

2003 Oregon Natural Heritage Plan



**Natural Heritage Advisory Council
to the State Land Board**



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The Oregon Natural Heritage Plan, first published in 1981 and revised in 1988, 1993 and 1998, has again been revised and updated by the Natural Heritage Advisory Council and by the staff of The Oregon Natural Heritage Information Center:

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**State Land Board
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OREGON NATURAL HERITAGE PLAN

**Natural Heritage Advisory Council
to the State Land Board**

2003

**775 Summer St. NE
Salem, Oregon**

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Part 1

The Natural Heritage Program

Goals and Objectives

Chapter 1: Conserving Oregon's Natural Heritage

The mission of the Oregon Natural Heritage Program is to conserve the full range of Oregon's native plants, animals and ecosystems through voluntary and cooperative action. Many other states and large parts of Europe and Asia have lost the opportunity to conserve their natural heritage. While parts of the state have been radically altered since pioneers traveled the Oregon Trail, much of Oregon substantially retains both its natural character and elements of its natural heritage. This provides Oregonians the opportunity to conserve our native ecosystems and the diversity of life they harbor.

The Oregon Natural Heritage Program uses science to identify high quality and representative examples of native Oregon habitats and species and works to protect these natural treasures through voluntary and cooperative habitat conservation agreements.

The Oregon Natural Heritage Plan has three roles:

- 1) Describe the components of Oregon's natural heritage;
- 2) Identify natural areas of exceptional value for conservation; and
- 3) Provide opportunities for voluntary conservation on both public and private lands.

A rich diversity of ecosystems and native plants and animals is one of Oregon's most distinctive and valued qualities. Our state contains rain forests, dry forests, oak woodlands, alpine meadows, prairies, deserts, coastal marshes, estuaries, beaches, rocky headlands, lakes and clear streams. But Oregon is changing and rapidly developing, and unless we plan specifically to conserve and restore our remaining natural habitats and species, many may be lost.

The wise use of our natural resources, both to support the economy and to provide recreational opportunities, is essential to Oregon's economic and environmental health. When we want to study what happens to a landscape or habitat as the result of a proposed action, or assess current practices, our best yardstick to compare it to is a sample of that landscape in its natural condition. Scientists call such an area a "control," meaning a baseline against which comparisons may be made. Controls help provide a means to predict future conditions as well as to interpret past and present developments. In this sense, Oregon's remaining

natural areas are extremely valuable environmental reference sites.

There is an increasing interest and sophistication among Oregonians concerning their natural environment. Oregon's parks and wilderness areas are increasingly visited. At the same time, use of natural areas for research and baseline development has also increased, with increases in University researchers and more energy focused on inventory, monitoring and research by federal agencies. Promoting the protection of natural areas representing the full diversity of Oregon's native habitats will help ensure that future generations can continue to enjoy, appreciate, and learn from them.

The Oregon Natural Heritage Plan was established by the Oregon Legislature to provide guidance to federal, state, and local agencies; and private landowners, as to the most efficient way to create a comprehensive system of natural areas in the state. The Oregon Natural Heritage Program and Oregon Natural Heritage Plan together form the framework that guides the state's natural heritage conservation effort. One provides the inventory, the other the process for reaching the conservation goal.

The plan is organized into two basic parts. The first part includes four chapters that describe the goals and mechanisms created by the Natural Heritage Act. The second part of the plan includes an introductory chapter and the eight ecoregional chapters containing the lists of natural heritage elements, and the sites at which they are conserved.

This 2003 Natural Heritage Plan has been updated to reflect new thinking in biodiversity planning and to incorporate new information on species and geologic types. One change results from a reexamination of threats to listed natural areas. Some cells or species found on established Research Natural Areas and preserves that were previously considered "protected" have been recategorized as "partially protected" due to small size or isolation of the sites. Wetlands, streams and other natural habitats influenced by activities adjacent to the natural areas have been reevaluated based on watershed considerations to determine whether the cells or ecosystems are adequately protected.

Areas of Critical Environmental Concern, Wilderness Areas, National Monuments, local preserves and other public lands with management plans that adequately protect Oregon's natural heritage are now included with Research Natural Areas and preserves as providing complete or partial protection for some ecosystems and species. Some areas, including the descriptions of aquatic habitats and elements describing ecosystem processes, remain incomplete. However the Natural Heritage Advisory Council continues to strive to make this plan as relevant and comprehensive as possible.

Oregon Natural Heritage Program

The Oregon Natural Heritage Program in its present form was established by the 1979 Legislature (ORS 273.561-.591 [SB 448]). This legislation was built upon the 1973 Natural Area Preserves Act, which it replaced. It relied on information from the state's first natural area inventory (called the Oregon Natural Heritage Program, started in 1974 by The Nature Conservancy). The Natural Heritage Act of 1979 in essence combined the State Natural Area Preserves Act of 1973 and the Oregon Natural Heritage Program, but provided no resources to manage the program.

Between 1989 and 2002, limited state funding allowed for the creation of an official Natural Heritage Program, managed by The Nature Conservancy for the Division of State Lands (DSL) and State Land Board. In 2002, the Oregon Legislature transferred the staff managing the Natural Heritage Program to Oregon State University, to become part of a newly created Institute for Natural Resources (INR). At INR, the Oregon Natural Heritage Information Center (ORNHIC) will continue to manage the Natural Heritage Program for the State Land Board and DSL. A more detailed discussion of this new institute and biodiversity conservation and analysis efforts in Oregon is included in Chapter 2.

Goals of the Natural Heritage Program

The Natural Heritage Act established the following goals for the Natural Heritage Program:

1. Create a discrete and limited system of natural heritage conservation areas representing the full range of Oregon's natural heritage resources. These areas are to be used for scientific research, educational purposes and nature interpretation.

2. Provide a Natural Heritage Plan as a specific framework for conservation decision-making.
3. Provide systematic, accessible information on the locations of the resources of Oregon's natural heritage including special plant and animal species, terrestrial and aquatic ecosystems, and geologic formations and features; with emphasis on the areas already preserved with these resources.
4. Establish a process and means for public and private sector voluntary cooperation in the development of a system of conservation areas.
5. Provide advice to managers of natural heritage conservation areas on the management and use of such areas and provide information concerning the conservation of natural heritage resources and special species to the state, federal and local agencies that manage lands within Oregon.

The Act further establishes the following principles:

1. The Program shall be complementary to and consistent with the research natural area program as implemented on federal lands.
2. All conservation shall be voluntary on the part of the landowner or public land manager. The Program is advisory to those parties.
3. Wherever feasible, a resource shall be protected on public lands allocated primarily to special non-commodity uses, such as state and federal parks, preserves and wilderness areas.

Natural Heritage Advisory Council

The Natural Heritage Advisory Council (NHAC) was established in 1979 in order to: 1) develop policy for the Heritage Program through the development of the Natural Heritage Plan; 2) advise landowners and the Boards and Commissions of Oregon's natural resource agencies, including the State Land Board, concerning areas which qualify for the Register of Natural Heritage Resources; 3) evaluate, review and recommend for dedication potential Natural Heritage Conservation Areas; and 4) assist the State Land Board in the operation of the Natural Heritage Program.

Nine council members are appointed by the Governor and serve four-year terms. Four members are recognized experts in a discipline of natural history (ecology, zoology, aquatic biology, botany or geology).

