwaters of the Muddy Fork of the Cowlitz River. See Geological map.

CAMP SIX LOGGING EXHIBIT
At "Camp Six" various original examples of movable steam-logging equipment have been faithfully restored for posterity in a natural forest setting. This exhibit, including a film on "Age of Steam Logging," accurately presents for educational purposes the ingenuity and mastery of the early logging engineers. Located in Point Defiance Park, Camp Six is on the National Register of Historic Places. See Historical-Cultural map.

CARBON RIVER.
This is a free-flowing river used for kayaking. See Hydrological map.

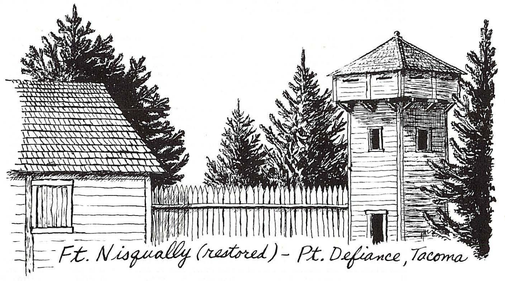
CARBON RIVER CANYON
This deep canyon with rushing glacial stream has heavy forests of fir, western hemlock and western red cedar. The flood plain of the meandering river at head of the canyon remains unchanged. See Geological and Botanical maps.

CASTLE MOUNTAIN GOAT PRESERVE
Castle Mountain supports a small mountain goat population. The area is readily accessible by road and trail and the goat herd has a high esthetic value. The State Game Department has agreed to maintain it as a mountain goat preserve. See Zoological-Terrestrial map.

CAYUSE PASS
Pass, at 4,730 feet, through the Cascade Mountains on State Route 410. See Geological map.

CHAMBERS CREEK
A fish-passage facility allows anadromous fish spawning upstream. Chambers Creek exhibits coliform densities above the limit recommended for safe water-contact recreation. See Hydrological and Zoological-Terrestrial maps.

CHARLES LATHROP PACK DEMONSTRATION FOREST
Managed by the College of Forest Resources, University of Washington, this is typical humid transition forest, predominantly Douglas-fir forest type aged to 400 years. The Forest has a residential field station for student instruction, intensive research, demonstration, and conference center. The gatehouse on the highway is open to visitors during summer. The forest includes over 1,000 acres of old-growth timber, including a 50+ acre undisturbed "ecological area" on Newton Creek. See Botanical and Environmental Use maps.



Ft. Nisqually (restored) - Pt. Defiance, Tacoma

CHAMBERS CREEK CANYON
This deep, steep-walled, heavily wooded valley, bordering lower Chambers Creek and estuary, is a natural greenbelt in a rapidly urbanizing area. See Geological map.

CLEARWATER, SNOQUALMIE NATIONAL FOREST
Immediately to the north of Mount Rainier National Park and contiguous to it in part, the Clearwater area is strongly recommended for wilderness designation. Conservation representatives have been unhappy with the intense logging that has taken place up to the boundaries of the National Park; in the Clearwater area, with logging roads separating much of it from the park. See Environmental Use Map.

COMET FALLS
A large hanging creek falls (320 feet high). See Hydrological map.

COMMENCEMENT BAY
This arm of Puget Sound is located in Tacoma and surrounding area, and is heavily abused and threatened by industrial pollution. Despite this, the shorelands support waterfowl and fauna. Pure stands of madrona grow on the East Bluff, while the western shore supports a variety of waterfowl and shorebirds. See Zoological-Terrestrial and Botanical maps.

COUGAR LAKES AREA
See Yakima County.

DASH POINT STATE PARK
The 290 acre park just north of Tacoma on Puget Sound offers camp and trailer sites, swimming, fishing and clamming. See Environmental Use map.

DRUMLINS
Glacial Pleistocene formations are found in several places in Pierce County. See Geological map.

EAGLE ISLAND
This is a small island where bird life, poison ivy, and thick plant growth abound. See Botanical and Environmental Use maps.

EDMOND MARSH
This large shrub-covered peat swamp is adjacent to and related to Fort Lewis marshes. See Hydrological map.

EDMONS GLACIER
Found on Mount Rainier, it is the largest glacier in the United States, excluding Alaska. See Geological map.

FIRST PRESBYTERIAN CHURCH
This is a 1920 Romanesque structure. See Historical-Cultural map.

FLETT CREEK BASIN
Featuring a scenic vista, feeding and resting place for waterfowl, this is prime greenbelt. Land use now is dairy farm and blueberry fields. It is very beautiful and although not prime, it is above average agricultural land. Flett Creek exhibits coliform densities above the limit recommended for safe water contact recreation. Not mapped.

FORT LEWIS AREA
There are stands of ponderosa pine (Pinus ponderosa) in the Fort Lewis area. The species is unusual for western Washington. See Botanical map.

FORT LEWIS MILITARY MUSEUM
The museum shows the history of the military in the Northwest. Pictures, uniforms and weapons from the Civil War to Viet Nam are featured. See Historical map.

FORT LEWIS MILITARY RESERVATION
Representative prairie terrain is preserved here, also an extensive system of fresh-water marshes and numerous lakes. The Fort Lewis Military Reservation is environmentally significant due to its unaltered, prairie terrain. It has an extensive system of fresh and salt water marshes and lakes, plus deposits of glacial outwash. The location holds garry oak woodlands and an anachronistic stand of Pinus ponderosa. Franklin and Dyrness (1969) describe the unusual plant communities of the Tacoma prairies. In addition to Pinus ponderosa, they include Juniperus scopulorum, Populus tremuloides, and Betula papyrifera, species which are rarely or never found elsewhere in western Washington. See Geological, Botanical, and Zoological-Terrestrial maps.

FORT NISQUALLY
This is a reconstruction of a Hudson's Bay company fur trading post using some of the original buildings. The granary here is a National Historic Place. The building (one story) was built in the mid 1800's and is one of the oldest buildings still standing in Washington State. There is a small museum in the Factor's house. See Historical-Cultural map.

FORT STEILACOOM COMMUNITY COLLEGE (JR)
Located in Tacoma, the college was established in 1967. See Historical-Cultural map.

FORT STEILACOOM COUNTY PARK
This park is being considered for a national park. Wanghop Lakes is a fine breeding and wintering place for ducks and waterfowl. The old barns, farm plan and orchard have educational value to urban youth who wish to study farming methods. See Environmental Use map.

FORT STEILACOOM WESTERN STATE HOSPITAL
This was the center of United States military activities in the Puget Sound area, 1849-1868. Three officers' quarters are still standing and there is a cemetery nearby. It is the site of an early farm built by Joseph Thomas Heath in 1844. It was a place of refuge during Indian War of 1855-56, and was supply headquarters for the narrowly averted war with Britain. See Historical-Cultural map.

FORT VANCOUVER - FORT BELLINGHAM ROAD
See Clark County.

FOX ISLAND HISTORICAL SOCIETY MUSEUM
Indian and pioneer artifacts found on Fox Island and items from Fort Nisqually are displayed along with pictures, documents, letters. See Historical-Cultural map.

FRANKLIN
This area is now owned by Palmer Coking Coal Company of Black Diamond and was formerly owned and operated by Pacific Coast Coal Company. The town was founded around 1880, and lasted till around 1910-1920. It was served by railroad to Black Diamond. The old railroad grade is still in existence, which is now the end of the route from Renton. Mines were operated by the Palmer Coking Coal Company until 1971. The State of Washington has purchased some of the land, and plans to buy more from rim to rim of the Green River for a park. Green River Gorge is now a summer tourist attraction with nature trail. Two cemeteries exist; one along the main road on the west side of the gorge is still being used. The other one is approximately 1 mile down the old grade toward Black Diamond. This one is older with headstone dates beginning at 1880. Most of the occupants were killed in a mine explosion in 1890. The town itself consisted of a school, tavern, jail, hotel, and store. It probably peaked out during World War I, or shortly before. See Historical-Cultural map.

FRONTIER MUSEUM
Located at Puyallup, historical relics are exhibited. See Historical-Cultural map.

FUNGI SITES
The following areas in this county are noted for their abundance and variety of higher fungi or important species: Grass and Huckleberry Mountains vicinity, Carbon Ridge, White River Valley. See Botanical map.

GIG HARBOR BAY
This is a sheltered harbor with great value for small boat recreation. Thistle-class sailing races are held here regularly. It serves as home port for many recreational and commercial fishing vessels. A major problem is increasing reduction of the navigation area by construction of piers, marinas and other encroachments. See Environmental Use map.

GRAND FIR
Record Grand Fir, Abies grandis. Circumference at 4-1/2 feet, 22 feet, 4 inches; height, 175 feet; crown spread, 40 feet. See Botanical map, under Tree Specimens, Evergreen.

GREEN RIVER GORGE, GREEN RIVER VALLEY
The Green River Gorge is a summer tourist attraction with a nature trail. The State of Washington has plans for a park stretching from rim to rim of Green River Valley and has begun purchasing land toward that end. See King County. Environmental Use map.

HANDFORTH GALLERY, TACOMA PUBLIC LIBRARY
The art gallery at the Tacoma Public Library has monthly exhibits. The Thomas S. Handforth collection of etchings, sketches, oils, prints is included. Works of other Northwest artists are also on display. See Historical-Cultural map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Pierce County discussion are plotted on the Historical-Cultural map and listed in its index.

HOME
Home is located on Joe's Bay, a small intrusion from Von Gildred Cove which is an arm of Carr's Inlet not far from Tacoma. The inhabitants were a free-spirited people who kept surrounding newspapers buzzing about their amoral ways and anarchist society of free love, no rules, laws, or money. George Allen, O. A. Verity, and F. F. O'Dell came from the Socialist Colony at Glennis in a boat and started the colony in 1897. The colonists invited anyone into their colony and advertised through their monthly and weekly newspapers. Home was suspected of harboring anarchist refugees and other extremists of the time such as Leon Czolgosz, the assassin of President McKinley. After losing their post office in 1902 and having a colonist convicted of bombing the Los Angeles Times in 1912, the colony dispersed, leaving only a few faithful. Today Home is sparsely populated by summer residents with a few permanent homes. See Historical-Cultural map.

HUDSON'S BAY COMPANY ROAD
This was the first wagon road in Pierce County, Washington. It was built to join the Hudson's Bay Company post at Fort Nisqually to settlements at Muck, near present-day Roy, Washington. See Historical-Cultural map.

INDIAN HENRY'S GRAVE
Indian Henry was an early friend of the white people in eastern Pierce County around Mount Rainier. His gravesite, about 6 miles from Longmire in Mount Rainier National Park, is an area where a viewer can observe more glaciers than from any other site in America. This is a popular region for tourists and has become famous because of the expanse and overwhelming beauty of the Glacier systems, rocks, and Hudsonian and Alpine fields. This region honors this famous and kindly old Indian and is known as Indian Henry's Hunting Grounds. His resting place on the Mashel Prairie near his ancestral home is but a few miles from the magnificent mountain region bearing his name. See Archeological map.

KOPACHUCK STATE PARK
The 104 acre park is located 16 miles west of Tacoma, offering camping, picnicking, swimming, fishing and clamming. See Environmental Use map.

LA GRANDE CANYON
This extremely deep scenic gorge on the Nisqually River is undeveloped and relatively unknown even by local people. See Geological map.

LAKE SEQUALLITCHEW CELEBRATION
In 1841, the Wilkes' expedition held an Independence Day celebration at Lake Sequallitchew. This is said to have been the first Fourth of July celebration held west of the Missouri River. In addition to its historic significance, this is a serene and lovely lake with great recreational possibilities, and a state-rearing pond. It has been used by the military as a training area for amphibious vehicles, and a pilot coal reduction plant is now being constructed next to the lake. See Historical-Cultural map.

COUNTY DISCUSSION

LAKE TAPPS
This is a large reservoir with water diverted from the White River. See Hydrological and Zoological-Terrestrial maps.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Pierce County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LEACH CREEK
Leach Creek exhibits coliform densities above the limit recommended for safe water-contact recreation. See Hydrological map.

LITTLE ROCKIES
The area holds endemic or rare botanic species. See Botanical map.

LONGBRANCH HARBOR
This harbor is used heavily by pleasure boaters for an anchorage and recreation area. There are few good anchorages located in the Lower Puget Sound area. See Environmental Use map.

LYNCH CREEK FALLS
A falls in the Nisqually River Basin west of Mount Rainier. See Hydrological map.

MAPLEWOOD SPRINGS
Water from springs serves Puyallup fish hatchery. See Hydrological map.

MASHEL RIVER
This important nonglacial tributary to the Nisqually River is a well known spawning and fishing stream for anadromous fish. Mashel Valley was one of the early-day routes to Longmire. Confluence with the Nisqually shows vivid contrast between glacial and nonglacial rivers. See Zoological-Aquatic and Hydrological maps.

MASON GULCH
This is a large, wooded basin with many springs and a large creek. The city of Tacoma has retained it as a water source. It is also valuable as urban open space and as a potential park site. See Hydrological and Environmental Use maps.

MCNEIL ISLAND
McNeil Island is a Federal reservation untouched by land developers. Harbor seal rookeries are found on the eastern edge of the island. See Zoological-Terrestrial map.

MEEKER MANSION
National Historic Place in Puyallup at 321 East Pioneer Street. Ezra Meeker plotted first townsite and named it Puyallup. See Historical-Cultural map.

MILITARY ROAD (FORT WALLA WALLA-FORT STEILACOOM ROAD)
This historic route was first used by Indians, the Wilkes expedition of 1841, and later part of it was used as the Naches Pass Trail. It later became a military road used during the Indian War of 1855-56. See Naches Pass Trail. See Historical-Cultural map.

MINTER CREEK STATE SALMON HATCHERY
State Fisheries Department. Species propagated: fall chinook and coho salmon. See Zoological-Aquatic map.

MOUNTAINS BETWEEN THE EAST AND WEST FORKS OF THE WHITE RIVER
The mountains in this area include: Burroughs Mountain, Skyscraper Mountain, and Sourdough Mountain. All are considered excellent mountain climbing areas. See Geological map.

MOUNTAINS BETWEEN THE HEADWATERS OF THE MOWICH RIVER AND THE CARBON RIVER
The mountains in this area include: Arthur Peak, Castle Rock, Echo Rock, Fay Peak, Florence Peak, Gore Peak, Governor's Ridge, Hessong Rock, Howard Peak, Mother Mountain, Observation Rock, and Tolmie Peak. Some of the peaks are within the boundary of Mount Rainier National Park. All are considered excellent mountain climbing areas. See Geological map.

MOUNTAINS BETWEEN THE HEADWATERS OF THE WHITE RIVER AND THE OHANOPECOSH RIVER
The mountains in this area include: Cowlitz Chimneys, Double Peak, Goat Island Mountain, Little Tahoma Peak, Peak 8849, and Tamanos Peak. All are considered excellent mountain climbing areas. See Geological map.

MOUNTAINS BETWEEN THE WHITE RIVER AND THE CARBON RIVER
The mountains in this area include: Bearhead Mountain, Crescent Mountain, Old Baldy Mountain, Old Desolate, Pitcher Peak, Redstone Peak, Sluiskin Mountain, and Tyee Peak. Some of the mountains are within the Mount Rainier National Park boundaries. All are considered excellent mountain climbing areas. See Geological map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Pierce County discussion are plotted on the Geological map and listed in its index.

MOUNT RAINIER
Mount Rainier, a towering, ice-clad volcano rising 14,410 feet, is a striking landmark in the Pacific Northwest. It is made doubly impressive by the cap of glacial ice that conceals all but a few crags and ridges; the ice descends radially to about 6,000 feet. Although mere remnants of their former size, the glaciers on this mountain, with 34 square miles of ice, constitute one of the largest single-peak glacial systems in the conterminous United States. Six glaciers originate in the summit ice cap: Nisqually, Ingraham, Emmons, Winthrop, Kautz and Tacoma. Many other major glaciers are born of snows in valley heads or cirques, between 10,000 and 12,000 feet. The most notable of these are Cowlitz, Fryingpan, Carbon, Russell, North and South Nowlich and Puyallup Glaciers. Over 20 glaciers extend down the mountainside to end as rivers below. See Geological and Environmental Use maps.


Paradise Inn - Mt. Rainier

MOUNT RAINIER CLIMBING AREA
The following mountain climbing areas are located in Mount Rainier National Park: Tokaloo Spire, Pyramid Peak, Crystal Mountain, Iron Mountain, Mount Ararat, and Mount Wow. See Geological map.

MOUNT RAINIER NATIONAL PARK
Towering over its neighboring peaks, Mount Rainier dominates not only the park but the entire landscape within a 100-mile radius. This splendid landmark rises 14,410 feet, a few miles west of the crest of the Cascade Range. Its gleaming mantle of ice is composed of many glaciers which conceal all but its most rugged peaks and ridges. In delightful contrast to this bold landscape, the high areas have parklike subalpine forests broken by flower-covered meadows. Lower elevations have dense forests.

Successive volcanic eruptions of several kinds built up Mount Rainier less than a million years ago. Glaciers, water, and gravity sculptured the mountain to its present shape.

From mid-June through October, the experienced visitor comes prepared for cool and rainy days as well as for those that are warm and sunny. From November through May, heavy snowstorms are frequent. Annual snowfall at Paradise (5,420 feet) may total 80 feet; snow may lie as deep as 30 feet; 5 to 14 feet of snow may remain on the ground into June, and even 3 to 8 feet into July.

Wildflowers in the high meadows begin to blossom in mid-June in places where the snow has melted away. In late July and early August when blossoming is at its height, the meadows are luxuriant with color. Late in August, huckleberry, vine maple, and mountain-ash start to turn red. Autumn color is at its best in late September.

Deer, bear, and other animals may approach for a handout, but it is unlawful and dangerous to feed or touch any wild animal. Look for mountain goats on cliffs, ridges, and snowfields.

There are some 300 miles of trails where you can explore the Park's fascinating scenery. Be sure to take a map and compass with you. If you are hiking in the upper elevations, remember to pack rainwear, extra woolen clothing and food, as there may be inclement weather. Lower elevations, however, are exceptionally pleasant during the summer months. It is suggested for safety that you register at trailheads and tell a responsible adult where you are going and when you will return.

The numerous natural streams and limpid lakes will provide anglers with hours of pleasure. No fishing license is required. The Ohanapecosh River and its tributaries are limited to fly fishing only. Anglers are asked to fill in the creel census forms and observe other fishing regulations which may be posted at ranger stations, visitor centers or bulletin boards.

With the exception of Paradise, Longmire, Ohanapecosh, Carbon, Ipsut, Mowich, White River and Sunrise areas, you may ride any unpaved trail in the Park. Stock must be kept more than 100 yards from campgrounds, trails or lakes. Feed should be carried.

With its high elevation and many glaciers, Mt. Rainier presents a formidable challenge to climbers. In the higher elevations, loose rock, heavily crevassed glaciers and sudden storms demand that the climber know mountain travel and survival techniques. It is imperative that those climbing Mt. Rainier be well clothed, well conditioned and experienced on snow and ice. A one-day snow and ice climbing school, offered in the summer months by Rainier Mountaineering, Inc., will aid would-be climbers. Run by Lou Whittaker, brother of the first American to ever climb Mt. Everest, the school furnishes guided summit climbs and 5 day climbing seminars ...all guaranteed to prove an exhilarating experience.

Self-guiding trails are at Kautz Mudflow: Longmire Meadow (Trail of the Shadows), Sourdough Ridge, Nisqually Vista, Ice Caves Trail, and Emmons Vista.

The following are some of the more interesting and delightful areas of the park:

Paradise (5,420-foot elevation). Wildflowers in July and August, autumn colors in September, and snow as deep as 30 feet in April are all in Paradise. These attractions, combined with a closeup view of Mount Rainier and Nisqually Glacier, make this an exciting place. Walk the trails but leave the wildflowers unpicked and untrampled so other visitors can enjoy them, too. View the Nisqually Glacier from the Nisqually Vista loop trail, and hike 3 miles to the Ice caves. Climb to Camp Muir (10,000 feet) or to the 14,410 summit of Mount Rainier. Ski or slide the snowy slopes from December through April.

Sunrise (6,400-foot elevation). Alpine wild flowers and a classic view of Mount Rainier and Emmons Glacier await you at Sunrise. Here, whitebark pine and Engelmann spruce join subalpine fir and mountain hemlock to form a scattered forest at the upper limit of tree growth. Stop at Sunrise Point (6,100-foot elevation) for views north to Mount Baker and Glacier Peak, and south to Mount Adams. From Sunrise Visitor Center, where exhibits tell the mountain's geologic history, watch mountaineers scaling the glaciers, and mountain goats climbing on Goat Island Mountain. A network of trails leads to spectacular scenes of mountain and glacier.

Longmire (2,761-foot elevation). Enroute to climb the mountain August 13, 1883, George B. Bayley, Philemon B. Van Trump, James Longmire, and Indian Henry camped by "soda and iron springs of great variety." Longmire returned to build a trail and a hotel at "Longmire's Springs." The hotel and its associated mineral baths are gone, but the old stopping-place remains as the headquarters of Mount Rainier National Park. From here, you can: Explore the 0.5-mile Trail of the Shadows that circles Longmire Meadow; climb a steep 3.5-mile trail to 5,955-foot Eagle Peak for a grand view of Mount Rainier; or take the Wonderland Trail from Longmire that leads to points east and west.

Ohanapecosh (1,900-foot elevation). Deep forests of western hemlock and western red-cedar along a fast-moving river invite you to pause and wonder. The Grove of the Patriarchs offers you a glimpse into a forest nearly 1,000 years old. Also, see Silver Falls, 1 mile north of Ohanapecosh, a favorite goal for casual hikers from the campground; and fish the Ohanapecosh River, where sport is the object (artificial flies are required). Steep trails lead 6 miles to Three Lakes and the Cascade Crest, 4 miles to Shriner Peak Lookout, or 4 miles to Cowlitz Divide.

Mount Rainier serves as an observation area for high mountain bird species which are more accessible here than in other similar habitats in the state. White-tailed ptarmigan and Hepburn's gray-crowned rosy finch are two species seldom observed other than at locations like those found in the park. There is an isolated stand of Pacific flowering rhododendron (Rhododendrum macrophyllum) just outside the southwest corner of Mount Rainier National Park. See Botanical and Environmental Use maps.

MUD MOUNTAIN DAM
See King County.

MURRAY SPRINGS
The origin of Murray Creek is one of the few remaining unspoiled natural springs in the lower Puget Sound area. The site is an old homestead facing the Fort Lewis prairie. The water boils up from the ground, clear, clear, cold and pure. It forms the headwaters of Murray Creek, which flows across the Fort Lewis Reservation. The spring also constitutes a historic landmark. The surrounding area contains remnants of the old Murray orchard and in the water itself can be seen the remnants of an old spring box. See Hydrological map.

NACHES PASS
Pass through the Cascade Mountains on Ezra Meeker Trail, elevation 4,923 feet. See Kittitas County. See Geological map.

NACHES PASS TRAIL
This trail or "Citizens Road of 1858" was pioneered by the Longmire-Byles wagon train in 1853 as a northern branch of the Oregon Trail. Part of the route became the U.S. Military Road from Fort Steilacoom to Fort Walla Walla across Naches Pass. The areas of interest along the trail include the "cliff" and the campsite at Government Meadows. See Kittitas County. See Historical-Cultural map.

NISQUALLY DELTA WILDLIFE RECREATION AREA
Unique among Washington's coastal areas, the Nisqually Delta Wildlife Recreation Area encompasses one of the last remaining natural river deltas on the West Coast. Fed by Nisqually Glacier on the slopes of Mount Rainier, the Nisqually River ends on 665 acres of Game Department-owned tidelands extending into southern Puget Sound.

Nisqually Wildlife Recreation Area includes vital tidelands of this unique river delta. As the most productive area of an estuary, these extensive flats often seem to be a vast desert of mud, sand and muck, but in fact support hundreds of species of plant and animal life.

Here on Nisqually Delta thousands of Pacific Flyway birds find resting and feeding grounds on their northern and southward migrations. Major use of Nisqually lands is by waterfowl hunters each fall. But, hundreds of others fish for salmon and searun cutthroat trout and dig for clams, geoducks, and oysters on the tideflats during summer. The opportunity for wildlife photography is unlimited.

Game Department tidelands abut important, privately-owned delta uplands. Here a flood plain less than twenty feet above sea level provides marsh and upland habitat for over 170 different species of terrestrial and avian wildlife. The tidelands of Nisqually Delta have been declared a National Natural Landmark, thereby hopefully preserving this unique estuarine environment for generations to come.

During fall and winter, hunting is a major activity as some 50,000 waterfowl annually winter on the delta's lands and adjacent waterways. Nineteen species of duck and three species of geese have been identified during the wintering period. Chinese pheasant, valley quail, Wilson's snipe, coot, band-tailed pigeon and mourning dove are occasionally hunted. Nine species of loons, grebe and heron, 16 species of raptors and 70 species of songbirds are some of the extremely varied nonhunted wildlife to be observed.

Black-tailed deer, raccoon, muskrat, beaver, mink, river otter, weasel, red fox, coyote, skunk, mountain beaver, Trowbridge shrew, squirrel, mice, mole and gopher are all native, resident animals of the delta.

Main access to the flats is by boat, which can be launched at a Game Department access at the mouth of McAllister Creek. To get there, take Interstate 5 north from Olympia or south from Seattle to the Nisqually Exit. Exit and turn right (south) onto Martin Way (old Highway 99). Continue to Meridian Road and turn right - follow Meridian to Milluhur Road. Turn right on Milluhur and proceed to its end which terminates at the Game Department access on the shores of Puget Sound immediately south of the main tideflats. See Environmental Use and Zoological-Terrestrial maps.

NISQUALLY ESTUARY
The Nisqually Estuary is internationally important to migratory birds along the Pacific Flyway. The Estuary and surrounding lands provide habitat for 165 species of western Washington birdlife, either as residents or winter visitors. Black-tailed deer and numerous fur-bearing mammals inhabit the area year round, and the river itself provides excellent fishing for salmon, steelhead, and searun and resident trout.

The entire delta comprises a land area of 3,500 acres. If the underwater interface is also included, the total acreage is raised to 5,000 acres. The estuary has been registered as a National Natural Landmark by the U.S. Department of the Interior, and efforts have begun by that Department to purchase over 1,200 acres for a wildlife refuge. The State Game Department already owns 665 acres, which is managed for its excellent waterfowl hunting.

The first white man to visit Puget Sound, Captain George Vancouver, saw the delta in 1792. A quote from his diary observes: "The country before us exhibits everything that bounteous nature could be expected to draw into one point of view." See Nisqually Wildlife Recreation Area. See Hydrological, Botanical, Zoological-Terrestrial, Zoological-Aquatic, and Environmental Use maps.

NISQUALLY INDIAN VILLAGE SITES
This is the site of the former villages of the Nisqually tribe of Indians. These are of archeological interest. See Archeological map.

NISQUALLY RIVER
The river has its source in the Nisqually Glacier on Mount Rainier. The glacier itself is one of the most studied glaciers in the country and is easily seen by park visitors. The river is free-flowing for a large part of its length. The upper river is accessible on the mountain highway to Longmire and Paradise. LaGrande and Alder Dams impound the river near Eatonville. Below, the middle Nisqually flows unimpeded through a deep wooded valley where it is joined by the nonglacial Mashel River and Ohop Creek. The middle Nisqually River is also the site of Eocene fossils. The river enters Puget Sound through a broad delta with extensive salt marshes and pastureland. The Nisqually system and delta are now unique in Puget Sound as all comparable areas have been extensively modified. The delta has been registered as a National Natural Landmark.

The Nisqually is the major supplier of Class AA water for lower Puget Sound. In addition, the river provides spawning habitat for chinook, coho, chum and pink salmon, steelhead and cutthroat trout. The Nisqually is extremely popular with canoeists and kayakers. See Geological, Hydrological, Zoological-Terrestrial, Zoological-Aquatic, and Environmental Use maps.

NISQUALLY RIVER INDIAN FISHERY
An Indian fishery, guaranteed by Medicine Creek Treaty of 1854, is located on the Nisqually River.

OHOP VALLEY LAKES
This area represents a chain of lakes in an old glacial valley striking northeast and southwest in direction. Graphic illustrations of the work of ancient glaciers and runoff are illustrated here with the growth of typical flora and the residency of typical fauna. Vistas show classical U-shaped glacial valleys. See Hydrological and Botanical maps.

OLD CITY HALL
Tacoma's Old City Hall is an 1890 structure in Spanish style, significant both historically and architecturally. See Historical-Cultural map.

OLD NORTHERN PACIFIC RAILWAY HEADQUARTERS
This 1890's structure is historically significant, as Tacoma's first great growth spurt occurred when it was chosen as western terminus for the Northern Pacific. The building was used for many years as an annex to the old city hall. See Historical-Cultural map.

OLD TOWN AND PUBLIC DOCK (TACOMA)
This is the location of an historic church and other important historic buildings. See Historical-Cultural map.

ORO BAY
Located in the southern part of Anderson Island, it is being considered as a possible state park. See Environmental Use map.

OSCEOLA MUD FLOW
See King County.

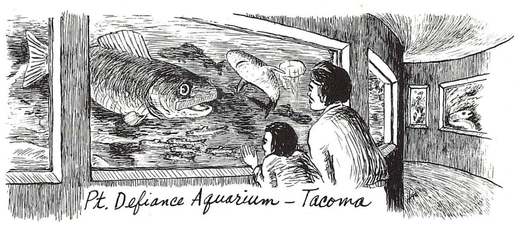
PACIFIC DOGWOOD
A record Pacific dogwood Cornus nuttallii, found on this site, has a 9 foot circumference at 4-1/2 feet, a total height of 60 feet and a crown spread of 42 feet. See Botanical map.

PACIFIC LUTHERAN UNIVERSITY
Located in Tacoma, it was established in 1890. See Historical-Cultural map.

PAUL H. KARSHNER MEMORIAL MUSEUM
In Puyallup, rocks, minerals, fossils, Indian items, and other objects from around the world are exhibited. See Historical-Cultural map.

PENROSE POINT STATE PARK
The 145 acre park is 3 miles north of Longbranch; it offers camping, swimming, fishing and clamming, and boating facilities. See Environmental map.

PETRIFIED WOOD EXPOSURE
Exposure along the Nisqually River at Nisqually. See Geological map.


Pt. Defiance Aquarium - Tacoma

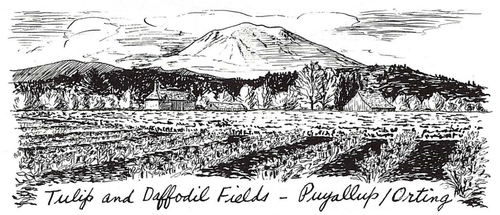
POINT DEFIANCE PARK
Tacoma's Point Defiance Park is a dramatic bluff totaling 638 acres at Tacoma's northern tip, of woodlands, beaches, trails and outstanding rose gardens. The park includes virgin forests with important stands of 450-500-year old trees. Point Defiance has the only natural marine interface in the Tacoma area. It has a natural salt-water beach/bluff relationship and the clay beds are the home of the giant boring species of piddock clams. This is a good observation beach for the accumulated stratified and variable sea life. Much of the park can be seen by driving a 5 mile loop that circles the peninsula. The major exhibits are open all year. The aquarium is among the finest on the west coast, featuring thousands of specimens from Puget Sound. Also included within the Point Defiance complex is Fort Nisqually, one of the state's most historic structures. Originally a Hudson's Bay post built in 1833, the buildings were moved to the park and rebuilt. A 20-acre lumber museum, Camp Six, is another exhibit, featuring Washington's past. Here visitors can see the story of steam logging, including an old bunkhouse, steam donkey engine, and even an old steam locomotive. See Botanical, Hydrological, Geological, and Environmental Use maps.

PUGET GULCH
Puget Gulch is an important urban open space. The long, wooded gulch contains a creek and some of the area is dedicated park space. See Botanical map.

PUGET SOUND
See Kitsap County.

PUYALLUP FISH HATCHERY
State Game Department. Species propagated: trout and steelhead trout. Water source: springs. See Zoological-Aquatic map.

PUYALLUP INDIAN RESERVATION
Ethnic group. See Historical-Cultural map.


Tulip and Daffodil Fields - Puyallup/Orting

PUYALLUP RIVER
A free-flowing stream, used for kayaking. Anadromous runs are spring and fall chinook, coho, pink and chum salmon, winter and summer steelhead, searun cutthroat, and searun Dolly Varden. The lower reaches of Puyallup River exhibit coliform densities above the limit recommended for safe water-contact recreation. These reaches provide good angling for jacks and adult coho from September through early November. See Hydrological and Zoological-Aquatic maps.

PUYALLUP STATE SALMON HATCHERY
State Fisheries Department. Species propagated: chinook and coho salmon. See Zoological-Aquatic map.

PUYALLUP VALLEY DAFFODIL FESTIVAL
This festival observes the former, large bulb industry in the Puyallup Valley. The festival takes place in mid-April, involving the cities of Tacoma, Puyallup and Sumner. Farming land is being made into subdivisions as high taxes and labor costs are forcing more "profitable" use of the land. See Historical-Cultural map.

SALMON FISHING DERBY
The derby is held in Tacoma, in June. See Historical-Cultural map.

SAND AND GRAVEL PIT
The huge gravel pit (Pioneer Sand & Gravel Co.) north of Steilacoom, Pierce County, has operated since before the turn of the century and has potential for 30 or 40 more years. One of the major problems encountered here is that urbanization, particularly residential development, is encroaching upon these areas; and because of the nature of the work, the pits are noisy and dusty. See Geological map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

6056 RAILROAD TRESTLE
One of the state's last standing logging railroad trestles. See Historical-Cultural map.

SKOOKUM ARCHERS' RANGE
This area is as abundant in plant life as some lowland areas of Olympic National Park. The flora is beautiful in all seasons. The 35-acre area has mushrooms, wildflowers, nurse logs, and second-growth trees. Many birds, small animals, and deer make their homes in the areas adjacent to the paths of the 46 targets. The paths are undeveloped except for steps of pipes and boards in some of the steeper areas. There are no parks near this area. Skookum Archery Club is very proud of its range and hopes to keep it in its present natural state. See Botanical map.

SNOQUERA FALLS
Located on the White River northeast of Mount Rainier. See Hydrological map.

SOUTH TACOMA GAME FARM
Operated by the Department of Game, the farm is 3 miles south and west of Lakewood Center. Both Chinese ringneck and Japanese green pheasants are raised here. Average annual production is 10,000 ringneck cocks and 2,000 greens for release in Pierce, Thurston and some areas in northwest and southwest Washington. See Zoological-Terrestrial and Environmental Use maps.

SOUTH TACOMA AND CHAMBERS CREEK FISH HATCHERY
State Game Department. Species propagated: trout and steelhead trout. Water source: springs. See Zoological-Aquatic map.

SPANAWAY BOG
Sphagnum bog, with ledum (labrador tea) and kalmia. See Botanical and Hydrological maps.

SPANAWAY LAKE
The 267 acre lake has a maximum depth of 28 feet. Nuisance algal blooms and swimmers itch are the main problems in the lake. Herbicide treatment has been tried. See Hydrological map.

STADIUM HIGH SCHOOL
This high school is an 1890 structure copied from a French chateau. It was originally built by the Northern Pacific Railroad as a hotel. The building is historically and architecturally significant. See Historical-Cultural map.

STARBO MINE ROAD
This old mining road was built by Pete Starbo, and parts can be found in the Dalles Campground. Pete Starbo had a mine in Mount Rainier National Park at Glacier Basin. Built about 1916, the road followed the White River up the valley. See Historical-Cultural map.

STEILACOOM LAKE
The 313 acre lake has a maximum depth of 23 feet. Nuisance algal blooms are a problem in the lake. Herbicide treatment is carried out on a regular basis. See Hydrological map.

STEILACOOM HISTORICAL ASSOCIATION MUSEUM
In Steilacoom, the museum displays early pioneer items and artifacts from Fort Steilacoom dating from 1840. See Historical-Cultural map.

STEWARTS EXPRESS ROUTE
Historic route. See Historical-Cultural map.

TACOMA ART MUSEUM
A collection of American and European works, and contemporary prints are featured. Many traveling exhibitions also appear. See Historical-Cultural map.

COUNTY DISCUSSION

TACOMA COMMUNITY COLLEGE (JB)
Located in Tacoma, it was established in 1965. See Historical-Cultural map.

TACOMA GULCHES
These scenic green areas have been recommended for preservation for their esthetic quality as peaceful, quiet islands of calm in an urban area, and their potential for habitat for birds and small creatures, as well as nature study, interpretation and pollution abatement. See Geological map.

TACOMA NARROWS MARINE SHORELINE
Marine shoreline west of Tacoma. See Geological map.

TATOOSH RANGE
The following peaks are part of the Tatoosh Range located between the Nisqually River and the Cowlitz River in Mount Rainier National Park: Eagle Peak, Chutla Peak, Wahpenayo Peak, Lane Peak, Plummer Peak, Pinnacle Peak, The Castle, Unicorn Peak, Boundary Peak, Stevens Peak and Tatoosh Peak is located nearby. See Geological map.

TITLOW BEACH
A critical erosion problem exists along about 0.5 mile of shoreline at Titlow Beach south of Tacoma. This bank, about 15 to 20 feet high, has been eroding for many years at the rate of one foot per year. The beach and backland is part of a city park, and the city desires to control this erosion so that recreation facilities may be developed. See Geological map.

TITLOW POND
State rearing saltwater pond. See Zoological-Aquatic map.

UNION STATION
The Tacoma station is a landmark structure of great architectural value. See Historical-Cultural map.

UNIVERSITY OF PUGET SOUND
Located in Tacoma, it was established in 1888. See Historical-Cultural map.

VAUGHN BAY
This popular anchorage is one of the few good anchorages in the Lower Puget Sound area. See Environmental Use map.

WOLLOCHETT BAY
This area is used heavily by recreational boaters as there are not many good anchorages in the lower Puget Sound area. The Tacoma Yacht Club has built a clubhouse on Wollochett Bay. See Environmental Use map.

WASHINGTON STATE HISTORICAL SOCIETY MUSEUM
In Tacoma, it displays Pacific Northwest historical artifacts, manuscripts, pictures, and books, including Indian and Alaskan exhibits. See Historical-Cultural map.

WASHINGTON STATE HISTORICAL ROAD NUMBER 1
Called the Byrds Mill Road, (1852) it was the Military Road between Puyallup Valley and Fort Steilacoom. The road also follows the route of the partially built Russian-American telegraph line (1864). See Historical-Cultural map.

WESTERN WASHINGTON FAIR
The fair takes place in Puyallup the fourth week in September. See Historical-Cultural map.

WHITE RIVER
This is a free-flowing river used for kayaking. The lower reaches of the White River exhibit coliform densities above the limit recommended for safe water-contact recreation. State administered shoreland is northeast of Lake Tapps. The lower and upper forks of the White River are used by Kayakers. See Environmental Use and Hydrological maps.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part the year. These species were identified as being of statewide or national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the biological Section; (2) small wildlife range maps in the section entitled, "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled, "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. The spotted owl (Strix occidentalis) may be noted in the Cascade Mountains. The golden eagle has been seen regularly in Pierce County. Other species include the band-tailed pigeon, gray-crowned rosy finch, bald eagle, grouse, and osprey.

MAMMALS. The wolverine (Gulo gulo) is increasing in numbers in the Cascades. The pine marten (Martes americana) is noted in upper mountain slopes throughout the state, and the fisher (Martes pennanti) inhabits forests of the Cascade Mountains. The cougar (Felis concolor) is noted throughout the forests of the state. The mountain red fox (Vulpes vulpes cascadensis) is noted in the mountainous areas of Pierce County. Western grey squirrel (Sciurus griseus griseus) is noted in lowlands south of Puget Sound and from Columbia River north to Tacoma and Elma. A rare subspecies of pocket gopher (Tomomys mazama tacomensis) has a critical habitat in this county. The only breeding colony for harbor seal (Vitulina richardi) in southern Puget Sound is on McNeil Island. This colony is a precarious remnant of former widespread breeding grounds.

REPTILES. The sharp-tailed snake (Contia tenuis) has a very limited range in Pierce County and Klickitat County. The Pacific pond turtle (Clemmys marmarata) is probably an endangered species in this state, and has a very localized breeding range.

AMPHIBIANS. The tailed frog (Ascaphus truei) is found in rapid mountain streams of the Cascades.

WILDWOOD SPRINGS
This is the only stream source in Wildwood Park. See Hydrological map.

WRIGHT PARK
Wright park is a 27 acre park, near downtown Tacoma, including an arboretum and a conservatory. See Botanical and Environmental Use maps.

BARRON ISLAND
This small island lies northwest of San Juan Island. See Geological map.

BATTLESHIP ISLAND
This small island is northwest of San Juan Island. It is State park land. See Geological and Environmental Use maps.

BEACH HAVEN RESORT
This resort area on the west side of Orcas Island on President Channel is a possible state park. See Environmental Use map.

BIGLEAF MAPLE
This large maple (Acer macrophylum) is located in San Juan Island National Historical Park, English Camp. Its circumference at 4-1/2 feet: 24 feet, 5 inches; height; 98 feet, crown spread: 104 feet. See Botanical map.

BLACK ROCKS
A small rocky island exposed only at low tide, it is often used by scuba divers and for marine research. See Geological map.

BLAKELY ISLAND
This beautiful, unsettled island of 4,500 acres under one ownership has two fresh water lakes. It is a fascinating rock formation, heavily forested, rising sharply out of the water adjacent to the ferry route. See Geological and Environmental Use map.

CACTUS ISLANDS
Marine Research Site. See Environmental Use map.

CANOE ISLAND
This small marine island near Shaw Island is being considered as a possible state park. (Not mapped).

CASTLE ISLAND
This very tall rock formation is visible from great distances. See Geological map.

CATTLE POINT
This point on the southern tip of San Juan Island is a possible state park. Now owned by the Department of Natural Resources, the area is used for the study of exposed fauna and marine algae. The Coast Guard owns a lighthouse here. There are unique glacial outwash formations that can be seen. See Environmental Use and Geological maps.

CLARK ISLAND
Designated a marine park of about 55 acres, it is located northeast of Orcas Island. It is presently undeveloped. See Geological and Environmental Use maps.

COLVILLE ISLAND
This is a federal migratory bird refuge, part of San Juan National Wildlife Refuge. See Environmental Use and Zoological-Terrestial maps.

COUNTY PARKS, SAN JUAN ISLANDS
There are four county parks in the San Juan Islands. Two are on Lopez Island, one on Shaw Island, and one on San Juan Island. In 1970, more than 5,000 people visited these parks.

CRESCENT BEACH
This unique beach forms a large crescent, with the road between it and adjacent swamp land. See Geological map.

CRETACEOUS FOSSILS
Fossil clams and cephalopods are numberous on Sucia Island of the San Juan groups. See Geological map.

DANGER ROCK
Small rock southwest of Waldron Island. See Geological map.

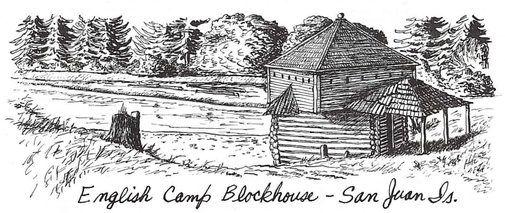
DEADMAN BAY TO LIME KILN LIGHT
Useful for comparative studies on ecology. See Environmental Use map.

DECATUR HEAD
The east side of Decatur Island is a possible state park. See Environmental Use map.

DOT ROCK
This small rock island on the southeast coast of Decatur Island is exposed only at low tide. It is used for scuba diving and marine research. See Geological map.

EAGLE POINT, EAGLE COVE
Sheer, rocky banks drop into deep water. These banks are inhabited by faunal association of the San Juans and outer coast. Giant kelp beds provide rich habitat for a variety of fishes. See Geological and Environmental Use maps.

ENGLISH CAMP NATIONAL HISTORICAL PARK
Newly established National Park commemorating the "Pig War" of the late 1800's. See San Juan National Historical Park. See Environmental Use map.


English Camp Blockhouse - San Juan Is.

San Juan

AFTERGLOW MANOR
John McMillin built the manor during the early part of the century in the grand-living, Classical style of the era. The mausoleum alongside Afterglow Manor was also built around 1900. Seven or eight pillars surround a concrete table and chairs. One son was disowned by the family and they removed one pillar and one chair from the mausoleum. See Historical-Cultural map.

ALECK ROCKS
Aleck Rocks area is composed of tilted, stratified rock of varied colors. The adjacent headland has folded stratified rock. See Geological map.

AMERICAN CAMP NATIONAL HISTORICAL PARK
This small area is the only known nesting site in the continental United States for the skylark. It is an important area for hawks, eagles, and owls attracted by the abundant European hare populations. See Zoological-Terrestrial and Environmental Use map.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the San Juan County discussion are plotted on the Archeological map and listed in its index.

FALSE BAY
This unique area is a bay only at high tide. It is noted as an intertidal study area. Bottom materials are composed of sand not mud, and only one small fresh water stream enters the bay. See Hydrological, Environmental Use and Geological maps.

FREEMAN ISLAND
Small island off northwest coast of Orcas Island. See Geological map.

GRIFFIN BAY
The State Department of Natural Resources plans a 15-1/2 acre campground on the southeast side of San Juan Island. See Environmental Use map.

GULL ISLAND
The island is significant as a demonstration biome of dry, sheltered, isolated habitat. It is also potentially a fine rookery. It is the only island where one can find both types of native cactus. See Environmental Use map.

GULL REEF
Small reef southeast of Stuart Island. See Geological map.

GULL ROCK
Small island west of Orcas Island. See Geological map.

HALFTIDE ROCK
Rock off the southeast coast of San Juan Island. See Geological map.

HALL ISLAND
Small island south of Lopez Island. See Geological map.

HENDERSON CAMP
This area on the south end of Lopez Island is a possible state park. See Environmental Use map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned in the San Juan County discussion are plotted on the Historical-Cultural map and listed in its index.

HOTEL DE HARO
This historic Victorian "gingerbread" structure, built in 1886, was part of John S. McMillin's Tacoma and Roche Harbor Lime Company operation. See Historical-Cultural map.

HUMMEL LAKE
This lake is the only significant fresh water lake on Lopez Island. Trout planted by the State Game Department provide fishing. See Hydrological and Zoological-Aquatic maps.

ICEBERG ISLAND
Small island south of Lopez Island. See Geological map.

ICEBERG POINT
This exposed rock was polished and striated by glaciation. The point is known for excellent intertidal flora and fauna. See Geological and Environmental Use maps.

JONES ISLAND
Owned by the U.S. Bureau of Sports, Fisheries and Wildlife, the island is leased by the Washington State Parks and Recreation Commission and operated as a camping area. See Geological map.

JONES ISLAND NATIONAL WILDLIFE REFUGE/STATE MARINE PARK
With 188 acres, Jones Island is the largest island in the Puget Sound Refuges groups. It has a dense cover of shrubs and timber. The principal trees are Douglas-fir, white fir, and madrone. The shoreline is indented with many small coves, low rocky points, and sections of gravelly beach. There are two large harbors.

This refuge island, with its dense stands of brush and timber, provides habitat for many species of songbirds. Some band-tailed pigeons nest there. Deer are often seen about the campgrounds.

In cooperation with the Bureau of Sport Fisheries and Wildlife, the Washington State Parks and Recreation Commission maintains recreational facilities on the island. A floating dock and boat ramp are provided in the harbor on the north side. There are two campgrounds complete with picnic tables, fireplaces, and restrooms available for use throughout the year. See Environmental Use map.

JURASSIC FOSSILS
Fossil clams are common on Davidson Head at the northwest side of San Juan Island. See Geological map.

KANAKA BAY
This is a state marine preserve area with unique biological aspects. See Environmental Use map.

KNOB ISLAND
Small island adjacent to Orcas Island. See Geological map.

LAKES, STREAMS. ETC.
Some hydrologic features of the state which are not specifically mentioned in the San Juan County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LAWSON REEF
Small reef off the southeast coast of Lopez Island. See Geological map.

LIME KILN POINT
This recreation area is state-administered under Federal ownership. A lighthouse and related facilities are located there. The area has a very rocky seashore, and the giant kelp beds provide rich habitat for a variety of fishes. See Historical-Cultural and Environmental Use maps.

LONESOME COVE AND LIMESTONE POINT
This protected area possesses a variety of substrates and tidal exposures. It is used for ecological experimentation. See Environmental Use map.

LOPEZ ISLAND
See San Juan Islands entry.

LOW ISLAND
This small island west of Shaw Island is one of the most important rookeries in the San Juan Island group. (Not mapped.)

MATIA ISLAND NATIONAL WILDLIFE REFUGE
Matia Island is a 145-acre island covered with a beautiful stand of Douglas-fir, white fir, western fir, western red cedar, Pacific yew, bigleaf maple, madrone, and a bushy understory. The shoreline is steep and, on most of the island, high. It has two striking natural harbors for small boats that provide protection in any weather. The rocky shoreline supports a nesting population of pigeon guillemots. Bald eagles are commonly seen and occasionally nest. Many songbirds breed on the island and others stop to rest and feed in their migrations.

Matia Island has recreational facilities similar to those found on Jones Island. Boating and camping trips in the San Juan Islands are high-quality recreation, and these refuge islands are popular stopping points. See Environmental Use map.

MITCHELL BAY SOUTHERLY ENTRANCE
The area is rich with marine invertebrates and is an excellent study area. See Hydrological map.

MORAN STATE PARK
This park is located on Orcas Island, 80 miles north of Seattle. Most of the land for this park was donated by Robert Moran (a former mayor of Seattle and shipbuilder) in 1920. Today this 4,934 acre park has several lakes, serveral thousand acres of forested land, many trails, picnic areas, and camping facilities. The outstanding structure in the park is the stone view tower built in the mid-thirties by the Civilian Conservation Corps and standing on top of Mt. Constitution. It affords a 360 degree view of the San Juans, the Cascades, the Olympics, and Northern Puget Sound. A log cabin museum at the village of Eastsound near Moran State Park gives an account of the history of the island. See Environmental Use map.

MOUNT CONSTITUTION
This is a high, distinctive peak on Orcas Island. The stone lookout tower on top of the mountain. will be rehabilitated. The tower is a popular and well-known attraction. See Historical-Cultural and Geological maps.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the San Juan County discussion are plotted on the Geological map and listed in its index.

MUMMY ROCKS
Under state ownership, these rocks south of Lopez Island serve as a hauling ground for marine mammals. See Geological map.

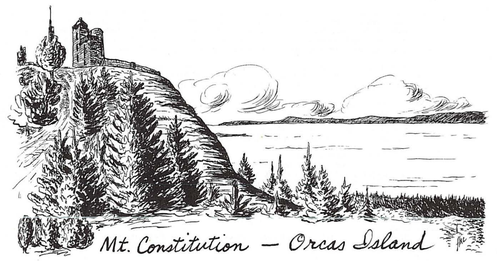
NORTH PACIFIC ROCK
Rock off the southeast coast of San Juan Island. See Geological map.

OBSTRUCTION PASS
The area between Orcas and Obstruction Island is being considered as a possible state park. See Environmental Use map.

ONE ROOM SCHOOLHOUSE
The historic and well-preserved one room schoolhouse on Stuart Island near Reid Harbor State Marine Park houses classes during the summer. The weather is too severe in winter as transportation to class is by boat. See Historical map.

ORCAS ISLAND
See San Juan Islands entry.

ORCAS ISLAND HISTORICAL SOCIETY MUSEUM
At East Sound, Indian artifacts and general antiques are housed in a building constructed from the materials of six old log cabins. See Historical map.


Mt. Constitution - Orcas Island

PARKERS REEF
Although the reef located off the north coast of Orcas Island is submerged (except at low tide) there is much sea life not commonly found elsewhere. The area is an excellent one for study purposes. See Environmental Use and Geological maps.

PEAPOD ROCKS
A small rocky island, east of Orcas Island, it is exposed only at low tide. The rocks are excellent for scuba diving and marine research. See Environmental Use and Geological maps.

POINT DOUGHTY
This is a Department of Natural Resources recreation area. It offers fine views, much marine life in tide pools, wildflower area in spring and is one of the few locations of "juniper" trees in the San Juan area. Marine fishing is possible from shore. It is used extensively by nearby YMCA camp. See Environmental Use map.

POINT GEORGE AND PARK'S BAY
This picturesque 300 acre, undeveloped point of land on Shaw Island has a rocky coast with sandy bights. It is owned by the University of Washington, Friday Harbor Labs. See Geological and Environmental Use maps.

POINTER ISLAND
Small island just southeast of Blakely Island. See Geological map.

POSEY ISLAND
Small island northwest of San Juan Island. See Geological map.

PREVOST HARBOR STATE MARINE PARK
Camping is available at this 40 acre park on Stuart Island. See Environmental Use map.

PUGET SOUND
See Kitsap County.

REEF NET FISHERY
Reef netting is an historic and colorful mode of commercial fishing, and the existing designated reef net areas should be retained. See Historical-Cultural map.

REID HARBOR STATE MARINE PARK
On Stuart Island, this 45 acre park has camping, a beautiful bay and forested slopes. See Environmental Use map.

RIPPLE ISLAND
Small island southeast of Stuart Island. See Geological map.

ROCK ISLAND
Small island southeast of Stuart Island. See Geological map.

ROCK POINT
This large, glacial-erratic boulder on the beach gives the point its name. See Geological map.

ROSARIO
This is the site of an historic mansion built by Robert Moran, now the central building of a resort. See Historical-Cultural map.

SAN JUAN HISTORICAL SOCIETY MUSEUM
At Friday Harbor, regional items are housed in the pioneer James King residence. See Historical-Cultural map.

SAN JUAN ISLANDS AND VICINITY
The San Juan Islands are extremely scenic with irregular shoreline and many small harbors, rocky points and narrow channels. About 35 percent of the shoreline has rocky headlands with no beach. The remainder has beach with rocky uplands. Because of the rocky shoreline and protection in the inland waters only minor erosion is occurring. Most of the shoreline is in private ownership primarily for residential purposes.

These islands are believed to have been inhabited for over 2,000 years. Historically the San Juans were known to the earliest Spanish and English explorers, perhaps even known to Juan de Fuca himself. During the 19th century, the islands became the subject of the "Pig War" boundary dispute between England and the United States. Surrounded by rich fishing grounds, the islands were also an early-day agricultural center. Now recreation has replaced agriculture as the primary attraction of the San Juans. The scenery, the saltwater, the abundant wildlife are all part of a total atmosphere that makes the entire archipelago unique and valuable.

Originally a glacial mountain top, the peaks rise to over 2,000 feet out of the water forming over 468 islands and rocks at low tide. Several scattered colonies of harbor seals are found here. The islands are surrounded by deep water with a multitude of marine fishes, birds and mammals. The isles are forest or grass covered slopes. Orcas Island, San Juan Island, and Lopez Island (in order of size) are the most heavily populated.

Important nesting areas for many species are the rocks and small islands of San Juan County. Species include double-crested and pelagic cormorants, black oystercatcher, pigeon guillemot, tufted puffin and especially glaucous-winged gulls which have their second largest Puget Sound colony on Colville Island. Many other species occur as migrants and winter residents. Rocky shore areas exposed by tidal action provide winter feeding habitat for surfbirds, black turnstones, rock sandpipers and, in nesting season, feeding habitat for black oystercatchers.

SAN JUAN ISLAND AND VICINTY
San Juan Island itself is the year-round habitat of golden eagles, bald eagles, and red-tailed hawks. This island has a large population of wild domestic rabbits on which the above named birds feed. The turkey vultures are less common but are seen occasionally throughout the San Juan Islands. The San Juan Islands are good hunting grounds for hawks, eagles, and because the grassy terrain is excellent rodent habitat and because of the miles of marine shoreline. The most northerly point in the range of the Oregon white oak or Garry oak (Quercus garryana) is San Juan Island.

National seashore, nature preserves, parks, and national monuments have been proposed throughout the San Juan Islands, (complete islands such as Cypress, Speiden, Stuart, Blakely, parts of San Juan, Waldron, and Lopez). See Geological, Botanical, Zoological-Terrestrial, Zoological-Aquatic, and Environmental Use maps.

COUNTY DISCUSSION

SAN JUAN ISLANDS NATIONAL WILDLIFE REFUGE
The San Juan Islands National Wildlife Refuge consists of four islands and two separate groups of rocks. The San Juan group has a total area of 52 acres and includes Turn Island (35 acres), Colville Island, Bare Island, Buck Island, Williamson Rocks, and Bird Rocks.

These islands provide habitat for many species of colonial nesting and oceanic birds. Glaucous-winged gulls are the most abundant. Other species, either nesting on the islands or using them during some part of the year, are pigeon guillemots, black oystercatchers, black turnstones, pelagic cormorants, double-crested cormorants, Baird's cormorants, and tufted puffins. Harlequin ducks, nowhere else as abundant, are seen commonly on the water surrounding these islands.

Turn Island, the largest of the San Juan group, has a heavy cover of timber and brush. Bald eagles sometimes nest there. Located near the mouth of Friday Harbor on San Juan Island, the refuge is popular with boaters operating from the harbor. See Environmental Use map.

SAN JUAN ISLANDS WILDERNESS
Inclusion within the National Wilderness Preservation System has been proposed for a San Juan Islands wilderness, to include Smith Islands, Jones Island, Matia Island and the San Juan National Wildlife Refuge, which includes a group of 85 named and unnamed islands including many smaller islands and rock areas. Congressional action is pending. See Environmental Use map.

SAN JUAN NATIONAL HISTORICAL PARK
The American and English Camps comprise San Juan Island National Historical Park, with a total acreage of 1,750 (1,222 acres at American Camp; 529 acres at English Camp). This park was authorized September 9, 1966 to interpret and protect the sites of the American and English Camps on San Juan Island and commemorates the historic events that occurred from 1853 to 1874 in connection with the final settlement of the Oregon territory boundary dispute, including the so-called "Pig War" of 1859. See Environmental Use and Historical-Cultural maps.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SECAR ROCKS
Rocks south of Lopez Island. See Geological map.

SHAW ISLAND
Possible state park. See Environmental Use and Geological maps.

SHOE ROCKS
Small rocky area adjacent to Orcas Island. See Geological map.

SIGNIFICANT SUBTIDAL AREAS
From Lopez Sound northward between Lopez and Blakely Islands into East Sound. Peavine Pass, Peapod Rocks, Black Rock, and Parker's Reef. See Geological map.

THE SISTERS
Small groups of islands northeast of Orcas Island. See Geological map.

SKIPJACK ISLAND
Small island north of Waldron Island. See Geological map.

SKULL ISLAND
Small island in West Sound, Orcas Island. See Geological map.

SMITH ISLAND NATIONAL WILDLIFE REFUGE
See Island County.

SPENCER SPIT
Found on the northeast side of Lopez Island, this is a recently acquired state park. See Geological, Environmental Use and Hydrological maps.

SUCIA ISLAND GROUP
Though some of these islands are state parks, primarily for boaters; they are of significance to zoologists as well as fossil hunters. See Environmental Use map.

TURN ISLAND
This island is used for research by the University of Washington at Friday Harbor Marine Laboratories. It is a nesting site for bald eagles. Controlled by U.S. Coast Guard, the island covers 35 acres. It is the site of a state marine park and an archeological site. See San Juan Islands National Wildlife Refuge. See Zoological-Terrestrial, Archeological, and Environmental Use maps.

TURTLEBACK RANGE
This is the oldest rock formation in the San Juan Islands - the gneisses and granitic rocks at least pre-Middle Devonian in age. (Minimum 360 million years). See Geological map.

TURTLEBACK, MOUNT STONE, ANCHOR
This anchor points to "treasure" in Boundary Pass. See Historical-Cultural map.

VICTIM ISLAND
Small island in West Sound, near Orcas Island. See Geological map.

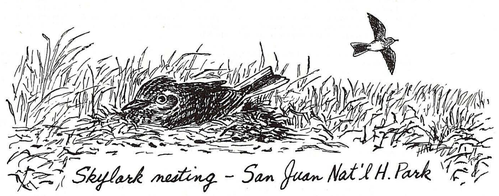
WALDRON ISLAND
Waldron Island is a 68 acre preserve of white sand beach, marshes, lakes, and evergreen and hardwood forest which attracts seals, otters, bald eagles, and innumerable shore and sea birds. The island is owned by the Nature Conservancy. See San Juan Islands entry. See Environmental Use map.

WASP ISLAND
Small island west of Shaw Island. See Geological map.

WATERS OF SAN JUAN COUNTY
A state marine biological preserve. See Environmental Use map.

WATMOUGH BAY
This narrow, scenic bay is bordered on north by towering rock wall. There is a freshwater marsh immediately behind the beach, an example of characteristic San Juan Islands marshes which are rapidly being drained and filled for waterfront housing sites. See Hydrological map.

WHITE ROCK
Small island west of Orcas Island. See Geological map.



WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the Atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide or national significance and reflect, in part, the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. The European Skylark, (Alauda arvensis) was introduced to Vancouver Island, British Columbia. Approximately 10-20 pairs now reside in the area of American Camp on the south end of San Juan Island and represent the only known nesting population in the continental United States. Habitat in nearby Victoria, British Columbia is threatened. The Washington population exists with large numbers of European rabbits on the grassy slopes of the national monument site. The San Juan Islands are an important nesting and wintering area for bald eagles in western Washington. Approximately 15-20 nests are in the islands. Sizable concentrations of eagles reside during the other seasons, especially at the south end of San Juan Island. There are osprey nests on Lopez Island, but reproductive success at present is unknown. The golden eagle lives in small numbers in San Juan County, and peregrine falcons are noted in the island group. Other noted birds include arctic loon, Merriam's turkey, black oystercatcher, guillemots, and terns.

MAMMALS. In the San Juan Islands, the river otter has adapted to the salt water habitat. Because the otter is intelligent, playful and graceful, and because it is diurnal, a conflict is arising between residents who enjoy watching the animals and trappers after the pelts. Waldron, Shaw and Orcas Islands are now closed to trapping. A European rabbit commonly called the "European Hare", introduced during the early twentieth centry now overpopulates San Juan Island. The rabbit does provide food for the golden eagles and hawks and crops the grass short enough to permit the skylarks to nest. Other noted mammals include black-tailed deer, harbor seal and other marine mammals.

WILLOW ISLAND
This highly scenic "mini-island" is steep-sided with small grove of trees. See Geologic map.

Skagit

ALMA COPPER, MOUNT BAKER NATIONAL FOREST
Being at the western portal on the south side of the approach to, as well as contiguous to, the North Cascades National Park and the Ross Lake National Recreation Area, the Alma Copper area should be treated sensitively. Conservation groups concerned with the environment of this region have recommended a wilderness study be conducted in this 7,700 acre unit. See Environmental Use map.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Skagit County discussion are plotted on the Archeological map and listed in its index.

BACUS HILL QUARRY
A former rock quarry owned by Skagit County. Many fossils including palm trees are exposed. See Geological map.

BARNABY AND HARRISON SLOUGH REARING PONDS
State Game Department. Species propogated: Summer and winter steelhead trout. Water source: Skagit River. See Zoological-Aquatic map.

BARNEY LAKE
A shallow, wet-season lake 3 miles east of Mount Vernon, draining into Nookachamps Creek. It is an important winter feeding area for trumpeter swans. Zoological-Terrestrial map.

BAY VIEW STATE PARK
The 24 acre park is 25 miles southwest of Bellingham. It fronts on Padilla Bay. Camp and trailer sites and swimming are available. See Environmental Use map.

BIG ROCK AND FLORAL AREA
Located 4 miles east of Mount Vernon, the area was revered by Indians in legend. It is used for practicing mountaineering. See Geological and Botanical maps.

BOSTON GLACIER
This natural area includes a large alpine glacier and adjacent recently deglaciated terrain. See Botanical and Geological maps.

BUCKTHORN TREE
This Buckthorn (Cascara, Rhamnus pushiana) is believed to be largest in United States: 9'5" circumference, 60' height. Reported in 1945 American Forests, April 1973. See Botanical map.

CASCADE PASS
This Pass is between the Cascade and Stehekin Rivers, at 5,392 feet, in the Northern Cascade Mountains. The native plant life is endangered through over-use of area although animal life is beginning to reappear. See Zoological-Terrestrial and Geological maps.

CASCADE RANGE
These peaks are in the Cascade Range and fall between the Middle Fork of the Cascade River and the Sutattle River: Hurricane Peak, Mount Chaval, Snowking Mountain, Illabot Peaks, Peak 7160, Mount Buckindy, Peak 7103, Peak 6971. See Geological map.

CASCADE RIVER
The entire river is an anadromous fish spawning ground. The free-flowing stretch, totaling 9 miles from the river mouth to the point where the South Fork joins Glacier Peak Wilderness, is noted as a significant roadless area. The river's South Fork is a spectacular glacial cirque in the Glacier Peak Wilderness. It is the home of the South Cascade glacier, a broad, flat, valley glacier. There are very few such glaciers in the lower 48 states. Little is known of the region. See Geological, Hydrological and Environmental Use maps.

CASCADE RIVER AND FALLS, JUG LAKE, BUCK DOWNEY CREEK, CIRCLE PEAK, LOST CREEK, MOUNT BAKER NATIONAL FOREST
All these areas, on the western side and contiguous to the Glacier Peak wilderness were in the original Glacier Peak wilderness area proposed by the various conservation groups in the Northwest in the 1950's and early 1960's. These organizations continue to recommend that the boundaries of the Glacier Peak Wilderness should be extended to incorporate these as yet roadless, undeveloped "de facto wilderness" sections. See Environmental Use map.

CHOBOHAHBISH
This is an old Indian village site. See Archeological map.

CHUCKANUT MOUNTAIN
This wildlife and "quiet" recreation area lies in close proximity to an urban population. Varied habitats support a large population of birds and mammal species and are valuable for study and enjoyment. This is a popular area for hiking. See Zoological-Terrestrial map.

CLEAR LAKE
This lake is important as a winter feeding area for trumpeter swans. See Zoological-Terrestrial map.

CLYDE SENGER TALUS CAVES
This is reported to be one of the largest caves of its type in the United States (talus cave). The depth is over 100 feet and the distance from the entrance to the furthest exit is over 250 feet. There are at least four levels present with a lake at the bottom. See Geological map.

CRANBERRY LAKE
Cranberry Lake lies 3 miles north of Sedro-Woolley on the east side of Highway 9. An undeveloped sphagnum lake, it is 27 acres in size and 20 feet deep. The lake is becoming highly eutrophic. It experiences blooms of algae to the point that the water turns green and mats form. Surrounding homes are few or nonexistent. Concentrated sources of nutrients are not apparent so the cause is thought to be natural. The lake supports bullfrogs, catfish, trout, nesting ducks and other migratory waterfowl. The lake has a unique geological history which is not fully studied. See Hydrological map.

CYPRESS ISLAND
This island is noted for unique flora and the juniper trees which some think were mistaken for cypress by Captain George Vancouver, who named the island in 1792. Vancouver might have been referring to the western red cedar when he recorded that the island was "producing an abundance of upright cypress." This big island, comprising about 9 square miles, is situated northwest of Anacortes. There are few permanent residents. Efforts have been made to acquire part of it for a state park, and to utilize the existing state land as a nucleus for a scientific and educational preserve. The United States Bureau of Outdoor Recreation has recommended that all of Cypress be included in a San Juan Islands Trust, part of a proposed National System of Island Trusts. The shoreline is in the process of being identified for protection by the Seashore Alliance. The waters of Cypress Island are a state marine biological preserve. A lake is in the center of the island, and several swamps are on the north end. Cypress, with its diverse and extensive wild forested areas, its excellent permanent stream habitats and its fine unmolested fresh water marshes, is today one of the richest areas for ornithological study in the San Juan Islands. Cypress may have the largest population of breeding long-billed marsh wrens and the only breeding wood ducks of the Islands. There are several bald eagle nests. Considered by many to be the finest area remaining in the San Juans for ecological, biological and geological study and enjoyment. Most of the northern half of Cypress Island is presently under threat of extensive logging. Formerly the Foss property, and the wildest and most spectacular half of the island, the land was recently purchased as an investment by the Whitworth College Foundation of Whitworth College in Spokane. Ornithologists have studied and identified over 120 species of wild birds utilizing this northern part of the island in its present natural state. See Geological, Environmental Use, Botanical and Zoological-Terrestrial maps.

DEBAY SLOUGH
A former channel of the Skagit River, DeBay Slough is a resting and winter feeding area for trumpeter swans and other waterfowl. Here and around Clear and Barney Lakes live 70 or more trumpeter swans. The population is slowly increasing. See Zoological-Terrestrial map.

DECEPTION PASS
This strait between Fidalgo Island and Whidbey Island was discovered and named by Captain George Vancouver. Through this pass pour some of the most awe-inspiring tidal currents seen anywhere in the world. The pass also allows passage to salmon bound for the Skagit River. See Hydrological and Geological and Zoological-Terrestrial maps.

DECEPTION PASS STATE PARK
A very popular park with spectacular tide action, many wildflowers, beaches, two large lakes, camping and picnicking. See Environmental Use map.

DONOVAN STATE PARK
The 3 acre park is on Lake Whatcom, near Bellingham. See Environmental Use map.

ELDORADO PEAK
Large glacial system in the North Cascades National Park. See Geological map.

FISHTOWN
This town is located at the confluence of the North Fork of the Skagit River and the bay. In the early 1900's it was a unique community of fishermen living among the swamp willows along the river in float houses and cabins. These were all connected with an intricate system of catwalks, ladders, and planking. The introduction of new laws and regulations governing fishing caused nearby Indian fishermen to give up their formerly used techniques of set and drift netting. The town, now largely deteriorated, is occupied by young artists. In this general location, remains of ancient Indian campsites were excavated. Findings included a grave, artifacts, and outline of a long house. Littoral caves in the area are also of interest. See Historical-Cultural and Archeological maps.

FORT VANCOUVER-FORT BELLINGHAM ROAD
See Clark County.

FUNGI SITES
The following areas in this county are noted for abundance and variety of higher fungi or important species: Skagit and Sauk River Valleys. See Botanical map.

GAGE'S SLOUGH
This slough lies 2 miles north of Mt. Vernon between Highway 99 and Interstate 5. It is an essential natural wildlife refuge in a rapidly urbanizing community. See Hydrological map.

GILLIGAN CREEK FALLS
There is a small waterfall (upper falls about 30-40 feet, lower falls about 10-15 feet) where Gilligan Creek drops between steep cliffs on the north side of Cultus Mountain. See Hydrological map.

GLACIER PEAK WILDERNESS
See Snohomish County.

GOAT ISLAND AND OTHER SKAGIT BAY ISLANDS
These islands (Goat, Deadman's, Kiket, McGlinn, Greenback, and others), all in Skagit Bay, are essential to the preservation of scenic, recreation and wildlife habitats of this area. Some already are game refuges, others are parks. Kiket Island is a haven for deer and many small animals and a resting place for the bald eagle and the blue heron. It is the eastern visual terminus of the spectacular Deception Pass park. Deadman's Island was once an Indian burial ground. Many of these islands have colonies of crows. A historical old fort is located on Goat Island. McGlinn Island, Green Back Island, and Brown Lily Island have floral species more characteristic of subalpine elevations (see also Green Back entry).

River otters can be seen feeding and playing off many of these islands. The islands also serve as nesting sites for eagles and other birds, and are good areas to observe water birds and shore birds. See Zoological-Terrestrial, Botanical, and Historical-Cultural maps.

GRANDY SLIDE (GOAT MOUNTAIN SLIDE)
A massive earth slide approximately 1,000 feet wide came down 29 January 1971, scarring a mile of mountain side and carrying thousands of board feet of timber across Grandy Creek and completely across the valley. The slopes were exposed in many places to bedrock, and now a small waterfall can be seen pouring over unoxidized unvegetated rocks covered for thousands of years by soil. The slide area is an excellent site to observe plant succession commencing with the mosses, grasses, annual plants and small seedlings of hemlock, Douglas-fir, and other species which are now greening the land. See Geological and Botanical maps.

GREEN MOUNTAIN
Small lakes are found at high altitudes which have not been planted with fish. See Botanical map.

GREENBACK, BROWN LILY, MCGLINN, ET. AL. ISLANDS
These are a group of islands, landlocked by alluvial buildups and diking, bordering Skagit Bay primarily between the north bank of the Skagit River and the southern end of Swinomish Channel at Hole-in-the-Wall. Distinctive in such a lowland landscape for their elevation, these strikingly attractive rock formations shelter small animals such as red fox and raccoon, and provide an abundance of alpine zone flora: Allium, brodiaea, camassia, erythronium and fritillaria. See Botanical map.

HICKORY HAT DAYS
Occurring the fourth week of July, it takes place in Mount Vernon. See Historical-Cultural map.

HIDDEN LAKE LOOKOUT
This is one of the few remaining Forest Service lookouts. It is now maintained by a group of volunteers as a shelter and for its historic significance. Most lookouts are being removed as aerial patrols supplant them, but a few merit preservations for their historical value and as survival shelters. There is a magnificent view. See Historical map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Skagit County discussion are plotted on the Historical-Cultural map and listed in its index.

HOLE-IN-THE-WALL
Originally, this was a nearly invisible passage between Skagit Bay and Padilla Bay. It has since been widened to accomodate log tows. See Geological map.

INDIAN SLOUGH, TELEGRAPH SLOUGH AND JOE LEARY SLOUGH
These three sloughs empty into Padilla Bay. See Hydrological map.

IRENE AND BOULDER CREEK DRAINAGES
Because of altitude change (1,200-5,000 feet) and slope, old growth western hemlock and forest type silver fir are found here with a variety of forest types. See Botanical map.



JADE EXPOSURE
Jade can be found in an area 6 miles east of Mount Vernon. See Geological map.

JASPER EXPOSURE
Jasper can be found near Anacortes on Fidalgo Island. See Geological map.

JORDAN CREEK FALLS
Located on Jordan Creek, a large tributary of the Cascade River, these falls form a series of cascades with a total height of approximately 500 feet. See Hydrological map.

JORGENSEN LAKE
This peat bog near Acme has much wildlife, including nesting ospreys and pied-billed grebe. Not mapped.

KIKIALLUS
This is an old Indian village site. See Archeological map.

KINDY CREEK
Four-hundred year old Pacific silver fir with seral to climax stages represented may be found in this 1,340 acre Canadian life zone area. See Botanical map.

LA CONNER
La Conner is a historic western Washington town. It was the early county seat of Skagit County. Its historic buildings include: Magnus Anderson log cabin (built 1869) on the North Fork Skagit, later moved to La Conner; La Conner town hall (built 1885 for a bank); La Conner civic club (1875); Puget Sound Mail (oldest weekly newspaper - 1890); and Tillinghast seed company (1890). See Historical-Cultural map.

LAKE CAMPBELL
Covering 410 acres with a maximum depth of 22 feet, this lake is eutrophic. It experiences blooms of algae that turns the water green and form mats. Surrounding homes are few or nonexistent. Concentrated sources of nutrients are not apparent so the cause is thought to be natural. See Hydrological and Geological maps.

LAKE CAMPBELL ISLAND
Tiny island in the center of Lake Campbell on Fidalgo Island.

LAKE SHANNON
There are several osprey nests on old snags at the upper end of Lake Shannon. At least two of these were active in 1972. See Zoological-Terrestrial and Environmental Use maps.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Skagit County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LIBERTY BELL I AND II AND DRIVEWAY BUTTE, MOUNT BAKER AND OKANOGAN NATIONAL FOREST
See Whatcom County. See Environmental Use map.

LILY LAKE
This small lake with boglike edges is the home of many interesting and unusual plants including a large colony of the insectiverous sundew. See Botanical map.

LITTLE MOUNTAIN
This timbered hill, owned by the city of Mount Vernon, is a city park with a road leading to the top where a fine view of the western lowlands unfolds. See Environmental Use map.

MARIETTA FALLS
This is a spectacular waterfall about 100 feet high, where Marietta Creek completes its plunge from the Cascade foothills to the Skagit Valley. See Hydrological map.

MESEKWIQUILSE
This is an old Indian village site. See Archeological map.

MILLTOWN
This island in the delta on the south bank of the Skagit, one mile south of Conway, has many migratory waterfowl, wading birds, song birds and raptors. It is a popular resting place for bushtits as well as the breeding place for the little green heron. Not mapped.

ISSKAIWHOVERHEA
This is the site of an old Indian village. See Archeological map.

MOUNT BAKER-TWIN SISTERS, MOUNT BAKER NATIONAL FOREST
See Whatcom County.

MOUNT ERIE
This mountain, located south of Anacortes and above Lake Erie, is the highest point on Fidalgo Island. It has been made a city park and has a superb view. Several mountaineering clubs make use of the cliffs and ledges to practice climbing skills. See Environmental Use map.

MOUNT LOGAN
This area is located between Thunder and Fisher Creeks. See Geological map.

MOUNTAINS BETWEEN NORTH FORK CASCADE RIVER AND MCALLISTER CREEK, WEST OF THUNDER CREEK
The mountains in this area include: Boston Peak, Sharkfin Tower, Forbidden Peak, Mount Torment, Hidden Lake Peaks, The Triad, El Dorado Peak, Dorado Needle, Klawatti Peak, Primus Peak, and Tricouni Peak. See Geological map.

MOUNTAINS BETWEEN NORTH AND MIDDLE FORKS OF CASCADE RIVER
The mountains in this area include: Johannesburg Mountain, Cascade Peak, The Triplets. See Geological map.

MOUNTAINS BETWEEN THE SOUTH FORK OF AGNES CREEK AND STEHEKIN RIVER, AND THE CASCADE CREST
The mountains in this area include: Dome Peak, Hurry-Up Peak, Leconte Mountain, Lizard Mountain, Sentinel Peak, Sinister Peak, Spider Mountain, and Spire Peak. These are all noted as mountain climbing areas. See Geological map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Skagit County discussion are plotted on the Geological map and listed in its index.

NOISY-DIOBSUD
Contiguous to the northern unit of the North Cascades National Park, as well as flanking the Baker Lake reservoir to the north, this area is probably one where increased wilderness recreation will be sought. For this reason, together with the desirability of coordinating with the expected wilderness in the adjoining National Park lands, conservation groups have recommended that a wilderness study be planned in this roadless area. See Environmental Use map.

COUNTY DISCUSSION

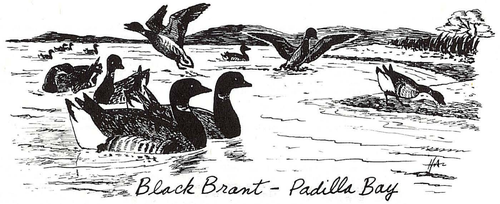
NOOKACHAMPS CREEK
Nookachamps Creek furnishes habitat to whistler and trumpeter swans on its ponds and in slow areas. Not mapped.

NOOQUACHAMISH
This is an old Indian village site. See Archeological map.

PADILLA BAY
Padilla Bay in Skagit County is a tidal plain of approximately 14,600 acres. This area is classified as having statewide significance under the Shorelines Management Act. It is the largest shallow-water bay in Puget Sound that does not have a tributary stream emptying into it. Consequently the water remains quite clear, allowing sunlight to penetrate to the bay floor. This permits the development of extensive eelgrass beds which supply food for large numbers of waterfowl and nursery areas for fish and crustaceans. Padilla Bay is edged with marshes, where minor erosion is noted.

Padilla Bay is an outstanding example of an estuarine area, relatively free of urban encroachment, easily accessible to all, providing a laboratory of inestimable value. Because of the many channels crossing Padilla Bay, interested persons may use small boats or canoes, anchor where they wish and have a firsthand view of many types of estuarine marine life, ranging from the harbor seals basking in the mud in the southern part of the bay just out from Indian Slough to the kelp growing off Williams Point on Samish Island.

Black brant spend the winters feeding on the eelgrass growing in the bay in all the shallow areas. Padilla Bay is considered to be the most important Pacific Coast resting place for black brant. There are periods in the spring when the shallows are covered with brant. Along with the brant are all kinds of ducks, both dabbling and diving. To be found on the bay are mallard, green-winged teal, pintail, wigeon, canvasback, scoters, ruddy duck, and mergansers. Shorebirds frequent the beaches, herons feed in the bay and nest on Samish Island. There are vast numbers of wintering and migratory waterfowl, numerous species of gulls and terns, large aggregations of migratory shorebirds and many species of raptors. It is one of the best places in the United States to get frequent closeups of the endangered peregrine falcon. The south end of the bay has a substantial salicornia marsh, a type of habitat greatly reduced along the entire Pacific coast due to dredge-and-fill operations. There is eelgrass in both Padilla and Samish Bays, an essential form of food for birds. The importance of these areas cannot be stressed too much due to their increased destruction along the Pacific Flyway. The interrelationships of Padilla and Skagit Bays are many and subtle and the health and preservation of one may very well depend on the other. See Zoological-Terrestrial and Hydrological maps.


Black Brant - Padilla Bay

PARKS
Rockport Steelhead County Park is used by many steelhead fisherman. Steelhead Park, near Sauk Mountain, is used along with the park as an environmental education area. Undeveloped county park areas are Friday Creek south of the fish hatchery, Sauk River Park by the government bridge south of Rockport and a site 5 miles west of Concrete. See Environmental Use map.

PASS LAKE
The lake covers 99 acres, with a maximum depth of 20 feet. This lake in Deception Pass State Park is eutrophic. It experiences blooms of algae that turns the water green and forms mats. Surrounding homes are few or non-existent. Concentrated sources of nutrients are not apparent so the cause is thought to be natural.

It furnishes occasional habitat to the water ouzel (American dipper), far from its normal habitat of mountain streams and lakes. See Hydrological map.

PEAT BOGS
These bogs are adjacent to Jorgensen Lake, northeast of Acme on Mosquito Lake Road. There are many wildlife species here, including nesting ospreys and pied-billed grebes. See Hydrological map.

PRESSENTIN CREEK AND HIGGINS MOUNTAIN, MOUNT BAKER NATIONAL FOREST
Developments and roads have rather isolated these two roadless, forested remnants. With the increasing number of visits to areas with anything resembling wilderness character, these two areas will become ever more attractive to those seeking a roadless wilderness day. Conservation groups have recommended these be put in a wilderness study category before any final decisions are made to remove the remainder of their forest resources.

This 519-acre plant community at Pressentin Creek is dominated by Douglas fir and red cedar, the latter of which is rare for North Cascades. See Botanical and Environmental Use maps.

PUGET SOUND
See Kitsap County.

PYRAMID LAKE RESEARCH NATURAL AREA
This natural area includes a virgin mountain lake and surrounding sub-alpine forests. See Botanical map.

RAGGED RIDGE
This area is located between Fisher and Panther Creeks. Red Mountain is included in this Ridge. See Geological map.

RAINY PASS
This Pass, at 4,860 feet, runs through the Northern Cascade Mountains, on State Route 20. See Geological map.

THE ROCK
This is the site of a sheer rock promontory. According to local history, the Indians herded deer onto the point where they were killed for food. Not mapped.

ROCKPORT STATE PARK
This 447 acre park is located on State Highway 20 near the town of Rockport. The park features a fine stand of virgin timber and a shady campground. See Environmental Use map.

ROSS LAKE NATIONAL RECREATION AREA
This area is comprised of glaciers, mountain peaks and forested valleys. Lakes are formed by Ross, Diablo and Gorge Dams. Recreational opportunities include limited camping, fishing, mountain climbing and hunting. There are no overlaps nor any spaces between the National Park and the National Recreation Areas. Where the park and recreation areas are adjacent to each other, they have common boundaries. See Environmental Use map.

SADDLE BAG ISLAND
Located near the southern tip of Guemes Island, the island is a possible state park. See Environmental Use map.

SAHKUMEHHU
This is the site of an old Indian village. See Archeological map.

SALMON CREEK
This small stream (often dry in August-September) is located on the north side of Cultus Mountain and is about 3 to 4 miles in length. In January 1971, a spectacular flood caused by a blocked culvert on the Old Day Creek Road gouged out a mile of the ravine north of the road, exposing the shale bedrock and quartz veins. This is a very spectacular sight, good for geology-oriented educational use. See Geological map.