Five members are selected from throughout the state and have an interest in the conservation, management or commodity use of natural resources.

In addition, there are nine ex-officio, non-voting members representing the Director of the Department of Fish and Wildlife, the State Forester, Director of Transportation, the Chancellor of the State Board of Higher Education, Director of the Department of Geology and Mineral Industries, Director of the Oregon Watershed Enhancement Board, Director of Agriculture, Director of the State Parks and Recreation Department, and the Director of the Division of State Lands. The Natural Heritage Advisory Council meets quarterly, with three meetings each year at the office of the Division of State Lands and one meeting elsewhere in Oregon.

Natural Heritage Plan

The Natural Heritage Plan guides the Natural Heritage Program's selection of priority areas for establishment as natural areas. As a first step, the Plan defines the full range of components of Oregon's natural heritage -- the terrestrial, wetland and aquatic ecosystems that define Oregon's living landscape. Characteristic geologic formations and features are included due to their special scientific and educational values.

In addition to these Natural Heritage Resources, the Plan lists special species, including vascular plants, non-vascular plants, vertebrates, and invertebrate animals that need attention in order to survive as components of Oregon's natural heritage.

The Plan also establishes criteria for the selection of natural areas suitable for: 1) inclusion on the Oregon Register of Natural Heritage Resources, 2) dedication as a Natural Heritage Conservation Area, 3) designation as a Research Natural Area, or 4) designated as another public or private reserve.

Since so many lands in Oregon have natural values and potential importance for conservation, criteria are needed for selection of a limited number of areas containing the highest natural values. The Plan provides landowners and public land managers with

tools to voluntarily designate and protect priority areas. Guidelines for the management of these conservation areas should be consistent with those developed for the research natural area program on federal lands.

The first Oregon Natural Heritage Plan was produced in 1981. It was primarily based on data developed by scientific professionals and conservationists convened to develop the first *Research Natural Area Needs in the Pacific Northwest*. This 1975 publication guided the establishment of federal natural areas in Oregon until the first Heritage Plan was published. The plan was updated in 1988, 1993, 1998, and now in 2003.

Procedure for Amending the Plan

The Oregon Natural Heritage Plan is updated at least every five years and a report is submitted to the Land Board describing the progress of the program.

This report includes:

1. A listing of the cells that have been filled and an analysis of the progress toward the goal of complete representation of all identified elements in the Natural Heritage system.
2. A description of the advances in scientific understanding of the natural heritage resources and special species that will affect the status, inclusion or removal of elements in the Plan.
3. A recommendation to the Land Board of any necessary changes to the Plan.

The Council prepares an amended or updated draft plan and circulates it for review by scientists, land managers and the general public. Following public notice and hearing, the Council presents the Plan to the State Land Board for adoption. The Plan is an official rule of the State Land Board, and as such sets policy for the Oregon Natural Heritage Program.

Key Terms and Definitions

The following terms and concepts are used throughout this Plan:

Aquatic and Wetland Ecosystems -- Distinct freshwater aquatic environments, equivalent to

"Aquatic Types" as used in the Oregon Natural Heritage Act, and to Wetlands and Deepwater habitats, as defined by the U.S. Fish and Wildlife Service (Cowardin *et al.* 1979). They refer primarily to wetlands, streams, rivers and lakes. Marine and Estuarine aquatic ecosystems are treated separately.

Biodiversity -- The full range of variety and variability within and among living organisms and the ecological complexes in which they occur. The concept of biodiversity encompasses ecosystem processes, species diversity and genetic variation.

Cell -- A unique ecosystem type used in the Natural Heritage Plan to describe and evaluate natural areas. Cells contain one or more ecosystem elements.

Ecoregion -- A geographic area with characteristic features such as climate, geology, geomorphology, soils, and ecosystem processes, and natural assemblages of plants and animals. There are a number of ecoregional classifications used in the Northwest. The Natural Heritage Plan uses a system developed cooperatively by the EPA and Jim Omernik (2002). It is quite similar to those used by the U.S. Forest Service and The Nature Conservancy, based on a system developed by Bailey (1995).

Ecosystem -- An assemblage of integrated organisms plus the local environment supporting them. Ecosystems generally have consistent dominant species, food chains, nutrient flows, etc. Ecosystems in the Heritage Plan can vary in size from local plant communities, such as a 20 acre silver sagebrush flat to a 20,000 acre wetland complex.

Elements -- The basic units of Oregon's ecological and geological heritage. Elements are generally either plant communities or ecosystems listed in the Plan as Natural Heritage Resources, or special species.

Element Occurrence -- An example of an element in nature. For example, a particular forest stand that meets the definition in the Plan, or the nesting site for a particular bird included in the special species list.

Geological Formations and Features -- The rocks and sediments deposited in distinct environments (formations) or the landforms formed by distinct biological, chemical, and/or physical processes

(features). These features or formations have been grouped into cells that indicate when they were formed or deposited.

Introduced Species -- Also referred to as exotic species, these are plants or animals occurring in Oregon as a result of introduction or unnatural range expansion. These are species that did not occur in Oregon before the arrival of European culture.

Native Species -- Any species known to occur in Oregon before the arrival of European culture or which has moved into Oregon through natural range extension.

Natural Area -- Any site, characterized by natural (see definition below) vegetation that is managed primarily for the preservation and maintenance of its natural features. Natural areas may be privately or publically owned. See Chapter 4.

Natural Heritage Conservation Area (NHCA) -- A natural area dedicated by the State Land Board under the Natural Heritage Act as part of a statewide system of protected natural areas. NHACs are state or privately owned. See Chapter 4.

Natural Heritage Resources -- The Terrestrial Ecosystems, Aquatic and Wetland Ecosystems, Special Species and Unique Geologic Types as defined by the Natural Heritage Act.

Natural -- A quality possessed by sites reflecting the range of natural variability present before the arrival of European culture in Oregon. Disturbance from this state generally results in reduction in cover of native species, increases in introduced species or changes in the organization of the community, often accompanied by changes in the associated physical environment.

Oregon Register of Natural Heritage Resources -- A registry maintained by the Natural Heritage Program of significant natural areas, voluntarily managed in ways that protect one or more natural heritage resources. The Council recommends natural areas to the State Land Board for inclusion on the Register. Chapter 4 shows the current list of registered sites.

Plant Community -- A general term for an assemblage of plants which grow together at a site or show a definite association or affinity to each other, such as a Ponderosa pine/snowberry forest. Plant communities may be forests, woodlands, shrublands, grasslands, forblands, and include uplands and wetlands.

Protected -- An element that is represented in a natural area which is managed for its long term survival, and which has a large enough population or area to assure its viability. In this plan, representation of a species at a natural area does not assume it is protected.

Representation -- The inclusion of an element in a natural area identified according to the guidelines of the Plan. The central goal of the Heritage Program is to assure that each element is adequately represented, but without unnecessary duplication.

Research Natural Area (RNA) -- Areas established by federal agencies under the plan of the Pacific Northwest Research Natural Area Committee. The RNA is the federal counterpart of the NHCA, as the Oregon Natural Heritage Program is the state counterpart of the federal research natural area program

Special Species -- Animal and plant species considered to be of conservation interest because of their rarity or vulnerability to extirpation or extinction, or because they are under-represented in the statewide system of protected natural areas.

Terrestrial Ecosystem -- The name given to an assemblage of land-based species in a given locale, possessing some degree of interrelationship, generally reflected in consistency in dominant species and environment. This term is equivalent to the term "Plant Community Type" as used in the Natural Heritage Act and more accurately reflects the interest in all components of the ecological system rather than merely the dominant plant species.



Photo of Elegant fawn-lily (*Erythronium elegans*) by Linda M. Hardie

Chapter 2: Biodiversity Protection and Benchmarks

Biodiversity Planning in Oregon

Since the Oregon Natural Heritage Act was passed in 1979, ecologists have drawn increasing attention to the value of protecting biological diversity. At the same time, new technologies have made it possible to analyze living systems in more sophisticated ways, over broader landscapes, and to more effectively devise strategies for conserving natural diversity. These developments have opened opportunities for the Natural Heritage Program to form new public and private partnerships with natural area managers and to contribute valuable biodiversity information to conservation planners.

Gap Analysis

Florida (Cox *et al.* 1994) developed one of the first statewide biodiversity strategies which is now used as a blueprint for protection efforts in Florida. Nationally, the Biological Research Division of the U.S. Geological Survey (BRD) has adopted the Gap Analysis Program (GAP), which develops partnerships with states to assess the representation of land cover types and wildlife in protected areas. GAP uses Geographic Information System (GIS) maps with overlays for land cover (generally using satellite imagery), matrices of wildlife-habitat relationships, generalized databases of wildlife distributions, and a stewardship (or management) layer to analyze how well each species or habitat is represented in existing protected areas (Scott *et al.* 1993).

The Oregon Natural Heritage Program has been heavily involved in the development and management of the Gap Analysis Program in Oregon. Staff of the Natural Heritage Program were the primary authors of the final Oregon GAP report (Kagan *et al.* 1999). Oregon GAP focuses on developing information to increase the efficiency of Oregon's biodiversity protection efforts. Currently, the Oregon Natural Heritage Information Center manages the Oregon Gap Analysis Program, which remains a cooperative effort. Partners include the U.S. Geological Survey, the Oregon Department of Fish and Wildlife (ODFW), and the Oregon State University (OSU) Institute for Natural Resources.

The most recent project is regional work with adjacent states to initiate a northwest regional GAP, called re-GAP. The re-GAP effort is ongoing in the five southwestern states, and a primary goal is to develop seamless vegetation and wildlife distribution information for the entire western U.S. Other ongoing Oregon GAP projects include the development of a classification and analysis of aquatic species and habitats and the creation of an on-line system to serve GAP and Heritage Data over the Internet.

State of the Environment Report and Environmental Benchmarks

In 2000, the State of Oregon completed a *State of the Environment Report*. Organized by Dr. Paul Risser, the Oregon State University President, and funded through the Oregon Progress Board, the report described the current status of Oregon's environment. It also focused on updating Oregon's environmental benchmarks, including those focused on the protection of biodiversity. Almost all of the benchmarks have been revised, and state agencies are striving to change the way they collect information and design their programs to improve Oregon's environment. The Heritage Program and the Oregon Gap Program provided key data for the analysis in this report. The report also highlighted the need for an Institute for Natural Resources and for better coordination of natural resource information.

Oregon Plan for Salmon and Watersheds

Over the last 6 years, a major focus for the State of Oregon has been a large-scale planning and restoration effort, called the Oregon Plan for Salmon and Watersheds. This interagency, locally-focused effort was a priority of Governor Kitzhaber, and is coordinated by the Oregon Watershed Enhancement Board. Referred to as the Oregon Plan, this is a comprehensive effort to restore watersheds to conditions that will provide substantial cultural, environmental and economic benefits. While the Oregon Plan focuses on the ecological needs of salmon, overall it will conserve and restore crucial elements of natural systems that support people, agriculture, industry, fish and wildlife.

Oregon Biodiversity Project

The first statewide assessment in Oregon was the Oregon Biodiversity Project, completed in 1998. This was a partnership including representatives from the Defenders of Wildlife, The Nature Conservancy, the Oregon Natural Heritage Program; and the forest, power, ranching and consulting industries.

Originally started as an Oregon Gap Analysis Project implementation program, the Oregon Biodiversity Project has developed and published a statewide conservation strategy and atlas. Following the completion of the strategy, the group became the Oregon Biodiversity Partnership, which is currently focusing on ways to improve voluntary biodiversity protection in Oregon using incentives. House Bill 3564, passed in the 2001 legislature, created a Conservation Incentives Work Group to review the many state and federal programs, looking for ways to improve coordination, increase efficiency of agency efforts, and remove disincentives for conservation.

Federal Regional Assessments

Federal agencies have completed two ambitious plans for biodiversity protection in Oregon, and are undertaking a third. The first is the President's Forest Plan, which was developed over four years to promote the recovery of the northern spotted owl together with sustainable forestry practices in western Oregon. This plan significantly increased the amount of federal land designated for wildlife and conservation purposes. This was also the first regional plan that focused on a specific group of habitats – the old-growth forests and the biodiversity that they contain.

Second is the Interior Columbia Basin Ecosystem Management Project, which remains the largest regional assessment yet completed. This assessment included all of eastern Oregon and most of the Pacific Northwest, and was an attempt to develop ecosystem management guidelines for public and private lands. Heritage data and staff participated extensively in the analysis for this project. However, for various reasons, the federal agencies have had a more difficult time implementing recommendations from the study.

The third, ongoing regional assessment is a multi-scale planning effort coordinated by the Northwest Power Planning Council, and funded by the Bonneville Power Administration (BPA). As part of this effort, subbasin plans are being developed by local groups to provide

specific actions and projects recommended for fish and wildlife mitigation efforts funded by BPA. Subbasin plans also have a role in recovery planning for the National Marine Fisheries Service and the United States Fish and Wildlife Service, as well as a coordination function at the local and state levels. Plans are being developed cooperatively with local watershed councils, in association with the Oregon Plan.

Institute for Natural Resources

A major finding of the State of the Environment Report was that natural resources information was poorly managed in Oregon, and dramatic change in the way information was gathered and managed was needed to make essential progress in improving the environment.

The key is to make objective and comprehensive information readily available to policy and decision-makers.

To do this, the 2001 Oregon Legislature took three important steps. First they provided funding and direction to integrate the Oregon Geospatial Data Center into the work of all natural resources agencies, and to develop a Spatial Data Framework for the state. Secondly, they created natural resource data coordination authority at the Oregon Watershed Enhancement Board (OWEB). Finally, they created a new Institute for Natural Resources (INR) at Oregon State University. The mission of the INR is to provide science and information to improve natural resource decision making. The INR will include an Information Office, to integrate natural resources information from the diverse network of state and federal agencies, and from colleges and universities throughout the Pacific Northwest.

Still in its infancy, the Information Office of the INR includes the Oregon Natural Heritage Information Center (ORNHIC), a Digital Natural Resources Library created by the OSU Valley Library, and an OSU Spatial Data integration effort called Virtual Oregon. ORNHIC will coordinate the management of data on vegetation, wildlife, threatened and endangered species, protected areas; and other core biodiversity information. ORNHIC will also provide staff to support the activities of the Natural Heritage Advisory Council for the Division of State Lands and the Land Board.

Oregon Natural Heritage Information Center Data

The Oregon Natural Heritage Information Center uses all available information to guide implementation of the Natural Heritage Plan, particularly the selection of natural areas for registration and dedication. It is also contracted to provide natural heritage and sensitive species information to state and federal agencies and is accessed daily by public land managers, private developers, researchers and educators.