SAMISH ISLAND VILLAGE SITE
This is the site of an old Indian village. See Archeological map.

SAMISH BAY
Large shallow bay that supports extensive eelgrass beds, oyster and clam beds and a good crab population. It is used heavily by waterfowl including black brant and blue herons. Minor erosion is occurring along the shoreline. See Zoological-Terrestrial and Hydrological maps.

SAMISH ISLAND
Approximately 125 pairs of great blue herons nest on the island. See Zoological-Terrestrial map.

SAMISH RIVER AND DELTA
The Samish is a free-flowing river with delta which empties into Samish Bay, enriching farmland with its overflows. A major, winter run steelhead stream, it also contains fall chinook and coho salmon, many being of hatchery origin. The lower Samish is currently open to jacks only; however, for salmon angling purposes, the mouth of the stream has been defined as occurring well within the lower estuary. Below this point Puget Sound fishing regulations apply. See Hydrological and Geological maps.

SAMISH STATE SALMON HATCHERY
State Fisheries Department. Species propagated: chinook, coho, and chum salmon. See Zoological-Aquatic map.

SAUK MOUNTAIN
Situated north of Rockport State Park, Sauk Mountain is accessible by a steep road to a trailhead. The hike to an abandoned lookout leads through verdant wildflower meadows and presents a beautiful mountain panorama. See Geological, Botanical, and Environmental Use maps.

SAUK RIVER
The segment from its mouth to its junction with Elliott Creek is classified as a wild and scenic river. It is free-flowing from the mouth up the North Fork to the Glacier Peak Wilderness boundary. See Hydrological and Environmental Use maps.

SBALEECH
This is an old Indian village. See Archeological map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SHANNON POINT MARINE SCIENCE CENTER
This 71-acre site will serve students of Western Washington State College, Central Washington State College, Eastern Washington State College and neighboring community colleges. The site includes a deep saltwater channel and a fresh water pond. See Environmental Use map.

SKAGIT
This is the site of an old Indian fishing village. See Archeological map.

SKAGIT BAY
Skagit Bay from Brown Point to Yokeko Point is a designated Shoreline of Statewide Significance under the State Shoreline Management Act. See Padilla Bay, Samish Bay, and Skagit Delta-Estuary and Flats entries. See Hydrological map.

SKAGIT BAY ISLANDS
See Goat Island.

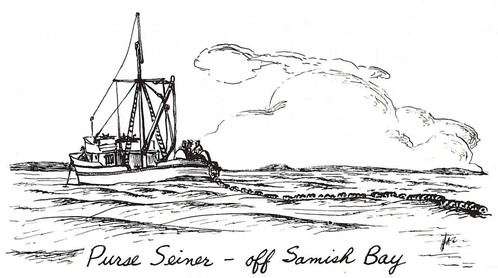
SKAGIT COUNTY HISTORICAL MUSEUM
At La Conner, Indian and pioneer memorabilia are featured, along with early county industries. See Historical-Cultural map.

SKAGIT DELTA, SKAGIT FLATS, ESTUARY
The flood plain delta area has long been one of the most outstanding waterfowl areas in the state. It hosts thousand of puddle ducks during part of the year and is an annual wintering ground for 20,000 to 40,000 snow geese. Canada geese, black brant, mallard, wigeon, teal and pintail are found in abundance. Almost one-half of the 125,000 black brant on the Pacific flyway feed in eelgrass beds found in the Skagit estuary. More than 70 whistling swans utilize the area between Hall and Brown Sloughs. This is also an excellent raptor area during September to April. There is considerable evidence of Indian camp sites along both North and South Fork channels of the Skagit. Excavations have been made in the Conway area and in the Fishtown area southwest of La Conner. See Archeological, Hydrological, and Zoological-Terrestrial maps.

SKAGIT RIVER
Aside from the splendid Cascade Range and the Puget Sound, the Skagit River is the most singular feature in northwestern Washington. It provides the connective artery between the massive stretch of mountains to the east and the teeming waters of Skagit Bay to the west. Along its banks is written in clamshells the early history of Indian campsites under the silt. This unique river cuts a swift passage from its headwaters through steep gorges that afford glimpses of glaciered peaks and snowfields. Free-flowing along heavily forested banks of conifers, it breaks and meanders around island stands of cottonwoods and alders. It is joined at Marblemount by the Cascade River and at Rockport by the combined Sauk and Suiattle Rivers before bursting onto the alluvial plains and farm delta of the Skagit Valley. All these combined rivers are much admired for their natural wildness, great scenic beauty, and recreational advantages. It was these qualities that placed them under the Wild and Scenic Rivers' Act.

The Skagit River, second largest in the state, supports the largest runs of anadromous fish of any river in Puget Sound. It is a major winter run steelhead stream, and five species of Pacific salmon are abundant in the river. The native chinook run into this fine stream begins in April, slowly builds through July and then tails off through August and early September. The coho run occurs from August through October with peak abundance in late September. Pink salmon fishing begins in August and is best during the first half of September. Runs of sockeye and chum salmon also exist. A steelhead hatchery is located at Barnaby's Slough.

Upward to 150 wintering bald eagles roost in the tall trees and feed in the Skagit River between Rockpoint and Marblemount. Along the south side of the river are the cottonwood forests much favored by mushroom hunters for the morel and chanterelles they provide, and the little creeks and waterfalls. It is newly explored by rock hunters for leaf fossils.


Purse Seiner - off Samish Bay

The lower reaches of the Skagit River exhibit coliform densities above the limit recommended for safe water-contact recreation.

The Skagit River Delta and Flood Plains along with Samish and Padilla Bays and appended rock outcroppings and islands should be viewed as an ecological entity. See Hydrological, Zoological-Aquatic and Environmental Use maps.

SKAGIT STATE SALMON HATCHERY
State Fisheries Department. Species propagated: spring chinook salmon. See Zoological-Aquatic map.


Bald Eagle nesting - Upper Skagit River

SKAGIT WILDLIFE RECREATION AREA
Twenty-six species of ducks, snow, white-fronted, and Canada geese, brant, and whistling swan either nest or winter on Skagit (12,761 acres), west of Conway in Skagit county. It is one of the most important waterfowl areas in western Washington. Nearly 200 species of birds, harbor seal, river otter, mink, blacktail deer, pheasant, band-tailed pigeon and dove have been identified here. The Skagit's intertidal flats and shallow salt-water bays winter 20-35,000 snow geese annually. Trout, steelhead and salmon are taken in the adjacent Skagit River. The Skagit's extensive tidal flats are accessible only at low tide, but its cattail saltmarsh, sedge-bullrush, wooded stream banks and farmlands can be reached at all times.

This area is particularly valuable for wildlife, and provides hunting, fishing and other forms of recreation for outdoor enthusiasts. See Environmental Use and Zoological-Terrestrial maps.

SKAGIT VALLEY COLLEGE (JR)
The college was established in 1926 in Mount Vernon. See Historical map.

SKWIKWIKWAB
There are two archeological sites on North Fork Skagit River and on a hill near Fishtown, a former fishing village at the mouth of the North Fork of the Skagit River. One is approximately 2,500 years old and the other approximately 1,500 years old. Many shellfish remains may be found on the site which were used for slicing and cutting tools. One permanent structure excavated at this site was probably a community meeting place or lodge, made of cedar and in the shape of a semi-circle approximately 40 feet long. These archeological sites have been recorded on the register of National Historic Sites. See Archeological map.

STRAWBERRY ISLAND
State marine park. See Environmental Use map.

SUIATTLE RIVER
The segment from its mouth to the Glacier Peak Wilderness area boundary at Mill Creek has been given Wild and Scenic River status. See Hydrological and Environmental Use maps.

SULLIVAN'S SLOUGH
The slough drains into the North Fork of the Skagit River. It has been degraded at its northern end but is still an attractive wildlife haven. It empties into Skagit Bay. See Hydrological map.

SWINOMISH
This is the site of an old Indian village near La Conner. See Archeological map.

SWINOMISH INDIAN RESERVATION
Adjacent to the town of La Conner, this reservation includes 4,973 acres. The reservation operates its own sawmill, fishtrap, oyster beds and fish cannery. See Historical-Cultural and Zoological-Aquatic maps.

SWINOMISH INDIAN TREATY DAY POWWOW
The powwow is held January 22 at the Swinomish Reservation. See Historical-Cultural map.

TEEBONE RIDGE
This area is located between the Skagit and Cascade Rivers - south of Newhalem. This area includes: Big Devil and Little Devil. See Geological map.

THUNDER CREEK GORGE
This is located in the North Cascades National Park and Recreation Area. It is about 4 miles up the Thunder Creek trail, where the creek compresses into a narrow slot and thunders off (hence its name) in a spectacular waterfall into a mossy gorge. See Hydrolocal, Geological, and Botanical maps.

UPPER GRANITE LAKE
Washington State's only population of grayling are found in Upper Granite Lake, a high elevation lake in Skagit County. These cold-water fish were introduced by the State Game Department. See Hydrological and Zoological-Aquatic maps.

VANCOUVER EXPEDITION ANCHORAGE
Between June 8 and 11, 1792, the Vancouver Expedition anchored in Strawberry Bay off Cypress Island. See Historical-Cultural map.

WASHINGTON PARK
The timbered point owned by Anacortes is noted for the many species of marine animals found in the tidal areas, and also for wildflower displays in the spring. Rock formations here indicate glacial evidence, as well as glacial markings on a rock wall. See Geological, Botanical and Zoological-Terrestrial maps.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide or national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats napped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. The upper Skagit River is an outstanding bald eagle habitat. The lower section of the river is also frequented by bald eagles. Sightings have been made between Rockport and Clear Lake and frequently at Clear and Beaver Lakes. Other important wintering areas are along the Skagit River from the Whatcom County line to Sedro Woolley, and on the Sauk River from the Snohomish County line to the confluence with the Skagit River. The Skagit River and Fidalgo Island are important feeding grounds. The golden eagle is seen in small numbers in Skagit County. The Barney Lake area, DeSay Slough, and Clear Lake are important as feeding areas for trumpeter swans in the winter. This population of swans numbers at least 70, and seems to be increasing. Spotted owl (Strix occidentalis) is noted on the Pacific coast and in the Cascade Mountains. The spruce (Franklin) grouse is noted in Skagit County, which is a general area of importance due to existing habitat. Osprey nests are noted at Lake Shannon, Lake Ten, and near Birdsview on the Skagit River.

MAMMALS. Cougar (Felis concolor) are present in forests throughout the state and coyote are found in Skagit County in the Skagit River Delta and in the Boulder River area. Wolverine (Gulo gulo) are increasing in numbers and noted in the Cascades. Fisher (Martes pennanti) are noted in the forests of the Cascades. Red fox (Vulpes vulpes cascadensis) are well distributed in the Cascade Mountains. The pine martin (Martes americana) is found on upper mountain slopes throughout the state. Moose (Alces alces andersoni) are a rare species sometimes seen in this county. A general area of importance to grizzly bear (Ursus arctos) is the Cascades. The grizzly is found only in North Cascades National Park and in the extreme northeast corner of the state. The state population of this species is about 10 bears.

AMPHIBIANS. The tailed frog (Ascaphus truei) is noted in rapid mountain streams of the Cascades.

WILLIAMSON ROCKS
This is a nesting site for various seabirds, including a colony of glaucous-winged gulls. See Zoological-Terrestrial map.

WISEMAN CREEK FALLS
A beautiful series of falls and cascades boil through a small, narrow canyon carved in the creek bed. The pounding water has hollowed out bowl shapes in the rock. See Hydrological map.

YOUNG ISLAND
Located on Burrow's Bay south of Anacortes, this is a possible state park. See Environmental Use map.

Skamania

ALDRICH BUTTE, COLUMBIA RIVER GORGE
Formerly the site of a fire lookout cabin, Aldrich Butte (1,000 feet) is now a natural platform for expansive views of the Gorge in all directions. Indeed, Aldrich Butte may be the single best viewpoint in the entire Gorge. A primitive road leads to the summit. The forest cover of Aldrich Butte was completely burned off in the first half of this century, but its rocky face is now partly covered by a stand of young Douglas-fir. See Geological map.

APE CANYON
This deep gorge was probably a fault in the lava subsequently enlarged and deepened by water. This canyon is reported to be one of the first places in Washington where white men sighted a "Big Foot" (Sasquatch). See Geological map.

APE CAVE
Ape Cave is the longest unitary lava tube in the United States. It contains many interesting geological features such as splash holes, calcareous formations, rippled lava, chock-stones wedged between levels, lava springs, and lava stalactites and helectities. The passage in the tube is 11,215 feet long, with a depth change of 700 feet.

The cave has two entrances connected to short upper levels from which one may reach the level of the main tube. Water enters from several large breakdown domes very close to the surface. Dripping from these domes has eroded the sand deposits on the lava floor to miniature "badlands" like those of Cathedral Gorge, Nevada.

It is remarkable not only from the standpoint of the small amount of fallen roof-rock slabs within it but is within area of remarkable tree molds. Some of the tree molds in vertical position have diameters as great as 4 feet. Speleologists report that only in Hawaii Volcanoes National Park are tree molds of greater diameter found. The site is recommended as a potential Natural Landmark. See Geological map.

ARCHER MOUNTAIN, PRINDLE MOUNTAIN
The high bluffs of Archer Mountain and Prindle Mountain (1,800 feet) dominate the skyline east of Cape Horn. Periodic logging at the base and more recently along the skyline itself has marred the appearance of these headlands. Recent quarrying operations have also added scars. These headlands are still lovely from a great distance, but on closer viewing the signs of misuse become evident.

In a recess just west of Archer Mountain is the delicate ribbon of Archer Falls, briefly visible from the Oregon side of the river. Archer Mountain, buttressing the western edge of the Great Bonneville Land Slide (Cascade Slide) shows remnants of pre-Columbia River Valley. See Geological map.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Skamania County discussion are plotted on the Archeological map and listed in its index.

BEACON ROCK
The second largest "Monolith" in the world, Beacon Rock is a butte less than 500 feet in diameter. Its top is a very narrow serrated hogback rising 815 feet above the normal level of the Columbia River. The rock is part of a great dike which exhibits a cross-cutting relationship with the Columbia River basalt. It was obviously a feeder for extensive andesitic lava extrusions younger than the basalt. Many other feeder dikes of the same kind but less prominently exposed occur elsewhere along the walls of the Columbia River Gorge. The site is recommended as part of Lewis River Caves, a potential Natural Landmark. See Geological map.

BEACON ROCK STATE PARK
Beacon Rock is located in the gorge of the Columbia River 35 miles east of Vancouver, Washington, on Highway 830. A Washington state heritage marker at the foot of the rock explains that the Lewis and Clark Expedition camped here in November, 1805. The trail to the top is 4,500 feet long with a 15 percent grade, and the view from the top reveals the river, islands, basaltic bluffs, and Bonneville Dam. The park contains 4,051 acres and a boat launch and boat moorage is located 1/2 mile west of the rock. Camping, swimming, fishing, boat docks and ramp are available.

This monolith was named by Lewis and Clark. In the early years of this century, the rock was purchased by Charles E. Ladd of Portland to protect it from quarrying. It then came into the hands of Henry Biddle who with Charles Johnson constructed a trail to the top. The excellent trail, begun in 1915 and completed in 1918, is still in existence and receives heavy public use. The heirs of Henry Biddle gave Beacon Rock to the state of Washington as a park. See Environmental Use map.

BIG CREEK FALLS
In Gifford Pinchot National Forest near the North Fork of the Lewis River, this waterfall is an impressive sight. See Hydrological map.

BIG LAVA BED
The lava bed area totals 12,500 acres. It rises from 2,000 feet in elevation on the southern end to 3,360 feet at the base of the crater. A large part of the area is underlain by a very young series of olivine basalt flows. The lava is dark grey to black olivine basalt with little soil cover. Northwest of the crater the flows are young and the surface is characterized by rubble and pressure ridges 30 feet high.

This is a wild area because of its location and its rough terrain. It is a recent lava flow (800 to 1,500 years old), 9 miles long by 4 miles wide. In the north-central part of the flow is a crater peak about 8,000 feet high that has a 400-foot deep crater in the top. It is a 1-1/2-mile hike across the lava from the nearest road. There are many lava tube caves in the area a few miles north of the lava beds in an older formation. Upper Lost Creek runs into the north end of

COUNTY DISCUSSION

the lava and disappears. Lower Lost Creek sinks into the lava on the lower west side. Moss Creek emerges in large springs a mile south of the Big Lava Bed. It is a clear cold stream of good size. This is a good refuge for blacktail deer in hunting season. Many pika coneys live in the crannies of the lava. Most of the lava bed has a growth of scrub timber—mostly jack pine (lodgepole pine). See Geological and Zoological-Terrestrial maps.

BIG LAVA BED AND BEAR CREEK, GIFFORD PINCHOT NATIONAL FOREST
Separated by a road, these are not quite as well known to conservationists as other areas which they recommend for wilderness. Big Lava Bed is self-descriptive. Both need further field study, but are considered to be ideal for a roadless, protective category. See Environmental Use map.

BROUGHTON MILL WATER FLUME
This is one of the last functional water flumes left in the world and has been suggested for preservation as a historical landmark. This flume starts at Willard and terminates at the Broughton Mill on the Columbia. See Historical-Cultural map.

CAPE HORN
So named because of the high winds that often prevail here, especially in winter. Cape Horn is topped off by gently rolling farmland. The vertical basaltic palisades here are perhaps 1/4 to 1/2 mile long and rise abruptly from the river. Several small streams drop directly into the river from the cliffs. These falls are easily observed from the Oregon side. The railroad is located on a narrow margin between the cliff and the river except for one stretch where it tunnels behind the cliff. The view upriver to Stevenson offers one of the best views of the Gorge. The present highway is located on a bench along the side of Cape Horn. A future highway to replace the present route will probably be located on the top. See Geological and Hydrological maps.

CARSON NATIONAL FISH HATCHERY
Species propagated: chinook salmon, steelhead trout, rainbow trout and cutthroat trout. See Zoological-Aquatic map.

CASCADE RIVER
This river is being considered as a possible State Park site. See Environmental Use map.

CASCADE SLIDE
Otherwise known as the Bonneville land slide, this was one of the largest slides in the Western Hemisphere. Around 1250 A.D., a part of the mountains broke away from the main body and swept across the Columbia, damming it temporarily. The local Indians created a legend of the "Bridge of the Gods." A manmade bridge presently spans the 1/4 mile narrows where the river finally broke through. A portion of the slide is still visible on the Oregon shore. See Geological map.

CEDAR FLATS RESEARCH NATURAL AREA
Wildlife make significant use of the natural area. It provides late fall and winter range for a herd of Roosevelt elk (Cervus canadensis roosevelti) and for deer (Odocoileus hemionus columbianus). In fact, these animals may be encountered in the area at almost any time of year and their grazing undoubtedly has a significant impact on the character of the plant communities. Black bear also forage the swampy areas during the spring and some may possibly hibernate on the natural area. Predators such as coyote, cougar and bobcat (Lynx rufus) are occasional visitors, probably following the deer and elk. Other mammals include marten (Martes americana), weasel (Mustela sp.), Douglas squirrel and white-footed deermouse (Peromyscus maniculatus), mink (Lutreola lutreola), river otter (Lutra canadensis pacifica), and beaver (Castor fiber) inhabit areas along the Muddy River.

The research area exemplifies the western red cedar (Thuja plicata) stands found on valley bottom habitats in the Washington Cascade Range.

A 680-acre area with the primary forest cover type being SAF-229, Pacific Douglas fir, 400 acres in extent. Other important cover types include SAF-228 Western Red cedar, 220 acres; SAF-221 red alder, 10 acres; average height of Douglas fir, 200 feet; average diameter, 48 inches; average age, 350 years. Average height of western redcedar is 150 feet; average diameter, 50 inches; average age, 400 years. A 50-acre swamp and marshy area provide the environment for zoological elements. Elevation: 1,200 - 1,800 feet. Topography: Gently rolling. See Environmental Use and Zoological-Terrestrial maps.

CISPUS RIVER VALLEY
The valley is valued as big game habitat. See Zoological-Terrestrial map.

COLLINS SLIDE
This is still a very active slide. Its upper portion is moving 20 to 30 feet per year and creates flexure in the Columbia River channel. See Geological map.

COLUMBIA RIVER
See Clark County.

COLUMBIA RIVER GORGE
The flood plains of the Columbia River Gorge, especially east of Stevenson, are an important feeding area for migratory waterfowl. The Larch Mountain Salamander (Plethodon larselli) has a range limited to the Gorge area. The Gorge area is also noted for its archeological sites. On much of the north side of the Gorge the so-called Eagle Creek Formation lies exposed. This formation, derived from ancient volcanic mudflows, far predates the more recent Boring Lava and Columbia River Basalt Formations which are responsible for the great headlands in the Gorge. In the more gentle terrain where the Eagle Creek Formation is not overlain by these later formations, leaf fossils and petrified wood are abundant in several locations. Rock Creek, which flows into the Columbia at Stevenson, is a good example. See Zoological-Terrestrial, Archeological and Geological maps.

COPPER CREEK MINING CLAIM AREA
Miners searching out copper and silver lived here during the 1920's. Their settlement was called Copper City. See Historical-Cultural map.

CURLEY CREEK
Curley Creek passes under a low arch of rock. See Geological map.

CYPRESS ISLAND
This island in the Columbia River is being considered as a possible State Park. See Environmental Use map.

DOG MOUNTAIN
This very large upwarp (anticline) exposed by the erosive force of the Columbia River shows the interior of the Cascade Range. At 3,700 feet elevation Augspurger Mountain is the highest peak on the Washington side of the gorge, standing opposite Mount Defiance, the highest point on the Oregon side. Because of a bend in the river east of Stevenson, the massive north-south ridge of Augspurger Mountain and Dog Mountain (3,000 feet) is very prominent, viewing from the west. It must be borne in mind that all the heights of the gorge are viewed essentially from sea level, since even as far east as the Dalles, the river is less than 100 feet above sea level. The rugged face of Dog Mountain rises directly from the river. The Pacific Crest Trail climbs to near the top of Dog Mountain, circling this and leading on to the north. Almost unnoticed as one drives under Dog Mountain is Dog Creek Falls, a pleasant spot only a short walk from the highway. From Dog Mountain eastward the bluffs press in close to the river on both sides, making a very literal gorge, alleviated only by the valleys of tributary streams like the White Salmon and the Little White Salmon. The ancient Indian style of fishing is still practiced at the falls on the Little White Salmon River. See Geological map.

DRANO LAKE
This is a resting area for anadromous fish runs on their migration further upstream. See Hydrological map.

FLETCHER FLATS
Found east of Cape Horn, these flats represent a valley remnant of pre-Columbian River valley. A sizeable stream pours over the lip of volcanic breccia. See Geological map.

FRANZ LAKE
The river front below Archer and Prindle Mountains is still unspoiled. Surrounded by a forest of ash and other hardwoods, mile-long Franz Lake lies just behind the river front. This almost unknown lake has a recreation potential comparable to that of Rooster Rock and Benson Parks on the Oregon side. Its importance in public recreation planning should not be overlooked. See Hydrological map.

FUNGI SITES
The following areas in this county are noted for their abundance and variety of higher fungi or important species: Hamilton Buttes Area, Upper Cispus River Valley, Sleeping Beauty Peak Area and Central Skamania County. See Botanical map.

GOLDEN CHINQUAPIN STAND
There are only two areas in the State of Washington where the golden chinquapin (Castanopsis chrysophylla) grows. One stand is in Mason County, the other along the Columbia River in Skamania County. See Mason County. See Botanical map.

GOVERNMENT MINERAL SPRINGS
This is a small hot springs with highly mineralized water and a unique algae population. See Hydrological map.

GREEN RIVER VALLEY
This is one of the largest known stands of virgin Douglas-fir in the state. It is further prized in that it is a low valley stand. Specimens measure up to 9 feet diameter at breast height. The valley is further valued as game habitat. See Botanical and Zoological-Terrestrial maps.

GREENLEAF FALLS
In the spring, great volumes of white water crash over the escarpment created by the Cascade Slide of 1250 A.D. The 300-foot falls are especially prominent from the vicinity of Bonneville Dam. At present the only access to the base of the falls is a very primitive logging road from the Aldrich Butte area. See Hydrological map.

GREENLEAF PARK
The red cliff in the face of Greenleaf Park is a fault scarp of the Giant Bonneville Land Slide. See Geological map.

HAMILTON ISLAND
An unspoiled island in the Columbia Gorge, Hamilton Island is easily accessible by car from the north and gets much use, especially from fishermen who camp along the shore. The balance of the island is presently used for cattle grazing. See Environmental Use and Geological maps.

HAMILTON MOUNTAIN
This unique mountain buttressing the west edge of the Great Bonneville Land Slide (Cascade Slide) shows remnants of pre-Columbia River Valley. See Archeological and Geological maps.

ICE CAVES
This cave is a lava tube in the Big Lava Bed with its east (lower) end sealed, containing abundant ice. See Geological map.

INDIAN HEAVEN, GIFFORD PINCHOT NATIONAL FOREST
All four Forest Service units making up this area have long been proposed by the conservation groups for wilderness. This is an area that has been characterized as a "gentle wilderness." See Environmental Use map.

INDIAN HEAVEN ROADLESS AREA
This is a high elevation country, mostly plateau, with numerous, small alpine lakes and meadows. The area is laced with recreation trails; the Pacific Crest National Scenic Trail traverses the length of the area. See Indian Race Track. See Environmental Use and Hydrological maps.

INDIAN PITS
This unusual interest area (Archeological) is located within the proposed Silver Star scenic area, within view of the Portland-Vancouver population. Only the rough single-lane gravel road limits the current number of visits. See Silver Star Range. See Archeological map.

INDIAN RACE TRACK
An unusual interest area located within the Indian Heaven Roadless Area. In past years, several tribes met here annually to pick berries, race horses, hunt, and play games. The location of the race track is still evident in the meadow. See Archeological map.

JASPER EXPOSURE
This geological exposure is found along Wind River east of Stevenson. See Geological map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Skamania County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LAVA CAVES
The Lava Caves are among the most interesting geological features in the State of Washington. The lava flow in which they are located covers approximately 7,000 acres and extends from Mount Saint Helens to the Lewis River a distance of about eight miles. Fiery lava cascaded down the raw slopes of newly formed Mount Saint Helens. Then, consuming the forest in its path, it flowed slowly toward the Lewis River Valley. The surface of the lava hardened and the advance apparently stopped, but beneath the cooled crust the still molten material flowed on, leaving, in some places, tubes in its wake. As new flows occurred they also ran through the open tubes adding layers to the walls. Five large lava tubes or caves have been discovered with a combined length of over five miles. The largest and longest among these is Ape Cave. Easily accessible by stairs, the cave is open for exploration. Any spelunkers planning to explore the caves should come prepared with warm clothing, heavy shoes, headlights, lanterns and protective headgear. See Geological map.

LAVA FLOWS
Area south of Mount Saint Helens. See Geological map.

LEWIS AND CLARK TRAIL
See Clark County

LEWIS RIVER AND FALLS
This is a major free-flowing stream. The lower 8 miles of this segment of the river are maintained in a roadless condition to provide an outstanding river gorge hike on the Lewis River Trail No. 31. It is one of the few low elevation trails in the forest and is extremely popular. A series of three spectacular falls occur within this section of the river. See Hydrological and Environmental Use maps.

LITTLE WHITE SALMON NATIONAL FISH HATCHERY
Species propagated: chinook and coho salmon. See Zoological-Aquatic map.

LITTLE WHITE SALMON RIVER
This river is an anadromous salmon and trout stream. The river canyon provides winter range for deer and elk. See Zoological-Aquatic, Zoological-Terrestrial, Hydrological, and Geological maps.

MCCLELLAN'S ROUTE HISTORICAL AREA
The trail was taken by Captain George B. McClellan in search of a feasible route through the Cascade Mountains. The route passes through or near McClellan Meadows, Indian Race Track, Goose Lake and Big Lava Bed. See Historical-Cultural map.

MOUNT ADAMS WILDERNESS AREA
The Mount Adams Wilderness, named for the peak which is the dominant feature of its 32,400 acres, lies along the eastern edge of the Gifford Pinchot National Forest and adjoins the Yakima Indian Reservation. Good mountain roads approach to within about one mile of the boundary on the south and northwest sides, making it unnecessary to travel far on foot to reach the Wilderness. Trails lead into the area and meet with the Round-the-Mountain and Pacific Crest National Scenic Trails. Average elevation within the Wilderness is about 5,500 feet, approximately 500 feet below the timberline. Some of this country is particularly rugged, especially on the east face of the mountain where appropriately named Hellroaring Creek heads among the glaciers. The Ridge of Wonders, created by lava flows from Mount Adams, lies between Big Muddy and Big Muddy Creeks. The area has undergone successive convulsions until it presents a scene of chaotic devastation. Little Mount Adams, a secondary cone thrown up after the last eruption of Mount Adams, stands in the midst of all this havoc. It is a volcano in miniature, having a circular crater with unbroken wall about 100 yards in diameter.

The lower slopes of the Mount Adams Wilderness have an exceptionally rich variety of trees, shrubs and herbaceous ground cover. There is an intermingling of species native to both the moist western Cascade slopes and the drier east side. The wide elevational range within the Wilderness also accounts for the variety. The Round-the Mountain Trail No.9 and Pacific Crest Trail, which traverse the timberline area on the west and southwest, provide excellent opportunities to view wildflowers in an alpine meadow setting. The flowers usually are on their peak in late July or early August. Here many of the plants native to other Cascade Mountain peaks are found, together with some species generally considered native to the Sierra Nevada and Rocky Mountains. Though not all are in the Wilderness, the lovely meadows are adjacent to it.

The wildlife surrounding Mount Adams is varied. The high elevations are home for the marmot and pika which live in the talus slopes above high mountain meadows. The ptarmigan, brown in the sumemer and white in the winter, is another native of the summer snowline. Wild goats, once numerous on Mount Adams, disappeared many years ago. Coyotes range over the entire area and will usually be heard in chorus on a summer evening. Deer, black bear and a few elk use the area as summer range. Blue and ruffed grouse are abundant for a short season during the time berries and tender plant shoots are at a palatable stage. Most of the lakes in the Wilderness are too shallow or lack the proper food to support fish; however, eastern brook trout have been planted in Lookingglass Lake and small schools of these fish can be seen in the crystal clear waters.



The predominantly forested area lies about 80 percent in the upper forest zone and 20 percent in the alpine zone. There are numerous glaciers. There are no major streams, but there are numerous wet places, especially in the area to the north. Elevation ranges from about 4,000 to 5,600 feet in the north and 7,500 feet in the southern parcel, to 12,236-foot Mount Adams, the central feature of the present Wilderness.

This magnificent mountain land was designated a Wild Area in 1942 by the Chief of the U.S. Forest Service. With the signing of the Wilderness Act in 1964, it became one of the first units of the new National Wilderness Preservation System. In May 1972 a Presidential Proclamation was signed which corrected an old surveying error and returned approximately 10,000 acres of the Wilderness to the Yakima Indian Tribe.

Although recreational opportunities are emphasized, the area is also important for wildlife, water and forage. The history of grazing within what is now the Wilderness began before 1900. Limited numbers of cattle and sheep are still permitted to graze portions of the area. See Environmental Use and Geological maps.

MOUNT HAMILTON, COLUMBIA RIVER GORGE
A part of Beacon Rock State Park, this headland stands about 2,400 feet above the river. Actually the end of a long north-south ridge, the sheer south face of Mount Hamilton was shaped by the gigantic Columbia River flood of the late Pleistocene epoch. An excellent trail leads past two fine waterfalls on Hardy Creek and on to the summit for fine views of the Gorge. Most of Beacon Rock State Park is owned by the Department of Natural Resources. See Geological map.

MOUNT MARGARET BACK COUNTRY
This highly scenic area provides an outstanding backcountry hiking or riding experience, for visitors to the Spirit Lake Area. Accessible by trail only, this area permits its visitors to spend an enjoyable time away from the hustle and bustle of industrial and urbanized living. The area has more than a dozen high-mountain lakes varying in size from an acre to over twenty acres. The lakes are separated by steep, rock-crested ridges which are generally timbered with upper forest species. These are some of the more unique high lakes in Washington. The lakes include: Snow Lake, Venus Lake, Shovel Lake, Panhandle Lake, Holmstedt Lake, Boat Lake and Grizzly Lake.

Elevation ranges from 3,500 feet to 5,828 feet at Mount Margaret. The area is populated with elk, deer, bear and small game; it is especially important for its summer elk range. Forested areas are mostly of the true fir-mountain hemlock types Douglas-fir is scattered at the lowest elevations and Alpine fir is found at higher elevations. According to a Gifford Pinchot forest official, this will be a management unit in the proposed Mount Saint Helens Recreation Area and is currently managed as the Mount Margaret Unusual Interest Area (Backcountry). See Environmental Use, Zoological-Terrestrial and Hydrological maps.

MOUNT SAINT HELENS
Mount Saint Helens (elevation 9,677 feet) was discovered on May 19, 1792, by Captain George Vancouver. On October 70 of that year he named it Sector Helens in honor of His Majesty's British Ambassador to the Court of Madrid. Because of the mountain's symmetrical shape, it is sometimes called "The Fujiyama of the West."

The Klickitat Indian name for Mount Saint Helens is Tah-one-lat-clah, which means "Fire Mountain." The name is probably a result of volcanic activity. The last observed eruption of Mount Saint Helens occurred November 22, 1842. Prior to that time, perhaps about 400 years ago, the mountain passed through a period of violent volcanic activity during which forested areas surrounding the mountain were showered with pumice to a depth of several feet. With the decay of the buried trees, the "tree wells" of today were created.

Black bear are common. These animals frequent the berry patches and may be encountered along trails. They are usually harmless but should not be provoked. Deer are seen frequently along the highways and Forest roads. Other animals observed include squirrel, rabbit, otter, beaver, marmot (in the Mount Margaret backcountry) and bobcat. Cougar range through the country but are rarely seen. Birds commonly seen include ducks, osprey, eagle, hawks, loon, ruffed and blue grouse, and several species of songbirds. See Mount Margaret Backcountry. See Geological and Zoological-Terrestrial maps.

MOUNT SAINT HELENS BAT CAVE AREA
Lava flow with lava tubes serving as winter hibernating sites for a local species of bat, (Plecotus townsendii) and a few migratory species of myotis (M. lucifugus, M. volans, M. yumanensis, and M. evotis). This area and the one at Trout Lake represent the only two known large (300+) colonies of Plecotus townsendii remaining in Washington. This species has declined in number in recent years. See Zoological-Terrestrial map.

MOUNT SAINT HELENS NATIONAL MONUMENT, GIFFORD PINCHOT NATIONAL FOREST
Although under the administration of the Forest Service, this area of Mount Saint Helens, Spirit Lake, Mount Margaret and the Green River, with a number of fascinating lava tubes has excited the interest of many in seeking National Monument status under the National Park Service. The old-growth forests yet remaining in the area are considered a vital part of the scenic, geologic unit this region would contribute as a National Monument. The roadless units generally encompassed by the tentative monument boundaries are proposed for wilderness designation. See Environmental Use map.

MOUNT SAINT HELENS RECREATION CENTER
A widely recognized area providing a range of recreation such as mountain climbing, hiking, horseback riding, trail bike riding, snowmobiling, skiing, ski touring and snowshoeing, camping, picnicking, canoeing, motorboating, fishing, waterskiing, youth organization camping, hunting and sightseeing. See Environmental Use map.

MOUNT ZION
A volcano of the Upper Cenozoic Era, Mount Zion (elevation 1,500 feet) provides sweeping views of both sides of the Columbia River Gorge. A road leads to the top where a microwave tower is located. See Geological map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Skamania County discussion are plotted on the Geological map and listed in its index.

NEW CAVE
This interesting lava tube cave was discovered in 1954 by a logging crew constructing the East Peterson Ridge Road. New Cave is a sinuous, spacious 6,000-foot unitary lava tube cavern. A newly discovered western section is about 2,140 feet. Much breakdown is present. A considerable variety of lava is exposed in the walls. New Cave is of some biological importance. Bats have been observed flying in the cave. Unidentified moths, fly larvae and cocoons have been found near its eastern end. The main entrance supports an extensive growth of mosses. It is probable that the cave is undergoing or will undergo ecological changes due to presence of the nearby road in what previously was densely forested country. See Geological map.

NORTH BONNEVILLE TOTE ROAD PORTAGE ROCKS
This area is the site of the old Indian and early settler tote road around the rapids. The rope marks cut into the rocks are still visible. See Historical-Cultural map.

OLE'S CAVE
Ole's Cave is the second largest cave in the Mount Saint Helens group with a slope length of about 5,800 feet of mapped passages and a 5,400-foot main passage. The elevation of the main entrance is about 1,350 feet. With the exception of the bifid 400 feet immediately south of the lowest, or main, entrance and of a few short lava springs and segments of additional upper levels, the cave has the form of a unitary, locally sinuous lava tube. Much of the cave is about 10 feet high and 15 feet wide. This cave is in what may be the most recent pahoehoe lava flow in the continental United States, perhaps originating with the 1842 or 1854 eruptions of Mount Saint Helens. Casts of delicate tree parts are visible in tree molds on the surface of the flow are strikingly younger than those bordering it. The floor of much of the cave has the appearance of fresh lava fragments which have fallen from the ceiling into still-molten lava and left congealed splash rings on the floor. Taken from Caves of Washington, by William R. Halliday. See Geological map.

PETERSON PRAIRIE CAVE SYSTEM
This extensive but largely collapsed lava tube system is between Peterson Prairie and Dry Creek. Slope length of the main route is 3,915 feet. One cavernous part contained ice deposits in August 1962. A rather extensive biota is sheltered in the cave. Locally, small plants display a marked photo-tropism. The complexity of this system and its possible relationship to schollendons in two areas makes it of special interest despite the degree of collapse. This information is from Caves of Washington, by William R. Halliday. See Geological map.

PHOCA ROCK
This crag bearing the Latin name for "seal," is located near the middle of Columbia River. It is listed in some climber's guides, although access to the base can be something of a challenge. See Geological map.

PIERCE ISLAND
This island in the Columbia River and associated mainland has potential open spaces and is currently being used by the Pierce Cattle Ranch. See Environmental Use and Geological maps.

PLANT COMMUNITIES
The climax plant communities listed below occur in the county. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Alaska-cedar - Cascades azalea
Pacific silver fir - Alaska huckleberry (common beargrass phase)
Pacific silver fir - Alaska huckleberry (Oregongrape - common beargrass phase)
Pacific silver fir - Alaska huckleberry (Oregongrape phase)
Pacific silver fir - Alaska huckleberry - bunchberry dogwood
Pacific silver fir - common beargrass
Pacific silver fir - deerfoot vanillaleaf
Pacific silver fir - dwarfmistletoe
Pacific silver fir - mountain hemlock - American false hellebore
Pacific silver fir - mountain hemlock - big huckleberry
Pacific silver fir - Oregon oxalis
Pacific silver fir - Oregongrape
Pacific silver fir - purple twistedstalk
Pacific silver fir - salal
Pacific silver fir - western hemlock - big huckleberry
Pacific silver fir - western coolwort

REED ISLAND
Almost 3 miles long, Reed Island lies at the west entrance to the Columbia River Gorge. It has recently become the property of the Washington State Department of Parks, thus becoming the second state park on the Washington side of the Gorge, Beacon Rock State Park being the other. Reed Island has spectacular broad sandy beaches, especially on the upstream end, except during late spring when the Columbia is high. Reed Island receives much use by boaters, waterskiers and fishermen. See Environmental Use and Geological maps.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SHARK ROCK SCENIC AREA
This area is currently managed as the Shark Rock Unusual Interest Area. This high elevation country on the divide between the Coulitz and Lewis River drainages provides opportunity for hiking, horseback riding and trail bike riding. Boundary Trail connects the Mount Adams area with the Mount Saint Helens Area and trâverses the length of this roadless area. See Environmental Use map.

SHARK ROCK-UPPER LEWIS, GIFFORD PINCHOT NATIONAL FOREST
Included in this unit are areas labeled Clear Creek, Shark Road, Upper Lewis, Juniper Peak, and Cussed Hollow, together with some contiguous roadless areas presently unlisted in the Forest Service inventory. Geologists familiar with this area state that it is of wilderness caliber and differs in its geologic and wilderness merits from the Mount Saint Helens complex due west of it. The Cussed Hollow unit is separated from the remainder of the area by a logging road. It is recommend the road be closed for reversion to trail status. See Environmental Use and Geological maps.

COUNTY DISCUSSION

SHIPPARD FALLS
Historical migration block to salmon but not summer run steelhead. Fish passage is now provided by Wind River Fishway. See Hydrological map.

SILVER STAR RANGE
While somewhat distant (13-14 miles) from the Columbia River and not actually a part of the Gorge, Silver Mountain (4,300-foot elevation) and the summits just to the east must be considered part of the Gorge landscape because of their prominence as seen from the Oregon shore near Rooster Rock. Almost totally denuded by the Yacolt Burn of 1902 these mountains still remain gaunt and unforested. In the spring months, however, an unbroken mantle of snow covering the bare slopes makes the Silver Star Range stand out, brilliant above the green forest near the river. See Geological and Environmental Use maps.

SIOUXON, GIFFORD PINCHOT NATIONAL FOREST
Recent information indicates that this is a prime candidate for wilderness study. This area burned over approximately 60 to 70 years ago and is now reforesting. See Environmental Use map.

SISTER ROCKS RESEARCH NATURAL AREA
The area exemplifies Pacific silver fir (Abies amabilis) stands as they occur on mountain slopes and ridgetops in older (Eocene-Oligocene) volcanic portions of the Cascade Range. A 215-acre tract of Pacific silver fir - Hemlock, SAF-226 forest cover type. Average age, 300 years; average height, 125 feet; average diameter, 30 inches. Elevation: 3,600-4,200 feet. Topography: rolling.

Mammals known to occur within the natural area are blacktail deer (Odocoileus hemionus columbianus), Douglas squirrel (Tamiasciurus douglasii), and black bear (Ursus americanus). See Botanical and Zoological-Terrestrial maps.