ORNHIC databases contain:

- More than 20,000 records of locations of rare and endangered plants and animals.
- Status and descriptions of 850 vertebrates, 300 invertebrates, 1100 vascular plants, and 62 non-vascular plants, as well as over 600 plant community types.
- Detailed descriptions of 825 vertebrate animals, 49 invertebrates and 215 plants, with county, ecoregional, watershed and Environmental Monitoring and Assessment Program (EMAP) hexagon (a national grid created for the U.S. which has 440 hexagons in Oregon) distributions.
- Maps and files on all designated and proposed natural areas, preserves, parks and wildlife areas in Oregon. A map and complete list of established natural areas in Oregon are also included as Appendix A, on page 158.
- GIS maps showing locations of all rare and endangered species, historic vegetation and existing vegetation, ownership and management status of all public lands and private reserves in Oregon, and other information relevant to biodiversity conservation.

Defined in the Natural Heritage Act, this is information critical to the development of the Oregon Natural Heritage Plan and Program. Most of the natural area data in the databank related to state and private lands was collected in the early years of the program, between 1975 and 1989. Funding to update this information has not been available.

Making a Data Request

Much of ORNHIC's information is available online, thanks to the assistance of the U.S. Geological Survey and the Oregon Watershed Enhancement Board. The Internet address is <http://oregonstate.edu/ornhic>.

To request other information or services from the Natural Heritage Information Center, send a written statement of your data needs. Include the following information:

Name, address, and phone number

The type of data needed

Specific location of project, and map if available

Explanation of how the information will be used

Data requests are processed in the order in which they are received. The response time is approximately 10 working days, although large or complex data requests may take longer.

Fees are charged to cover the cost of providing data services. The minimum charge is \$45.00. Charges are based on a rate of \$50.00 per hour for staff time, plus a \$0.50 per record printout fee and a \$20.00 computer access fee. An estimate of fees can be provided prior to initiating a search. Send data requests to:

Data Output Manager
Oregon Natural Heritage Information Center
1322 SE Morrison Street
Portland, OR 97214-2423
Fax (503) 731-3070
Phone (503) 731-3070

In addition to providing data output for specific projects, ORNHIC provides interested parties access to large parts or all of the statewide, threatened and endangered (T&E) species database. To access this, or any other digital data, ORNHIC requires the completion of a Data Use Agreement prior to the distribution of digital data. These forms can be obtained from the Data Output Manager. Access to this information is via an annual subscription. The annual fee for this subscription, which provides both spatial data and information from the T&E species element occurrence database, is currently \$6,000.

Chapter 3: Oregon's Natural Heritage Resources

The Natural Heritage Act calls for the establishment of “a discrete and limited system” of natural heritage conservation areas which have “substantially retained their natural character” and which “represent the full range of Oregon’s natural heritage resources.” The natural heritage resources lists contained in this plan guide the selection of conservation areas that, considered together, will protect the full range of Oregon’s ecological diversity.

Element Approach

Oregon's natural diversity consists of thousands of plants and animals interacting with each other and with their physical environment. The approach used by the Oregon Natural Heritage Program to describe

and protect this diversity is to begin by identifying the “elements” of diversity (Figure 1). At the broadest level, an element can be a plant community or an ecosystem (for example, Douglas fir / swordfern forest, Idaho fescue prairie, or sphagnum bog). Most native plant and animal species would be found in a comprehensive inventory of such elements so defined. However, some individual species (such as the Willamette Valley daisy or the pygmy rabbit) are rare or occur only locally. Because these species may not be protected using the ecosystem approach alone, the Natural Heritage Program calls them “special species” and classifies them as elements in their own right. An “element,” therefore, as used in this Plan, is commonly a plant community or ecosystem, but may also be either a rare plant or animal.

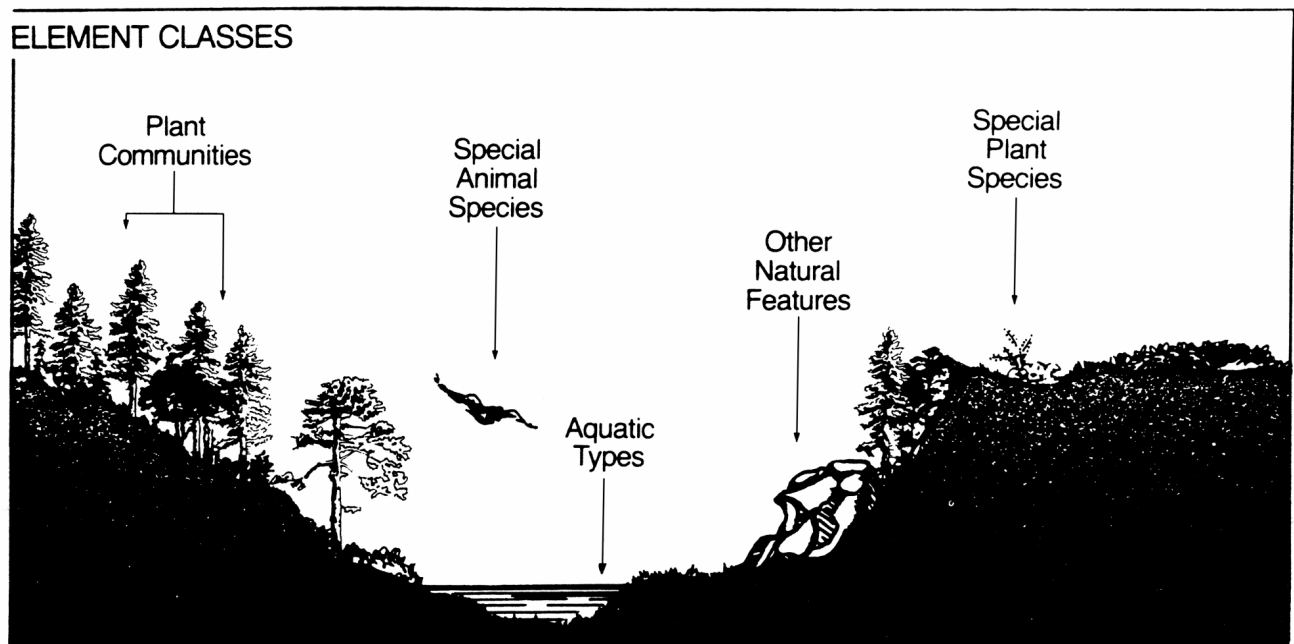


Figure 1. Diagram of Element Types used in Natural Heritage Plan

Ecoregional Approach

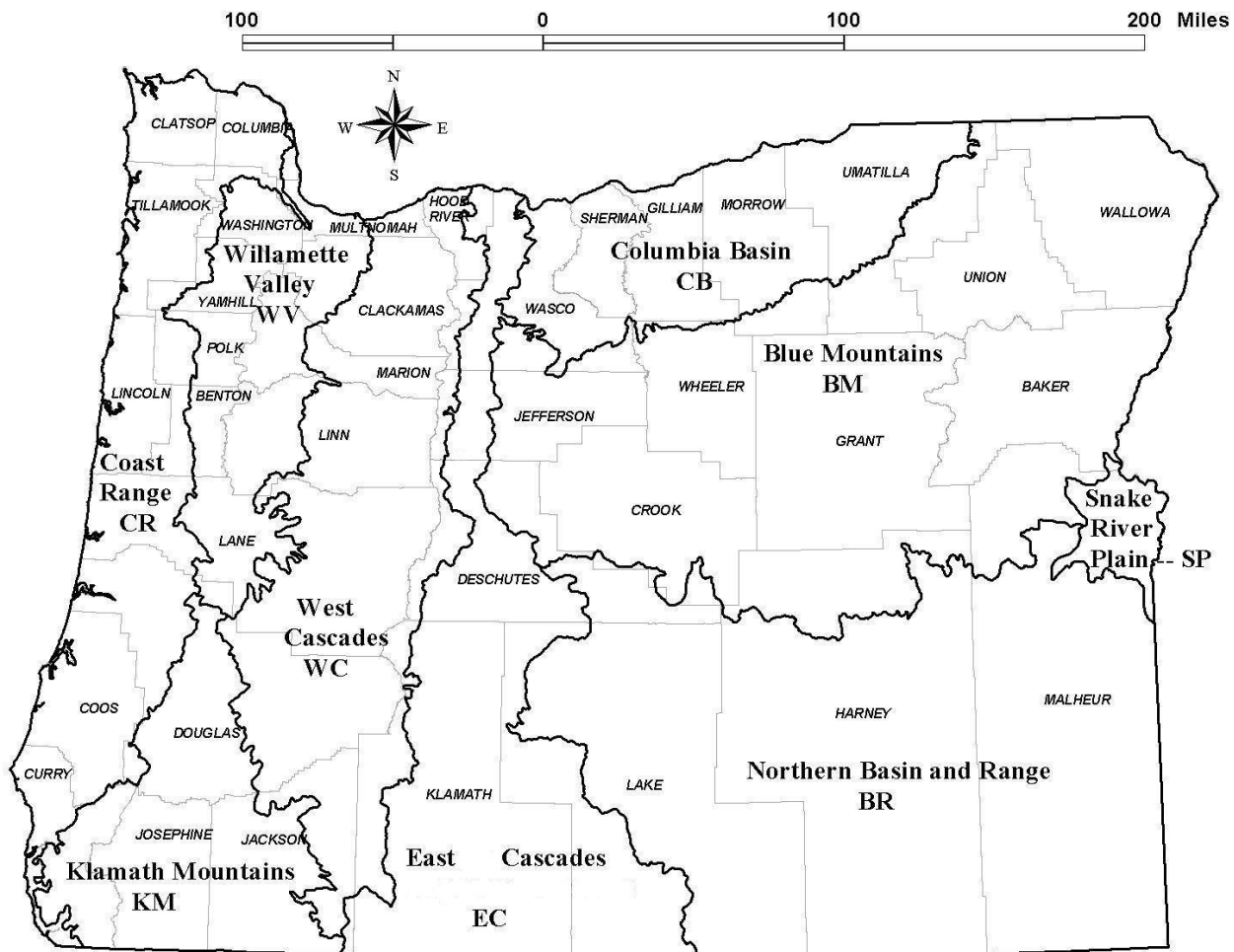
The Natural Heritage Plan is organized by ecoregion. Ecoregions are geographic areas with similar features, such as climate, vegetation, geology, geomorphology, soils, and ecosystem processes, together with characteristic natural communities of plant and animal life. The State of Oregon has adopted the ecoregional concept as a way to evaluate environmental health, having used ecoregions in the *State of the Environment Report* (2000), and in the reporting of their environmental benchmarks (see *Oregon Shines*).

Currently, the state and the Natural Heritage Program recognize 8 ecoregions (Figure 2) in Oregon, a change from previous editions of the plan, which had 10 ecoregions. The only differences between the new state adopted ecoregion cover, and the one used in previous editions is that the High Lava Plains and the Blue Mountains ecoregions have been combined into the

Blue Mountains, and the Northern Basin and Range and the Owyhee Uplands Ecoregions were combined into the Northern Basin and Range.

The revised ecoregional map was a result of a three year, interagency process coordinated by the Environmental Protection Agency Research Lab in Corvallis (Thorson *et al.* 2003). The 9th ecoregion in Oregon is the Snake River Plains, which has been combined with the Basin and Range Ecoregion for state use, since the area found in Oregon is so small. In addition, our East Cascades Ecoregion is named the East Cascades-Modoc Plateau Ecoregion by Thorson *et al.* (2003) to reflect its distribution in California. A brief description of each ecoregion's ecology, biology and major land uses is included at the beginning of each ecoregion chapter.

Figure 2. Oregon Ecoregions



Ecosystem Cells

The Natural Heritage Act requires Oregon's Natural Heritage Plan to identify a "discrete and limited system" of natural areas that will represent the full range of Oregon's natural diversity. In order to achieve this goal, the Plan uses the concept of a natural unit comprised of one or more ecological elements, called an ecosystem "cell." The ecological elements represented in cells are generally one or more ecological assemblages called plant associations, defined by the dominant native plants that characterize the environment.

Within each of Oregon's ecoregions is a specific set of unique and non-overlapping cells which, taken together, represent the full range of biological diversity in that ecoregion. The lists of Oregon's Ecological Natural Heritage Resources in this Plan are lists of cells. When a cell is identified in a natural area that is adequately protected, that cell is said to be "filled." When Oregon's system of natural heritage conservation areas includes at least one viable example of each cell in a protected area, or, in other words, when all the cells in this Plan are filled, then a main goal of the Natural Heritage Act will have been achieved.

It is important to understand that the goals of the Natural Heritage Act and Plan are to assure that at least one example of all the elements are protected, to assure there is a place where baselines can be established and where all of Oregon's ecosystems and species can be studied. In some cases, assuring that a single example of a Natural Heritage Element is conserved will not be sufficient to assure long term persistence of the element. There are other laws and programs designed to protect the biodiversity in Oregon. The Natural Heritage Act is focused on assuring that examples of all of Oregon's Natural Heritage are available for study and enjoyment.

Since some cells are wide-ranging, ecosystem cells are sometimes listed in more than one ecoregion. For example, "Ponderosa pine/snowberry forest" is found in the Blue Mountains, East Cascades, and Basin and Range Ecoregions. Some vary in ecosystem function, species composition or land management practices sufficiently to require representation in different ecoregions to adequately represent them. The associated species, rather than the dominant species, make the best indicators of this variability.

Criteria to Define Ecosystem Cells

Oregon's ecological Natural Heritage Resources are included in the Natural Heritage Plan as cells based on the following criteria:

1. Natural communities or ecosystems are included as cells when they have been defined in the literature or proposed by scientists or managers, and are determined by the Council to represent a significant part of Oregon's natural heritage.
2. Unique or local ecosystems are only included when they appear to make a significant contribution to biodiversity within the Ecoregion.
3. The list of cells is to be finite and restricted.

It is important to recognize that because elements typically occur in clusters, several cells can be found contiguously in the landscape. Because of this potential for clustering, the number of natural areas needed to protect all natural heritage resources is significantly smaller than the number of elements. However, as a resource becomes rarer, it becomes more difficult to find such clusters.

Various scientific references were consulted in the preparation of the natural resource lists. All major sources are included in the bibliography, which is based on an updated comprehensive collection of scientific literature maintained at ORNHIC, and included as Appendix B on page 162. In addition, experts from the region's universities and natural resource agencies as well as knowledgeable amateurs were consulted in the preparation and the updates of the lists. A file of experts consulted is also maintained at ORNHIC.