SKAMANIA COUNTY HISTORICAL SOCIETY MUSEUM
Located in Stevenson, the museum features Indian and pioneer artifacts and tools. See Historical-Cultural map.

SLIME CAVE
Slime Cave is a unitary lava-tube cavern about 775 feet long, with a slightly sinuous course from south to north. It is named for an unidentified algae-like material present on the ceiling and walls in many of the moist parts of the cave. Thinner deposits of similar material have been found in lava tubes of the Northwest, but in Slime Cave reaches a thickness of more than 1 centimeter. Biota is scanty except in the twilight zone, which contains a considerable amount of rodent debris. In several areas, long rootlets hang from cracks in the ceiling. Slime Cave has three flow levels with relatively minor subsequent flow. The cave is 1/2 mile south of Smoky Creek Campground. From Caves of Washington, by William R. Halliday. See Geological map.

SPEAR POINT CAVE
This small, somewhat complex lava-tube cavern is the only lava-tube cave in Washington in which Indian artifacts are known to have been found. Lava tube slime is present in moderate quantities and indications of a moderate biota were observed. From Caves of Washington, by William R. Halliday. See Geological and Archeological maps.

SPRING CREEK NATIONAL FISH HATCHERY
Species propagated: chinook salmon. See Zoological-Aquatic map.

STEAMBOAT MOUNTAIN NATURAL AREA
The 1,670-acre area has three different true fir associations entirely covering the mountaintop. See Environmental Use and Botanical maps.

SPIRIT LAKE
Spirit Lake (elevation 3,199 feet) on the north side of Mount Saint Helens is a result of a volcanic action. The lake developed over a period of centuries as successive eruptions occurred and blocked the headwaters of the Toutle River. The latest deepening probably occurred around 1500 A.D. when volcanic mudflow and glacial outwash dammed the lake's outlet and raised the water level at least 60 feet.

Spirit Lake gained its present size in the early 1920's when Coe's Dam, a man-made timbered structure was built at the outlet. This structure raised the water level another two feet. The lake now covers, 1,262 acres and is about 184 feet at its deepest point.

The ground is covered with a light-colored, rocky substance called lapilli or pumice. This pumice, a hardened, volcanic glassy froth, was blown from the crater onto the surrounding countryside.

There are numerous hiking trails into the wilderness environment. The lake is adjacent to the Mount Margaret Backcountry. Spirit Lake is stocked annually with rainbow trout. Occasionally large fish, up to 26 inches and 7 pounds, are taken. Saint Helens Lake and other high lakes in the back-country provide good fishing. Salmon migrate through Spirit Lake each fall. The fish can be watched working their way upstream to spawn. It is an eagle nesting area. See Hydrological, Zoological-Aquatic, Environmental Use and Zoological-Terrestrial maps.

TABLE MOUNTAIN AND GREENLEAF PEAK
The twin peaks with roughly the same elevation (3,400 feet) are prominent from the east, much as Augspurger Mountain and Dog Mountain loom large from the west, and for basically the same reason, a bend in the river near Stevenson. The raw face of this massif, known as the Red Bluffs, represent the point from which the great landslide of 1250 A.D. broke away from the main body of the mountain and swept across the river, damming it temporarily and creating the basis for the Indian legend of the "Bridge of the Gods." The present manmade bridge spans the 1/4 mile narrows where the river finally succeeded in breaking through the dam. A portion of the slide still rests on the Oregon shore. As viewed from the south, Table Mountain appears emphatically square and flat-topped. From the east, however, a dramatic serrated ridge leads to an apparently pointed summit. The Rabbit Ears, a point on this ridge, is a difficult challenge for rock climbers. A hiker trail leads to the top of Table Mountain. See Geological map.

TRAPPER, GIFFORD PINCHOT NATIONAL FOREST
This area has received priority recommendations for wilderness by the conservation organizations familiar with it. See Environmental Use map.

TROUT LAKE BAT CAVE AREA
Lava flow with lava tubes serving as winter hibernating sites for a local species of bat, (Plecotus townsendii) and a few migratory species of myotis - M. lucifugus, M. volans, M. yomanensis, and M. evotis. This area and the one near Mount Saint Helens represent the only two known large (300+) colonies of Plecotus townsendii remaining in Washington. This species has declined in number in recent years. See Zoological-Terrestrial map.

UNDERWOOD RIM AND MOUNTAIN
Like Mount Zion on the west end, this was an Upper Cenozoic volcano. As with most of the grand sweeping landscapes on the Washington side, its grandeur is best appreciated from the south side of the river. At the base of the cliffs of Underwood Rim is the log flume which brings rough-cut logs 7 miles from Willard down to the sawmill at Bingen. This is the last working flume in the Pacific Northwest. See Geological map.

VOLCANIC CONE, CRATER AND VENTS
The volcanic cone in the lava bed is a very interesting feature few people know about. The top of the crater rises about 1,500 feet from the lava bed and is 4,200 feet above sea level. The cone is probably the lava source in the Big Lava Bed and is a regular-shaped cone. There are one or two side vents in the cones. The cone is between South Prairie and Race Track Camp. See Geological map.

WASHOUGAL RIVER
This river is a major winter and summer run steelhead trout and fall chinook salmon stream. See Hydrological and Zoological-Aquatic maps.

WASHOUGAL RIVER VALLEY
The valley is valued as big game habitat. See Zoological-Terrestrial map.

WASHOUGAL SALMON HATCHERY
State Fisheries Department. Species propagated: chinook and coho salmon. See Zoological-Aquatic map.

WHITE SALMON RIVER AND VALLEY
There are critical deer and elk wintering habitats along the White Salmon River bottoms from its headwaters to the Columbia River. The stream provides free-flowing raparian habitat. See Zoological-Terrestrial and Hydrological maps.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide and national significance and reflect in part of the range of wildlife values held by citizens of the state as well as their concern for these animals. As such the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. The golden eagle is found in small numbers in Skamania County. Some other birds include ptarmigan and wood duck. Bonneville Pool has 20 islands used by wildlife. Miller Island has gull and hawk nesting and is one of the most important breeding areas for Canada geese. These are potential breeding areas for Caspian terns, ring-billed gulls, Foster's terns, and double crested cormorants. Breeding areas of the last four species were eliminated through inundation of islands in the Columbia River. These species cannot tolerate disturbance by humans in the breeding season. Other areas along the river are of special importance to the waterfowl population in the Pacific flyway. These areas are not areas of high reproductive potential by waterfowl, but are important migratory resting habitat. The lower end of the Gorge near Vancouver is of great importance as nesting habitats. The Columbia River bottomlands from Stevenson to Burbank, are migratory waterfowl areas.

MAMMALS. The Wind River Gorge is an important winter range for big game and has been recommended for preservation as a wild river. The North and East forks of the Lewis River valleys are noted as big-game habitat. Hamilton Creek valley is valued as big-game habitat. Cougar (Felis concolor) are present in forests here and throughout the state as are pine marten (Martes americana) on the upper mountain slopes, wolverine (Gulo gulo), fisher (Martes pennanti), and mountain red fox (Vulpes vulpes cascadensis).

AMPHIBIANS. Dunn's salamander (Plethodon dunni) has a limited range in southwest Washington. The tailed frog (Ascaphus true) is noted in rapid mountain streams of the Cascades and may be found in Skamania County.

REPTILES. Striped whipsnake (Masticophis taeniatus) is noted for south-central Washington. The western alligator lizard (Gerrhonotus multicarinatus) inhabits the Columbia River Gorge. The ring-necked snake (Diadophis punctatus) has a limited range in extreme southern Washington.

WILLARD NATIONAL FISH HATCHERY
Species propagated: coho salmon. This is the only Federal fish nutrition laboratory in the western United States. It is operated by Bureau of Sport Fisheries and Wildlife, Division of Research. See Zoological-Aquatic map.

WIND MOUNTAIN
Eroded Pleistocene intrusions characterize this mountain, known with its Oregon counter-part Shellrock Mountain, as one of the Twin Guardians of the Columbia. The volcanic origin of Wind Mountain is unmistakable. Rising more than 1,800 feet above the river, its regular conical shape is striking from every aspect. A trail leads to the rocky summit from the Girl Scout Camp at Rome Lake. Road construction and rock removal at the base have caused some scarring of the river face of the mountain. See Geological map.

WIND RIVER
This free-flowing river produces steelhead, spring and fall chinook and coho. A large fishway approximately 500 feet long has been built to allow anadromous fish access to upper Wind River and the Carson National Fish Hatchery. The river has cut a very young, steep-walled canyon in a lava-filled valley. The river valley and gorge serve as valuable winter range for big game. See Geological, Botanical, Zoological-Aquatic, and Zoological-Terrestrial maps.

WIND RIVER RESEARCH NATURAL AREA
The area exemplifies the old-growth Douglas fir (Pseudotsuga menziesii) - western hemlock (Tsuga heterophylla) forests. A 1,180-acre tract consisting of 1,140 acres of Pacific Douglas-fir, SAF-229 forest cover type and 40 acres of Western redcedar, SAF-228. Average height of Douglas-fir, 150 feet; average diameter, 30 inches. Elevation: 1,100-2,000 feet. Topography: rolling.

Animals found within the natural area include blacktail deer (Odocoileus hemionus columbianus), black bear (Ursus americanus), coyote (Canis latrans), Douglas-squirrel (Tamiasciurus douglasii), white-footed deermouse (Peromyscus maniculatus), an occasional bobcat (Lynx rufus) and cougar (Felis concolor). See Botanical and Zoological-Terrestrial map.

An unusual feature of the research natural area is an arboretum established over 50 years ago as a place to display the varieties of conifers native to the Northwest. Trees were transplanted here from throughout the region, until the collection was the most extensive in the world. However, the designers had neglected to take into account the variables in the supportive ecosystems of the several species. Eventually the collection died because the Wind River area differed slightly from the species' required environments. Rather than tear the trees out, the Forest Se-vice maintains the area. Special markers are placed along paths through the arboretum identifying the species and explaining why each failed to adapt. See Botanical and Zoological Terrestrial maps.

Snohomish

ALPINE LAKES WILDERNESS AREA
This area includes 251,000 acres along both sides of the Cascade Divide, 120,000 acres of which are in the Snoqualmie National Forest. Numerous alpine lakes, meadows and streams with topography of sharp ridges and peaks are typical of the area. See King County.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Snohomish County discussion are plotted on the Archeological and listed in its index.

ARLINGTON FISH HATCHERY
State Game Department. Species propagated: trout. Water source: spring. See Zoological-Aquatic map.

BASALT OUTCROPPINGS
These are found along the north side of the Snohomish River. See Geological map.

BIG FOUR MOUNTAIN AND DEL CAMPO PEAK
Wildflowers, characteristic of higher elevations, can be seen blooming at this warmer and lower altitude. Possibly the plants were bought down by mudflows, or seeds may have come down with the ice. Many spots along the mountain loop highway are of considerable botanical interest. See Botanical map.

BLACKMAN'S CORNER
This was the site of Tulalip Indian meeting ground. See Historical-Cultural map.

BLACKMAN'S HOUSE
This home of one of the founders of Snohomish contains exhibits of historical and local interest. Dr. Blackman was a physician and many instruments and records are on exhibit in one room. Other rooms of the house are furnished authentically. It is maintained by the Snohomish Historical Society and serves as a meeting place for the club. See Historical-Cultural map.

BOULDER RIVER AND FALLS
The entire drainage basin of this free-flowing river contains a virgin stand of low and middle elevation forest. A tributary stream enters Boulder River by a spray-type waterfall. See Hydrological and Geological maps.

BOULDER RIVER, MOUNT BAKER NATIONAL FOREST
Almost a lowland wilderness due to its virgin forest, the Boulder River has long been recognized as a scenic wilderness jewel. It has strong recommendations to be given wilderness designation or inclusion in the National Wilderness Preservation System. See Environmental Use map.

BRIDAL VEIL FALLS
Located northeast of Seattle on the North Fork of the Skykomish River. See Hydrological map.

BUCK AND DOWNEY CREEKS
The Buck and Downey Creeks area is being considered as a possible wilderness area. See Environmental Use map.

CARNEGIE LIBRARY
The Andrew Carnegie Library, 118 Fifth Avenue North, Edmonds, is a National Historic Place.

CASCADE RIVER, JUG LAKE FALLS, BUCK DOWNEY CREEK, CIRCLE PEAK, LOST CREEK, MOUNT BAKER NATIONAL FOREST
See Skagit County.

CEDAR PONDS
Unusual exposed minerals are found in this rain forest area. See Geological and Botanical maps.

CHASE LAKE
Chase Lake is one of the few kettle-formed peat-bog lakes close to a populated area. It is used extensively as a study site because of its uniqueness and accessibility. See Hydrological map.

CHERRY CREEK
This is an area of unusual exposed minerals. See Geological map.

CIRCLE PEAK
Circle Peak is being considered as a possible wilderness area. See Environmental Use map.

COLUMBIA GEOLOGICAL AREA
This area is noted for numerous glacial formations. See Geological map.

DARRINGTON TIMBER BOWL
This annual spring logging festival includes events such as tree topping and falling, log bucking, speed chopping, and axe throwing. There is also a parade. See Historical-Cultural map.

DEERING WILDFLOWER ACRES
A 25-acre natural preserve and site for ecological research, the Nature Conservancy deeded Wildflower Acres to Western Washington State College in perpetuity. A research project is being conducted jointly by Western Washington State College and the Wildflower Acres Citizens Committee. See Botanical map.

DICKERMAN, MOUNT BAKER NATIONAL FOREST
The Mount Dickerman area is a popular nearby "defacto wilderness." Conservationists say that it deserves to be the subject of a wilderness study. See Environmental Use map.

DOWNEY MOUNTAIN
This is located between the Sulattle River and Downey Creek. See Geological map.

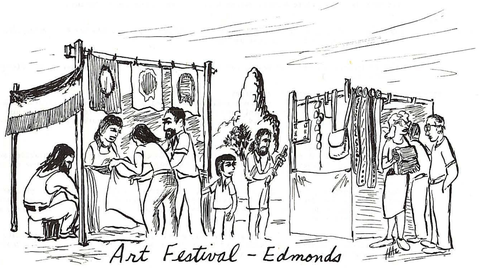
DUBUQUE CREEK
This is a salmon spawning stream which empties into the Pilchuck River. See Hydrological map.

EAGLE FALLS
This falls is found on the Skykomish River, northeast of Seattle. See Hydrological map.

EBEY SLOUGH
The waters of the Snohomish River disperse through this unique slough. It provides natural habitat for estuarine marine life, and a food source for a wide variety of animals. This area is surrounded by developed areas, yet remains in a wild state. One can see the land as it probably was in the past when the Everett area was first settled. See Hydrological map.

EBEY ISLAND STATE WILDLIFE RECREATION AREA
Covering 420 acres, the area is largely managed for waterfowl. See Environmental Use map.

EDMONDS ART FESTIVAL
The annual festival is one of the largest in the state and attracts large numbers of artists, sculptures and craftsmen as well as a very large audience. See Historical-Culture map.



EDMONDS COMMUNITY COLLEGE (JR)
Edmonds. See Historical-Cultural map.

EDMONDS GRANT TRACT FOREST
This is a rare indigenous lowland forest. The land is owned by the Department of Natural Resources. See Botanical map.

EQUATOR (SCHOONER)
This National Historic Place is located in Everett at the 14th Street Basin. See Historical map.

EVERETT COMMUNITY COLLEGE (JR)
The college was established in 1941 in Everett. See Historical-Cultural map.

EVERGREEN STATE FAIR
The annual state fair is held at permanent fair grounds in Monroe. It is always a very large fair featuring a rodeo with thousands in attendance. See Historical-Cultural map.

FIDDLER'S BLUFF
This is a fossil area. See Geological map.

FORT VANCOUVER-FORT BELLINGHAM ROAD
See Clark County

FUNGI SITES
The following areas in this county are noted for their abundance and variety of higher fungi or important species: South Fork of the Stilliguamish River Area, Upper Sauk River Valley and North Fork of the Skykomish Area. See Botanical map.

GALENA TO INDEX
Unusual exposed minerals are found here. See Geological map.

GARLAND HOT SPRINGS
These small hot springs have highly mineralized water and a unique algae population. See Hydrological map.

GLACIER BASIN
This high-altitude basin holds many uncommon species of wildflowers. Included in the species found is a member of the Gentian family native to the Rocky Mountains, and otherwise unknown this far west. See Botanical map.

GLACIER PEAK WILDERNESS
The Glacier Peak Wilderness is a 458,105 acre mountainous terrain, crisscrossed with trails, cupped with lakes fed by dozens of glaciers, with snow-clad peaks which individually would be renowned in less rugged land, fast flowing streams where fish abound, an untouched garden of plant life, and a stillness punctuated by cascading water and ice, by chirping birds or the thump of a bounding deer. Glacier Peak Wilderness is not an area set aside to preserve a single feature, although the surmounting cone of Glacier Peak wrapped in white, does stand above the surrounding countryside. For those who penetrate the interior and wander from the beaten path there are as many wonderful sights awaiting them as there are wild flowers on Flower Dome.

The massive ice displays of the Dome Peak-Spire Peak-Sentinel Peak area, together with the concentration of ice in the Glacier Peak-Clark Mountain group, are awe-inspiring from a distance and almost frightening when approached. Sometimes an ice field will shudder and ice-falls and avalanches at times shatter the pristine stillness with their roars, as many of these glaciers are alive. Chocolate Glacier on the northeast slope of Glacier Peak has steadily advanced as much as 200 feet per year for the past few years.

Cascading streams, many of which have their origin in these massive ice fields, fall from the heights. Down the heights the water races over the lavender and green cliffs of Buck Mountain, winding through the gently sloping, peak-rimmed hidden valley of the Napeequa, the Shangri-la of the Cascades, carved from the mountains by a long forgotten glacier. As the rivulets, streams and creeks form the rivers, they traverse the valley floors -working their way from one side of the valley to the other. Thousands of wilderness glades under mantles of green, spotted with vari-colored wild flowers, are traversed by suddenly lazy streams.

Alpine conifers appear in clumps or singly. Species such as the whitebark pine or the rare Lyall larch tie the sky to the gray rock, and often gain in grandeur after green needles have turned to weathered gray fingers. There are many representative stands of virgin timber on both the east and west side of the Wilderness. The broad pumice-covered valley of the Suiattle with its rain forests of western hemlock and true firs, varies little from some of the lush stands of the White River Valley.

The meadows, varying from stringer glades in the timbered valleys to the fragile, lightly-plant-covered expanses above timberline, serve the dual purpose of being the prime interest areas and affording travel routes. Here is where wildlife is seen, visitors camp, stock graze, and the most striking plant life occurs.

Image Lake, named for its ability to mirror Glacier Peak, is a popular beauty spot. Lyman Lake, gray-green with glacial silt, is lovely season long, but especially so in the fall when the brilliant foliage of deciduous shrubs makes a striking contrast to the lake and glacier-clad Chiwawa Mountain.

Increasing numbers of wilderness travelers visit Glacier Peak Wilderness each year to hike or ride through timbered valleys and alpine meadows or climb the numerous challenging peaks, including Glacier Peak itself. Many climbing parties reach its summit each year.

Game is plentiful in the Wilderness and the area is open to hunting. State of Washington game laws, which apply, designate open seasons for black bear, deer, mountain goat, and grouse, but no open season for marmot or ptarmigan. The majority of the Wilderness lies within a special, early-season deer hunting area designed for those who enjoy high-mountain hunting. Fish are also plentiful in the lakes and streams. The waters are stocked by the Washington State Department of Game.

Others visit the Wilderness for another reason, perhaps to camp by a lake with a mountain view, to take pictures, to study the flora, or enjoy the solitude.

Aside from trails and occasional rustic shelters, there are few recreation improvements in the Wilderness. At camp sites of heaviest use, simple sanitary facilities have been provided. Others will be installed in the future. Miners Ridge Lookout is the only permanent Forest Service Administrative Station in the Wilderness. See Environmental Use map.

GOLD BASIN CREEK
The small ponds around this creek provide valuable wildlife habitat. See Environmental Use map.

GORDON MARCKWORTH EXPERIMENTAL FOREST
See King County.

GRANITE FALLS FISH LADDER
Major fish ladder passing anadromous fish around Granite Falls. See Zoological-Aquatic map.

HALF-MILE FALLS
Five acre area on the Boulder River. See Hydrological map.

HIGGINS MOUNTAIN
The mountain is being considered as a possible wilderness area. See Environmental Use map.

HIGH ROCK
This scenic outlook is the result of glaciation. See Geological map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Snohomish County discussion are plotted on the Historical-Cultural map and listed in its index.

INDEX
Index is located along the Skyhomish River just off Highway 2, 35 miles east of Snohomish. The town grew slowly, establishing a post office in 1891 and a few buildings including several saloons. In 1897, new veins of copper ore were opened in the Sunset Copper Mine and new buildings went up, more saloons, hotels, drugstores and homes were built. When the copper deposits wore thin and no others were found, the town declined. Glacial varve deposits have been found which are unique to this area. See Historical-Cultural and Geological maps.



JULY LAKE FALLS
Located at Jug Lake, the falls area is being considered as a possible wilderness area. See Environmental Use map.

KENNEDY HOT SPRINGS
These small hot springs with highly mineralized water and sites available for baths are located within the Glacier Peak Wilderness Area. See Hydrological map.

COUNTY DISCUSSION

KUYKENDAHL CABIN
This log cabin was built in 1870 and was originally located on the Machias Road. It was always occupied by a member of the Kuykendahl family and was acquired by the Pioneer Boys and Girls Association of Snohomish and moved to its present location. Headstones from the original cemetery are still standing on the grounds and other headstones are in the cemetery site on the opposite side of Highway 2, which intersected the original cemetery. See Historical-Cultural map.

LAKE STEVENS
Located northeast of Everett, Lake Stevens provides habitat for kokanee salmon. See Hydrological map.

LAKE TWENTY-TWO RESEARCH NATURAL AREA
The area is a sample of virgin, old-growth, western redcedar (Thuja plicata) and western hemlock (Tsuga heterophylla) forest. It encompasses 790 acres. Several significant forest cover types are as follows: primary type, SAF-227, western redcedar-western hemlock of 455 acres. Other important types are SAF-226, Pacific silver fir-hemlock, 80 acres; SAF-221 red alder, 25 acres; SAF-228 western redcedar, 40 acres. Elevation: 1,100-4,300 feet.

A variety of fauna inhabit the natural area including the blacktail deer (Odocoileus hemionus columbianus), black bear (Ursus americanus), pika (Ochotona princeps), Douglas squirrel (Tamiasciurus douglasii), and occasionally the mountain goat (Oreamnos americanus). Fish were planted in Lake Twenty-two over 30 years ago and Wolcott (1961) indicates rainbow trout were planted in 1931. See Environmental Use, Zoological-Terrestrial and Botanical maps.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Snohomish County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of hydrological features covered by the Shoreline Management Act.

LEE FOREST
This 160-acre forest tract is used by the University of Washington as a forest sciences educational facility. See Botanical and Environmental Use maps.

LONG CREEK RESEARCH NATURAL AREA
Long Creek is an example of virgin western hemlock (Tsuga heterophylla) and western redcedar (Thuja plicata) forest type.

It covers 640 acres of several important forest cover types as follows: SAF-224 western hemlock, 460 acres, average age: 250 years; SAF-227 western redcedar-western hemlock, average age: 350 years, average height: 140 feet; average diameter 60 inches; SAF-230 Douglas fir-western hemlock, average age: 350 years; average height of Douglas fir, 140 feet; average diameter of Douglas fir, 48 inches SAF-221 red alder. Elevation: 1500-3500 feet; topography: steep.

Mammals observed within the natural area are blacktail deer (Odocoileus hemionus columbianus). Douglas squirrel (Tamiasciurus douglasii), and black bear (Ursus americanus). See Botanical map.

LOST CREEK
Presently, this site is being considered as a possible wilderness area. See Environmental Use map.

MONROE QUARRY
This mineral and crystal deposit contains unusual exposed minerals. See Geological map.

MONTE CRISTO
Monte Cristo was an early day mining camp. It died during the late 1800's and was used by campers and a few people who didn't want to move on in the early 1900's. Today very little remains of the old town. The old hotel on Dumas Street is nearly gone, but the tree planted by Commander James Kyes when he was a young boy still remains on the hotel grounds. The tree was dedicated to him after his death when his destroyer, the "U.S.S. Leary," was attacked by enemy submarines in 1943. See Historical-Cultural map.

MONTE CRISTO AND GRIZZLY PEAK, SNOQUALMIE AND MOUNT BAKER NATIONAL FOREST
This area in the Snoqualmie and Mount Baker National Forests has long been recognized as prime wilderness. It has been proposed as an addition to the Glacier Peak Wilderness in the past, and presently as an addition to the North Cascades National Park. At its periphery is an early mining site, which can also best retain its character by perpetuation of the wilderness behind it. See Environmental Use map.

See Environmental Use map.

MOUNT INDEX, SNOQUALMIE NATIONAL FOREST
See King County.

MOUNT PERSIS
This mountain is located between the north fork of the Tolt River and the Skykomish River. See Geological map.

MOUNT PILCHUCK
Pilchuck is the Indian name for "red water". Easily seen from Everett on a clear day, Mount Pilchuck is approximately 5 miles long by 8 miles wide with an elevation of 5324 feet. Logging and a ski resort development have left only a 2-1/2-mile trail to the summit, and this can be shortened to 1 mile by riding the chair lift to the upper terminal. Any further development will reduce the alpine experience now achieved by several thousand hikers every summer. Portions of the upper mountain presently have a small degree of protection under authority of the State Parks Commission. An abandoned fire lookout has been rebuilt by The Mountaineers as an observation shelter for use by anyone reaching the summit.

Much of the upper north slope of the mountain generally consists of intrusive igneous and gneissic rock and rock outcrops and inclusions of soils. Small inclusions of perpetual snow and ice are present. Bedrock is generally competent and moderately to highly fractured.

Two excellent examples of glacially formed cirques are found on the north slope of the mountain. Lake Twenty-Two and Heather Lake are found at the base of these cirques. The Lake Twenty-Two Research Natural Area was set aside in 1949 by the Department of Agriculture.

Numerous lakes and streams and small waterfalls are found on the mountain. Many of the smaller lakes are not named, especially those in Twenty Lakes Basin approximately 1 mile east of the summit and just below and south of the main ridge. See Geological and Environmental Use maps.

MOUNT STICKNEY
This mountain is located between the South Fork of the Sultan River and the Wallace River. See Geological map.

MOUNTAINS IN THIS AREA BOUNDED BY STILLAGUAMISH RIVER, SOUTH FORK SAUK RIVER, SULTAN RIVER AND NORTH FORK SKYKOMISH RIVER
The mountains in this area include: Troublesome Mountain, Scott Peak, Hubbart Peak, Mineral Butte, Crested Buttes, Sheep Gap Mountain, Silvertip Mountain, Gothic Peak, Del Campo Peak, Red Mountain, Lewis Peak, Morning Star Peak, Sperry Peak, Vesper Peak, Little Chief Peak, Big Four Mountain, Hall Peak, and Marble Peak. See Geological map.

MOUNTAINS BETWEEN THE NORTH AND SOUTH FORKS OF THE SKYKOMISH RIVER
The mountains in this area include: Townsend Mountain, Merchant Peak, Gunn Peak, Spire Mountain and Bear Mountain. See Geological map.

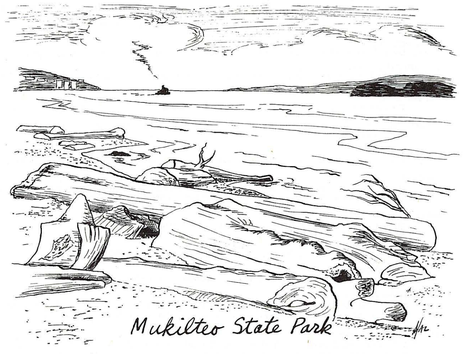
MOUNTAINS BETWEEN THE SOUTH FORK OF STILLAGUAMISH RIVER AND SAUK RIVER
The mountains in this area include: Twin Peaks, Dickerman Mountain, Mount Forgotten, Stillaguamish Peak, Devils Thumb, Devils Peak, Helena Peak, Liberty Mountain, Big Bear Mountain, Three Fingers Mountain, Jumbo Mountain, Mount Bullion and Whitehorse Mountain. See Geological map.

MOUNTAINS BETWEEN NORTH AND SOUTH FORKS OF SAUK RIVER
The mountains in this area include: Bedal Peak, Sloan Peak, Sheep Mountain, Foggy Peak, Cadet Peak, Monte Cristo Peak, Wilmon Peaks, Kyes Peak, Columbia Peak and Goblin Mountain. See Geological map.

MOUNTAINS BETWEEN THE NORTH FORK OF SAUK AND WHITECHUCK RIVER
The mountains in this area include: Spring Mountain, Red Mountain, Portal Peak, Skullcap Peak, Black Mountain, White Mountain, Whitechuck Mountain, and Pugh Mountain. See Geological map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Snohomish County discussion are plotted on the Geological map and listed in its index.

MUKILTEO STATE PARK
In 1855, Governor Isaac Stevens met with 82 leaders of 22 Indian tribes on the beach at Mukilteo and signed treaties with them. Among them were four leading chiefs: Sealth (Seattle), Patkanim, Goliah, and Chow-Its-Hoots. Mukilteo was a popular place for Indian councils because of its central location in the Puget Sound area. Today this 14 acre state park offers swimming, fishing, and clamming, and a launch and moorage for boats. See Environmental Use map.



NORTH FORK FALLS
Five acre area west of Glacier Peak. See Hydrological map.

PEAK 7368
This peak is located between the Suiattle River and Downey Creek. See Geological map.

PERRY CREEK TRAIL
Ferns in unusual variety of different species are located here. See Botanical map.

PORT SUSAN BAY
This bay is edged with marshland. See Hydrological and Zoological-Terrestrial map.

PUGET SOUND
See Kitsap County.

RAGGED RIDGE, SNOQUALMIE NATIONAL FOREST
Quite easily accessible from the metropolitan region of Puget Sound, the ridge is a nearby, frequently-visited wilderness. It has been recommended for wilderness status under the Wilderness Act. See Environmental Use map.

RED MEN HALL
This building in Index at Index Avenue and Sixth Street is a National Historic Place.

RICIMOND BEACH
The area is a scientific benthic research area. See Environmental Use map.

SAUK RIVER
The river is free-flowing from the mouth up the North Fork to the Glacier Peak Wilderness boundary. See Hydrological and Environmental Use maps.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SILVERTON-WARDHEIM OUTDOOR EDUCATION LABORATORY
This is the headquarters for the Snohomish County School's outdoor education program. Western Washington State College grants college credits to teachers involved in the resident program. Classes run during the summer, and usually about 100 students take part. See Environmental Use map.

SKAGIT WILDLIFE RECREATION AREA
Twenty-six species of ducks, snow, white-fronted and Canada geese, brant, and whistling swan either nest or winter on Skagit (12,761 acres), west of Conway in Skagit County. It is one of the most important waterfowl areas in western Washington.

Nearly 200 species of song birds, harbor seal, river otter, mink, blacktail deer, pheasant, band-tailed pigeon, and dove have been identified here. The Skagit's intertidal flats and shallow salt-water bays winter 20-35,000 snow geese annually. These are trout, steelhead, and salmon in the adjacent Skagit River.

The Skagit's extensive tidal flats are accessible only at low tide, but its cattail saltmarsh, sedge-bullrush, wooded stream banks, and farmlands can be reached at all times. See Zoological-Terrestrial and Environmental Use maps.

SKYKOMISH RIVER
This free-flowing river, designated as wild and scenic, joins the Snoqualmie near Monroe to form the Snohomish. The river supports heavy runs of anadromous fish, in addition to a sizeable resident trout population. The north fork is also used by kayakers. See Zoological-Aquatic and Hydrological maps.

SKYKOMISH REARING PONDS
State Game Department. Species propagated: trout. Water Source: Austin Creek and Haggerty Creek. See Zoological-Aquatic map.

SKYKOMISH STATE SALMON HATCHERY
State Fisheries Department. Species propagated: chinook salmon, coho salmon, and pink salmon. See Zoological-Aquatic map.

SNOHOMISH COUNTY HISTORICAL SOCIETY MUSEUM
At Everett, the museum houses Indian artifacts and logging pictures. Everett pioneer items are located in the abandoned Indian Council building. See Historical-Cultural map.

SNOHOMISH RIVER
A free-flowing stream used for kayaking, it is an excellent stream for all species of anadromous fish in Washington except sockeye salmon. An occasional white sturgeon is taken from the Snohomish River. See Zoological-Aquatic and Hydrological map.

SNOQUALMIE NATIONAL FOREST
See King County.

SNOQUALMIE RIVER
The Snoqualmie is one of the main tributaries of the Snohomish River. This is an excellent scenic river with the intangible quality of freedom from development, a river that is important biologically as good fish habitat and as an area where the native plants associated with the stream bank interface are undisturbed by major development. There are whitewater stretches. Also, this is a major winter run steelhead stream. See King County. See Hydrological map.

STEAMBOAT SLOUGH
The waters of the Snohomish River drainage disperse through the slough, which creates natural habitat for estuarine marine life. Part of the past wilderness of the rivers of the Puget Sound Basin is still evident in the area surrounding this slough. The land is close to a metropolitan area and provides easy access for biological and cultural observation. See Hydrological map.

STILLAGUAMISH RIVER
A free-flowing river, used for kayaking, it is a major stream used by anadromous fish. There is a fish ladder at Granite Falls. There are fossil outcrops on the north side of South Fork. See Hydrological, Geological, Environmental Use, and Zoological-Aquatic maps.

SULPHUR HOT SPRINGS
This hot springs area is located north of Glacier Peak. See Hydrological map.

SULPHER MOUNTAIN
This mountain is located between the Suiattle River and Downey Creek. See Geological map.

SULTAN
Like many other towns of early times, Sultan was a mining and lumbering town. It was started on a claim owned by John Nailor. He allowed his place to become a hangout for all sorts of undesirables and before long a town emerged. The town was prosperous at first with the Great Northern being built nearby, and mining operations and lumbering industries near. In 1888, the first light-draft steamer, the "Marra," reached Sultan up the Sultan River. Today the town still relies on its mining and lumbering trades, but much of the frontier rowdiness is gone. The old buildings with their "false fronts" are on a back street of a new and quieter Sultan. See Historical-Cultural and Environmental Use maps.

SULTAN RIVER BASIN
This basin contains a good example of a western hemlock-true fir forest at elevations of 2000 - 3000 feet. See Botanical map.

SUNSET FALLS
The falls are located on the Skykomish River northeast of Seattle. See Hydrological map.

THREE FINGERS GLACIERS
This low level glacier is approximately 30 miles northeast of Everett. Three Fingers and White Horse Glaciers are the two closest glaciers to major urban population centers on the west side of the Cascade Mountains. See Geological map.

THREE FINGERS HIGH-COUNTRY
East from the city of Everett is a very popular and picturesque drive called the "Mountain Loop Highway" which travels a total of some 90 miles from Granite Falls east to Barlow Pass, north to Darrington, and west to Arlington. Not too many years ago the area within the "Loop" was essentially untouched by roads or logging operations. Treks into the Three Fingers area were a minor expedition requiring fording creeks and several days of concentrated effort. Today, the situation is vastly different; logging roads and clear-cutting extend within only a few miles of Three Fingers Mountain on Clear Creek, Squire Creek, Canyon Creek, and Tupso Pass. The only untouched valley penetrating the magnificent Three Fingers area is the beautiful and spectacular virgin forest of the Boulder River.

The Three Fingers area is a focal point for hiking, climbing, and backpacking recreation, and contains prime back country for wilderness type recreation. The United States Forest Service has established tentative "scenic area" boundaries around Jumbo Mountain, Whitehorse Mountain, Three Fingers Mountain, Big Bear Mountain, Liberty Mountain, Goat Flats, Meadow Mountain, and the Boulder River Valley. The Mountaineers Club has proposed to the Forest Service a very specific boundary around approximately 41,700 acres, the boundary being designed to protect all of the approach routes to the high country. There is an old lookout on the south peak of Three Fingers that was constructed in 1930, and which has been retained as a historic landmark. The lookout was last manned in 1942.

There is a superb and distinctive bit of mountain scenery, both of glacier and rain forest and wilderness, in the Boulder River drainage of Snohomish County. There is a very spectacular canyon with a series of waterfalls in the beginning of the river, next to the rain forest. The canyon flattens out later into a great rain forest valley with the glaciers and sharp, jagged peaks of Three Fingers 10 miles by trail above it.

The soils and geology of the area are complex due to the occurrence of five distinct bedrock formations and extensive glaciation. The higher portions of the peaks are rock outcrop with occasional slopes of perpetual ice, and with scattered areas of very shallow residual soil of medium to coarse texture. The central portion of the area extending south from, and including, Whitehorse Mountain to Liberty Mountain, and from the eastern base of Three Fingers to the western base of Jumbo Mountain, is composed of tertiary granite, quartz diorite, granodiorite and related crystalline rocks. These rocks are hard, slightly weathered, and competent.

Jumbo Mountain is primarily composed of hard, competent, tertiary dunite and associated minor serpentine rocks flanked by small amounts of Pliocene-cretaceous sedimentary rocks. The major portions of Three Fingers and Mount Bullon are composed of shistose and metasedimentary rocks that are moderately hard to soft and are competent to moderately competent. North and east of Whitehouse Mountain the bedrock is primarily composed of pretertiary altered andesitic and basaltic igneous rocks that are hard and competent.

The soils, topography, and forests of the Boulder River area have been very significantly influenced by glacial erosion and deposition. The U-shaped topography of the Boulder River Valley is typical of the glacially formed valleys of the area. The smooth toeslopes of the middle and lower portions of the Boulder River, and the entire valley bottom support soils derived from mixed lacustrine and till deposits. These soils have been subsequently incised and oversteepened by the Boulder River itself and by the innumerable sideslope tributaries. The upper sideslope and ridges support very shallow residual soils as a result of past glacial erosion.

There are numerous minerals in the area, but past mining activities have centered mostly on copper. There are several patented claims in the vicinity of the forest boundary at Squire Creek and other unpatented claims throughout the area. See Geological, Historical-Cultural, and Environmental Use maps.

TULALIP INDIAN RESERVATION
Ethnic Group. See Historical map

TULALIP INDIAN TREATY DAY POW WOW
The festival is held January 22 on the Tulalip Indian Reservation. See Historical-Cultural map.

TWIN FALLS LAKE
This lake is located in the central part of the county. See Hydrological map.

TWIN FALLS NATURAL CAVES
Near Twin Falls Lake on the Skykomish River. See Geological map.

UNION SLOUGH
This site is unique as the waters of the Snohomish River disperse through these sloughs. The slough creates a natural habitat for estuarine marine life. This slough is very close to a large city and provides an opportunity to look at the area as it probably existed in the past. See Hydrological map.

WENBERY STATE PARK
Covering 46 acres, the park is 4 miles west of Marysville. Camping, limited trailering, swimming, fishing and boat launching facilities are offered. See Environmental Use map.

WHITEHOUSE MOUNTAIN
One of Washington's most impressive, rugged, and steep mountains, it is most impressive when approaching Darrington from Rockport. See Geological map.

WHITEHORSE REARING POND
State Game Department. Species propagated: summer and winter steelhead trout and trout. Water source: springs. See Zoological-Aquatic map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the Atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide or national significance and reflect, in part, the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. The golden eagle is found in small numbers in Snohomish County. The spotted owl (Strix occidentalis) is noted in the Pacific Coast and Cascade Mountains. The spruce (Franklin) grouse is also of general importance. The water ouzel can be seen near the south fork of the Stillaguamish River and the Sauk River. Heron nesting sites are found on Stillaguamish Delta. Snohomish County is a general area of waterfowl importance.

MAMMALS. The wolverine (Gulo gulo) is noted as increasing in numbers in the Cascades and northeast Washington. Fisher (Martes pennanti) are noted in forests of Olympic and Cascade Mountains. Cougar (Felis concolor) are present in forests throughout the state. Red Fox (Vulpes vulpes cascadensis) are well distributed in the Cascade Mountains. Pine Marten (Martes americana inhabit upper mountain slopes throughout Snohomish County.

AMPHIBIANS. The tailed frog (Ascaphus truei) is noted in the rapid Cascade mountain streams of Snohomish County.

Spokane

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Spokane County discussion are plotted on the Archeological map and listed in its index.

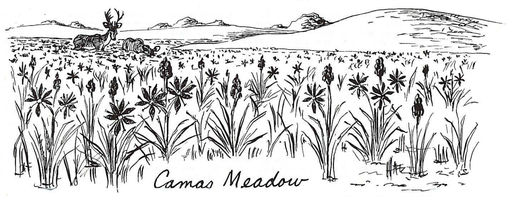
BADGER LAKE
Badger Lake covers 244 acres with a maximum depth of 105 feet. The lake is in middle to late mesotrophy and suffers from blue-green algal growths in August and September (primarily Lynghya sp. and Anabena sp.) No treatment has been reported to date. Occasional sampling is done for algae counts and nutrient analysis. The lake is heavily used for recreational purposes. It drains indirectly into Williams Lake. See Hydrological and Zoological-Aquatic maps.

BONNIE LAKE AND ROCK LAKE CANYON
A deep canyon containing two large lakes, natural bridges and arches, and a lava tree cast. One of the westernmost inliers of pre-Tertiary rock in eastern Washington is found here. See Geological map.

BOWL AND PITCHER AREA, RIVERSIDE STATE PARK
The Spokane River has carved huge rounded pinnacles out of basalt. See Geological map.

BROWNE MOUNTAIN
This is a relatively undeveloped area with exposures of pre-Tertiary crystalline rocks. Large rock monoliths occur along the ridge crest. See Geological map.

CAMAS MEADOW
This is the only known camas meadow left relatively intact in Washington. Camas was one of the most important staple food items of the Indians. Camas meadows have been extensively destroyed and turned to agricultural use or pasture. See Botanical map.