Assigning Priorities to Ecosystem Cells

Cells are ranked in the Natural Heritage Resource lists in order of priority as high (H), medium (M) or low (L). The primary factor in determining priorities for cells is the risk that elements comprising the cell may disappear. Many interrelated considerations are used to assess this risk. The most significant are: 1) **rarity** of known, high quality occurrences of the element; 2) **threat** to the occurrences of the type; 3) the **ecological fragility** or sensitivity to natural or artificial disturbances; and 4) the **adequacy and viability of protected occurrences**.

The Oregon Natural Heritage Information Center uses these same criteria to rank all terrestrial and aquatic ecosystem elements at the plant community level. The program uses a national classification for plant community types adopted by the Federal Geographic Data Committee (FGDC). The ranking system was developed originally by The Nature Conservancy and Heritage Programs. It is currently maintained collaboratively by NatureServe and Heritage Programs and is standard in all states and most Canadian provinces.

The system ranks elements on a global and state basis. The global system uses a scale of G1 to G5, using the four criteria listed above. G1 ranked elements are critically imperiled, while elements ranked G5 are demonstrably secure. Community elements (plant communities) are also ranked based on their status within Oregon, using the same numbering system. State ranks range from S1 to S5, with S1 including types critically imperiled in Oregon and S5 applied to demonstrably secure Oregon elements.

The priority ranking for cells in the Natural Heritage Plan is determined by the rank of the plant community which defines a cell. If a cell is composed of multiple associations, the highest ranking (lowest number) plant community in the cell is used. The priority values are assigned as follows:

High Priority	=	G1, G2 or S1 ranked elements
Moderate	=	G3, S2 or G4S3 ranked types
Low	=	ranks lower than above

Currently, plant community elements are only ranked at the state and the global level, which means that the status of an element in an ecoregion has not been evaluated. The Oregon Natural Heritage Program is working to develop a system for ranking community and species elements at the ecoregion level. It is hoped that this new ranking system can be incorporated into the next update of the Plan.

How to Determine if a Site Fills a Cell

To achieve the goal of a statewide system of natural areas protecting the full range of Oregon's Natural Heritage, sites must be identified which adequately fill each of the cells identified in the Natural Heritage Plan. The Plan uses the following criteria to determine whether a cell is either adequately or only partially filled at a listed site.

1. **Management Criteria.** A determination should be made that a site can be managed for a given element in a manner that will maximize the element's potential for long-term survival at the site. This should include reasonable assurances that the site will, insofar as possible, be protected from natural catastrophe, developmental intrusion, pollution or other extensive human impact.
2. **Quality Criteria.** A determination should be made that the occurrence of the element is of suitable size, quality and genetic character to be sufficient for research and educational uses.
3. **Duplication Criteria.** A determination should be made that an element is protected to the extent needed to maximize its chances for long-term survival in Oregon. Since the viability of any one natural area preserve could, despite careful management, become tenuous, the conservation of the element may in some cases depend on the protection of more than one site. In addition, in cases where the element is so depleted that only partial representation appears possible at a given site, two or more sites may be required to adequately fill a cell and protect the element.

Terrestrial Ecosystem Types

Terrestrial ecosystem types are organized by the dominant vegetation, generally representing a vegetation alliance, usually the dominant plant species in the canopy. Historically these had been based on forest zones were taken from the Yellow Book (Dyrness *et al.* 1975), which defined the first list of natural area needs for the Pacific Northwest and are only provided to make the lists easier to use. In this plan, forests types are listed first, then shrublands, and grasslands and forblands are last.

Aquatic and Wetland Types

There are five types of aquatic or wetland resources described in Oregon, and essential to this plan. They include Marine, Estuarine, Lacustrine, Palustrine, and Riverine Resources and are organized by ecoregion like the Terrestrial ecosystem types. Only the Coast Range Ecoregion contains Marine and Estuarine Wetland Resources, and therefore has a more extensive list than the other ecoregions.

The list of wetland and aquatic cells for all of these types was originally developed by separate subgroups at the Aquatic Classification Workshop held in Newport on August 15, 1980. This Workshop used the Yellow Book (Dyrness *et al.* 1975) as a basis for the Freshwater classification, and the *Oregon Marine and Estuarine Habitat Classification Systems* (Starr 1979) for the Marine and Estuarine classification. Since then, the lists for each type have been updated, and are discussed in more detail below.

Marine Resources include tidal and subtidal habitats with little or no freshwater dilution. They extend offshore from beaches, headlands and the outer limits of estuaries to the edge of the Oregon State's management area, which is three nautical miles seaward of the coastal baseline. Development of policy for management and designation of reserves is overseen by the Ocean Policy Advisory Council (OPAC), and its *State of Oregon Territorial Sea Plan* (1994). Currently, OPAC is establishing new rules for defining marine protected areas and for integrating these into the plan. In this version of the plan, NHAC has chosen to recognize the designations in the *Territorial Sea Plan* as adequately protecting the elements of biodiversity present in the sites. If these are changed in the future, NHAC will include any new rules in updates to this plan.

Estuarine Resources are tidal and subtidal waters with occasional to regular freshwater dilution. They extend from the outer limits of open to temporarily enclosed embayments, to a point upstream where the effects of ocean-derived salts are negligible. Estuarine resources are well catalogued in the *Oregon Estuary Book*, developed cooperatively by the Oregon Department of Fish and Wildlife and the Department of Land Conservation and Development.

Lacustrine Resources are defined as lakes larger than 20 acres (8 hectares) and greater than 6.6 feet (2 meters) at their deepest point. Vegetation growing in aquatic beds such as floating mats and lakeshore marshes is included in the lacustrine classification. All other wetland vegetation is considered palustrine. The Portland State University Center for Lakes and Reservoirs has the best database of lakes and aquatic weeds and is working to develop an on-line version of the *Atlas of Oregon Lakes* (1983).

Palustrine Resources are freshwater or alkaline wetlands dominated by emergent trees, shrubs, grasses, sedges, forbs, mosses or liverworts. These include

lakes, ponds and springs smaller than 20 acres (8 hectares) and less than 6.6 feet (2 meters) at their deepest point, as well as intermittent lakes, ponds, springs and playas of these dimensions - but not aquatic beds. Riparian areas associated with the immediate margins of rivers and streams are included in the definition. Wetlands are under the jurisdiction of the Division of State Lands, and have been a major focus of classification and inventory for the Oregon Natural Heritage Information Center staff. Freshwater wetland cells have been updated from early editions of the plan to conform with the U.S. Fish and Wildlife Service's Classification of Wetlands and Deepwater Habitats of the United States (Cowardin *et al.* 1979), the standard for wetlands classification in the US.

The 2003 update reflects the progress the Heritage Information Center has made in its inventory and classification of wetlands. This progress has occurred thanks to grants from The Nature Conservancy of Oregon, the U.S. Forest Service, the Oregon Watershed Enhancement Board, the Environmental Protection Agency, the Division of State Lands and the Oregon Economic Development Department. In addition, the Forest Service has independently inventoried and classified wetlands for most of their forests in northwestern and eastern parts of the State and has provided data and expertise to ORNHIC for inclusion in the state classification. It also reflects funding from NatureServe, and cooperation with ecologists from the Washington and Nevada Natural Heritage Programs, the Idaho Conservation Data Center, and the California Natural Diversity Database Inventory.