CHENEY COWLES MEMORIAL MUSEUM
This is the chief museum of Eastern Washington and is located in Spokane. Exhibits feature the culture and art of the Plateau Indians, the history of Spokane and the Inland Empire, birds of Washington, and other art forms in rotation. Attached to the museum is the Grace Campbell Memorial House, a restored mansion of the late 1890's. Also there is a research library in the Museum which, in addition to books, has a collection of manuscripts and photographs. See Historical-Cultural map.

CHANNELED SLABLANDS
See Lincoln County.

COWLEY PARK
The Reverend Henry Cowley and his family were one of the first families to settle at Spokane Falls, arriving here in 1874. Cowley was petitioned to establish a school for the Indians and a church, from which sprang two Presbyterian churches still serving the public today. Cowley also established himself as an intermediary between the settlers and the Indians. The park is listed on the National Register of Historic Places. See Historical-Cultural map.

DISHMAN HILLS
The area contains 80 acres owned by the Nature Conservancy, supporting Ponderosa Pine and Douglas-fir forests with associated biota. Over 200 species of ferns, conifers and flowering plants are found here. See Botanical map.

EASTERN WASHINGTON STATE COLLEGE
The school was established in 1882 at Cheney. See Historical-Cultural map.

EPHEMERAL PONDS
Giant fairy shrimp are located here, in water 3 to 5 feet deep. See Zoological-Aquatic and Hydrological maps.

FINCH ARBORETUM
A collection of native and imported plants is maintained by the city of Spokane. See Environmental Use map.

FORT WRIGHT COLLEGE
Located in Spokane, the college was established in 1907. See Historical-Cultural map.

FORT WRIGHT COLLEGE HISTORICAL MUSEUM
Items relating to military occupancy of the Fort (1899-1958), the restored historic St. Michael's chapel dating from 1882, and Indian artifacts are featured. See Historical-Cultural map.

COUNTY DISCUSSION

FOSSIL AREAS
Fossil and leaf and stem locality of Miocene lake clays under basalt are found southeast of Spokane and Opportunity and near the mouth of Deep Creek. See Geological map.

FOUR LAKES BATTLEFIELD
Just west of the community of Four Lakes, in the area now bisected by the freeway, Colonel George Wright and his military personnel defeated the combined forces of the Coeur d'Alene, Spokane and Palouse Indians on September 1, 1858. The battle took place on the flat area just below Wright's Butte.

The four lakes in the area are named Silver, Granite, Willow and Meadow. Wright's Butte is the highest point in the area and rises just west of Meadow Lake. A marker may be found on a part of the old road in the community of Four Lakes, Washington. See Horse Slaughter Camp. See Historical-Cultural map.

GONZAGA UNIVERSITY
Located in Spokane, it was established in 1887. See Historical-Cultural map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Spokane County discussion are plotted on the Historical-Cultural map and listed in its index.

HORSE SLAUGHTER CAMP
The actual site lies parallel to Interstate 90, and 2 miles west of the Idaho-Washington state line, but the marker is misplaced a mile eastward. After Colonel George Wright defeated the consolidated warriors of the Coeur d'Alene, Spokane, and Palouse tribes in the Battle of Four Lakes (September 1, 1858) and Spokane Plains (September 5, 1858), he moved into what is now the Spokane Valley with his military force. Here his command pursued and captured over 1,000 head of horses being driven away by the natives. The horses were captured very close to Liberty Lake and were herded to the area described above and slaughtered, purportedly to curb the mobility of the Indian warriors, for peace had not been declared at the time. The slaughter took place September 9 and 10, 1858. It was a sad day for both Indians and soldiers. See Historical-Cultural map.

INDIAN ROCK PAINTING STATE PARK
Located on the Little Spokane River above the confluence with the Spokane River, a grate was placed over some Indian pictographs in order to preserve them. The parcel of land surrounding these pictographs was given to the Washington State Parks and Recreation Commission by Professor and Mrs. Henry M. Hart. A trail from a highway parking area to the cliffs has been constructed. See Archeological and Environmental Use maps.

INLAND EMPIRE MOOSE FROLIC
The festival takes place in Spokane in early April. See Historical-Cultural map.

INLAND EMPIRE STOCK SHOW
The show is presented in Spokane the first week in February. See Historical-Cultural map.

JUNIOR CHAMBER OF COMMERCE STAMPEDE RODEO
The rodeo takes place in Spokane in June. See Historical-Cultural map.

KENTUCK ROAD
Historic route. See Historical-Cultural map.

LAKE OF THE WOODS
An abandoned glacial melt water channel, cascade, and plunge pool in granite. See Geological map.

LAKES IN SOUTHERN SPOKANE COUNTY (EUTROPHIC)
Lakes included in this area are: Amber, Badger, Williams, Clear, Silver, West, and Medical. All of these lakes are mesotrophic or eutrophic. They have no perennial inlets or outlets. The State Game Department has rehabilitated them by poisoning the existing mixed fish species and planting rainbow trout. The lakes are highly productive and support an outstanding fishery. These fish are unable to reproduce there naturally and must be continually stocked. See Hydrological map.

LAKES IN SOUTHERN SPOKANE COUNTY
These lakes are very scenic and heavily used for recreation - primarily fishing and other water-oriented sports. They are very productive, yielding over 450,000 trout and some miscellaneous species of fish annually. Water quality is good. See Hydrological and Zoological-Terrestrial maps.

LAKES IN MEDICAL LAKE AREA
Clear, Silver, North Silver and West Medical Lakes lie very close to Spokane. The lakes are very fertile, and provide habitat for all sorts of birds and aquatic mammals. They are heavily utilized and produce 500,000 rainbow trout annually. See Hydrological map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Spokane County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LIBERTY LAKE
This lake has progressed from a mesotrophic state in the early 1960's to a highly eutrophic condition, especially in late summers. Winter fish kills are now occurring and are related directly or indirectly with Anabena flos-aquae and Aphanizomenon flos-aquae algal blooms during summer and fall seasons. Extensive recreational use and the large number of inhabitants around the lake are probably contributing causes. See Hydrological map.

LITTLE SPOKANE RIVER
The free-flowing river joins the Spokane River northwest of Spokane. The lower reaches of the Little Spokane offers habitat for a number of furbearers in the vicinity of Ninemile Falls. This river winds through a multitude of private ownerships. It provides excellent habitat for birds and 9 heron rookeries are known to exist in the area. It is one of the few areas where wood ducks nest regularly. It is also a major bass spawning stream. The flood plain is quite extensive. There is one existing park on the river and a state fish hatchery. A 1500-acre park and an addition to the fish hatchery are now in the planning stage. Portions of a historical trail will be included in the development.

For being so close to a major city, this is an unusual wild area with an abundance of fish and wildlife. See Zoological-Terrestrial and Hydrological maps.

LONG LAKE
Covering 5,020 acres, the lake receives partially treated sewage and industrial wastes from the Spokane city area. See Hydrological map.

MEDICAL LAKE
The lake covers 149 acres with a maximum depth of 60 feet. Near here can be found waterfowl, mink, and muskrat. The lake is highly eutrophic and experiences large blooms of Anacystis Anabena Flosaquae. The problem is probably due to the large organic loading received by the lake. See Hydrological and Zoological-Terrestrial maps.

MIOCENE FOSSILS
In the Lahtah Formation, there are primarily plant fossils (leaves of many trees). The best sites are located in the Burlington-Northern Railroad cut and in the Ideal Cement Company quarry. See Geological map.

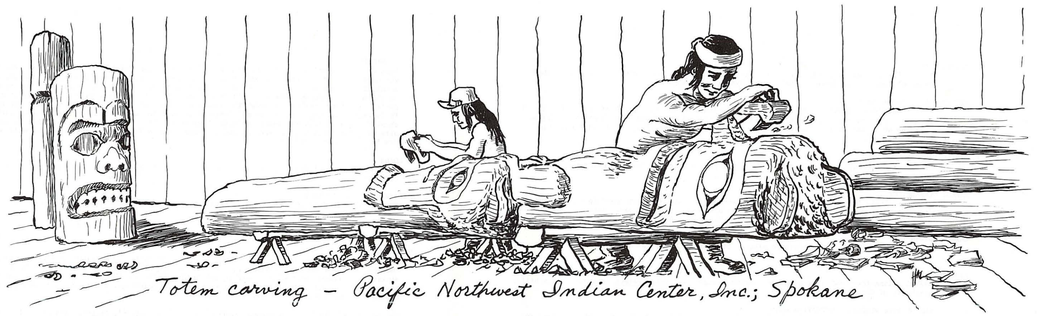
MOUNT SPOKANE
A 5,878-foot high peak of pre-Tertiary basement rock in the northeast part of the county. See Geological map.

MOUNT SPOKANE STATE PARK
The Park contains 20,771 acres, 34 miles northeast of Spokane. An improved road extends to the summit of Mount Spokane (5,881 ft.), which offers spectacular views. The park includes a winter sports area with limited camping in the summer. See Environmental Use map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Spokane County discussion are plotted on the Geological map and listed in its index.

MULLAN ROAD
Historical route. See Historical-Cultural map.

NEWMAN LAKE
This 1,190 acre lake is 30 feet deep. The lake experiences an excessive growth of blue-green algae in the late summer. Aquatic weed growth also is a problem due to the shallow depth of the lake. The upland sandpiper (Bartramia americana) has a restricted breeding range in Washington. The farmlands south of Newman Lake comprise its only known nesting site. This eastern North American species was much reduced in numbers in the late 1900's due to habitat destruction and shooting, and is now rare to uncommon. See Zoological-Terrestrial and Hydrological maps.



PACIFIC NORTHWEST INDIAN CENTER, INC.
In a bend of the Spokane River at the west end of Gonzaga University Campus, this Center is a complex of buildings containing a 2-story museum and a 2-story research wing. The museum is built in a circular form, and houses priceless Indian artifacts showing Indian contributions to area and national culture. Eskimo items, fine Navaho rugs, and Western art depicting the Indian are also on display in the museum.

The research wing houses Indian linguistic manuscripts, as well as missionary contributions to Indian life. Books and pamphlets tell the story of the fur trade era, as well as explaining many phases of Indian life and culture. See Historical-Cultural map.

PACIFIC NORTHWEST REALISTIC ART FESTIVAL
This annual art show begun twelve years ago shows all types and media of realistic art. Artists from all areas of the Pacific Northwest as well as British Columbia bring their art to be shown at this place. The show is usually held in the latter part of August. See Historical-Cultural map.

PLANTE FERRY
Antoine Plante erected the first permanent residence in Spokane Valley in 1849. This is an unverified date, but is on the marker in the Park. Two years later he was given a license to run a ferry. Many famous people camped here, including the newly-named territorial governor, Isaac J. Stevens, with his railroad survey crew in 1853. It was here that the same Isaac J. Stevens dissuaded unhappy Indians from joining the Yakimas and other tribes in the Indian War of 1855. At this time he organized two military units: "The Spokane Invincibles" and "The Stevens Guards." This was a crossing place (Spokane River) on the Hullan Road after 1860. Isaac Kellogg built a bridge here in 1865. See Historical-Cultural map.

PLANT COMMUNITIES
The climax plant communities listed below occur in the county. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Douglas-fir - mallow ninebark
Idaho fescue - common snowberry
Idaho fescue - Wyeth buckwheat
Ponderosa pine - bluebunch wheatgrass
Ponderosa pine - common snowberry
Ponderosa pine - Idaho fescue
Ponderosa pine - lemmon needlegrass
Ponderosa pine - needle and thread
Ponderosa pine - thurber needlegrass
Ponderosa pine - western needlegrass
Threetip sagebrush - Idaho fescue

PILLOW LAVAS
These pillow lavas were formed where lava flowed into a marsh or lake. They may be found throughout the area north of Rosalia. See Geological map.

PINE CREEK RESEARCH NATURAL AREA
This area is within the Turnbull National Wildlife Refuge and is managed by the Bureau of Sport Fisheries and Wildlife. The area exemplifies relatively undisturbed savanna of ponderosa pine (Pinus ponderosa) and bunchgrass found in the forest-grassland transition at the northeastern edge of eastern Washington's steppes. A 160 acre tract consisting of 135 acres of Interior Ponderosa Pine, SAF-237; 20 acres of Aspen, SAF-217. Elevation: 2,250 - 2,350; Topography: Rolling with rocky outcropping above, and meadows or pond at lower elevations.

Animals inhabiting this tract include mule deer (Odocoileus hemionus) chipmunk (Eutamias spp.), ground squirrels (Citellus spp.), Douglas squirrel (Tamiasciurus douglasii), and white-footed deermice (Peromyscus maniculatus). See Botanical and Zoological-Terrestrial maps.

REEVES LAKE AND TURNBULL SLOUGH
See Wildlife paragraph for this county.

RIVERSIDE STATE PARK
The 5,514 acre park is 3 miles northwest of Spokane. Spokane House Interpretive Center, reached from Spokane by Downriver Drive, houses exhibits of the fur trade. Camping and fishing are featured recreations. See Environmental Use map.

ROCK CREEK CANYON
A spectacular flood-scoured canyon 400 feet deep containing excellent basalt exposures, rapids, and hanging waterfalls. The canyon follows a prominent alignment probably caused by post-Miocene tectonism. See Geological map.

ROCK LAKES
These lakes, well-stocked by the Game Department, are excellent trout habitats. See Zoological-Aquatic map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SCOTIA WATER GAP
On Little Spokane Canyon, about 1,200-1,500 feet high. See Geological map.

SKI MEET
This meet takes place at Deer Park in mid-March. See Historical map.

SPOKANE ARM OF ROOSEVELT LAKE
One of two locations in the state in which walleye pike are found. See Hydrological and Zoological-Aquatic maps.

SPOKANE COMMUNITY COLLEGE
Located in Spokane, the college was founded in 1963. See Historical map.

SPOKANE FALLS
This series of two falls in the Spokane River is the site of the lumber mill that grew to become the City of Spokane (located there in 1874). The upper falls are located on both sides of Cannon Island and have a drop of 60 feet. The lower falls have a drop of 70 feet. Flow over falls is reduced over 90 percent in summer by diversion of water for power generation. This is the site of the Expo '74 Worlds Fair. See Hydrological map.

SPOKANE FISH HATCHERY
State Game Department. Species propagated: trout. Water source: springs. See Zoological-Aquatic map.

SPOKANE GAME FARM
The farm is located at Deer Park, Washington, about five miles west and south of that town. Besides Chinese ringneck pheasants, this game farm raises a number of exotic birds such as Reeves pheasants, Hungarian partridge, and a few chukar partridge. About 10,000 Chinese ringnecks are raised here for release each year in Spokane, Ferry, Stevens, Pend Oreille and Whitman counties. The exotics are released experimentally statewide. See Environmental Use map.

SPOKANE HOUSE
At the confluence of the Spokane and Little Spokane Rivers is the site of the first British-American business established in Washington or Oregon. The American-owned Pacific Fur Company built a fur-trading post here in 1810. Later, in 1813, the North West Company, a British-owned operation, bought out the American Company and took over the posts throughout the Pacific Northwest. In this case, the North West Company built a new post nearby. In 1821, the North West Company merged with the Hudson's Bay Company and the fort was abandoned and moved to Kettle Falls. The North West Company stockade and buildings have disappeared and their exact location is still in question. This site was also an Indian campground long before the coming of the white man. On the portion of this historical site located in the Riverside State Park area stands an Indian barn built of logs and wooden pegs. It is perhaps the oldest building standing in eastern Washington. Experts of the Park Service have uncovered the large original stockade built by the Pacific Fur Company, presumably Old Spokane House. The 153-year old structure uncovered was a building 132 feet by 123 feet; many important artifacts were taken to eastern Washington's Historical Society Museum building in Spokane. See Historical-Cultural map.

SPOKANE HOUSE INTERPRETIVE CENTER
Located 9 miles north of Spokane, exhibits relating to the early fur trade in the post built on this site in 1810 are featured. See Historical-Cultural map.

SPOKANE HOUSE STATE PARK
0.39 acre. See Environmental Use map.

SPOKANE PLAIN BATTLEFIELD STATE PARK
1 acre. See Environmental Use map.

SPOKANE RIVER
The Spokane River flows westerly out of Idaho and joins with the Columbia River in the Franklin D. Roosevelt Lake below Miles, in Lincoln County. The river is partially impounded below the city of Spokane. These impounded sections include the Lower Spokane River (Spokane Arm of Roosevelt Lake) and Long Lake. Both lakes are extensively used for motor boating and contain excellent populations of perch, bass and walleye pike. During the summers, these sections west of Spokane experience algae blooms and thermal stratification. The algae are mainly diatoms such as Melosira italica, Tabellaria fenestrata and Fragilaria sp. Decay of algae and other organic matter causes a depletion of dissolved oxygen below a depth of 30 feet. The river is also contaminated by bacteria below the city of Spokane, especially during periods of runoff, when the city's combined sewers overflow into the river. These riverwaters are also high in heavy metals, especially zinc, which may range from 0.2 to 0.6 mg/l of soluable zinc. The section from Monroe Street in Spokane to Seven Mile Bridge (10 miles) downstream, is the only other stretch of free-flowing water. The river is especially scenic through the Bowl and Pitcher area at the confluence of the Spokane and Little Spokane River. Riverside State Park is located here.

East of Spokane into Idaho, the river is free-flowing. This section of river is extensively used for recreational purposes. Canoeing, rafting, and inner-tubing are extremely popular. The river contains rainbow and some brook trout. All are wild stock, and many are of trophy size.

Some brown trout have been stocked throughout the Spokane River in an attempt to introduce the species. Gnarled junipers are scattered all along the southern shore of the river, which appears to be the species' northernmost occurence in Washington. In addition, the river and valley supports much waterfowl and other bird life. See Botanical, Hydrological, Zoological-Terrestrial and Zoological-Aquatic maps.

SPOKANE JAYCEE'S RAFT RACE
A not-very-serious race, open to people using just about anything that will float, is held in June of each year. It normally attracts several hundred participants. See Historical-Cultural map.

SPOKANE VALLEY PIONEER MUSEUM
Poineer items and Indian artifacts are shown. See Historical-Cultural map.

STRATIFIED DRIFT
There is stratified drift showing the outwash of the Spokane flood. This consists of gravels and sand, with torrential cross-bedding. See Geological map.

TERMINAL MORAINE
The site indicates the terminus of the last ice sheet, west of the Little Spokane Valley; it trends roughly east-west. The highest point is about 80 feet. Many accompanying erratics are in the area. See Geological map.

TILICUM CLUB HISTORICAL MUSEUM
Located at Cheney, the museum contains regional power items. See Historical-Cultural map.

TURNBULL NATIONAL WILDLIFE REFUGE
The refuge's 17,171 acres contain a series of lakes and marshes with adjacent pine uplands, 6 miles south of Cheney. Originally, ducks, geese, and waterbirds nested here by the thousands. Many more made use of the productive natural marshes and lakes during their migration flights. This area was a garden spot for the Spokane Indians who came to collect roots and herbs such as camas, wild onion, bitterroot, rose, and kinnikinick. They also gathered wildfowl eggs for food.

Pioneers arrived in the late 1800's. Before long there was a demand for more cropland, and drainage began. The lakes and marshes were almost completely drained in the 1920's. This excellent wildlife area may have been lost forever had it not been for the failure of lakebeds to produce crops as expected, and because of the efforts of individuals who felt the area should be returned to its natural state.

Conservationinists and sportsmen encouraged adding of this area to the rapidly growing system of National Wildlife Refuges. Their efforts bore fruit in 1937 when the refuge was created and named after Cyrus Turnbull, an early settler. Since then the lakes and marshes have been restored to occur much the same as they existed prior to settlement. Management of the area is directed toward assurance of continued wildlife existence for the benefit of man. Through such areas as this, wildlife can continue to be a part of man's outdoor experience.

The refuge is of prime importance to nesting and migrating waterfowl in the Pacific Flyway, and is managed so that all types of wildlife can exist here. Large numbers of ducks, geese, and other waterbirds nest and raise young on the refuge. During migration season a great variety of waterfowl stop and numbers have reached as high as 50,000 during the fall. Canada geese use the area for both nesting and migration, and are always an attraction.

A special program is underway on the refuge to establish a population of the once rare trumpeter swans. Young swans have been transferred from the Red Rock Lakes National Wildlife Refuge in Montana. The year 1967 marked the first known nesting of trumpeter swan in Washington in recent history. These birds are slow to reproduce and it will take several years before they are well established.

The refuge also supports a large variety of other wildlife. Over 200 different kinds of birds have been recorded. Mammals include white-tailed deer, coyotes, beaver, raccoons, muskrats, and mink. There are also numerous smaller animals such as chipmunks, red squirrels, and Columbia ground squirrels. The primary visitor attractions are a waterfowl display pool featuring trumpeter swans and a five-mile auto tour. See Environmental Use map.

TURNBULL PINE RESEARCH NATURAL AREA
The area exemplifies a nearly pristine ponderosa pine savanna at the transition from forest to grassland and a series of freewater potholes characteristic of the Channeled Scablands found on the basalt plateau of east-central Washington.

The 50-acre tract consists of 40 acres of Interior Ponderosa Pine, SAF-237, 5 acres of Aspen, SAF-217 and 5 acres of wheatgrass and bluegrass. Elevation: 2,250-2,350. Topography: Rolling with rocky bluffs, wet meadows and vernal pools.

Animals inhabiting the tract include mule deer (Odocoileus hemionus), chipmunks (Eutamias spp.), Douglas squirrel (Tamiasciurus douglasii), white-footed deermice (Peromyscus maniculatus) and a variety of other animals and birds. See Botanical map.

WHITES BLUFF ROAD
Historic route. See Historical-Cultural map.

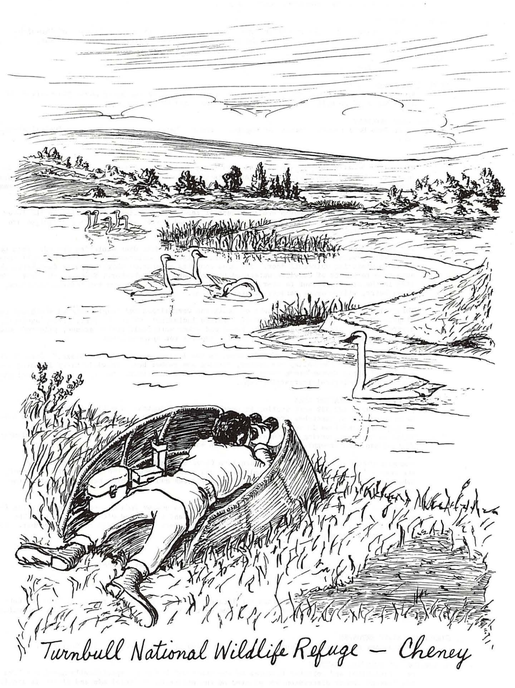
WHITWORTH COLLEGE
Located in Spokane, it was established in 1890. See Historical-Cultural map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide and national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. Trumpeter swans are rare in this state although a breeding population exists at the Turnbull National Wildlife Refuge. Reeves Lake and Turnbull Slough are important waterfowl winter habitats. Watercourses in the county are of general importance to waterfowl. The prairie falcon (Falco mexicanus) is noted in Spokane County. Bobolink are occasionally seen in the county.

MAMMALS. Mica Peak is the home of a large population of marmot. Red-tailed chipmunk (Eutamias ruficaudas) has a restricted range in Spokane, Stevens, and Pend Oreille Counties. Cougar (Felis concolor) are present in forests throughout the state. The following are critical deer wintering areas in the county: from 5 miles north of Spokane to Deer Park, and running west from U.S. 395 to confluence of Spokane River with Roosevelt Lake; 15 miles southeast of Spokane and adjacent to Washington - Idaho State line; from Chattaroy on U.S. 95 north 20 miles along Little Spokane River Valley; and a narrow band running for 10 miles to the southeast of Chattaroy.

WILLIAMS LAKE
This lake is in late mesotrophy and experiences intermittent blue-green algae blooms from late July and August through mid-September. The primary species involved are Anabaena flosaquae, Lynbya, and Aphanizomenon flosaquae. Some remedial treatments have been tried. Extensive data collection has been going on for three years, nutrients and algal count have been monitored by Washington State University, Sanitary Engineering Research Group. The lake is heavily used for recreation. See Hydrological and Zoological-Aquatic maps.



COUNTY DISCUSSION

Stevens

ABERCROMBIE MOUNTAIN
This area contains rare or unique communities of arctic-alpine plants. See Geological and Botanical maps.

ABERCROMBIE-HOOKNOSE, COLVILLE NATIONAL FOREST
This 30,000 acre unit has been recommended by conservation groups for wilderness study. See Environmental Use map.

ADDY CAMBRIAN FOSSIL SITE
Trilobite and brachiopod fossils are found in very platy, thin-bedded sandy argillite that crops out along the north side of the road, 0.2 mile south of the west end of the bridge over the Colville River at Addy. See Geological map.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Stevens County discussion are plotted on the Archeological map and listed in its index.

BAIRD BASIN RESEARCH NATURAL AREA
This area examplifies typical northeastern Washington ponderosa pine, Douglas-fir, and grand fir forest stands as they vary with land form (ridgetop and slope) and aspect (north and south). It contains 160 acres of ponderosa pine-larch-Douglas-fir forest cover type (SAF 214) as well as other important forest types as follows: SAF-214: 63 acres; SAF-212: 62 acres (Larch-Douglas-fir); SAF-218: 35 acres (lodgepole pine). Elevation: 3,100-3,500 feet. Topography is rolling, with forested hills.

Mule deer (Odocoileus hemionus) use the area as spring, summer and fall range. Other animals noted on the tract are Rocky Mountain elk (Cervus candensis), chipmunks (Eutamias spp.), Douglas squirrel (Tamiasciurus douglasii), and whitefooted deermice (Peromyscus maniculatus). The Natural Area is located within the Little Pend Oreille National Wildlife Refuge. See Botanical and Zoological-Terrestrial maps.

BEAR CANYON
The glacier-carved canyon was created by meltwaters and outwash resulting from stream capture. See Geological map.

BIG SHEEP CREEK
The entire length of the creek is protected and maintained for its trout fishing. Beautiful and little known Big Sheep Creek Canyon is contained by Upper and Lower Big Sheep Creek Falls, trapping trout in between. See Hydrological, Geological and Zoological-Aquatic maps.

BOSSBURG
Bossburg on the banks of the Columbia River was a village founded on galena ore, some so rich it was "specimen" material. The town was named "Young America" in 1895, then changed to "Millington," and eventually "Bossburg." After mining operations tapered off, Bossburg attempted to recoup its failing fortune by establishing a ferry across the Columbia. Fruit orchards were set out, a sawmill put in working order, and some lumber and limestone shipped. None of these efforts lasted long and Bossburg was soon abandoned. Nearly all of the old buildings are gone; a family still occupies a remaining schoolhouse. See Historical-Cultural map.

CALISPELL PEAK
Peak of 6,837 feet in the eastern part of the county. See Geological map.

CALISPELL TRAIL
Historic route. See Historical-Cultural map.

CHEWELAH MOUNTAIN
A small stand of the intermountain type of Douglas-fir may be found northeast of Chewelah. It has the growth rate and size of the coast form of Douglas-fir. See Botanical map.

COLUMBIA RIVER
See Clark County.

COLVILLE CAMBRIAN FOSSIL SITE
Archeocyathids are among the oldest fossils found in Washington, being about 500 million years old. North of Colville exist excellent deposits. See Geological map.

COLVILLE FISH HATCHERY
State Game Department. Species propagated: trout. Water source: well. See Zoological-Aquatic map.

COLVILLE RIVER AND VALLEY
The entire 50 mile length is protected as a trout fishery and "scenic river." It is good waterfowl habitat. Neither scenic or spectacular, this river does contain trophy sized rainbow and brown trout, and a good number of waterfowl and shore birds. Beaver, muskrats, mink and other mammals are provided habitat. Whitetail deer live along the river.

Total coliform bacteria counts are in excess of recommended criteria, occurring in the lower reaches of the Colville River. Inadequately treated municipal wastes and septic tank drainages are generally responsible for the problem.

The valley from Kettle Falls to Springdale is a critical mule deer wintering ground. From Colville to Chewelah, wide lowland bottom with wild and cultivated pastures joining timbered hillsides are vital to wintering whitetail deer. The area contains vegetation which supports deer herds that summer up to summit of Colville watershed to the east, and Huckleberry Range to the west. Vegetation in the area important to deer includes: serviceberry, evergreen and redstem ceonothus, chokecherry, willow and a variety of grass species.

This valley has mixed pine savannahs on south and west slopes and Douglas-fir on north and east slopes. Habitats serve a wide range of wildlife including: whitetail deer, flying squirrel, coyote, beaver, mink, muskrat, Canada goose and other waterfowl, ruffed grouse, pileated woodpecker, Merriam's turkey, goshawk, and sharpshined, Cooper's and sparrow hawks.

Chewelah, at the southern end of this area, is the Indian name for "Water Snake." Some of the reptiles found in the valley are garter, rattler and rubber boa. Colville River is noted for its catches of large German brown trout as well as rainbow and perch. See Hydrological, Zoological-Aquatic and Zoological-Terrestrial maps.

COULEE DAM NATIONAL RECREATION AREA
Encompassing a 102,399 acre section in northeastern Washington. The Coulee Dam National Recreational Area stretches from the Canadian border to Grand Coulee Dam on the Columbia River. Geological formations in much of the region are the result of intense volcanic activity followed by great carving glaciers. Framed by the Cascades, the potentially fertile Columbia Plateau has been brought to life by irrigation made possible by the dam.

Numerous wildflowers grace the southern lava flows and terraces on Roosevelt Lake. Deer are common in the recreation area and beaver and muskrat frequent the lakeshores. Roosevelt Lake abounds in waterfowl, Canada geese, mallard ducks and great blue herons are most often seen.

Hunting is permitted within the recreation area and on nearby Indian reservations; fishing for trout is good. Numerous scenic drives rim the area and are dotted with picnic sites. The recreation area is open all year. Boating facilities are available May through November. See Environmental Use map.

FORD TROUT HATCHERY
Washington Game Department. Species propagated: trout. Water source: springs. See Zoological-Aquatic map.

FUSILINAS
Reef limestone with giant fusilinas are located on a narrow hillside ridge northeast of Kettle Falls. They date from the Permian age. See Kettle Falls Permian Fossil Site. See Geological map.

GARNET AND AGATE EXPOSURE
Both garnet and agate are found in an area 15 miles west of Republic. See Geological map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Stevens County discussion are plotted on the Historical-Cultural map and listed in its index.

KETTLE FALLS
This falls is located on the upper Columbia River. It can be observed only during maximum drawdowns of Franklin D. Roosevelt Lake. See Hydrological map.

KETTLE FALLS PERMIAN FOSSIL SITE
Gastropods (snails) and corals are found in Permian outcrops just north of Kettle Falls. These fossils are in outcrops of limestone on the west side of and above the Vanasse Road and on the hillside above the road. Good fusulinids can be found at the first two localities. See Geological map.

KETTLE RIVER VALLEY
From Canadian border to Kettle Falls, this valley is a critical deer wintering ground. See Zoological-Terrestrial map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Stevens County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LANE MOUNTAIN
The mountain, a small forest-covered pluton, is located in the south-central part of the county. See Geological and Botanical maps.

LIMESTONE
Cambrian limestone with scarce but diagnostic sponge-like archeocyathus is located on a hillside northwest of Colville. See Geological map.

LITTLE PEND OREILLE WILDLIFE RECREATION AREA
This area (44,788 acres) is 13 miles east of Colville. About 80 percent of this mountainous yellow pine forest is managed to benefit its excellent whitetail deer population and hunting opportunities.

Little Pend Oreille includes habitat for other wildlife: black bear, mink, grouse, bald and golden eagle, and many song and water birds. Active beaver colonies can be seen from existing roads and muskrat live in Bayley and McDowell Lakes.

Little Pend Oreille has a network of nearly 200 miles of roads and trails, 7 established campgrounds, 62 miles of trout streams and 2 lakes which furnish a variety of year-round recreation. See Zoological Terrestrial and Environmental Use maps.

LONG LAKE
A reservoir covering 3,020 acres, the lake's depth is not given. The lake receives partially-treated sewage and industrial wastes from the city of Spokane area. See Hydrological map.

LOON LAKE
The lake supports an excellent kokanee salmon fishery. See Hydrological and Zoological-Aquatic maps.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Stevens County discussion are plotted on the Geological map and listed in its index.

NARCISSE CREEK
The creek drainage is a bald eagle nesting area. The number of birds regularly nesting in the area is unknown. See Zoological-Terrestrial map.

NORTHPORT
Northport began as a tent-and-shack mining camp in the early 1890's, with a few businesses and a newspaper called the "Northport News." The town was rebuilt several times following fires which wiped out much of the town. Many of the brick structures still reflect the rebuilding. After the fires came floods and the lower part of town was swept away in the 1894 flood of the Columbia River. By 1897 the town had a $250,000 smelter to process ore from Canada. From the beginning, the smelter was plagued with labor and international troubles. The town was booming and dead so often that people grew tired of leaving and returning. When the American Smelting and Refining Company bought the smelter and removed the equipment, the town was doomed. Today the town still exists with a sawmill and limestone marble quarry in operation. See Historical-Culture map.

OROZADA CREEK
Petrified wood is found here. See Geological map.

PEND OREILLE CREEK
The entire length, is considered an important area for deer and upland birds, and is protected for the outstanding wildlife habitat and trout fishery. See Zoological-Aquatic and Zoological-Terrestrial maps.

PINKNEY CITY
This was the first seat of Spokane County. The community was built adjacent to the military Fort Colville in 1859 and was in existence until 1882. Abutments of the old bridge may still be seen. The bridge crossed Mill Creek which divided the town from the military installation. Nothing remains of the military past, but a marker has been placed along the route to the town telling about it. See Historical-Cultural map.

PLANT COMMUNITIES
The climax plant communities listed below occur in the county. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the botanical map.

Douglas-fir - common snowberry
Douglas-fir - mallow ninebark
Ponderosa pine - bitterbrush
Ponderosa pine - common snowberry
Ponderosa pine - needle and thread

RICE ORDOVICIAN FOSSIL SITE
Graptolites, by far the most abundant fossils found in Ordovician rocks of Washington, can be found in road cuts along King Road east of Rice. See Geological map.


St. Paul's Mission - Kettle Falls

ST PAULS'S MISSION
This was the second Jesuit Mission erected in the area now the State of Washington. The mission was used until 1869. The original structure was rebuilt in 1938 and is an exact replica of the original building including the use of wooden pegs rather than nails. A monument now standing on the mission grounds formerly stood at the site of Fort Colville, one of the early trading posts. The fort site is now under the waters of Roosevelt Lake below the mission. The Kettle Falls region had been one of the main sources of food for the Indians for ages. They gathered there for salmon runs (no longer existing because of Chief Joseph Dam); hence, this historical site is a combination of an ancient Indian campground, a fur trading post, and an early mission. See Historical-Cultural map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SPOKANE ARM OF ROOSEVELT LAKE
One of two locations in which walleye pike are found. See Zoological-Aquatic map.

SPOKANE INDIAN RESERVATION
Ethnic group. See Historical-Cultural map.

TSCHIMAKAIN MISSION
This site (pronounced Shin-ik-in) was the locale of an early day mission built by missionaries of the American Board of Foreign Missions in 1838. It is located 0.5 mile north of Ford, Washington. The ministers in charge were Elhanah Walker and Cushing Eells and their wives. Religion was taught to the Spokane Indians and although few seemed to accept the teachings, later events proved their teachings had had a great influence on native thinking.

The mission was built on Chamahane Creek in what is now Walker's Prairie, and existed from 1838 to 1848. It was abandoned after the Whitman Massacre in the Walla Walla Valley, November 29, 1847. Nothing remains today of the original buildings. A marker on the highway was erected close to the site. See Historical-Cultural map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at lease part of the year. These species were identified as being of statewide and national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information of these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. Stevens County is a general area of importance to the Columbian sharp-tailed grouse (Pedioecetes phasianellus) which was formerly widespread in eastern Washington. The prairie falcon (Falco mexicanus) is noted throughout Stevens County. Other birds include bald eagle, golden eagle, and great blue heron.

MAMMALS. Grizzly bears (Ursus arctos) are known in the North Cascades and the far northeast corner of the state. Grey wolf (Canis lupis) is noted in the northern sections of Stevens County where animals from British Columbia range into Washington. The pygmy shrew (Otisorex hayi) has a restricted range in Stevens County. The red-tailed chipmunk (Eutamias ruficaudas) has a restricted range in Stevens, Spokane, and Pend Oreille Counties. The Canada lynx (Lynx lynx canadensis) is noted in Chelan, Okanogan, Ferry, Stevens, and Pend Oreille Counties. Other mammals noted in Stevens County include mule deer, pine marten, Rocky Mountain elk, and black bear.


Fish-netting - Nisqually River

FORT LEWIS MILITARY RESERVATION
Representative prairie terrain is preserved here, as well as an extensive system of fresh-water marshes and numerous lakes. It has an extensive system of fresh and salt-water marshes and lakes, plus an occasional deposit of glacial outwash. See Hydrologic and Environmental Use maps.

FORT VANCOUVER - FORT BELLINGHAM ROAD
See Clark County

GLACIAL OUTWASH PRAIRIES
There are extensive glacial outwash prairies of both geological and biological significance. They are classical outwash landforms, many containing Mima mounds and extensive gravel deposits. This is also the habitat of Quercus garryana (Oregon oak) communities and support grassland prairie vegetation. See Botanical map.

GRANT LANDS
These lands have been suggested to be considered for an outdoor laboratory. Presently this 10 acre area is owned by Washington State Department Natural Resources. See Environmental Use map.

HENDERSON INLET
Clams, oysters and smelt are found in this area. See Zoological-Terrestrial map.

HICKS LAKE
Several rare (for this region) aquatic plants are found at this lake. See Botanical map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Thurston County discussion are plotted on the Historical-Cultural map and listed in its index.

JOHNSON'S POINT
There is good salmon and cod fishing off the point. See Zoological-Aquatic map.

KENNEDY CREEK FALLS
There is a series of 15- to 20-feet falls in this picturesque canyon. See Hydrological map.

LAGRANDE CANYON
This extremely deep gorge on the Nisqually River is undeveloped and relatively unknown, even by local people. See Geological map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Thurston County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

MACINTOSH LAKE
MacIntosh Lake contains rainbow trout, and waterfowl. It used to be an old mill pond, the mill being built on the lake shore. See Hydrological, Zoological-Aquatic, Zoological-Terrestrial, and Historical-Cultural maps.

MARGARET MCKENNY PARK
This botanical area is noted for wildflowers, birds, and nature trails. It was named after Margaret McKenny, the nationally recognized naturalist, mycologist, and author who lived and taught in the Olympia area. See Botanical map.

MCALLISTER CREEK
This is the "Medicine Creek" of the 1854 Indian - United States Treaty. McAllister Springs, headwaters of the creek, is the city of Olympia's water supply. McAllister Creek forms the western border of the Nisqually Delta and is tide-affected throughout its length (reversible current). Extensive marshes offer wildlife habitat. Anadromous fish runs include a sockeye run, unique in southern Puget Sound. Evergreen State College's biological station and State Game Department's Luhr Public Access site are located on McAllister Creek. The "Treaty Tree" is on the bank of the creek. See Historical-Cultural and Hydrological maps.

MILLERSYLVANIA STATE PARK
This 835-acre park is located 11 miles south of Olympia. It offers camp and trailer sites, swimming, fishing and horseback riding, cabins and boating facilities. See Environmental Use map.

MIMA MOUNDS
The Mima mounds, named for their locality on Mima Prairie, occur on areas underlain by Vashon recessional gravel throughout the southern part of the Prairie Area Weir Prairie (16/1E-5) westward. They are a striking, well-developed physiographic feature. They have been a constant source of interest to geologists and laymen for more than a hundred years.

The mounds range in size from barely perceptible swellings on the prairie surface to maximum height of about 7 feet on Mima and Rocky Prairies. They range in diameter from 6 to 70 feet and average about 40 feet. The mounds are composed of black pebbly silt and sand and overlies rudely stratified sand and gravel outwash.

The origin of the mounds has long been a controversial subject that has caused numerous speculations. Theories include Indian burial grounds, Indian farming areas, giant gopher mounds and glacially-developed land forms. See Archeological, Geological and Environmental Use maps.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Thurston County discussion are plotted on the Geological map and listed in its index.

NEAN TONO AND SKOOKUMCHUCK RIVER
Local students often visit here to find freshwater clams and snails in fossil form. See Geological map.

NISQUALLY DELTA WILDLIFE RECREATION AREA
See Pierce County

NISQUALLY ESTUARY
See Pierce County.

NISQUALLY INDIAN RESERVATION
Ethnic group. See Historical-Cultural map.

NISQUALLY RIVER
See Pierce County.

NISQUALLY RIVER INDIAN FISHERY
An Indian fishery, guaranteed by Medicine Creek Treaty of 1854, is located on the Nisqually River.

Thurston

AGATE EXPOSURE
Agate may be found near Tono in the south-central part of the county. See Geological map.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Thurston County discussion are plotted on the Archeological map and listed in its index.

BALD HILLS LAKE
A stand of Viburnum ellipticum, a rare plant of the Cascades, is found here. This may possibly be the northern limit of the species' range. See Botanical map.

BALD HILL LAKE AND ENVIRONS AND HILLSIDE NORTH OF DESCHUTES RIVER
There is quite a variety of xeric flora on the small rocky hill beside the lake. Some of these plants are rare in western Washington. The lake itself has some interesting water vegetation. The site by the Deschutes River has Trillium chloropetalum, as well as a variety of common and uncommon spring flowers, which are different from these on the hill by the lake. See Botanical map.

BLACK RIVER SWAMP
This primitive swamp is habitat for fish, fowl, bear, otter, beaver and deer. There is very little development along the river. See Hydrological, Zoological-Aquatic and Zoological-Terrestrial maps.

BOSTON HARBOR LIGHTHOUSE
This lighthouse was important years ago as a navigation aid, and is still in good condition. See Historical-Cultural map.

CAPITOL LAKE
This is an artifical lake formed by damming the mouth of the Deschutes River at Olympia. The Deschutes system originally was without salmon because of a natural falls at its mouth. A large chinook run now enters Capitol Lake and the best fishing is from late August through mid-October. It is a state rearing pond for salmon. See Zoological-Aquatic map.