Riverine Resources represent aquatic types associated with rivers and streams. In the 1981-1993 editions of the plan, Riverine Resources were identified as a fifth aquatic category. However, since the Heritage Program was unable to adequately define the types, they were eliminated from the 1998 update. Although riverine resources are a critical component of Oregon's natural heritage, the inventory and classification work needed to identify these elements is so limited that a comprehensive list of riverine resources cannot yet be compiled. Protecting Riverine Resources is a major focus of the Natural Resources agencies in Oregon, all of which are involved in the Oregon Plan for Salmon and Watersheds. The Natural Heritage Advisory Council had hoped that a national aquatic classification or a statewide classification system would be available for the 2003 update. Unfortunately, it is not. Two current strategies for identifying Riverine Resources are discussed below.

The Oregon Watershed Board (OWEB) has developed an *Oregon Watershed Assessment Manual* to assist watershed councils in developing restoration priorities for Oregon's fish and rivers. This manual identifies 13 freshwater Channel Habitat Types to categorize rivers and streams. These range from a Low Gradient Large Floodplain River to a Very Steep Headwater Stream. The OWEB classification is fairly straightforward and easily understood and could be applied on an ecoregion basis in the plan. However, the OWEB classification is quite simple and may not represent the aquatic diversity in Oregon very well.

The second classification methodology has been developed cooperatively by the USGS Gap Analysis Program, a pilot aquatic effort in Missouri and the Freshwater Initiative of The Nature Conservancy. This method defines "aquatic macrohabitat" or "valley segment" types for each large river basin with distinct fish or aquatic species assemblages. In Oregon, the major basins are: 1) Closed Basins, 2) Owyhee and southern Snake Basin, 3) Powder River Basin, 4) John Day River Basin, 5) Umatilla River Basin, 6) Deschutes River Basin, 7) Willamette Basin, 8) North Coast and Coastal Columbia Basins, 9) Rogue and Umpqua Basins, 10) Klamath Basin. These basins are the same as the major basins defined by OWEB and the Water Resources Department.

Valley segment types are determined by using a Geographic Information System (GIS) to analyze a stream segment using a set of environmental variables that best describe aquatic diversity. The variables typically include elevation, stream order (which relates to how large the stream or river is), stream gradient (how rapidly the river is falling), stream sinuosity (how curvy rivers are), and the geology of the basin the river is flowing through (to measure potential impacts on water chemistry). The result of this classification is a list of between 100 and 200 valley segment types for each basin. An example of a valley segment type would be "third order, mid-elevation, high gradient, serpentine, stream in the Rogue Basin" or "high-elevation, first-second order, low gradient, montane valley, limestone stream in the Grande Ronde basin".

Currently, valley segment types have been classified and developed for most of Oregon, with only the Deschutes River Basin, the Klamath Basin, the Closed Basins, and the Owyhee River Basins remaining. Funding has been acquired from OWEB and private sources to complete the remaining Basins. This should also allow for the development of a crosswalk between

the valley segment types and OWEB's channel habitat types.

Because the classification is incomplete for the state, the Council was unable to include Riverine Resources in the 2003 plan. They will be completed before the 2008 update. Upon completion and after adoption by the State Land Board, the council intends to publish them as an addendum.

Ecosystem Process Cells

In order to represent biodiversity in a network of protected areas, it is necessary to consider not only the current condition of vegetation communities but also the landscape processes, generally related to disturbance, that either maintain or frequently affect ecosystems. The need for natural areas dealing specifically with landscape ecosystem processes is evident by recent work in landscape ecology.

Key disturbance processes, such as fire, wind, floods, insects and pathogens, are among the most important influences on Oregon's ecosystems. A natural area that allows for the study of dynamic ecological processes over time should also capture pattern or mosaic at broad to fine scales. Establishing these cells will increase the probability that processes can continue spatially and temporally at the natural area, unaffected by manipulative management.

The objective of the process cell is to represent landscape disturbance and the concomitant successional processes across a wide range of gradients in environment, vegetation zones or habitats, and disturbance intensities. In order for disturbance processes to be significant enough to merit the creation of a cell, two primary criteria must be met. First, the process must occur on a landscape scale, at a minimum impacting entire stands. The second is that the disturbances must occur at a frequency that is shorter than the life cycle of the affected stands. For example, throughout most of eastern Oregon, fires occur with return intervals ranging from 10 to 100 years, which is shorter than the duration of most stands. Volcanism, while occurring widely, rarely occurs at frequent enough intervals.

Generally a process cell natural area should be big enough to allow landscape flows and related successional processes to occur with minimal influence from adjacent lands. The size will depend on the area's

landscape context and the type of disturbance. Typically several thousands of acres are necessary to accommodate major disturbances such as fire and to allow replication of research sites across environmental, vegetational, and disturbance intensity gradients.

When selecting sites, those with minimal previous human impacts to the site are preferable, recognizing regional context (e.g. historical grazing). A preliminary threshold of 10% of the total reserve in previously impacted conditions is proposed. When possible, topographic features should be used to delineate natural area boundaries for process cells. Boundaries should minimize current and future edge influences such as microclimate differences, invasion routes for exotics, impacts of genetic material from nearby plantations, etc. Inclusion of some previously managed areas may be necessary to manage edges as well as to ensure connection to nearby landscape units (wilderness, major ridge or riparian systems, etc.) needed for critical landscape flows.

In this first effort to define process cells, only those that have been clearly defined are included. Wildfire is the process used to model the cells defined in the plan. To date, no fire process natural areas have been established. Once the process of defining and establishing fire process cells is underway by the federal and state agencies, work on other process cells such as insects and pathogens will begin. As a result, fire is the only process cell included in this plan.

Fire process cells are included at the end of the natural area cells for each ecoregion. In some ecoregions such as the Oregon Coast Range, the diversity of vegetation zones and the accompanying fire effects is low, so cells have not been defined. In others, such as the Blue Mountains, the diversity of vegetation zones and fire effects are high, and multiple cells have been defined.

How to Define a Fire Process Cell

The steps to define a process cell follow.

1) Define the element and objective

Fire is a major process that impacts most of Oregon's natural terrestrial habitats with varying effects among ecoregions. The objective is to include fire effects and successional processes, beginning with the earliest successional stages and including as wide a

range of disturbance intensities and environmental gradients as possible.

2) Outline significant process components and landscape criteria.

A. Fire event components consist of fire event types and range of post-fire successional stages present on the landscape. Three fire event types have been defined.

1. Stand replacement (greater than 70% mortality)
2. Partial stand replacement (30-70% mortality)
3. Underburn (less than 30% mortality)

Single or multiple event types may be present in a fire cell, depending on the representative fire regime for the ecoregion and vegetation zone.

B. Potential landscape conditions to be considered:

Most desirable		Wildfire with natural regeneration planting
Least desirable		Partial cut or clear-cut and burn (to be used in very rare circumstances, or in conjunction with more desirable circumstances)

3) Apply Process Cell Components in Ecoregions

Identify cells by appropriate event types and vegetation zones used in the plan. The fire example continues below for two typical ecoregions.