CHEHALIS INDIAN RESERVATION
Ethnic group. See Historical-Cultural map.

CHEHALIS RIVER
Low dissolved oxygen levels and high bacterial concentrations occur in the Chehalis River during the summer low-flow period. This poor water quality affects the migration and rearing of anadromous fish and participation in recreational activities. However, it is a free-flowing stream, used for kayaking, and is a major winter run steelhead stream. See Hydrological map.

DESCHUTES FALLS
There is a substantial year-round flow of water over this scenic falls in a rugged gorge. The area is near populated areas and is now in private hands. See Hydrological map.

DESCHUTES RIVER
Anadromous fish runs consist of chinook, coho and chum salmon and steelhead and searun cutthroat trout. A short free-flowing stretch of the river is found in the vicinity of Tumwater and is used for kayaking. See Hydrological and Zoological-Aquatic maps.

DESCHUTES RIVER EGG STATION
Ponds hold adult salmon for eggs and act as rearing ponds for smolts. See Zoological-Aquatic map.

EVERGREEN STATE COLLEGE (SOUTHWESTERN WASHINGTON STATE COLLEGE)
Located at Olympia, it was established in 1967. See Historical-Cultural map.

COUNTY DISCUSSION

NISQUALLY NATIONAL FISH HATCHERY
Proposed National Fish Hatchery located at the Nisqually Indian Reservation for rearing salmon, steelhead, and trout. See Zoological-Aquatic map.

PERCIVAL CREEK
This is a salmon and steelhead spawning stream. This is the primary source of fresh water supply to Percival Cove salmon rearing pond which is owned and operated by the Washington State Department of Fisheries. See Zoological-Aquatic map.

PERRY CREEK FALLS
Magnificent ribbon falls (40 to 50 feet high) spill into a deep, primative gorge fringed with old-growth firs and cedars. The creek is a salmon spawning stream between the falls and mouth. See Hydrological and Botanical maps.

PRIEST POINT PARK
This is an urban recreation area for the Olympia area. It contains many old-growth trees and picturesque salt waterfront views. There are picnic and recreation areas. It is also the site of a mission established about 1850 but now abandoned. See Environmental Use and Geological maps.

PUGET SOUND, LOWER
This is an important herring spawning area. An extensive bait fishery exists here also. It is probably being overfished by an intensive sein and dip net industry. The preservation of diminishing herring spawning habitat is crucial to preservation of anadromous fish population in this area. See Zoological-Aquatic map.

SAINT MARTIN'S OAK
This is possibly the largest Garry oak in the state. It was discovered and named by the late Theodore Scheffer of Puyallup. See Botanical map.

SAINT MARTIN'S COLLEGE
Located in Olympia, the school was established in 1895. See Historical-Cultural map.

SAINT MARTIN'S COLLEGE MUSEUM
The museum contains an extensive rock collection and Indian artifacts and exhibits. See Historic map.

SCATTER CREEK WILDLIFE RECREATION AREA
A mecca for pheasant hunters, field trainers and bird watchers, Scatter Creek (917 acres) is located 18 Miles south of Olympia, just west of Interstate 5.

Two segments, Case and Township, comprise Scatter Creek's rolling prairie grasslands and oak bottomlands. Case segment is open for year-round dog training, while Township segment is closed to training during April through July. Both areas are open for hunting and fishing in season.

Recreationists will find a wide variety of wildlife at Scatter Creek including pheasant, Hungarian partridge, blue and ruffed grouse, mink, otter, beaver, mallard and woodduck, blacktail deer, an occasional black bear, plus all common western Washington woodland and field birds. See Environmental Use and Zoological-Terrestrial maps.

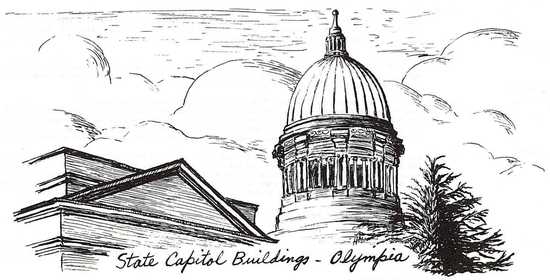
SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SETCHFIELD LAKE
This is a very deep peat lake. See Hydrological map.

SKOOKUMCHUCK RIVER
This river is an anadromous fish route and contains a trout population. See Zoological-Aquatic and Hydrologic maps.

SQUAXIN ISLAND
Marine aquaculture is carried on by the Squaxin Indian Tribe here. In rearing pens, chinook salmon are raised from fry to smolt size. See Zoological-Aquatic map.

STATE CAPITOL MUSEUM
Located in Olympia, the museum is divided into a historical museum featuring Indian art and culture, territorial and state government exhibits, and pioneer exhibits; natural history museum exhibiting fossil, agate and mineral exhibits, and fresh-water and marine mollusca and shells; and art museum which exhibits rotating collections of Northwest artists. See Historical-Cultural map.

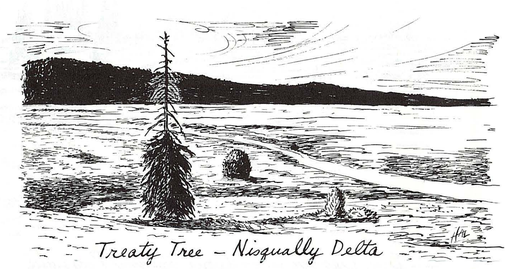


STEWART'S EXPRESS ROUTE
Historic route. See Historical-Cultural map.

SUMMIT LAKE
This lake holds cutthroat and silver trout and perch. There are also wood duck in the area. See Zoological-Aquatic map.

TREATY TREE
This is the tree beneath which Puget Sound Indians and Governor Isaac I. Stevens signed the Treaty of Olympia in 1855. Known as the "Medicine Creek Treaty of 1855," this treaty gave, for all time, the right to the Indians to fish in their usual and accustomed places. See also McAllister Creek. See Historical-Cultural map.

TROTTEN, ELD AND CASE INLETS (OYSTERS)
Before 1927, the Olympia oyster industry produced approximately 50,000 bushels annually. At that time, the Shelton Pulp Mill commenced operations and oyster production fell steadily until 1957, when the pulp mill ceased operation and the Olympia Oyster Growers produced only 2,000 bushels. Since then, production has risen slowly and now varies between 3,000 and 4,000 bushels per year. The oyster growers now are attempting to prevent domestic sewage discharges into oyster growing waters from the many recreational and housing developments along the shores of Trotten Inlet, Eld Inlet and Case Inlet. Washington State Fisheries records indicate annual production of more than 200,000 gallons of Pacific Oysters and 500,000 pounds of clams from Trotten and Case Inlets. The Olympia Oyster Growers Association states that they "believe that these waters are not receiving the protection necessary for pollution control and that pollution may soon seriously limit the productive capacity of these Inlets." See Zoological-Aquatic map.



WASHINGTON STATE PHARMACEUTICAL ASSOCIATION MUSEUM OF PHARMACY
Located in Olympia, visitors may see a restored 1860 pharmacy, including handblown apothecary jars, and an extensive collection of patent remedies. See Historical-Cultural map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the Atlas and consolidates contributors' statements about animals that use habitats in the county, at least part of the year. These species were identified as being of statewide and national significance and reflect, in part, the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the Section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. A marsh area on Bigelow Lake is noted as an area of importance for waterfowl and marsh birds. Other watercourses of Thurston County are also important waterfowl habitat for species including woodduck, herons, terns, and osprey.

MAMMALS. The cougar (Felis concolor) is present in forests throughout the state. Fisher (Martes pennanti) are found in the forests of Olympic and Cascade Mountains. Harbor seals, comprising several scattered colonies in lower Hood Canal and Puget Sound, total some 573 animals and utilize the marine waters of Thurston County. Other mammals include beaver, black-tailed deer, and black bear.

REPTILES. The Pacific pond turtle (Clemmys marmarata) is probably an endangered species in this state. It has a very localized breeding range in Washington.

WOODARD CREEK AND BAY
This is a smelt spawning area and a small salmon spawning stream. Clam beds are also in the area. See Zoological-Aquatic map.

YELM
A great blue heron rookery with 12 to 15 nests is located near Yelm. See Zoological-Terrestrial map.

Wahkiakum

ABE CREEK PARK
This is a small park maintained by Crown Zellerbach Corporation for picnicking and overnight camping. See Environmental Use map.

ALTOONA
Altoona, was once a fishing community on the north shore of the Columbia River opposite Astoria, Oregon. Just east of Altoona is Pillar Rock, an historic landmark around which much of the activity of the lower river has centered. A salmon-barreling operation established in the area in the 1840's, evolved into a large fish cannery by 1870. When salmon runs diminished, canning became unprofitable and operation was shut down entirely in the late 1940's. With the cannery closed, fewer boats, and the river steamers no longer running, the community of Altoona was effectively cut off from the world. Roads did not reach the area until the early 1950's. The hotel, cannery, and some homes are still in fair repair. See Historical-Cultural map.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Wahkiakum County discussion are plotted on the Archeological map and listed in its index.

BEAVER CREEK FISH HATCHERY
State Game Department. Species propagated: steelhead trout. Water source: Elochoman River, Beaver Creek and well. See Zoologic-Aquatic map.

COLUMBIA RIVER
See Clark County.

COLUMBIA RIVER BETWEEN THREE-TREE POINT AND JIM CROW CREEK
Sturgeon fishing is popular here. See Zoological-Aquatic map.

COLUMBIA RIVER ISLANDS AND FLOOD PLAIN
These river islands are the most important breeding areas for Canada geese and the only potential Breeding areas for Caspian terns, ring-billed gulls, Foster's terns, and double-crested cormorants. Breeding areas of the four species were eliminated through innundation of islands in the Columbia River. It was recommended that some new islands be designated bird refuges and that others be constructed to re-establish breeding areas. These species cannot tolerate disturbance by humans in the breeding season.

Puget Island is former prime habitat for the Columbia whitetail deer, but the island has been extensively developed for agricultural use and only a few of these deer remain on wooded tideland portions of the island. The Columbia whitetail subspecies is in danger of extinction. To protect and study this deer, a new federal refuge has been recently established primarily involving Tenasillahe Island, North Hunting Island, South Hunting Island and acreage on the Washington shore west of Cathlamet. This area, known as the Columbian Whitetail Deer National Wildlife Refuge, is mapped on the Zoological-Terrestrial map and Environmental Use map. The species is discussed in more detail in the section entitled "Some Important Wildlife of Washington."

Tenassillahe Island harbors primarily a forest community dominated by willow with red alder and black cottonwood spaced throughout and some Sitka spruce, but most of the terrain is dominated by shrubby growth. Southeast Tenassillahe Island has never been logged off and retains unique vegetation communities comprised of willow, spruce, red alder, red ozier, dogwood, elderberry, salmonberry, blackberry - plus several tideland rush communities - a preferred habitat for Columbia whitetail. This area is soon to be designated as Research Natural Area by the U.S. Fish and Wildlife Service.

North Hunting Island, dominated by Sitka spruce, has 300 acres also sought for a Research Natural Area. Since these deer depend upon open fields at the tidewater elevation, feeding on salt grasses and other grasses, which cows and grazing animals also feed upon, development should include provisions for this type of habitat if this animal is to be protected. See Zoological-Terrestrial and Environmental Use maps.

COLUMBIAN WHITETAIL DEER NATIONAL WILDLIFE REFUGE
Located in southwest Washington, approximately 4 miles west of Cathlamet, this area is being developed for the endangered Columbia whitetail deer by the U.S. Fish and Wildlife Service. Recreation includes fishing, wildlife observation and other related non-consumptive activities. See Environmetnal Use map, Zoological-Terrestrial Map, and small range map for the Columbia whitetail, in the section: "Some important wildlife of Washington."

DEEP RIVER PIONEER LUTHERAN CHURCH
Built in 1899, the church is still well preserved. See Historical-Cultural map.

ELOCHOMAN RIVER
This free-flowing stream has major winter steelhead runs. From November to February 2,000-5,000 whistling swan occup the mouth of the river. See Zoological-Aquatic and Hydrological maps.

ELOCHOMAN STATE SALMON HATCHERY
State Fisheries Department. Species propagated: fall chinook and coho salmon. See Zoological-Aquatic map.

GIFFORD HOUSE
This sample of elegant architecture is well preserved. See Historical-Cultural map.

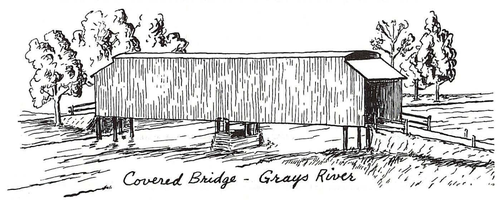
GRAY'S ANCHORAGE
Harrington Point was the anchorage of Captain Robert Gray's ship, Columbia, and was the most easterly point on the Columbia reached by Captain Gray in 1792. See Historical-Cultural map.

GRAYS BAY
Noncritical erosion is occurring along Grays Bay north of Harrington Point. The area is valued for its estuarine habitats. See Hydrological map.

GRAYS BAY AREA STATE PARK (PROPOSED)
Located between Deep River and Grays Bay and fronting on Grays Bay, the park covers 335 acres with approximately 9,000 feet of frontage on the Deep River, 300 feet of frontage on the Grays River, and 3,000 feet of frontage on Grays Bay; a total of approximately 12,300 feet of prime freshwater shoreland. See Environmental Use map.

GRAYS RIVER
A small, free-flowing stream entering the Columbia River. This river hosts a large run of hatchery coho from September through October. See Hydrological map.

GRAYS RIVER COVERED BRIDGE
This is the last covered bridge in Washington used by a public highway. The bridge was placed in the National Register in 1971. See Historical-Cultural map.



HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Wahkiakum County discussion are plotted on the Historical-Cultural map and listed in its index.

HAYES PARK
Small park maintained by Crown Zellerbach Corporation for swimming, picnicking, and overnight camping. See Environmental Use map.

HUME SALMON CANNERY
The Hume Brothers built the first salmon cannery in Northwest. The cannery was the second on the West Coast. See Historical-Cultural map.

HUNTING ISLANDS, PART OF THE COLUMBIAN WHITETAILED DEER NATIONAL WILDLIFE REFUGE
These two islands have been acquired by the U.S. Department of the Interior, U.S. Fish and Wildlife Service, to insure perpetuation of an endangered herd of about 350 whitetail deer inhabiting the area. See Environmental Use map and Zoological Terrestrial map.

JIM CROW CREEK AREA STATE PARK
Located near Altoona and Pillar Rock, the park covers 2,120 acres with 17,000 feet of Columbia River frontage. See Environmental Use map.

JIM CROW HILL
This is a nesting and rearing site for bald eagles. The Fish and Wildlife Service observed two adults and one immature bald eagle near the summit of Jim Crow Hill during a waterfowl check-census flight of the area in April 1972. Crown Zellerbach Timber Company owns the land. Not mapped.

K. M. WAYSIDE PARK
This is a small park maintained by Crown Zellerbach Corporation for picnicking and overnight camping. See Environmental Use map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Wahkiakum County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LEWIS AND CLARK TRAIL
Historic route. See Historical-Cultural map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Wahkiakum County discussion are plotted on the Geological map and listed in its index.

NATIONAL ENVIRONMENTAL TRAINING CENTER
Located at Cathlamet, grade school and high school students receive instruction in various aspects of the logging industry, tree-planting, and forest management. Groups of grade school students have labeled trees and plants within the center, and established a hiking trail. A log cabin was built on the property by high school students. The area serves as an outdoor classroom, and art classes as well as nature-oriented subjects are taught. The area is open to the public. Not mapped.

NORTH HUNTING ISLAND
In this area is a virgin stand of Sitka spruce sometimes known as "tideland spruce," black cottonwoods and willows. Columbia whitetail deer inhabit the area. See Botanical map.

PILLAR ROCK BLUFF
This Lewis and Clark encampment site is where members of the expedition first caught sight of what they thought was the Pacific Ocean.

PIONEER CHURCH
This building on Alley Street in Cathlamet is a National Historic Place.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SKAMOKAWA
Until 1915, Skamokawa had virtually no connection with the outside world. Surrounded by rocky cliffs on three sides and the lower Columbia River on the fourth, water was the only way to or from the fertile farming land. The Indians that lived there when the first whites came lived off salmon caught from the Columbia. They dried the meat for winter food, supplementing it with game from the forest. When a Hudson's Bay Post was established only 3 miles away, the Indians learned to salt the fish and trade with the post. The town was never large, but was always a going place with a few small businesses patronized by fishermen and farmers. Today the school is empty and many old buildings are deserted, although some fishing and farming continue. See Historical-Cultural map.

WAHKIAKUM COUNTY HISTORICAL SOCIETY MUSEUM
Located at Cathlamet, items on exhibit include logging tools, pictures, and Indian artifacts. See Historical-Cultural map.

WASHINGTON COAST
See Grays Harbor.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide or national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled, "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. Altoona bluff is noted as an estuarine habitat and as a band-tailed pigeon area. Bald eagles, osprey and falcon nest in southwestern Wahkiakum County. The Peale's peregrine falcon (Falco peregrinus pealei) is a rare resident along the Pacific coast. Alaskan short-billed dowitchers (Limnodromus griseus caurinus) winter along the Pacific coast in Wahkiakum County. Other noted birds include woodduck and geese.

MAMMALS. A concentration of Roosevelt elk occurs in the Willapa Hills in the southwest corner of the state; the cougar (Felis concolor) is noted in forested areas. The Elochoman River Valley and Skamokawa River Valley are valued big game habitats. Washington's Wahkiakum County and Oregon's Clatsop County are the last strongholds of the endangered Columbia whitetail deer.

AMPHIBIANS. Dunn's salamander (Plethodon dunni) has a limited range in southwestern Washington, as does Van Dykes' salamander (P. vandykei).

Walla Walla

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Walla Walla County discussion section are plotted on the Archeological map and listed on its index.

BLUE MOUNTAINS
See Asotin County.

COLUMBIA RIVER
See Clark County.

DRY CREEK AND CANYON
Land adjacent to this creek is subject to severe bank erosion. See Hydrological and Geological map.

FISH HOOK PARK
This is a riverside park located near Ice Harbor Dam in Walla Walla County. See Environmental Use map.

FORT WALLA WALLA MUSEUM
At Walla Walla, the museum features replicas of pioneer buildings. See Historical-Cultural map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Walla Walla County discussion are plotted on the Historical-Cultural map and listed in its index.

HOOD PARK
This riverside park is located on the south bank of the Snake River near its confluence with the Columbia River. See Environmental Use map.

KENTUCK ROAD
Historic route. See Historical-Cultural map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Walla Walla County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LEVEY PARK
This riverside park is located near Ice Harbor Dam in Walla Walla County. See Environmental Use map.

LEWIS AND CLARK TRAIL
See Clark County.

MCNARY NATIONAL WILDLIFE REFUGE
Refuge consists of 7,215 total acres with approximately 3,200 acres in this county. See Franklin and Benton Counties. See Environmental Use map.

MCNARY WILDLIFE RECREATION AREA
See Benton County.

MILL CREEK (UPPER)
The creek drainage contains a steelhead run and is an important whitetailed deer area.
The land surrounding this creek is subject to severe bank cutting. See Hydrological Zoological-Aquatic and Zoological-Terrestrial maps.

COUNTY DISCUSSION

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Walla Walla County discussion are plotted on the Geological map and listed in its index.

MULLAN ROAD
Historic route. See Historical-Cultural map.

NACHES PASS TRAIL
See Pierce and Kittitas Counties. See Historical-Cultural map.1 map.

PLANT COMMUNITIES
The climax plant communities listed below occur in the county. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Black greasewood - alkali saltgrass
Bluebunch wheatgrass - Idaho fescue
Bluebunch wheatgrass - sandberg bluegrass

SNAKE RIVER
See Asotin County.

SOUTHEASTERN WASHINGTON FAIR
The fair is held in Walla Walla during the fourth week of August. See Historical-Cultural map.

TABLE ROCK
A unique rock in the Umatilla National Forest. See Geological map.

TOUCHET RIVER
The river is an anadromous fish stream. A wildlife preserve is established in the Touchet River Valley. Land adjacent to this river is subject to severe bank erosion. Intermittent areas of basalt outcrops are found along the stream canyon. See Hydrological and Environmental Use maps.

TWIN BUTTES
Unique and fragile dune biota. See Geological and Botanical maps.

TWIN SISTER
Rock formation on the east bank of the Columbia River near Wallula Gap. See Geological map.

WALLA WALLA COLLEGE
The College was established in 1892. See Historical-Cultural map.

WALLA WALLA COMMUNITY COLLEGE (JR)
Located in Walla Walla, the college was established in 1967.

The Carnegie Art Center at Walla Walla Community College was built by converting the old City Library Building. The center was established in 1971. See Historical-Cultural map.

WALLA WALLA GAME FARM
The farm is located one mile north and west of the city of Walla Walla across the street from the Walla Walla State Penitentiary. Average annual production is 9,000 Chinese ringneck pheasants for release in southeast Washington. See Environmental Use map.

WALLA WALLA RIVER
This freshwater, free-flowing stream habitat is valued as a migratory steelhead run. The Walla Walla River Valley is protected as upland wildfowl refuge and steelhead fishery. The delta area at the mouth of the river is an important waterfowl area of statewide significance.

Inadequately treated municipal wastes result in bacterial contamination of surface waters in the Walla Walla River. In addition, septic tank drainage and agricultural animal wastes during low summer flows cause dissolved oxygen depressions. Excessive algal blooms and aquatic growths occur in the Walla Walla, chiefly the result of municipal and industrial wastes, irrigation return flows, and agricultural animal wastes, in combination with low summer streamflow.

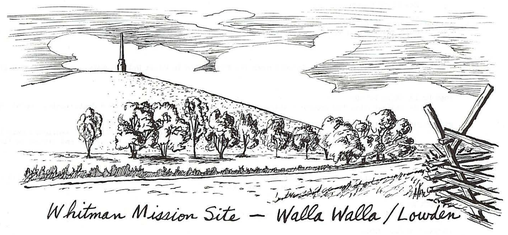
Land adjacent to this river is subject to severe bank erosion. See Hydrological, Zoological-Terrestrial, and Environmental Use maps.

WALLA WALLA RIVER DRAINAGE
The Walla Walla drainage has an endemic species of sculpin, (Cottus marginatus). It is also an important area for partridge, bobwhite, and other upland birds. See Zoologic-Aquatic, Zoological-Terrestrial and Hydrological maps.

WALLULA GAP
See Benton County. See Channeled Scablands entry, Lincoln County.

WALLULA LAKE
An important area for waterfowl, white pelican, prairie falcon, gulls, Canada geese, Ord's kangaroo rat, and spotted night snake.

WHITMAN COLLEGE
Located in Walla Walla, the college was established 1859. See Historical-Cultural map.



Whitman Mission Site — Walla Walla / Lowden

WHITMAN MISSION NATIONAL HISTORIC SITE
Waiilatpu, "the Place of the Rye Grass," is the site of a mission founded among the Cayuse Indians in 1836 by Marcus and Narcissa Whitman. As emigrants moved into the Pacific Northwest in increasing numbers in the 1840's, the mission also became an important station on the Oregon Trail.

Inevitably, deep cultural conflicts marked the missionary effort, culminating in Indian violence that ended the mission 11 years after the coming of the Whitmans.

The mission expanded gradually. Other missionaries arrived, and new stations were established. At Waiilatpu, the large adobe house, a grist mill, a sawmill, and a blacksmith shop were built. William Gray built a house for himself that later served as a dwelling for travellers.

When the Whitmans came overland in 1836, the Oregon Trail was still unnamed. They followed the trails of fur trappers and Indians. Then, in 1842, the first large group of emigrants to travel to the Oregon country over this route stopped at Waiilatpu for rest and supplies. From that time on the mission was an important station on the Oregon Trail. Although the main trail bypassed the mission after 1844, those who were sick and destitute turned their wagons toward the mission, and the Whitmans treated these exhausted people with great kindness. More than two-thirds of the persons staying at Waiilatpu in November 1847 were newly arrived emigrants.

For 11 years the Whitmans had worked among the Cayuse. Although at times some Indians threatened the missionaries and destroyed mission property, not all the Cayuse showed an unfriendly attitude. Despite setbacks and occasional hostility, the Whitmans refused to abandon Waiilatpu. Their best efforts, however, failed to prevent an increase in jealousy, distrust, and unrest, which ended in an outbreak of violence in late November 1847.

Several causes led to the rising Indian resentment. Increasing numbers of emigrants and stories of settlers taking Indian land elsewhere, convinced the Cayuse that their way of life was in danger. Their fears grew as measles, brought in 1847 by white newcomers, spread rapidly among the Indians. The Cayuse had no resistance to the new disease, and within a short time half the tribe died. When Whitman's medicine helped white children but not theirs, many Cayuse believed that they were being poisoned to make way for the whites.

In a tragic and bloody attack, born of deep misunderstandings and grievances, a small group of suspicious Cayuse attacked the mission on November 29 and killed Marcus Whitman, his wife, and 11 others. The mission buildings were destroyed. A few survivors escaped, but 50, mostly women and children, were taken captive. Except for two young girls and a small boy who died, this group was ransomed a month later by Peter Skene Ogden of the Hudson's Bay Company. The massacre ended Protestant missionary work among the Oregon Indians. It also led to a war against the Cayuse, waged by settlers from the Willamette and Lower Columbia Valleys.

The site is 7 miles west of Walla Walla and 4 miles west of College Place. The visitor center contains a museum with exhibits depicting the history of missionary activity in the Northwest. Self-guiding foot trails lead to the mission site, to the grave, and to the memorial shaft at the top of the hill. Near the visitor center is a picnic area with tables. See Historical-Cultural map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide and national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the biological section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington"; (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay", and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. The bobwhite has been reported in the stateline area along the Walla Walla River. The Columbian sharp-tailed grouse (Pediocecetes phasianellus columbianus) is noted along grassy breaks of river canyons in the Palouse Hills. Prairie falcon (Falco mexicanus) are found in eastern Washington and throughout Walla Walla County. Other noted birds include white pelican and golden eagle. The Snake River Valley, from Ice Harbor to Lewiston is a noted migratory waterfowl area.

MAMMALS. The cougar (Felis concolor) is present throughout the forests of Washington. White-tail deer winter in the Mill Creek area. Ord kangaroo rat (Dipodomys ord columbianus) is noted in the western part of Walla Walla County, along Columbia River in southern Benton County, and the area north of Pasco. A subspecies of the coast mole (Seapanus orarius schefferi) has a restricted range in Walla Walla and Columbia Counties. Areas in Walla Walla County are of general importance to the bighorn sheep (Ovis canadensis). Elk winter range consists of drainages in an area which extends east of a line running north of Walla Walla. Other noted mammals include black bear, white-tailed deer, and mule deer.

REPTILES. The spotted night snake and the ring-necked snake are noted in the county.

Whatcom

ANDERSON BUTTES
This is located east and south of Baker lake. See Geological map.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Whatcom County discussion are plotted on the Archeological map and listed in its index.

BACON PEAK
This basalt rock is located between the Baker River and Bacon Creeks. See Geological map.

BAKER HOT SPRINGS
The spring flows at a constant rate of 1 gallon per minute and has a temperature of 111°F. It is located in the eastern part of Mount Baker National Forest and is accessible year-round. See Hydrological map.

BAKER LAKE SPAWNING BEACH
State Fisheries Department. Species propagated: sockeye salmon. See Zoological-Aquatic map.

BEARPAW MOUNTAIN
This is located between Canyon Creek and the north fork of the Nooksack River. See Geological map.

BELLINGHAM BAY
Studies for the Puget Sound Enforcement Conference have shown pulp and paper mill effluents in Bellingham Bay to have caused damage to the indigenous marine life by injuring juvenile salmon migrating through the harbor, by suppressing phytoplankton activity, by damaging oyster larvae and growth, by damaging bottom fish eggs, by damaging bottom organisms, and by producing overall unattractive aesthetic conditions.

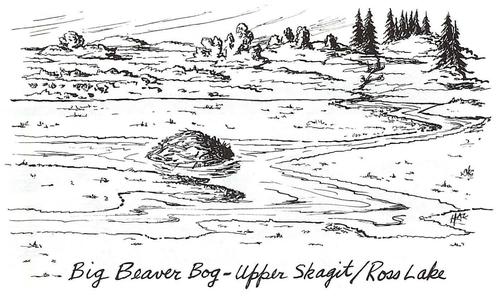
Erosion has occurred along a portion of Bellingham Bay, causing abandonment of about 1,000 feet of county road. Relocation of the road was found to be cheaper than action to prevent erosion. Development in this area is sparse and devoted mostly to summer home use.

Bellingham Bay is an important seabird habitat area for many species, including loons, grebes, cormorants, seaducks, gulls, terns and alcids. Flocks of wintering western grebes up to 30,000 are among the largest recorded for this species anywhere. See Hydrological map.

BELLINGHAM FISH HATCHERY
State Game Department. Species propagated: trout. Water source: Lake Whatcom. See Zoological-Aquatic map.

BIG BEAVER VALLEY
The stands of western red cedar (Thuja plicata) in Big Beaver Valley appear to be the best remaining example of valley botton cedar forest remaining in the State of Washington. A comparison of these stands with other known virgin cedar stands in the North Cascades indicates the Big Beaver stands are the most extensive, and have the highest relative frequency, density, and dominance. Because of the mosaic of aquatic and semi-aquatic communities in Big Beaver Valley, the area is judged particularly suitable for the establishment of a western red cedar research natural area, Type SAF 228. There is also marshland created by beaver activity.

This upper Skagit River Valley represents a zone of transition (ecotone) between the plant and animal communities of the dry eastern slopes of the Cascades, and the wet, western slopes. The flooding of the valley by Ross Dam has destroyed much of the ecotone, but remants exist in the valleys of Big and Little Beaver Creeks on the west side of the reservoir. Numerous examples are found of the intrusion of east side flora into these western slope areas, and hybridization has been noted in deer and deermice. Because plants and animals living in such areas of transition are subject to unusual genetic stresses, they are of particular interest to ecologists. See Botanical, Zoological-Terrestrial, and Hydrological maps.



Big Beaver Bog - Upper Skagit / Ross Lake

BIG BEAVER SPHAGNUM BOGS
Undisturbed sphagnum bogs, as described by Professor Rigg in his work with these ecosystems, have become increasingly rare in Washington. Almost all of the lowland bogs in western Washington have been mined, drained, or filled in for construction. The bogs in Big Beaver Valley are untouched examples in early stages of their development. They contain the characteristic bog flora including the insectivorous sundews, Drosera rotundifolia, and various species of bog orchids, Habenaria spp. See Hydrological and Botanical maps.

BIRCH BAY
Located near the Canadian border, this is an important wintering area for a great variety and number of waterbirds. The numbers of loons, grebes, cormorants, herons, ducks, shorebirds, gulls, terns and alcids indicate a healthy marine environment. The bay is an important Black Brant area. Birch Bay from Point Whitehorn to Birch Point is a designated Shoreline of Statewide Significance under the state Shoreline Management Act. See Zoological-Terrestrial maps.

BIRCH BAY STATE PARK
The 172 acre park is 10 miles south of Blaine. It offers camping, trailer sites, swimming, fishing and clamming.

BLIZZARD PEAK
This area is located near Harts Pass at the border west of the middle fork of the Pasayten River. It is popular with mountaineers. See Geological map.

BROWNS CREEK
There is an unusual garnet exposure along the North Cascades Highway road cut. See Geological map.

CHERRY POINT
Excellent waterfowl migration area and pheasant area. Much of the area has been developed for oil refineries. Not mapped.

CHILLIWACK VALLEY
The Chilliwack Valley in North Cascades National Park contains a very fine virgin forest of mixed western red cedar (Thuja plicata) and western hemlock (Tsuga heterophylla). Unusual components of this forest are very large specimens of Englemann Spruce (Picea engelmannii). See Botanical map.

CHUCKANUT MOUNTAIN
See Skagit County.

CHURCH MOUNTAIN
This is located between Canyon Creek and the north fork of the Nooksack River. See Geological map.

CHURCH MOUNTAIN FOSSIL BED
This fossil bed is found south of Church Mountain. See Geological map.

CHURCH MOUNTAIN MEADOWS
There are excellent displays of mountain wildflowers throughout the summer season. The change in altitude from trailhead to ridgetop gives several different environments and presents a great variety of plant life in a relatively accessible area. See Botanical map.

COLEMAN GLACIER
The Coleman Glacier on Mount Baker, like most of the northwest glaciers, has been fluctuating in size from year to year. The Coleman is unique in that the end of the glacier is squeezed into a narrow canyon where the snout may move forward or back several hundred feet in a year. This is an excellent place to observe glacial action. The advancing ice has pushed over small trees. See Geological map.

COLEMAN PINNACLE
This is located on Ptarmigan Ridge 4 miles southwest of Austin Pass between Wells and Swift Creek's. See Geological map.

COPPER MOUNTAIN
This is located between Silesia Creek and the Chilliwack River. See Geological map.

DAFFODIL FESTIVAL
The festival takes place in Lynden the second week of April. See Historical-Cultural map.

DIABLO LAKE
Diablo Lake is a reservoir on the Upper Skagit River, adjacent to the Ross Lake National Recreation Area. Recreation activities possible here include camping, hiking, fishing and hunting. See Hydrological map.

DIOBSUD BUTTES
This site is located between the Baker River and Bacon Creeks. See Geological map.

DOUGLAS MAPLE
The record Douglas Maple, (Acer glabrum var. douglasii). Its circumference at 4-1/2 feet: 5 feet 6 inches; height: 50 feet; crown spread: 20 feet. See Botanical map.

DRAYTON HARBOR
The harbor is located at Blaine, near the Canadian border. Drayton Harbor has been utilized for its oyster production back to Indian times. Not mapped.

ELEPHANT BUTTE
This mountain climbing area lies between the McMillan, Stelattle and Torrent Creeks. See Geological map.

ELISA ISLAND
This small island, located at the southern tip of Lummi Island, is being considered as a potential state park. See Environmental Use map.

FORT VANCOUNVER—FORT BELLINGHAM ROAD
See Clark County.

FRYING PAN POND
The pond covers 10 acres. Old growth silver fir are found here around a non-bog type pond. See Botanical map.

FUNGI SITES
The following area in this county is noted for its abundance and variety of higher fungi or important species: Mount Baker and Nooksack Valley Area. See Botanical map.

GAMWELL HOUSE
This is a National Historic Place in Bellingham at 1001 16th Street. See Historical-Cultural map.

GLADIOLA SHOW
The show in Bellingham takes place in July. See Historical-Cultural map.

HAGAN MOUNTAIN
This site is located between the Baker River and Bacon Creeks. See Geological map.

HALE'S PASSAGE
Area of sea bird habitats located between Lummi Island and the mainland.

HARVEST FESTIVAL
The Bellingham festival is held the fourth week in September. See Historical-Cultural map.

HEATHER CUP SKI RACES
This is an annual event on July 4th. The highlight is a small ski jump into a melting pond for the "Sluah Cup." See Historical-Cultural map.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Whatcom County discussion are plotted on the Historical-Cultural map and listed in its index.

ICY PEAK
This peak is located between the Baker, Chilliwack and Nooksack Rivers. It is popular with mountaineers. See Geological map.

JAGGED RIDGE
This is located between the Baker, Chilliwack and Nooksack Rivers. It is popular with mountaineers. See Geological map.

LADDER CREEK FALLS
Spectacular falls set in the heart of a well-maintained Seattle City Light park in Newhalem. It is lighted at night. See Hydrological map.

LAKE LOUISE ROAD
A natural beaver pond with resident beavers, it has a high priority for preservation because of educational/research value. See Environmental Use map.

LAKE SAMISH
This lake is highly used for recreation. See Hydrological map.

LAKE TERRELL WILDLIFE RECREATION AREA
Located just north of Ferndale, Lake Terrell (1,051 acres) is utilized in the fall by waterfowl and pheasant hunters, and during spring and summer by spinyray fishermen.

Most of this wildlife recreation area is contained within Lake Terrell itself. The lake is one of the first migration stops for ducks heading south from northern British Columbia breeding grounds. Plants of cock pheasants on the wildlife area, as well as surrounding lands, help supplement wild populations.

All duck species found in western Washington occur here, either as residents such as mallards, or brief fall visitors such as the canvasback. Catfish are the primary fish species, but large cutthroat also may be caught in Lake Terrell.

Very large numbers of Tree Swallows and other insectivorous species nest here in summer. See Zoological-Terrestrial and Environmental Use maps.

LAKE WHATCOM
This 5,003-acre lake with a maximum depth of 311 feet has a history of cultural eutrophication in the west end of the lake believed to be caused largely by septic tank drainage from surrounding homes. Attempts at control have been made in the form of sewer installations around the lake.

Lake Whatcom has been adversely affected by municipal waste loadings and by flow and land management practices, which have resulted in bacterial contamination as well as excessive nutrient enrichment of the lakes, causing excessive algal activity. Lake Whatcom contains large populations of kokanee salmon. See Zoological-Aquatic map.

LAKE WHATCOM FISH HATCHERY
State Game Department. Species propagated: trout. Water source: Brannian Creek. Also trout egg eyeing station. See Zoological-Aquatic map.

LAKE WHATCOM NATURAL AREA
Owned by State Department of Natural Resources, 83 acres are recommended as natural area for educational purposes. See Environmental Use map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Whatcom County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LARRABEE STATE PARK
The park contains 1,965 acres, 7 miles south of Bellingham on U.S. 99A and Puget Sound, with a grand view of the San Juan Islands. Swimming, fishing, hiking, clamming, boat launching, camping and trailer sites are available. See Environmental Use map.

LIBERTY BELL I AND II AND DRIVEWAY BUTTE, MOUNT BAKER AND OKANOGAN NATIONAL FOREST
This region is traversed by the new North Cascades Highway. Liberty Bell I, west of the road, is contiguous to the North Cascades National Park, the boundary following the ridgeline between the two areas. South of the highway it adjoins Lake Chelan National Recreation Area and Forest Service roadless, undeveloped areas. Liberty Bell II and Driveway Butte, shown as two separate areas by the

Forest Service, are one contiguous wilderness area. It is flanked on the west and south by the North Cascades Highway and on the east by the Harts Pass-Slate Creek road; to the north it merges with the Pasayten Wilderness and one corner of the Ross Lake National Recreation Area. Prior to construction of the North Cascades Highway this area had been proposed, first, in the 1950's, as a part of the Glacier Peak Wilderness, and later as an addition to the National Park. See Environmental Use map.

LITTLE BEAVER CREEK DRAINAGE, LOWER
This is the site of superlative valley-bottom community mosaic including beaver ponds and large western red cedar groves.

LOOMIS MOUNTAIN
This is located between the south and middle forks of the Nooksack River. It is popular with mountaineers. See Geological map.

LUMMI BAY AQUACULTURE
A large diked salt water rearing pond with elaborate water control facilities was constructed by the Lummi tribe with federal and state help. The facility includes smaller salt- and freshwater rearing ponds and a shellfish hatchery. The facility is operated and managed for the aquaculture of anadromous fish and shellfish. See Zoological-Aquatic and Zoological-Terrestrial maps.

LUMMI INDIAN RESERVATION
Ethnic group. See Historical-Cultural map.

LUMMI INDIAN TREATY DAY POW WOW
The festival is held January 22 at Marietta. See Historical-Cultural map.

MIDDLE PEAK
This is located between Silesia Creek and the Chilliwack River. See Geological map.

MOUNT BAKER LAVA BEDS
Mount Baker lava beds are protected by the Park Service. They are presently being destroyed by borrowing roadbed fill. The area is located on the Sulpher Creek Road off Baker Lake Highway. A number of types of wildlife occur in this distinctive area. See Botanical map.

MOUNT BAKER
Known to the Lummi, Nooksack and Skagit tribes as "Koma Kulshan" (the "white, steep mountain"), the mountain received its present name from Captain Vancouver in the summer of 1792. He named it in honor of Lt. Baker, who was credited with having first spotted it. At 10,778 feet, Mount Baker's snow-capped and glacier-covered peak towers above the broad general summit level of the Northern Cascades. It is one of the great volcanic peaks in the Cascades and has the classic form of an active volcano. Reports indicate that it has erupted ash as recently as 1870; this is one of several eruptions during the past few centuries. In no other part of the Cascade Range is the contrast more striking between young eruptive materials forming the cinder cone and the ancient platform rocks upon which they rest.

COUNTY DISCUSSION

A 74,880-acre site within the boundary of Mount Baker National Forest was set aside by the Secretary of Agriculture in 1926 to protect the scenic and recreational aspects of the area surrounding Mount Baker. Recreation activities within the area include camping, picnicking, hiking, mountain climbing, hunting, fishing, and skiing. The area is presently being considered for wilderness status. See Environmental Use map.

MOUNT BAKER-TWIN SISTERS, MOUNT BAKER NATIONAL FOREST
These two areas, separate in the Forest Service inventory, are one contiguous wilderness unit. Much of the area is above 5,000 feet in elevation, many of the lower slopes and valleys having been subject to timber harvest. This remaining unlogged area in the vicinity of Mount Baker and the Twin Sisters has previously been recommended for wilderness by the various outdoor and conservation clubs in the Pacific Northwest. Serious recommendations had been made for its inclusion in the North Cascades National Park, and subsequent to passage of the act establishing the National Park bills have been introduced to add the Mount Baker unit to the park. See Environmental Use map.

MOUNT BLUM
This site is located between the Baker River and Bacon Creeks. See Geological map.

MOUNT PROPHET
This mountain climbing area is located between the Little and Big Beaver Creeks. See Geological map.

MOUNT SEFRIT
This is located between the north fork of the Nooksack River and Ruth Creek. See Geological map.

MOUNT SHUKSAN
This 9,127-foot peak is northeast of Mount Baker. See Geological map.

MOUNT WATSON
This is located east and south of Baker Lake. See Geological map.

MOUNTAINS BETWEEN BACON AND GOODELL CREEKS
This area includes: Oakes Peak, Trappers Peak, Mount Triumph, Damnation Peak, and Pioneer Ridge. See Geological map.

MOUNTAINS BETWEEN GOODELL AND STELATTLE CREEKS AND SOUTH OF MCMILLAN CREEK
The mountains in this area include: Barrier Pinnacles, Crescent Creek Spires, Davis Peak, Degenhardt Mountain, Inspiration Peak, Inspiration Peak Towers, McMillan Spire, Mount Ross, Mount Terror, Pinnacle Peak, The Pyramid, and Twin Needles. See Geological map.

MOUNTAINS BETWEEN CANYON CREEK AND BORDER EAST OF ROSS LAKE
This area includes: Crater Mountain, Jack Mountain, Devils Dome, Spratt Mountain, Desolation Peak, Skagit Peak, Joker Mountain, Freezout Mountain, Castle Peak, Hozomeen Mountain, and Little Jackass Mountain. See Geological map.

MOUNTAINS BETWEEN GRANITE CREEK AND SLATE CREEK
The mountains in this area include: McKay Ridge, Majestic Mountain, Mount Ballard and Cady Point. See Geological map.

MOUNTAINS BETWEEN MCALLISTER AND THUNDER CREEKS AND NEWHALEM CREEK AND THE SKAGIT RIVER
This area includes: Colonial Peak, Pyramid Peak, Pinnacle Peak, Paul Bunyons Stump, The Needle, The Horsemen, and Snowfield Peak. See Geological map.

MOUNTAINS BETWEEN RUTH CREEK AND THE BORDER EAST OF DAMFINO CREEK AND WEST OF HANNEGAN PASS
The mountains in this area include: American Border Peak, Goat Mountain, Granite Mountain, Hannegan Peak, Mount Larabee, The Pleiades, Tomyhoi Peak, Winchester Mountain and Yellow Aster Butte. See Geological map.

MOUNTAINS BETWEEN THE BAKER RIVER AND BEAVER CREEKS
The mountains in this area include: Crooked Thumb Peak, Easy Peak, Luna Peak, Mineral Peak, Mount Challenger, Mount Fury, Phantom Peak, and Whatcom Peak. See Geological map.

MOUNTAINS BETWEEN THE CHILLIWACK RIVER AND LITTLE BEAVER CREEK
The mountains in this area include: Bear Mountain, Indian Mountain, Mount Redoubt, Mount Spickard (Glacier Peak), Mox Peaks, Nodoubt Peak, Red Face Mountain, and Ridge of Gendarmes. See Geological map.

MOUNTAINS NORTH OF RAGGED RIDGE, BETWEEN PANTHER AND GRANITE CREEKS
The mountains in this area include: Gabriel Peak, Beebe Mountain, and Elija Ridge. See Geological map.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Whatcom County discussion are plotted on the Geological map and listed in its index.

NOISY-DIOSSUD
See Skagit County.

NOOKSACK CIRQUE, MOUNT SHUKSAN
This is a spectacular glacial cirque, is part of Mount Shuksan, of a kind which is found elsewhere perhaps only in Alaksa. It lies just within the North Cascades National Park. See Geological map.

NOOKSACK ESTUARY
Estuaries are among the most productive ecosystems in the world. Per acre, more plant matter is produced in an estuary than in almost any other environment. Each area of the estuary - tideland, marshland, and deeper waters - plays an important role in the overall productivity of this environment. Tidelands are the most productive area of the estuary, providing an environment for many species of seaweed, eelgrass, and microscopic vegetation. Oysters, crabs, clams, snails and worms all live on or in the tideflats and are specially adapted to estuarine habitat. Migrating birds of the Pacific Flyway use Washington estuaries for nesting, resting and feeding grounds. They are dependent on the quality of estuarine waters and surrounding habitat for survival. See Nooksack River Delta. See Hydrological map.

NOOKSACK FALLS
This old-growth stand of western hemlock and red cedar totalling 685 acres may be the best stand of such timber remaining in the Glacier Ranger District. See Botanical and Hydrological maps.

NOOKSACK RIDGE
This is located between the north fork of the Nooksack River and Ruth Creek. See Geological map.

NOOKSACK RIVER DELTA
A waterfowl wintering and resting area, with thousands of ducks of several species present, along with an average of 15-35 whistling swans. Many other birds reside all seasons, including great blue herons, bald eagles, and many species of gulls, terns and shorebirds. The Nooksack is one of the more significant river deltas in Washington. A free-flowing stream, it is also an important salmon and steelhead holding ground. See Nooksack Estuary. See Hydrological and Zoological-Terrestrial maps.

NOOKSACK RIVER AND NORTH FORK RESEARCH NATURAL AREA
This glacial stream enters Bellingham Bay northwest of Bellingham. A few chinook are taken from May through September. Coho angling begins in September, peaks in October, and continues through early November. An early pink salmon run enters the stream from late July through early August. Turbid glacial runoff frequently interferes with angling. It is a significant eagle wintering area along all three forks, downstream from Glacier, Heisler's Creek and Acme to the delta in Bellingham Bay. Currently known nests are at Shintaffer and Loonis trail roads, at west end of the Unick road and at Birch Point. Nesting success unknown. This is an important winter concentration area similar to the Skagit, with 30 to 40 bald eagles concentrating along these stretches from December through February.

The Nooksack is a free-flowing stream. The entire river system from mountain glaciers to tidewater estuary is displayed in a relatively small area. The lower reaches of the Nooksack River exhibit coliform densities above the limit recommended for safe water-contact recreation.

The North Fork Nooksack Research Natural Area is an example of the Douglas-fir (Pseudotsuga menziesii) - western hemlock (Tsuga heterophylla) virgin forests. A 1,495-acre site. Primary forest cover type is SAF-230, Douglas-fir--Western Hemlock, 615 acres. Average height of Douglas-fir, 200 feet; average diameter, 50 inches. Other important cover types include SAF-227, Western redcedar--Western hemlock, 437 acres; SAF-224, Western Hemlock, 296 acres; SAF-221, Red alder, 4 acres. Average height of Western redcedar, 180 feet; average diameter, 72 inches. Grass and meadowland comprise 143 acres. Elevation: 1,700-4,800 feet. Topography is steep, mountain slopes with breaks and cliffs.

Mammals known to occur within the natural area include black-tail deer (Odocoileus hemionus columbianus), Douglas squirrel (Tamiasciurus douglasii), and black bear (Ursus americanus). See Hydrological, Zoological-Terrestrial, Botanical and Environmental Use maps.

NOOKSACK STATE SALMON HATCHERY
State Fisheries Department. Species propagated: fall chinook and coho salmon. See Zoological-Terrestrial map.

NOOKSACK TOWER
This is located between the Baker, Chilliwack and Nooksack Rivers. It is popular with mountaineers. See Geological map.

NORTH CASCADES NATIONAL PARK COMPLEX (INCLUDES ROSS LAKE NATIONAL RECREATION AREA AND LAKE CHELAN NATIONAL RECREATION AREA)
The North Cascades National Park and associated National Recreation Areas were established by Congress in 1968. Wilderness was not designated in that Act, but Congress directed the National Park Service to submit Wilderness proposals within 2 years after establishing the park complex. In 1972 hearings began in Congress on the Wildernesses proposed by the National Park Service, and conservation organizations testified in behalf of their recommendations for Wilderness. See Botanical, Environmental Use and Zoological-Terrestrial maps.

PARK BUTTE LOOKOUT
This is one of the few remaining lookouts in the Mount Baker National Forest. Currently it is leased to the Skagit Alpine Club. See Historical-Cultural map.

PAYSAYTEN WILDERNESS, OKANOGAN AND MOUNT BAKER NATIONAL FORESTS
See Okanogan County.



Peace Arch Park - Blaine

PEACE ARCH STATE PARK
The central feature of Peace Arch State Park is the arch itself, an imposing structure dedicated in 1921 to peace between the United States and Canada. The park was begun by donations of school children from both the State of Washington and the Province of British Columbia with contributions limited to ten cents. This "Peace Portal" stands on the boundary line between the United States and Canada, a line which extends across an entire continent without a fortification on either side. Often referred to as the International Peace Arch the park has been declared international territory and the citizens of both countries may meet and mingle there without the formality of going through customs. The park, which is actually two parks, one on each side of the border, is maintained jointly by the Washington State Parks and Recreation Commission and the Province of British Columbia. At Blaine on Interstate 5. See Environmental Use map.

PICKETT HOUSE
A National Historic Place in Bellingham at 910 Bancroft Street, Captain Pickett's house is a one-story, wood structure. See Historical-Cultural map.

POINT ROBERTS
Point Roberts, the westernmost portion of the country, is not connected physically with the rest of the United States. Land access to the point is through Canada. The Point has narrow sandy beaches with privately owned uplands. Minor noncritical erosion has occurred along its southwestern shoreline.

A heavily used ornithological study area with great numbers of sea-birds present, especially during migration and winter seasons. The combination of geography, water depths, and food supply make this a concentration point of a great variety of species, with better observations possible at Point Roberts County Park than at many other locations in the state. Land-birds are also found in significant numbers in the various habitat types of this area although the pressures of development are effecting rapid change. See Zoological-Terrestrial map.

PORTAGE ISLAND PARK
Local park of statewide significance. See Environmental Use map.

PTARMIGAN RIDGE
This ridge is an excellent white-tailed ptarmigan habitat. Fall migrations of raptors (including bald and golden eagles) and other birds pass through here. There are fine examples of glacial striations on southerly exposed rock of the ridge. See Geological and Zoological-Terrestrial maps.

PUGET SOUND
See Kitsap County.

QUAKING ASPEN STAND, EAST SHORE OF ROSS LAKE
Populus tremuloides is a species almost never found in western Washington. There is a small stand on the east shore of Ross Lake near Cougar Island. It is composed of an aspen overstory, with grand fir, chokecherry, and mountain maple in the understory. Rubus spp. and Berberis nervosa are prominent plants in the ground cover. This appears to be the only stand of aspen along Ross Lake south of Hozomeen. See Botanical map.

RACEHORSE CREEK
This area is in a climax stage of upper montane forest with several codominant species. See Botanical map.

RAINBOW FALLS
This is a 20-acre site southeast of Mount Baker. The falls consist of several cascades in Rainbow Creek falling from a total height of about 280 feet. See Hydrological map.

RED OR LUDMI RIVER
This old course of the Nooksack extending to Lummi Bay has a control gate with a maximum flow of 800 c.f.s. See Hydrological map.

ROSS LAKE
This reservoir on the upper Skagit River is named for J. D. Ross, former Commissioner of Seattle City Light and first Commissioner of Bonneville Power Administration. Ross Lake, the reservoir behind Ross Dam, is 24 miles long and 2 miles across at its greatest width and covers about 12,000 acres. See Hydrological map.

ROSS LAKE NATIONAL RECREATION AREA
Situated in the North Cascades National Park Complex, this area is comprised of glaciers, mountain peaks and forested valleys. Lakes are formed by Ross, Diablo and Gorge Dams. Recreational opportunities include limited camping, fishing, mountain climbing and hunting when licensed. There are no overlaps or spaces between the National Park and the National Recreation Areas. Where the park and recreation areas are adjacent to each other, they have common boundaries. See Environmental Use map.

RUBY MOUNTAIN
This is located between Diablo-Ross Reservoirs and Panther Creek. See Geological map.

RUTH MOUNTAIN
This is located between the Baker, Chilliwack and Nooksack Rivers. It is popular with mountaineers. See Geological map.

SANDY POINT
This sand spit habitat is now being greatly reduced by development. At least formerly, the largest wintering flocks of snow buntings to be found in the state have occurred here. The point supplies important habitat also for snowy and short-eared owls, rough-legged and marsh hawks, and lapland longspurs, but development is eliminating this. Many waterbirds and shorebirds still reside in adjoining habitats. See Zoological-Terrestrial map.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SEAHPO PEAK (CLOUD CUP PEAK)
This is located between the Baker, Chilliwack and Nooksack Rivers. It is popular with mountaineers. See Geological map.

SEHOME HILL PARK
Located in Bellingham, this park is a valuable natural study area with native and introduced flora and, especially, breeding birds. Important in respect to proximity to urban areas and schools, it is protected at present as a city park. The varied habitats feature an excellent shoppiece area for songbirds, including seven species of nesting warbler. See Environmental Use map.

SERPENTINE VEGETATION
Serpentine vegetation at the Big Slide above the south fork of Nooksack River. See Botanical map.

SKAGIT RIVER
See Skagit County.

SKOOKUM CREEK AREA
This is an excellent ruffed and spruce grouse area. It also has excellent streams and beaver ponds with cutthroat trout. See Zoological-Aquatic and Zoological-Terrestrial maps.

SKYLINE RIDGE
In the summer there are expansive mountain flower displays above the ridge. In the autumn interesting bird migrations takes place here including species (savannah sparrow, northern shrike) not ordinarily associated with mountains, and also numerous raptors including both bald and golden eagles. Throughout the year, the views of Mount Baker, the Olympics, and Puget Sound are quite beautiful. See Zoological-Terrestrial and Botanical maps.

SLATE MOUNTAIN
The 470-acre Slate Mountain holds a pioneer stand of hemlock, and red cedar 400 years old. See Botanical map.

SOUTH TERMINAL PARK IN BELLINGHAM NEAR PAF SHIPBUILDING FACILITY
This mini-park is operated by the Port of Bellingham. See Environmental Use map.

SOURDOUGH MOUNTAIN
This mountain climbing area is located north of Diablo Lake and west of Ross Lake. See Geological map.

SQUALICUM CREEK AND SQUALICUM LAKE
A small salmon and steelhead run still occurs here in spite of man's intrusion and abuse. See Zoological-Aquatic map.

SULPHUR CREEK LAVA FLOW
A 6,000-acre lava flow area occurs on Sulphur Creek. See Geological map.

SUMAS MOUNTAIN CAVE
This complex little cave has about 250 feet of narrow passage and small chambers and is the only known sizable limestone cave of western Washington outside of the Snoqualmie Pass group. Detailed study of bedrock features exposed in the cave is desirable. The fauna of the cave is moderately large. Mosquito insects and harvestmen were noted in total darkness and rodent droppings were present. A large white slug was collected in total darkness and in the dim twilight zone of the entrance passage, spiders and two large white slugs with irregular large black spots were noted. From Caves of Washington by William R. Halliday. See Geological map.

SWIFT CREEK
Agate and jasper are found in this creek bed. See Geological map.

TAMARACK PEAK
This area is located from Harts Pass to the border west of the middle fork of the Pasayten River. It is popular with mountaineers. See Geological map.

TENNANT LAKE
A noted waterfowl area, this small, partially grown-over lake attracts a proportionately high number of birds. It is one of the very few areas where Gadwall are found during winter in northwest Washington. Bald eagles and many other nongame species are frequent here. See Zoological-Terrestrial map.

TERTIARY FOSSILS
Fossil leaves, commonly include sequoia, ginkgo, oak (Quercus), willow (Salix), and poplar (Populus) can be found in the sandstones and shales along Chuckanut Drive just south of Bellingham.

THREE FOOLS PEAK
This area is located from Harts Pass to the border west of the middle fork of the Pasayten River. It is popular with mountaineers. See Geological map.

THUNDER CREEK GORGE
This gorge is located in the North Cascades National Park and Recreation Area, about 4 miles up the Thunder Creek trail where the creek compresses into a narrow slot and thunders off (hence its name) in a spectacular waterfall in a mossy gorge. See Hydrological and Geological maps.

THUNDER CREEK VALLEY
The valley of Thunder Creek, running through North Cascades National Park and Ross Lake National Recreation Area contains some extensive stands of virgin western redcedar and western hemlock with some relict populations of Douglas-fir. The 1970 Thunder Creek Burn No. 2 disturbed some small portions of these virgin stands and now offers opportunities for studies of plant succession. See Botanical map.

TOMYHOI-SILESIA, MOUNT BAKER NATIONAL FOREST
This 74,000-acre area abutting the Canadian border and sharing the northwest boundary of the North Cascades National Park is a favorite "defacto wilderness". The Forest Service has proposed a roadless-type area in this unit. The Tomyhoi-Silesia is of extraordinarily lovely wilderness character. See Environmental Use map.

TWIN SISTERS
Possible wilderness area. See Environmental Use map.

TWIN SISTERS MOUNTAIN
This is a heavily used mountain climbing area. The Twin Sisters Mountain is composed of nearly pure olivine mineral. See Geological map.

WELLS CREEK
Managed by The United States Forest Service, Wells Creek totals 2,610 acres. Talus slopes are of interest to geologists while Wells Creek proper is of interest to aquatic biologists. See Environmental Use map.

WESTERN WASHINGTON STATE COLLEGE
Located in Bellingham, the college was established in 1893. See Historical-Cultural map.

WHATCOM MUSEUM OF HISTORY AND ART
This National Historic Place in Bellingham at 121 Prospect Sreet is a restored building originally constructed in 1892. See Historical-Cultural map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the Atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide or national significance and reflect, in part, the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay," and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. Hale's Passage, the strait between the Whatcom County mainland and Lummi Island, is winter and migration habitat for many seabird species. Large numbers of loons, grebes, cormorants, sea-ducks, gulls, and alcids like Pigeon Guillemots represent one of the highest densities for a similar habitat anywhere in Washington. The water is relatively shallow, and clean and productive here. A great blue heron rookery of about 25 nests is located 1 mile northwest of Lake Terrell. These are threatened by impending future development. Golden eagle have been noted in small numbers in Whatcom County. The osprey (Pandion haliaetus) nests at Silver Lake and just south of Deming.

MAMMALS. Grey wolf (Canis lupis) ranges into Whatcom County from British Columbia. Grizzly bear (Ursus arctos) occur in the Ross Lake Recreation Area. Sightings have been reported within the last 2 years (1971-72) in the North Cascades National Park. The current estimated population is 10 bears, including both the North Cascades habitat and Pend Oreille habitat areas. The moose (Alces alces) is a rare species and is sometimes seen in this county. Individual Shiras moose have been reported by the National Park Service Rangers and other individuals using the North Cascades National Park. Fisher (Martes pennanti) are noted in the Cascade forests of Whatcom County, and pine marten (Martes americana) are noted on upper slopes throughout the state.

Wolverine (Gulo gulo) are increasing in numbers in the Cascades and northeast Washington. Cougar (Felis concolor) are present in forests throughout the state. The bog vole (Synaptomys borealis wrangeli) is recorded in Whatcom County.

AMPHIBIANS. The tailed frog (Ascaphus trueI) is noted in rapid mountain streams of the Cascades.

WISER LAKE
Waterfowl refuge south of Lynden holds thousands of ducks, grebes and coots in winter and geese and swans during migration. It is the only protected lake for many miles, and as such, this small lake is vital to freshwater species for rest and food. The lake holds an excellent bass population and has a developed access. See Zoological-Terrestrial map.

WOODELL SITE
This is possibly the best site of late prehistoric variation of Northwest Coast culture on Fraser Delta. See Archeological map.

Whitman

ALMOTA CANYON AND CREEK
This large canyon possesses well-preserved native vegetation supports big game and other wildlife. See Zoological-Terrestrial and Botanical maps.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Whitman County discussion are plotted on the Archeological map and listed in its index.

BASALT BLUFFS
These brown basalt bluffs, located along the Snake River, are 1,000 feet high. See Geological map.

CHANNELED SCABLANDS
See Lincoln County.

CHARLES R. CONNER MUSEUM, WASHINGTON STATE UNIVERSITY
Located at Pullman, the display shows several hundred mounted birds and mammals. The University Herbarium has 260,000 dried plant species. See Historical-Cultural map.

COLFAX ROUNDUP
The roundup is held in Colfax the second week in September. See Historical-Cultural map.

GILDERSLEEVE FALLS
These falls are upstream from Palouse Falls. Although not widely known, the falls are quite beautiful. See Hydrological map.

GRANITE POINT
Most of this beautiful landmark on the north side of the Snake River was completely destroyed although a small remnant remains on the south side of the river. A disjunct population of Pityrogramma triangularis, a fern, common along the Pacific Coast, occurs here far inland as a crevice plant in the granite outcrops. See Geological and Botanical maps.

HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Whitman County discussion are plotted on the Historical-Cultural map and listed in its index.

HOLE-IN-THE-GROUND
This arch was carved by ancient flood waters. The surrounding area contains a lake and free-flowing stream. It is an important migratory duck area and supports mule deer, ruffed grouse, and spiny-rayed fish. It is one of the few areas in eastern Washington where turkey vultures are found consistently in summer. See Zoological-Terrestrial map.

KAMIAK BUTTE
This is the best preserved example of a steptoe (granitic mountain protruding through basalt). It supports native forest and grassland vegetation 3,641 feet high, 284 acres. See Geological map.

KENTUCK ROAD
Historic route. See Historical-Cultural maps.

KRAMER PRAIRIE PRESERVE
This 22 acres of native Palouse upland prairie is owned by Washington State University. See Environmental Use and Botanical maps.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Whitman County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

LEWIS AND CLARK TRAIL
See Clark County.

LYLE GROVE
This preserve is managed by Washington State University as a biotic study area; it includes 44 acres of ponderosa pine with creek and floodplain. See Botanical and Environmental Use maps.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Whitman County discussion are plotted on the Geological map and listed in its index.

MULLAN ROAD
Historic route. See Historical-Cultural map.

NIGGER CREEK FALLS
This is a secluded falls, approximately 75 feet in height, located in one of the timbered washes in the scablands of northwestern Whitman County. See Hydrological map.

PALOUSE CANYON
A deeply eroded gorge cut through basalt, Palouse Canyon contrasts vividly with adjacent rolling wheat lands. The canyon was carved by the "Spokane Flood." The lower canyon is a raptor (bird of prey) nesting area. See Geological map.

COUNTY DISCUSSION

PALOUSE FALLS
Located on the Palouse River several miles upstream from its confluence with the Snake River, this 200 foot waterfall is unusually large for this non-mountainous area. The surrounding basalt cliffs also offer an interesting study in geology. See Hydrological map.

PALOUSE FALLS STATE PARK
This 252 acre state park offers a spectacular view of the 200 foot waterfall on the Palouse River. It is 17 miles southeast of Washtucna, and has hiking trails, fishing, swimming, and campsites. See Environmental Use map.

PALOUSE RIVER, NORTH AND SOUTH FORKS
A free-flowing river flowing southwest into the Snake River. The Palouse River carries heavy sediment loads, particularly during periods of maximum runoff (winter and early spring). The most significant pollution in the Palouse River Basin results from land use and management practices in the agricultural area of the Palouse drainage. The Palouse drainage has the greatest sediment yield of the Pacific Northwest area. The loess soils of the area are extremely susceptible to erosion. Thousands of acres bared by the plow are exposed to strong winds, spring rains, and thaw which move great quantities of the loess topsoil into the streams. The Palouse area has long been a site of soil conservation measures and methods of development, but erosion control measures have, in most cases, been inadequate as applied by the farmer. Streambank and channel erosion also contributes to the problem. This eroded soil costs thousands of dollars in road maintenance to the local counties and is the largest polluter of water within the Snake-Columbia River system. In addition, bacterial densities are above limits recommended for water-contact recreation (1,000 organisms/100 ml). This river contains a trout population and has endemic subspecies of Cottus rhotheas and perhaps of the sucker (Catostomus).

The North Fork Palouse River is free-flowing through a scenic canyon containing large tracts of coniferous forests. The South Fork of the river, in the vicinity of Pullman, Washington, the numbers of total and fecal coliforms exceed class C standards (bacteriologically - very poor). The area also provides important winter habitat for waterfowl. See Zoological-Aquatic, Hydrological and Zoological-Terrestrial maps.

PERKINS HOUSE
This property is a tribute to one of the founders of Colfax, who was also very instrumental in the town's further development. The house is listed on the National Register of Historic Places. See Historical map.

PLANT COMMUNITIES
The climax plant communities listed below occur in the county. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Black greasewood - alkali saltgrass
Black hawthorn - common cow parsnip
Black hawthorn - common snowberry
Bluebunch wheatgrass - Idaho fescue
Douglas-fir - common snowberry
Idaho fescue - common snowberry
Ponderosa pine - common snowberry
Ponderosa pine - millow ninebark
Slenderbrush buckwheat - sandberg bluegrass
Snow eriogonum - sandberg bluegrass
Stiff sagebrush - sandberg bluegrass
Threetip sagebrush - Idaho fescue

ROCK LAKE AND CANYON
An important waterfowl wintering habitat, the lake covers 2,147 acres, with a maximum depth of 320 feet. Silt from runoff entering the lake reduces productivity to that of an oligotrophic lake until mid-July when the water clears and persistent blue-green algae occur, usually Aphanizomenon. See Zoological-Terrestrial, Zoological-Aquatic, Hydrological, and Geological maps.

ROSE CREEK PRESERVE
This 12 acre preserve is owned by the Nature Conservancy. It is the best remaining example of Crataegus-Heracleum vegetation community bottom land, and supports large populations of breeding birds. See Botanical and Environmental Use maps.

SCABLAND GORGE
An exceptionally deep gorge containing a lake, the scenic canyon is relatively unknown to the public and therefore, little disturbed. See Geological map.

SCABLAND "ISLAND HILLS"
These loessial hills, spared by the Spokane Flood, are found north of La Crosse. See Geological map.

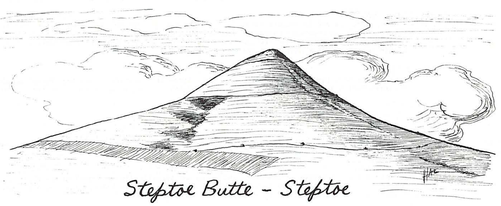
SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SMOOT HILL BIOLOGICAL FIELD AREA
There are about 27 acres of virgin prairie (Festuca-Symphoricarpos type) included in this biological field area. This is part of a 700-acre biotic study area belonging to Washington State University. See Environmental Use and Botanical maps.

SNAKE RIVER
See Asotin County.

STEPTOE BATTLEFIELD (MEMORIAL) STATE PARK
3 acres. See Environmental Use map.

STEPTOE BUTTE
An isolated quartzite mountain rising 1,000 feet above the adjacent lavas of the Columbia Plateau; it is 3,613 feet above sea level. The sites registered as a Natural Landmark by U.S. National Park Service. See Geological map.


Steptoe Butte - Steptoe

STEPTOE BATTLE MONUMENT, ROSALIA, WASHINGTON
The monument at Rosalia, Washington memorializes the dead in a battle between the area's Indians and Colonel Steptoe. The soldiers were pinned down on a hill nearby the present town of Rosalia. The men were surrounded by the hostile Indians and were cut off from a water supply. Chief Timothy (Ta-Moot-Soo) of the Nez Perce led Colonel Steptoe and his men by night down a narrow valley to safety. History credits Timothy with preventing complete destruction of Steptoe's men. The monument bears the names of the soldiers who died in battle there and a brief account of the encounter. See Historical-Cultural map.

STEPTOE BUTTE STATE PARK
Steptoe Butte is a bald protrusion of ancient rock jutting out through younger basalt flows. A Registered National Landmark plaque is located at the summit, 3,612 feet in elevation. Similar geological features are now known as "steptoes." Steptoe Butte was named for Lieutenant Colonel Edward J. Steptoe who fought the Indians in 1858 in a battle at Rosalia a few miles north. This 151 acre park is located 14 miles northeast of Colfax and offers only picnic facilities. See Geological and Historical-Cultural maps.

TEKOA MUSEUM
Located in Tekoa, pioneer exhibits are featured. See Historical-Cultural map.

ALBERT W. THOMPSON HALL
Albert W. Thompson Hall is the oldest major building standing on the Washington State University campus. Long noted for being the early ideal in educational architecture, the building was completed three years after Washington State's only separte land-grant institution opened its doors. Thompson Hall, which suggests a French Revival style of architecture, was the nerve center of the university until 1968 when the administrative offices were moved. It is listed on the National Register of Historic Places. See Historical-Cultural map.

UNION FLAT CREEK
The free-flowing stream enters the Palouse River. The stream harbors virtually all plants and animals typical of the virgin Palouse country. Important waterfowl winter habitat west of Pullman. This river contains a trout population. See Zoological-Aquatic, Zoological-Terrestrial and Hydrological maps.

WASHINGTON STATE UNIVERSITY
Located at Pullman, the school first opened in 1890. See Historical-Cultural map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide and national significance and reflect in part the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aqutic maps; (4) the section entitled "Life Zone Overlay" and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. Prairie falcon (Falco mexicanus) are found throughout eastern Washington and noted in Whitman County. Columbia sharp-tailed grouse (Pedioecetes phasianellus columbianus) are found along grassy breaks of river canyons in Palouse Hills. The Snake River Valley, from Ice Harbor to Lewiston, Idaho, is an important migratory waterfowl resting area.

MAMMALS. The western jumping mouse (Zapus princeps) has a restricted range in Whitman, Garfield, Columbia, and Asotin Counties.

REPTILES. Ring-necked snake (Diadophis amabilis) has isolated populations in this county with very restricted ranges in the state..

Yakima

AMERICAN RIVER
The river is free-flowing its entire length, providing valuable stream habitat. See Hydrological and Zoological-Aquatic maps.

AMERICAN RIVER VALLEY
The valley is a critical deer wintering ground. See Zoological-Terrestrial map.

ARCHEOLOGICAL SITES
Some archeological sites of the state which are not specifically mentioned in the Yakima County discussion are plotted on the Archeological map and listed in its index.

BLUE SLIDE, SNOQUALMIE NATIONAL FOREST
A geological area noted for the massive earth movement on the alluvial fan of the South Fork of the Tieton River. See Geological and Environmental Use maps.

BOULDER CREEK CAVE
This impressive, 400-foot cavern was cut by Boulder Creek after a slide dammed its canyon. The imposing upper entrance is almost 200 feet wide and about 50 feet high. The lower entrance is a narrow opening between the compacted slide and the canyon wall. The cave follows a curved path and is actually a huge closed stream meander niche. Much of its length is in total darkness despite the immensity of the entrance. It has been known since 1901 and is regularly visited by campers at the nearby Forest Campground across and a short distance up the Naches River from Cliffdell. (From Caves of Washington by William Halliday) See Geological map.

BUMPING CREEK
This river contains a trout population. See Zoological-Aquatic map.

BUMPING LAKE, TIETON RESERVOIR
An irrigation reservoir in a forest setting providing habitat for osprey. Developed recreation sites provide camping, picnicking, swimming, fishing, boating and hiking. See Hydrological and Zoological-Terrestrial maps.

BUMPING RIVER
The stream is free-flowing its entire length and provides valuable stream habitat. See Hydrological map.

CAPITOL THEATRE
This building, at 19 South Third Street in Yakima, is a National Historic Place. See Historical-Cultural map.

CASH PRAIRIE
During late July there is an abundance and variety of wildflowers in the meadows and along the ridge. See Historical-Cultural map.

CENTRAL WASHINGTON FAIR
The fair takes place in Yakima in September. See Historical-Cultural map.

CHIMNEY PEAKS
East of Rimrock Lake, the area is noted for volcanic formations. See Geological map.

CHINOOK PASS
Pass, at 5,440 feet, through the Cascade Mountains on State Route 410. See Geological map.

CLEAR LAKE
Three pairs of osprey nest here. See Hydrological and Zoological-Terrestrial maps.

COLD CREEK
This is a free-flowing river. See Hydrological and Zoological-Terrestrial maps.

COLUMBIA RIVER
See Clark County.

COUGAR LAKES AREA
The Cougar Lakes area is in the Cascade Mountains on the Snoqualmie and Gifford Pinchot National Forests. It lies in Yakima and Lewis Counties, Washington. Mount Rainier National Park is directly west. The area totals 127,000 acres, all National Forest lands.

The area is mostly rugged mountains with many lakes and open basins along the crest. About 14 percent is in the principal forest zone, 75 percent in upper forest zone and the remainder in the alpine zone. Elevations range from about 4,000 feet to 7,776 feet at Mount Aix. The area provides summer range for big game and fishing streams and lakes. The Pacific Crest National Scenic Trail crosses the area. Other trails provide adequate access.

A Cougar Lakes Wilderness has been proposed by the conservation groups for some years. It has been proposed to be added to Mount Rainier National Park, adjacent to it on the west. The Regional Forest Service Office recognized its wilderness potential (together with other areas in Washington and Oregon) when it designated the Cougar Lakes area, both north and south of the Chinook Pass highway, as a limited area, wherein no development would be permitted pending study as a possible wilderness.

Bills were introduced in Congress in the last several years to establish a Cougar Lakes Wilderness, but no action was taken on them. The Snoqualmie National Forest has appointed a task force to make detailed studies and recommendations for the Cougar Lake area during 1973. Conservationists' proposals are for a two-part wilderness, to include the Norse Peak section north of the highway and the areas south of the road identified by the Forest Service as Cougar Lakes by both the Snoqualmie and Gifford Pinchot National Forests.

The rare pileated woodpecker, mountain red fox, mountain goat, coyote, golden-mantled squirrel and many other species of wildlife are found in this area. See Botanical, Zoological-Terrestrial and Environmental Use maps.

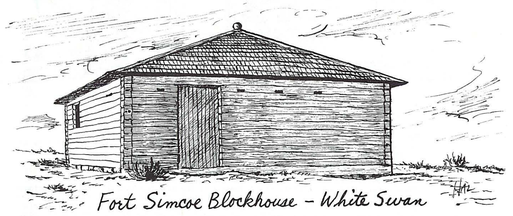
DEVILS TABLE
The 2,560 acre site is noted for its extensive volcanic rock. See Geological map.

DIATOMITE BEDS
The beds are located northeast of Yakima. See Geological map.

END OF THE TIETON FLOW
There are single flow termini, such as the one at the end of the Tieton flow. There are Indian Rock Paintings on this flow. See Archeological and Geological maps.

FIFES PEAKS
This is a popular rock climbing area. See Geological map.

FORT SIMCOE STATE PARK AND MUSEUM
Forts Simcoe and Walla Walla were two regular Army posts established in the interior of Washington Territory as a consequence of Indian hostilities which started in the fall of 1855. Fort Simcoe was the advance post of the Ninth Regiment, United States Infantry, 1856-1859. The site had been an important tribal gathering place known as "Mool-Mool" (bubbling water) after an especially active spring. Fort Simcoe was transferred to the Indian Department in May of 1859, and was finally abandoned in 1923. Five of the original military structures remain today: a commanding officer's house, three dwellings, which served as captain's quarters, and a squared-log blockhouse. One of the enlisted men's barracks has been reconstructed as have two blockhouses. Fort Simcoe is 28 miles west of Toppenish, and the 200-acre park has hiking trails, picnic facilities, displays of Indian crafts, and exhibits depicting the story of Fort Simcoe. See Environmental Use and Historical-Cultural maps.


Fort Simcoe Blockhouse - White Swan

FUNGI SITES
The following areas in this county are noted for their abundance and variety of higher fungi or important species: Bumping and American River Valleys and Tieton River Valley. See Botanical map.

GATES OF YAKIMA
These remarkable gates were cut by the Yakima River through ridges of Columbia Basin lava. There are frequently 6 or 8 distinct layers of basalt exposed which are 50 to 150 feet thick. The site has been recommended as a Natural Landmark. See Geological map.

GLADE CREEK DRAINAGE AND CANYON AND DEAD CANYON
A free-flowing river and pristine grasslands in the midst of intensive dryland used for wheat farming. Numerous cultural and paleontological sites may be found throughout the drainage, particularly in the lower reach near the Columbia River. Fragile soil conditions combine with flash floods to produce severe erosion and subsequent deposition in the Columbia River. It is an important area for deer, upland birds, and waterfowl. See Geological, Hydrological, Botanical, and Zoological-Terrestrial maps.

GOAT ROCKS
A volcano, originally as large as Mount Rainier, has been eroded so that only sharp, resistant rocks are now present. See Geological map.

GOAT ROCKS WILDERNESS
The Goat Rocks area lies in eight parcels adjoining the Goat Rocks Wilderness in the Gifford Pinchot and Snoqualmie National Forests. They are in Lewis and Yakima Counties, Washington. The wilderness is composed of 7,500 acres of National Forest lands and 360 acres owned by others. The parcels vary in character but are generally rugged and forested. About 33 percent is in the principal forest zone, 60 percent in upper forest, and the remainder in the alpine resource zone. Elevation ranges from 3,000 to over 7,000 feet. The area provides summer range for big game. Mountain goats use the parcel on the northwest corner of the Wilderness. A portion of the Midway Sheep and Goat Grazing Allotment extends into the south parcel.

The core of this wilderness had been a primitive area and was reclassified as a "wild" area prior to enactment of the Wilderness Act in 1964. Thus, it was automatically included in the National Wilderness Preservation System at that time.

The U.S. Forest Service roadless, undeveloped area inventory identified contiguous areas in a natural condition. These are proposed both by the Forest Service and the conservationists as additions to the Goat Rocks Wilderness, with two differences. The Forest Service only proposes a portion of the Bluff area at the northwest corner; the citizen groups recommend the entire section. The Packwood Lake area, also on the western side (south of Bluff) was eliminated in 1973 from the 1972 inventory. Nevertheless, except for the small developed portion at the lake's outlet the remainder of the area is in a wilderness condition.

Names of the other areas proposed for addition are: Clear Fork, Milldridge, Jordam Creek, Small, and Section, all on the Gifford Pinchot National Forest. Bear Creek Mountain adjacent to the east side of the Goat Rocks Wilderness is within the Snoqualmie National Forest. See Lewis County. See Zoological-Terrestrial and Environmental Use maps.

GOOSE EGG MOUNTAIN
An important rock climbing area, the mountain is a small pluton in the Tieton Valley which is steep-walled, round-topped, and bare rock. See Geological map.

GRANITE LAKE
Owned by the United States Forest Service, this 1,555 acre area contains a good representation of timber types and has been recommended as a natural area to be preserved for study. A number of qualities of ecotones and elevation types are represented. See Botanical map.

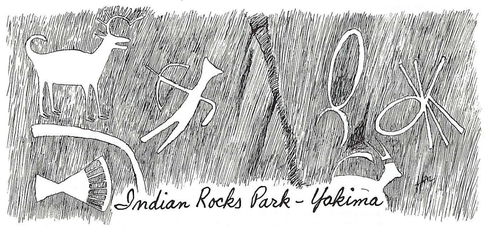
HISTORICAL AND CULTURAL FEATURES
Some historical and cultural features of the state which are not specifically mentioned here in the Yakima County discussion are plotted on the Historical-Cultural map and listed in its index.

HORSE HEAVEN HILLS, NORTH SIDE
Extensive beds are found here containing fossil vertebrate remains dating from Pliocene, Pleistocene and sub-Recent. See Geological map.

INDIAN CHRISTMAS CEREMONIAL
The ceremonial takes place in Toppenish the last two weeks in December. See Historical-Cultural map.

INDIAN PAINTED ROCK
These pictographs are the oldest such markings found in Washington. Similar paintings are found in eastern Washington, Idaho, Oregon, and British Columbia. The Advisory Board of the Washington State Parks and Recreation Commission recommended the paintings be excavated by the Anthropology Department of the University of Washington. During excavation more paintings were discovered and sprayed with a preservative to prevent fading. A trail from the highway to the cliffs has been constructed with explanatory and directional signs.

INDIAN ROCK PAINTINGS STATE PARK
The 1/2 acre park is 5 miles west of Yakima on Highway 410. See Environmental Use map.


Indian Rocks Park - Yakima

JUMPOFF LOOKOUT
This peak is east of Rimrock Lake. The botanical area is noted for the peculiar and excellent association of alpine flowers in a meadow situation. See Botanical map.

KLICKITAT RIVER
This is a free-flowing stream, with critical deer and elk wintering habitats from the headwaters to the Columbia River. See Klickitat County.

KLOOCHMAN ROCK AREA
This rock climbing area is located 2 miles east of the junction of the South and North Forks of the Tieton River. The area is noted for volcanic formations. See Geological map.

LAKES, STREAMS, ETC.
Some hydrologic features of the state which are not specifically mentioned in the Yakima County discussion are plotted on the Hydrological map and listed in its index. Also see the listing of Hydrological features covered by the Shoreline Management Act.

MEEKS TABLE (BALD MOUNTAIN) NATURAL AREA
The Meeks Table site is in the Naches River area. The site is inaccessible to livestock but accessible to big game. Meeks Table is noted for extensive volcanic rock.

The area exemplifies ponderosa pine/pinegrass vegetation. A 68-acre tract consisting of 38 acres of interior ponderosa pine, SAF 237 forest cover type; 21 acres of ponderosa pine, larch, Douglas-fir, SAF 214' and 9 acres of sagebrush, steppe (Poa secunda - Artemisia tridentata). Elevation: 4,300-4,500 feet. Topography: rolling. See Botanical and Environmental Use maps.

MOUNT ADAMS
Mount Adams (12,326 feet) is second only to Mt. Rainier in height and bulk among Washington's peaks. Because of its comparative isolation and distance from major routes and population centers, few have visited its flowered meadows or glacier-clad slopes. Perhaps the use of pack horses to transport sulphur mined near the summit down the easy south side has taken away the challenge of climbing a mountain whose glaciers offer interesting and varied routes. The present name, Mount Adams, came as a mistake. In 1839, Hall Jackson Kelley, a Boston school teacher, proposed naming Cascade peaks for presidents. Mount Hood was to be named Mount Adams, but for some unexplained reason the name was transferred to the present peak. In 1921 the Forest Service constructed a fire lookout cabin on the summit which was manned for 10 years. The summit climbing register is fastened to the remains of the cabin. A mining claim to obtain sulfur near the summit was recorded in 1931. Mining equipment included a Model-T engine to run the drill. The engine was winched to the top of the mountain, using its own power. Horses were used to transport material and food for the seven-man crew. Approximately 12,000 horse trips were made to the summit before mining activity ceased in 1937.

Mount Adams was formed by volcanic eruptions of ash and cinder, accompanied by flows of basaltic and andesitic lavas. The flows issued from a central vent creating a wide based cone. Glaciers formed and subsequent erosion by ice gave the mountain its present rugged configuration. The largest glacier and most severe examples of erosion are found on the northern and eastern flanks where prevailing storm paths caused large accumulations of snow and ice. The rather broad, irregular appearance of the summit area is probably due to the occurrence of several different vents. Geological points of interest include the many vents, blowholes and caves scattered around the sides of the mountain. Hydrogen sulfide gas issues from crevasses near the summit and large deposits of sulphur cover the crater floor.

The predominantly forested area lies about 80 percent in the upper forest zone and 20 percent in the alpine zone. There are numerous glaciers. There are no major streams, but there are numerous wet places, especially in the area to the north. Elevation ranges from about 4,000 to 5,600 feet in the north and 7,500 feet in the southern parcel, to 12,236-foot Mount Adams, the central feature of the present Wilderness.

This magnificent mountain land was designated a Wild Area in 1942 by the Chief of the U.S. Forest Service. With the signing of the Wilderness Act in 1964, it became one of the first units of the new National Wilderness Preservation System. In May 1972 a Presidential Proclamation was signed which corrected an old surveying error and returned approximately 10,000 acres of the Wilderness to the Yakima Indian Tribe.

Although recreational opportunities are emphasized, the area is also important for wildlife, water and forage. The history of grazing within what is now the Wilderness began before 1900. Limited numbers of cattle and sheep are still permitted to graze portions of the area. See Environmental Use, Botanical and Geological maps.

L.T. MURRAY WILDLIFE RECREATION AREA
See Oak Creek Wildlife Recreation Area.

MOUNT ADAMS WILDERNESS
See Skamania County.

MOUNT RAINIER PARK ADDITION AND TATOOSH, SNOQUALMIE NATIONAL FOREST
See Lewis County.

MOUNTAINS, PEAKS, ETC.
Some of the geological features of the state which are not specifically mentioned here in the Yakima County discussion are plotted on the Geological map and listed in its index.

MOXEE BOG
This 14-acre nature preserve includes a rare, floating sphagnum bog and its associated biota, about 3 miles south of Moxee. The site is owned by the Nature Conservancy and is recommended as a

COUNTY DISCUSSION

Natural Landmark. Moxee Bog is also the only known habitat of the silver-bordered fritillary butterfly (Blaria selene). See Hydrological map.

NACHES CANYON
A unique cactus is endemic to this area. See Botanical map.

NACHES FISH HATCHERY
State Game Department. Species propagated: trout, steelhead trout. Water source: springs. See Zoological-Aquatic map.

NACHES PASS TRAIL
See Pierce and Kittitas Counties.

NACHES PEAK
This mountain climbing area is located between the headwaters of the White River and the Ohanopecosh River. See Geological map.

NACHES RIVER
This free-flowing stream is valued as wildlife habitat. Remnants of large numbers of blue herons nest and feed in the river near Nelson's Bridge. Bald eagles scavange the Naches River for fish. This river is an anadromous (salmonid-steelhead) fish route and contains a trout population. See Hydrological, Zoological-Aquatic, and Zoological-Terrestrial maps.

NELSON BRIDGE RACEWAYS
State Game Department. Species propagated: trout. Water source: springs. See Zoological-Aquatic map.

NORTH SLOPE MANASHTASH RIDGE
Extensive beds are found here containing fossil vertebrate remains dating from Pliocene, Pleistocene and sub-Recent. See Geological map.

OAK CREEK, WENAS, AND L.T. MURRAY WILDLIFE RECREATION AREAS
L. T. Murray (103,461 acres), Wenas (17,099 acres), and Oak Creek (85,598 acres) comprise the largest land complex owned by the Game Department. Over 200,000 acres of typical eastern slope Cascade timberland and grassy rangeland are included in this complex, located west and north of Yakima and stretching along the entire Yakima River to Ellensburg.

The western portions, bordering national forest lands, are primarily heavy ponderosa pine timber. Timber gives way to more open forest and rangeland farther east and in the extreme eastern section one finds the typically rugged and hilly cheatgrass covered country of chukar and bighorn sheep.

Famous nationwide is the elk winter feeding operation at Oak Creek headquarters. During severe winters as many as 4,000 elk may utilize various feed stations and public viewing at Oak Creek headquarters may attract 2,000 persons daily during peak feeding operations. See Zoological-Terrestrial and Environmental Use maps.

OAK CREEK GRANT LANDS
These are Washington State Department of Natural Resources lands, 4,866 acres. They are managed by the Department of Game for wildlife rangelands. See Environmental Use map.

OLD DURR WAGON TRAIL
Historic Route. See Historical-Cultural map.

PLANT COMMUNITIES
The climax plant communities listed below occur in the county. Some of the species are discussed briefly in Daubenmire's review article. Scientific names are listed in the index to the Botanical map.

Alaska-cedar - Cascades azalea	Douglas-fir - pinegrass
Big sagebrush - bluebunch wheatgrass	Pacific silver fir - mountain hemlock - big huckleberry
Bitterbrush - Idaho fescue	Pacific silver fir - western hemlock - big huckleberry
Black greasewood - alkali saltgrass	Spiny hopsage - sandberg bluegrass
Douglas buckwheat - sandberg bluegrass	Stiff sagebrush - sandberg bluegrass

PROSSER DAM AND FISH SCREENS
This is a large irrigation diversion for the Chandler Canal supplying 1,500 c.f.s. of water. The screens and fishways are maintained by the Bureau of Sports Fisheries and Wildlife. See Zoological-Aquatic and Hydrological maps.

RATTLESNAKE HILLS
See Benton County.

RAY E. POWELL MUSEUM
At Grandview, this Commercial museum features antique clocks, furniture, guns, and Indian artifacts. See Historical-Cultural map.

ROCKY PRAIRIE
This is the largest bitterroot area in the Yakima area. Death camas, common camas, wild peonies, lupine fields and white phlox are also found here. See Botanical map.

ROADS AND TRAILS (YAKIMA)
The first road connecting Ellensburg and Yakima was the Squaw Creek Road, built about 1875. The road entered the Kittitas Valley at what is now Kittitas and proceeded to Ellensburg. The main problem with the Wenas Route was that it was blocked almost every winter by deep snows, since it is a higher route than even the new I-82 highway. Then came the Untanum Road, which is still the Wenas Road, entering the Kittitas Valley in what is now the Damman District. The Yakima River Canyon Highway, now a scenic highway, was built in 1924. It started out as a gravel road, then was oiled in 1933, and changed to concrete about 1935. The 1853 "military road" was not originally a military road. An interview with David Longmire, pioneer of the Yakima Valley, was made in early 1900. Longmire was 9 years old when he traveled the trail marked today as a military road. He described the trip thusly: Date: March 1853. "We crossed the Yakima at its mouth and came up the east side, Indians following us all the way by thousands. Our wagons were great curiosities, for they were the first they had ever seen; the first to be brought up the Yakima Valley and over the Cascade Range. Not a white man lived in the valley at the time, (except) two Catholic priests, one at Tampico and the other on the ground taken by George Taylor in 1865 as a homestead, opposite the present George Hall ranch. The Indian trail was all right for single horses, but hauling wagons over it, even after the trees had been cut down to make it wider, was simply out of the question. We could not follow the trail at all, only in a general way." In 1854, the government made an appropriation for the improvement of the road, but after the outbreak of the Indian war (October 1885) it fell into disuse and became so overgrown with brush and clogged with fallen logs that it had to be abandoned entirely. See also Naches Trail. See Historical-Cultural map.

ROZA DAM AND FISH SCREENS
There is sizable irrigation diversion (2,200 c.f.s.) constructed by the Bureau of Reclamation. The fish screens and fishway are maintained by the Bureau of Sport Fisheries and Wildlife. See Zoological-Aquatic and Hydrological maps.

SCENIC ROADS
Many designated and proposed scenic roads and trails of the state are mapped on the Historical-Cultural map.

SENTINEL GAP
A scenic gap along the Columbia River between Beverly and Priest Rapids. See Geological map.

SILVER SAGE RELIC
The only plants of silver sage north of Oregon occur on Yakima Ridge around a small temporary pond. Much more of this vegetation grew in Washington about 6,000 years ago, but it has dwindled until this is all that remains. See Botanical map.

SPIRAL BUTTE
This is one of many cinder cones in the area north of the Tieton River. See Geological map.

SUNNYSIDE DAM AND FISH SCREENS
This is a large diversion dam built by the Bureau of Reclamation to supply 130 c.f.s. of water. Fishway and fish screens are maintained by the Bureau of Sports Fisheries and Wildlife. See Zoological-Aquatic and Hydrological maps.

SUNNYSIDE HISTORICAL ASSOCIATION MUSEUM
In Sunnyside, the museum houses pioneer and Indian artifact exhibits. The corner of the museum is devoted to the late Roscoe Sheller, prominent Sunnyside author. See Historical-Cultural map.

SUNNYSIDE WILDLIFE RECREATION AREA
Sunnyside Wildlife Recreation Area is near the town of Mabton, 35 miles southeast of Yakima and 45 miles west of Richland on State Highway 22. Managed mainly for waterfowl production and hunting, it is divided into two segments, Griffin and Byron, with the town of Mabton lying midway between the two properties.

The immediate area is rich in historical significance. Just off the nearby Dwinell Road was the pioneer Morgan stagecoach stop and hotel. Three stories high, the huge old cedar hotel had 21 rooms and feature an enormous kitchen-dining room stone fireplace. The original stagecoach route followed the Yakima River to Granger.

No actual Indian campsites have been identified on the recreation area itself, but the possibility of their occurrence on the site is very real.

Along the Yakima River paralleling Byron Ponds and approximately three-fourths mile south along the north boundary was a large campsite where Indians collected mussels along the stretch of the Yakima River known as Euclid Rapids. Cuts in roads show layers of shells to a depth of 14 feet in one spot.

Game birds are the most important resource of the Sunnyside Wildlife Recreation Area. The most popularly-hunted species are ringneck pheasant and various waterfowl. On both segments, agricultural lands are planted to wheat and corn to serve as feed for waterfowl; emphasis is placed on corn since waterfowl and pheasants is provided by plantings of multi-flora rose hedges on nonagricultural lands. Among other game birds are the mourning dove, valley quail and snipe. Non-game birds include golden and bald eagles, blue heron, various owls and a variety of songbirds.

Game fish are also found at Sunnyside. Fishing for rainbow trout, bass and perch is available. There is a boat launch on Griffin Lake for access to up-river steelhead and salmon fishing areas.

Fur-bearing animals round out the list of wildlife found on Sunnyside. They include coyote, raccoon, bobcat, beaver, otter, mink and muskrat. Small, native cottontail are quite plentiful; eastern cottontail, transplanted from Whidbey Island in 1954, are now common residents. See Zoological-Terrestrial and Environmental Use maps.

TIETON RIVER
The South Fork of the Tieton River is a clear, swift-flowing river with several excellent campsites near its banks. Camping spaces are in great demand, especially along a river of this caliber. Portions of the upper reaches of the river can be reached by trail so its beauty can be enjoyed in a more natural setting. The river offers trout fishing and many kinds of wildlife and plants can be found near it. See Zoological-Aquatic and Hydrological map.

TOPPENISH CREEK
This river contains a trout population. See Zoological-Aquatic and Hydrological maps.

TOPPENISH NATIONAL WILDLIFE REFUGE
The Toppenish Refuge, located in the Lower Yakima Valley in south-central Washington, consists of three units along Toppenish Creek and the Yakima River. The refuge presently comprises 1,764 acres and will ultimately contain 5,360 acres.

This inland marsh is a habitat for many species of waterfowl, shorebirds, birds of prey, songbirds, upland game birds, small mammals and several large mammals (such as deer, coyote, bobcat) reptiles and amphibians. The refuge is largely undeveloped but consists of brushy creek bottoms, wet meadows, croplands and sagebrush uplands. Future development will provide additional wetlands and open water and undoubtedly will attract additional species of birds to the area.

Birdwatching is good during all seasons but particularly through the fall and winter months. Spectacular concentrations of up to 200,000 ducks, primarily mallards, may be seen on the Lower Unit on Toppenish Creek. Canada geese may be seen from Highway 97 during the late winter and spring.

UNION GAP
Short canyon just south of the city of Yakima, in the Yakima River Valley. See Geological map.

WAPATO DAM AND FISH SCREEN
This is a large irrigation diversion (2,000 c.f.s.) supplying water to the Yakima Indian Reservation. Screens and fishways are maintained by the Bureau of Sports Fisheries and Wildlife. See Zoological-Aquatic and Hydrological maps.

WENAS CREEK VALLEY
The upper Wenas area has an enormous bird, floral and fungi population. Birds sighted in this area include turkey buzzards, mountain bluebirds, Merriam's turkeys, western bluebirds and horned lark. Flora includes bitterroot, death camas, wild peony, lumpine and banks of white phlox along a small creek near Rocky Prairie. See Zoological-Terrestrial map.

WENAS WILDLIFE RECREATION AREA
See Oak Creek Wildlife Recreation Area.

WHITE PASS
Pass through the Cascade Mountains on U.S. Route 12. Elevation of pass is 4,500 feet. See Geological and Environmental Use maps.

WHITE SWAN VICINITY
This is an important area for shorebirds, burrowing owls, Lewis woodpeckers, songbirds, curlews, bitterns, hawks, and the ring-necked snake. See Zoological-Terrestrial map.

WILDLIFE
Wildlife information in this entry is in addition to that presented elsewhere in the atlas and consolidates contributors' statements about animals that use habitats in the county at least part of the year. These species were identified as being of statewide or national significance and reflect, in part, the range of wildlife values held by citizens of the state as well as their concern for these animals. As such, the list below should be considered neither limiting nor comprehensive for the county. More information on these and other species may be gained by study of: (1) overview papers by various authors in the Biological Section; (2) small wildlife range maps in the section entitled "Some Important Wildlife of Washington;" (3) important animal habitats mapped on the Zoological-Terrestrial and Zoological-Aquatic maps; (4) the section entitled "Life Zone Overlay", and appended species lists integrating Washington's wildlife with characteristic habitats found in the life zones of the state.

BIRDS. The Yakima Bewick's Wren, a subspecies of Bewick's Wren, has a geographic range limited to Yakima River streamside habitat. It is vulnerable to extinction because of habitat reduction. Osprey are seen at Rimrock Lake. The Columbia River in Yakima County is noted as a breeding area for the double-breasted cormorant (Phalacrocorax auritus). This bird originally bred on Goat Island, which was flooded by the McNary Dam Reservoir. Golden eagle are found in small numbers in Yakima County. the western end of the Yakima Firing Range there is a sage grouse display area. The spruce (Franklin) grouse inhabits Yakima County. Over 100 Great Blue Herons nest along the Yakima River in Green Valley.

MAMMALS. Yakima County drainage containing critical elk winter ranges includes the Tieton River Valley, from Clear Lake to Naches River; Naches River Valley, from Rattlesnake Creek to Tieton River; scattered ranges between U.S. 12 and the Toppenish River, about 5 to 10 miles west of the line between Naches and White Swan; the middle stretches of Dry Creek Valley; the middle stretches of Logy Creek Valley; the Status Creek Valley in vicinity of Yakima-Klickitat County line; the Bumping River Valley just below Bumping Lake; and the American River Valley just upstream of confluence with Bumping River. The fisher (Martes pennant) inhabits the forests of the Cascade Mountains. Red fox (Vulpes vulpes cascadensis) are well distributed in the Cascade Mountains. Mountainous areas of Yakima County provide important areas to mountain goat (Oreamos americanus). A high density population of coyotes lives on the Atomic Energy Commission Reservation. A sub-species of the coast mole (Seapanus orarius yakimensis) has a restricted range in Yakima and Kittitas Counties. The least chipmunk (Eutamias minimus scrutator) has a restricted range in Yakima, Benton, and Kittitas Counties. Wolverine (Gulo gulo) are increasing in numbers in the Cascades and in northeast Washington. Other noted mammals include cougar, mule deer, badger, white-tailed jackrabbit, and pronghorn antelope (Antilocapra americana oregona). Introduced into the county, the pronghorn finds suitable habitat here for part of its population of approximately 100 individuals.

REPTILES. An isolated population of Ring-necked snake (Diadophis amahlis) is noted in the county. The species has a very restricted range in the state. The night snake (Hypsiglena torquata) is noted in south-central Washington. The striped whipsnake (Hastiocpus taeniatus) has a range restricted to south-central Washington.

AMPHIBIANS. The tailed frog (Ascaphus truei) is noted in rapid mountain streams of the Cascades.

YAKIMA FIRING CENTER
Excellent petrified wood outcroppings and diatonite beds are found here. The area provides important habitat for sage grouse, pronghorn antelope, and coyote. See Geological and Zoological-Terrestrial maps.

YAKIMA FISH HATCHERY
State Game Department. Species propagated: trout, steelhead trout. Water source: Bachelor Creek, Ahtanum Creek, and well and spring. See Zoological-Aquatic map.

YAKIMA INDIAN RESERVATION
Ethnic group. See Historical-Cultural map.

YAKIMA PEAK
This mountain climbing area is located between the headwaters of the White River and the Ohanopecosh River. See Geological map.

YAKIMA RIVER
The free-flowing stream is an anadromous fish route. Low summer flows in the Yakima River are detrimental to fish passage, both from a quantity standpoint and from a quality standpoint. High nutrient concentrations stimulate excessive growths of nuisance aquatic blooms, and coliform densities greater than the limit for safe water-contact recreation exist. This condition results from inadequately chlorinated municipal wastes, irrigation return flows, and from agricultural drainages. The city of Yakima and vicinity are a major producer of municipal and industrial wastes but, in general, the levels of waste treatment is good except during peak periods of food processing (June to October).

Near Mabton is an important area for waterfowl and pheasant hunting. The river bottomland provides an excellent waterfowl rearing habitat.

The Sandroller (Percopsis transmontana) is a species endemic to the Columbia Basin. It is reportedly rare and becoming exterminated over much of its range. See Hydrological, Zoological-Aquatic, and Zoological-Terrestrial maps.

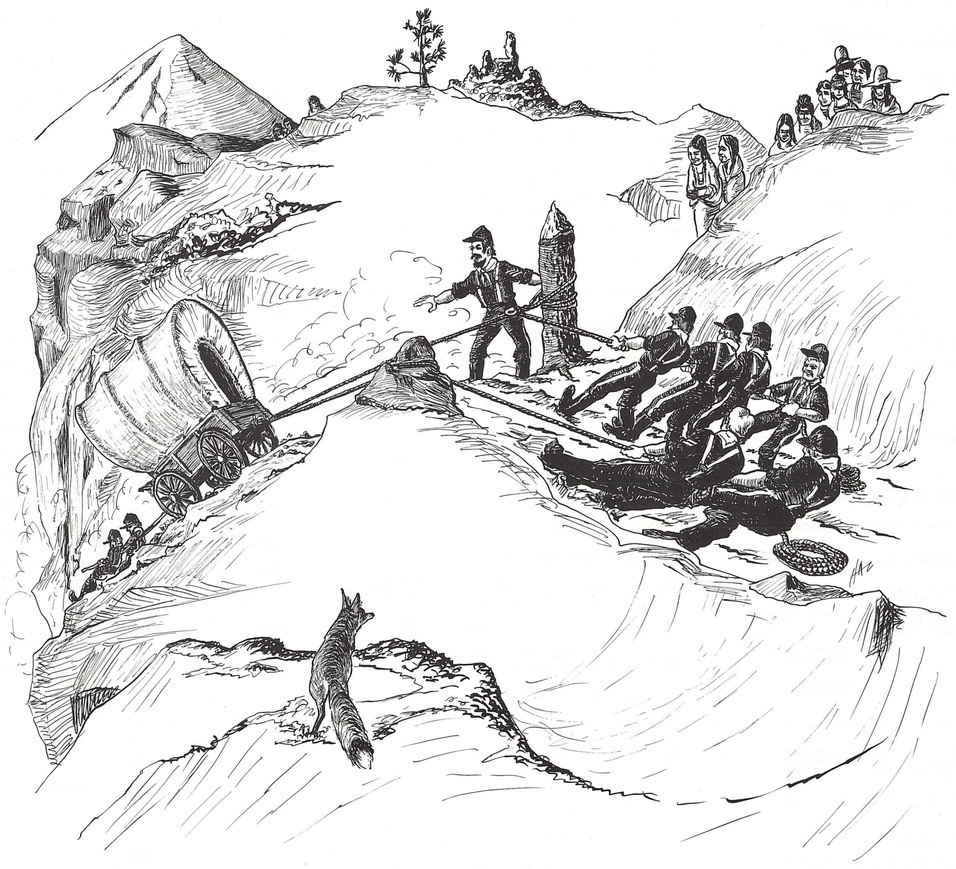
YAKIMA RIVER CANYON
This is a scenic canyon with good campsites. It is located on the Yakima River between Ellensburg and Yakima. Ideal for bicycle rides on the roadway through the canyon. A unique cactus is epidemic to this area. See Geological, Zoological-Terrestrial and Botanical maps.

YAKIMA RIVER WATERGAP
Watergap on the Yakima River between the cities of Yakima and Ellensburg. See Geological map.

YAKIMA SPORTSMEN'S STATE PARK
The 211 acre park is 3 miles southeast of Yakima. Camping, trailering, and fishing are featured. See Environmental Use map.

YAKIMA VALLEY COLLEGE (JR)
Located in Yakima, it was established in 1929. See Historical-Cultural map.

YAKIMA VALLEY MUSEUM
In Yakima, historical and Indian artifacts are exhibited. See Historical-Cultural map.



Military wagon train on overland route attempting crossing of Naches Pass - 1853

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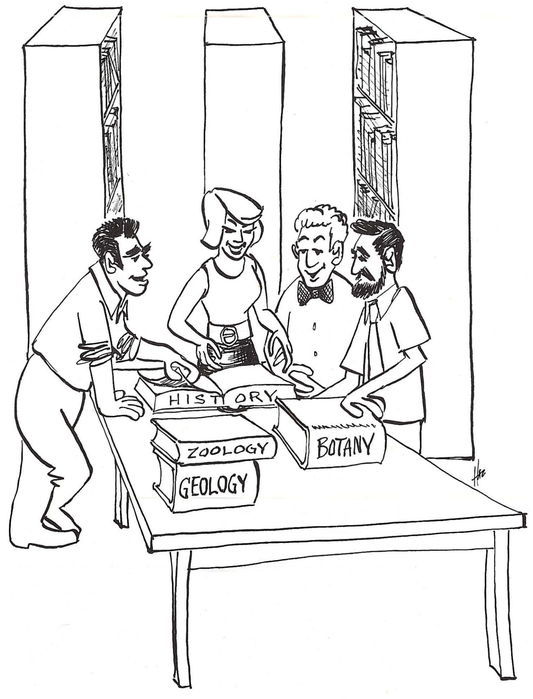

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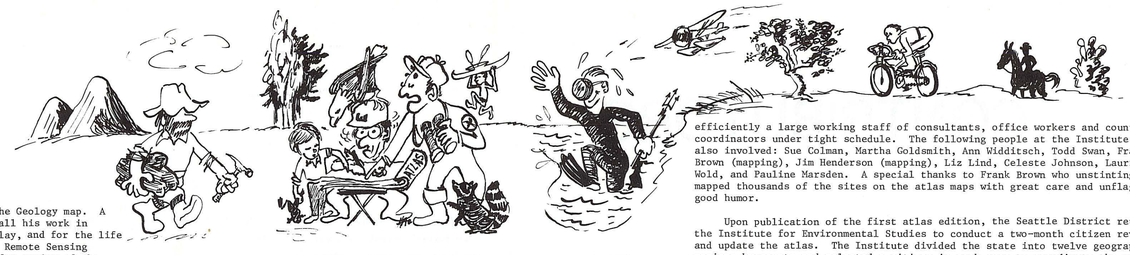
ACKNOWLEDGMENTS



A full list of acknowledgments for this expanded atlas edition would be a bit awesome, as the work compiled here has required the talents, experience and time of a large number of people. As has been stated elsewhere, these contents represent the opinions and factual data of numerous agencies, groups and individuals who took the time to contribute material.

In addition to the people mentioned here, it is fitting that these acknowledgments should extend as well to all persons listed on the foregoing page as "contributors" and to all unnamed people who provided information. Due to space limitations, time constraints and lack of manpower, it has been the unenviable task of the editors to selectively limit the list of contributors to mostly those who supplied large amounts of information, for it is their data that primarily makes up most of the County Discussion Section and their recommendations that make up many of the more than 5,000 sites indexed in the atlas. If by this action, some unacknowledged people feel that their efforts were not adequately recognized, the editors regret the omission as much as they.

This atlas is primarily built upon the solid foundation provided by the smallest of information units supplied by many hundreds of people. Leafing through the original review sheets sent in, a very conservative estimate suggests that perhaps close to 800 people had a hand in all of this. To each and every one of them a very hearty thanks with the hope that they may see their efforts bear fruit in preserving and maintaining a more productive environment as this second atlas edition is put into action at planning conferences and environmental forums around the state.

The original concepts for the atlas were born with David Aggerholm, Paul Kilburn and Steven Dice while working in the Washington, D.C. offices of the Corps. Bill McDonald and Philip Pierce joined in the development of early guidance as efforts expanded into trial reconnaissance inventories for the states of Vermont, North Carolina, South Carolina and Washington.

A special word of thanks is owed the following people for voluntarily writing overview papers for the various sections: Gordon Alcorn, Wolf Bauer, Rexford Daubenmire, Polly Dyer, Eugene Dziedzic, Curtis Erickson, John Garcia, Earl Larrison, Robert Mowrey, Folke Nyberg, Gordon Orians, David Rahm, Gary Reese, Harvey Rice, Carroll Rieck, Victor Scheffer, Joan Thomas, John Thompson, Richard Untermann, Terence Wahl and George Yount. Their written thoughts have helped clarify and integrate many diverse facts and ideas.

The atlas map materials reflect the efforts of several people who gave freely of their time and knowledge, providing guidance in the development of the maps: Dr. John Sherman, Geography Department, University of Washington, for much-appreciated advice on map preparation and map color selections; Seattle District Corps of Engineers (CoE) Map Survey staff for much technical assistance: Larry Signani, Jim Garton and Dick Henson; staff of the U.S. Geological Survey for lessons by phone on map design: Douglas Aitken, John Newhouse and Moyle Stewart in Menlo Park, California, and Ed Kennison in the Tacoma office of the USGS.

Thanks go also to CoE Reproduction Branch: Laverne Van Horn and his staff for photo-work and also Thomas Ferulano, Ted Niehoff and Harold Bauman for numerous services rendered. Thanks go also to Richard Galster, geologist, CoE Geology Section, for preparing the physiographic province overlay for the Geology map. A hearty thanks also to the following people: to John Garcia for all his work in taking on the assignment of preparing an updated life zone overlay, and for the life zone - habitat matrix on page 18; to Dr. Arthur Gray, Director, Remote Sensing Applications Laboratory, Department of Urban Planning, U of W, for review of the ERTS Section in the atlas; to Robert Scott, Department of Natural Resources, Olympia, for review of the ERTS Section and provision of photographs illustrating John Garcia's paper; and thanks also to Frank Moffett, Department of Highways, Olympia, for current information on scenic roads and the latest highway revisions mapped on the Historical and Reference maps.

In preparation of the Biological Section, many people gave freely of their time and knowledge in providing data, review and guidance. The development of the life zone system began with the inclusion of Dr. Orians' paper as the general introduction to the Biological Section and the inclusion of Dr. Daubenmire's paper as the preface to the Botanical Section. Their thoughts set the overall trend in the atlas toward efforts aimed at amplifying aspects of natural communities and further attempts to integrate ecological considerations. Dr. William Hatheway, College of Forest Resources, University of Washington, reviewed both Orians' and Daubenmire's papers and developed the approximate table of comparison of their terms for the life zones presented on page 16. Very helpful in preparation of the life zone overlay were Missy and David Deardorff, David Every of the Botany Department, University of Washington, and Douglas Henderson, Botany Department, University of Idaho.

For the small maps and texts in the wildlife section entitled: "Some Important Wildlife of Washington," the method used to acquire information was the same as that used to gain input for all the atlas sections. The broadly-phrased request to potential contributors was to review the first edition, provide corrections and supply more current information about Washington's environmental features considered to be "... statewide or national significance." Information arrived in two forms: as written text and as roughly-mapped wildlife ranges. All contributions were consolidated and edited. Ranges were redrawn on small relief maps, the same as are printed in the atlas, to provide mountain features for reference in improving range accuracy. Copies of the redrawn maps and edited texts were then sent to experts who were asked to choose important species for emphasis, correct the ranges, and expand the texts.

As a result of the review process, some species were deleted from this section, remapped on the Zoological-Terrestrial map, and placed in the County Discussion. If a definitive range was not provided, and supporting text was scanty, then the animal was relegated to the species lists; the lists also serve to supplement this section. In cases where reviewers provided a map, but limited supporting text, additional information was researched by the editors from current literature and by contact with other experts having firsthand knowledge of the animal. The section is designed to dovetail with programs of the Washington Department of Game, National Audubon Society, Wildlife Society, National Wildlife Federation, and the U.S. Fish and Wildlife Service's Office of Endangered Species and International Activities.

The basic format used to guide organization of this wildlife section is derived from the book: Threatened Wildlife of the United States, third edition, 1973, published by the Office of Endangered Species. More commonly known as "The Redbook," its format is developed around the following dozen key points summarized for each animal:

1. distinguishing characteristics
2. present distribution
3. former distribution
4. status
5. reasons for decline
6. protective measures already taken
7. measures proposed
8. estimated numbers
9. breeding rate in wild
10. number in captivity
11. breeding potential in captivity
12. references

Atlas contributors emphasized information fitting the first nine points of The Redbook's format, but not consistently for every animal because they were not specifically requested to comment on these points. The Redbook's organization was adopted after public involvement was completed. Where supporting text was researched for a species, The Redbook's points were selected from the sources on hand. To improve coverage, future information would be beneficial which emphasizes all twelve of The Redbook's considerations plus perhaps the addition of an additional point explaining each species ecological niche as much as possible.

The following people selected the species discussed, reviewed the maps and texts, and gave much valued guidance to the editors in preparation of this wildlife section: on birds: Terence Wahl, Bellingham, Gordon Alcorn, University of Puget Sound, Tom Knight, Washington Department of Game; on birds and mammals: Earl Larrison, University of Idaho, Burton Lauckhart, Eugene Dziedzic, Carroll Rieck, Reade Brown, Jack Adkins, Art Stendall, all Washington Department of Game, Philip Lehenbauer and Arthur Loestetter, Endangered Species Coordinators, U.S. Fish and Wildlife Service, Portland; on the Columbian Whitetail Deer: Dave Fisher, USFWS; on marine mammals: Victor Scheffer; on all mammals, reptiles and amphibians: Murray Johnson, Curator of Mammals, Puget Sound Museum of Natural History, Tacoma; on reptiles and amphibians: James Slater, University of Puget Sound, Robert Storm, Oregon State University; on the Olympic mud minnow: Department of Fisheries, University of Washington; on mollusks: Bruce Lang, Eastern Washington State College.

Thanks go also to Earl Basinger, Office of Endangered Species, Washington D.C., for review of text concerning endangered species. Richard Taber and David Manuwal, forest zoologists, College of Forest Resources, University of Washington, helped with the species lists. Oscar Soule, ecologist, The Evergreen State College, Olympia, and Arthur Feiro, Chairman, Biology Department, Peninsula Community College, Port Angeles, reviewed portions of the Biological Section and offered helpful criticisms. Thanks go also to three people who reviewed a test vertebrate species checklist, derived from the atlas lists, for the Elwha River Flood Plain on the Olympic Peninsula: Homer Brent and Donald Bakker of the Washington Department of Game and, again, the very helpful Arthur Feiro. The test checklist was found to be highly accurate.

Faculty members from the University of Washington's Institute for Environmental Studies who worked with this project were headed by Kieth Dearborn, Principal Investigator. Other faculty who assisted were Robert O. Sylvester, William Byers, Richard Untermann and J. Alan Wagar. A team of staff members, under Project Coordinator Alice Shorett, set up the public review and compiled revised information. A special "Thank You Alice," to Ms. Shorett, who managed efficiently a large working staff of consultants, office workers and county coordinators under tight schedule. The following people at the Institute were also involved: Sue Colman, Martha Goldsmith, Ann Widditsch, Todd Swan, Frank Brown (mapping), Jim Henderson (mapping), Liz Lind, Celeste Johnson, Laurie Wold, and Pauline Marsden. A special thanks to Frank Brown who unstintingly mapped thousands of the sites on the atlas maps with great care and unflagging good humor.

Upon publication of the first atlas edition, the Seattle District retained the Institute for Environmental Studies to conduct a two-month citizen review and update the atlas. The Institute divided the state into twelve geographic regions by county and selected a citizen in each area to coordinate the review process. These regional coordinators were:

Freesa Collins: Wahkiakum, Clark, Cowlitz, Skamania
Helen Engle: Mason, Kitsap, Pierce
Gerry Geschke: Snohomish
Bonnie Hodsdon: King
Dave Howard: Thurston, Lewis
Bob Parlett: Chelan, Okanogan, Grant, Douglas
John Sheppard: Whitman, Walla Walla, Adams, Asotin, Garfield
Bonnie Shideler: Clallam, Jefferson
Rupert Schmitt: Island, Whatcom, Skagit, San Juan
Mary Taylor: Spokane, Pend Oreille, Stevens, Ferry, Lincoln
Larry Upson: Yakima, Kittitas, Klickitat, Benton, Franklin
Mary Weed: Grays Harbor, Pacific

These people associated with the Institute for Environmental Studies were the active catalysts who brought the atlas into the public eye and generated the massive response in material now incorporated into this second edition. To all, many thanks for a job well done.

Thanks go also to Polly Dyer, Public Services Coordinator, Institute for Environmental Studies, and to Martin Baker, Executive Director, Washington Environmental Council, for review of this new edition prior to press time. Also, many thanks to Polly for her many hours of research and work in preparing an updated Environmental Use map.

The Seattle District, Corps of Engineers, actively developed much of the atlas through efforts of the Environmental Resources Section staff. Steven Dice, Chief, Environmental Resources Section, acted both as a member of the Steering Committee, directing inventories in other states, as well as guiding the development of the Washington atlas. Robert Mowrey and John Malek shared primary editorial responsibility. Mowrey coordinated and integrated the Biological Section, added the life zone overlay, ERTS photograph, habitat information, wildlife species lists, directed the map design, and managed many administrative duties in coordinating content and getting the atlas to press.

John Malek designed and implemented the entire atlas layout, researched the photographs, and coordinated with artist Hal Street on subject selection for the sketches. Malek designed and wrote the text for "The First Men" photo-essay on page 54 and added many significant professional editorial touches to the final polished atlas. A special word of thanks to Bill Holm, Curator of Northwest Coast Indian Art, Thomas Burke Memorial Museum, University of Washington, for information supplied to Mr. Malek and for review of the photo-essay on Indians.

Other people in the Environmental Resources Section who assisted in the atlas were Pamela Anderson, John Carlson, Paul Cooke, Dave Vance, Todd Snow, Jerry Keating, Jean McManus, Mike McNeely, Dick Swanson, George Doolittle, Jack Thompson, Ron Bush, Dennis Feten, Jim Newman, Fred Weinmann, and David Munsell.

Other staff of the Seattle District assisting were: Kathy LeProwse, Wayne Rowe, Douglas Bailey, David Adams, Bradley Luton, Lee Bass, and Oswald Schmidt. Finally, a special thanks to the staff of Seattle District's Service Branch who worked to provide all the meticulous polished copy that is so readable; for supervision: Neal Harwell and Ellen Keim; for much careful typing: Cherese Pearson, Catherine Miller, Marcia Kent, Vickie Wordsworth, Sharon Daniels, Patsy Moshier, Cynthia DeFilippo, Sherry Kemper, Cheryle Weiss, Margie Brock, and thanks also to Virginia Driver, Engineering Division, and to Phyllis Sherburne, Basin Planning, for many more hours of extra typing.

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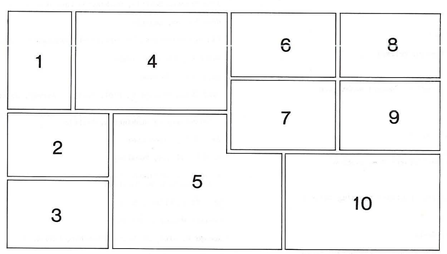

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PHOTOGRAPHS

Jerry Bodine, Seattle: "Climber at LaBohn Gap," pg 1, "Kayakers," pg 9.

Ken Davis, Seattle: "Glacier Peak," pg 1.

Allan Hopkins, Bellevue: "Mushrooms," pg 21.

Bob Lilly, Walla Walla: "Wheat Harvest," pg 71.

Harvey Rice, Pullman: "Ozette Village," pg 55; "Lind Coulee," pg 55; "Alpaweya," pg 55.

John Schoen, Seattle: "Blacktail Doe," pg 33; "English Fort," pg 59.

Robert Scott, Department of Natural Resources, Olympia: "Earth Resources Technology Satellite," (both photos) pg 72.

Seattle Times, Seattle: "Moses Coulee," pg 1; "Devil's Fence Post," pg 1; "Fort Lawton Shoreline," pg 8; "Snake River Dig," pg 55; "Farmhouse," pg 60.

John C. Sherman, U.W., Seattle: ERTS image, band 5, pg 73.

Bob & Ira Spring, Edmonds: "Tiffany Mountain," pg 66; "Curley Creek Bridge and Falls," pg 66; "Middle Fork Snoqualmie Kayakers," pg 67.

State of Washington, Department of Fisheries: "Purse Seiner," pg 27; "Brailling Operations," pg 28.

State of Washington, Department of Game: "Black Brant," pg ii; "Cattle Ranch," pg ii; "Padilla Bay," pg 8; "Wynoochee Falls," pg 9; "Bandtail Pigeons," pg 15; "Great Blue Heron," pg 15; "Clamming," pg 28; "Float Fishing," pg 28; "Black Brant," pg 33; "Merriam's Turkey," pg 33; "Bald Eagle," pg 33; "Mule Deer," pg 34; "Bobcat," pg 34; "Pronghorn Antelope," pg 34; "Marten," pg 39; "American Avocet," pg 40; "Seagull," pg 40; "Osprey Nest," pg 65; "Bear Cub," pg 65; "Backpacker," pg 67; "Falconry," pg 67; and the photographs used in the section "Some Important Wildlife Of Washington," with the exception of those marine mammal shots supplied by the National Marine Fisheries Service, were obtained from the Department of Game, as was also the Killer Whale photograph on page 27.





Dave Sutcliffe, Seattle: "Cape Flattery Sunset," pg iii.

U.S.D.O.D., Corps of Engineers, Seattle District: "Waterside Trail," pg 71.

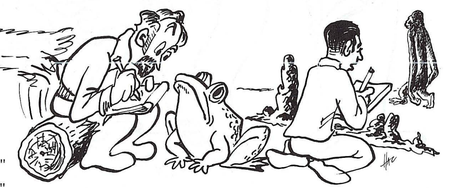
U.S.D.C., National Marine Fisheries Service, Marine Mammal Division: "Killer Whale," pg 52; "Pacific Whitesided Dolphin," pg 27; "Northern Fur Seal bull, female, pup," pg 27 by H. Kajimura; "Risso's Dolphins," pg 52 by C. Fiscus; "Harbor Seal Rookery," pg 52 by T. Newby; "Sea Otter," pg 52 by K. Kenyon; and a specieal word of thanks to Allan Wolman who generously made these pictures available.

U.S.D.A., Forest Service, Snoqualmie National Forest: "Rock Climbing," pg ii; "Steam Donkey," pg i; "Rockclimber In Enchantments," pg 1; "Rapid River," pg 7; "Tiger Lily," pg 21; "Wild Rose," pg 21; "Snow Lake," pg 65; "Ptarmigan" and "Marmots," pg 18; "Cougar Lake and Mount Adams," pg iii.

U.S.D.I., Bureau of Reclamation, Ephrata: "Dry Falls," pg 1; "Sagebrush Area," pg 21; "Sand Dunes in Columbia Basin," pg iii.

University of Washington Library, Special Collections; the following photographs were obtained from the Special Collections Room at Suzzallo Library. A special thanks to Robert Monroe, Director of Special Collections, for his assistance: photographer unknown: "Remote Valley in Olympics," pg i; "Cannonball Island," pg 8; Asahel Curtis, Seattle: "Towing In The Dead Whale," pg 54; "Fort Nisqually Granary," pg 59; "Nachess Pass Trail," pg 59; "Ahtanum Mission," pg 60. The "Sales Family Cabin," pg 59 was originally photographed in 1894 by Charles Kinner. The photo here is a copy of that orginal made by Asahel Curtis. Edward Curtis, Seattle: "The First Men" photo-essay appearing on pg 54 is composed of ten pictures, nine of which are reproduced from Edward Curtis' excellent volumes, North American Indian. The picture, "Towing In The Dead Whale," is by Edward's brother, Asahel.

Darius Kinsey: "Oxen Logging," pg 59.



SKETCHES

Hal Street: As editors, we are deeply indebted to artist Hal Street, far more than can be repaid, for his contributions of talent, knowledge and undaunted enthusiasm to this project. His aid as an unofficial graphics consultant prevented us from stumbling into a number of pitfalls. This atlas is profusely illustrated with sketches, all but seven of which were drawn by Hal. Sandwiched between drawing sketches for the atlas, answering our questions, and holding down his job as Graphics Director of the Health Sciences Photographic Facility at the University of Washington, he still finds time for another art form - that of periodically appearing (sometimes with his wife Theda) in community theater stage productions in the greater Seattle area. A native of Seattle, he has spent most of his life in the Puget Sound region. He has a special interest and discerning eye, as may be surmised, for all wildlife. Free time permitting, he may occasionally be observed perched on a mossy log in the woods, eyeball-to-eyeball with some creature, doing what he especially enjoys: sketching from nature firsthand.

Todd Swan: "Squirrel insert" and "Trees," pg 15; "Sasquatch," pg 53; "Archeology insert," pg 55; "Paul Thiry Residence," pg 60; "H. M. Meyers House," pg 60; "Seattle Revere House," pg 60.

STATE OF WASHINGTON

REFERENCE MAP

Washington Environmental Atlas
Second Edition, January 1975

Base modified from U.S. Geological Survey State
Base Map: Washington, 1:500,000, 1962

SCALE 1:750,000

- State capital
- County seat
- City, town, or village
- Corporate boundary shown for towns over 5000 population

10 0 10 20 30 40 miles
10 0 10 20 30 40 50 Kilometers

- Interstate highway
- U.S. highway
- State highway
- Other principal roads