Ecoregion | Vegetation Zone | Fire Event Type

Blue Mountains	Ponderosa Pine	1,2,3
	Douglas Fir	1,2,3
	Grand Fir	1,2,3
	Shrub Steppe	1,2
Basin and Range	Ponderosa Pine	1,2,3
	Big Sagebrush	1,2
	Low Sagebrush	1,2

Only the vegetation zones in which fire is a significant, natural disturbance occurring at a minimum of a stand scale and a regular frequency have been included.

Assigning Priorities to Ecosystem Process Cells

Ecosystem process cells were not assigned priorities in this edition of the plan. It is anticipated that the primary criteria would be the rarity of examples of the ecosystem process.

Geological Formations and Features

Oregon's geological heritage, which consists of rocks, sediments, and associated features, includes a wonderful geological diversity that illustrates well the richness of Oregon's natural heritage. For example, there are Jurassic shales with finely ornamented ammonites in the Blue Mountain and Klamath Mountain Ecoregions; spectacular Tertiary flood basalts that extend across the 300 mile-width of Oregon from the Columbia Basin Ecoregion to the Coast Range Ecoregion; explosive, volcanic deposits and features, such as Crater Lake of the Cascades Ecoregion; as well as the Quaternary deposits and features such as the striking, glacial erratics transported from the Rocky Mountains by icebergs during ice-age floods and deposited in the Willamette Valley.

The rocks, sediments and features of this geological heritage formed in distinct environments or the surface features were sculpted by distinct biological, chemical, and physical processes. These rocks, sediments and features can be defined as geological elements. The geological elements are grouped into geological cells that represent rocks formed at intervals of time, usually on the order of 10's of millions of years, known as periods. The periods used are the standard intervals of geological time. In the plan these periods extend from the Devonian (from 380 million years ago, these are the oldest rocks yet found in Oregon) through the Quaternary, which includes the present.

These geological elements can thus be considered similar to the ecological heritage elements in that for the most part, they consist of distinctive assemblages. They are dissimilar from the ecological heritage elements in that they are organized by time interval, rather than the type of element. Furthermore, even though there are similar cells among the different ecoregions, the geological setting and processes that formed the elements (deposits of rock and sediment) of the cells were usually different. For example, in one ecoregion, the Tertiary rocks may have formed on land

whereas in another ecoregion, Tertiary rocks may have formed in the sea. As a result, the elements are both distinct and characteristic of the different ecoregions.

The 2003 edition represents a major revision developed by the Oregon Department of Geology and Mineral Industries, in cooperation with other university and governmental geologists. Drafts were circulated to geologists throughout Oregon and a final list developed from the input received. The heritage program hopes that over time, these cells and geological elements will become more refined.

There are two main principles for including geological features and formations in the following element list of Geologic Types:

1. Certain elements, for instance fragile volcanic features and paleontological sites, are vulnerable to destruction and can be protected by effective natural area management. Paleontological elements will be included in future editions of the plan.

2. Other geological elements are a prominent component of our natural heritage and should be recognized for their educational and interpretive values. This could be accomplished through recognition of the finest features on the State Register of Natural Resources.

The Heritage Program has a dual function: (1) to formally recognize the geological elements and (2) to protect them through natural area conservation. As is the case with other elements, priorities for Council action to protect an element are based on the presence of a potential or actual threat to the type, and the rarity or significance of the type. As is the case with the ecological elements, types are included in a list for an Ecoregion if its occurrences are endemic to, representative of, or important in the ecoregion. The priorities used in the list of geologic types matches the priorities for the ecosystem cells.

"Protection" of a geological element is interpreted more liberally than for biologic communities and species. In many cases a geologic cell may not have to be included in a formally designated natural area for it to be considered protected. For instance, in many areas designated for recreation, such as Wild and Scenic Rivers, Wilderness Areas or Parks, geological values are an important factor in their management. However, some geological elements, such as fossil locales or ash flows, can be quite sensitive to disturbance. In these

areas, designations designed to protect the element(s) present is desired.

Assigning Priorities to Geological Cells

As was the case with ecosystem cells, geological cells are ranked in the Natural Heritage Resource lists as high (H), medium (M) or low (L) priority. The factors used for assessing geologic cells are somewhat different than the ecological cells. The primary factors include the: 1) **rarity** of known, high quality occurrences of the geologic cell; 2) **threat** to the occurrences of the type; and 3) **fragility** or sensitivity to natural or artificial disturbances.

Special Species

The Natural Heritage Act of 1979 specifies that the Plan "shall list the ... special species which should be represented on the register and in conservation areas". Special species "means those species of plants and animals determined by the council to be of significant value in a natural heritage conservation area and defined in the Natural Heritage Plan".

The Natural Heritage Program has worked hard to develop a comprehensive list of special species which need to be addressed by the Natural Heritage Plan. The species included in lists were selected using the most current information available on the distribution and abundance of plant and animal species native to Oregon. The list of taxa in the plan should assist public and private land managers and planners in determining which species are of special concern within their given management jurisdictions. They are also intended for use by amateur and professional botanists and zoologists to help focus their efforts on those taxa most in need of attention.

In previous editions of the Plan, Special Species lists were a compilation of all species potentially considered to be at-risk by the Council. The species were listed by status, with the status based on the most recent information published in the most recent version of the Heritage Information Center publication, *Rare, Threatened and Endangered Species of Oregon* (ORNHP 2001). The species distributions by ecoregions or their presence in natural areas was not included.

To better conform to the requirements of the Natural Heritage Act, the Council has changed the way special species are included in this 2003 edition of the plan. The most important difference is that species, like ecological and geological elements, are listed within the ecoregions they occur, and in the protected areas that support them. To do this, only those taxa which are considered to be threatened or endangered in Oregon or throughout their range have been included. More comprehensive information on all at-risk species in Oregon, the most up-to-date version of the *Rare, Threatened and Endangered Species of Oregon* booklet is available on-line or from the Oregon Natural Heritage Information Center.

Special Species List Criteria

List 1 contains taxa that are threatened with extinction or presumed to be extinct throughout their entire range.

List 2 contains taxa that are threatened with extirpation or presumed to be extirpated from the state of Oregon. These are often peripheral or disjunct species which are of concern when considering species diversity within Oregon's borders. They can be very significant when protecting the genetic diversity of a taxon. The Oregon Natural Heritage Advisory Council regards extreme rarity as a significant threat and has included species which are very rare in Oregon on this list.

The Oregon Natural Heritage Information Center tracks all occurrences in Oregon for any species included on List 1 and List 2, and has a fairly comprehensive database of their locations. The Natural Heritage Information Center also maintains two other lists of at-risk species, List 3 and List 4. List 3 is the "Review List" and includes taxa that may be threatened or endangered, but which lack sufficient information to accurately determine their status. List 4 is the "Watch List", which includes taxa that are rare but apparently stable, as well as taxa that are declining but remain too abundant currently to be considered to be threatened. Taxa on these lists have not been included in the Natural Heritage Plan because they are at lower risk, and because a complete list of their occurrences does not exist. A comprehensive list of these taxa and their distributions can be found in the most recent edition of *Rare, Threatened and Endangered Species of Oregon*.

Threatened and Endangered Species Programs in Oregon

In 1984, the Attorney General of Oregon ruled that the Division of State Lands, through the Natural Heritage Advisory Council, had responsibility and jurisdiction over threatened and endangered plants, based on the Oregon Natural Heritage Act. With the passage of Oregon's Endangered Species Act in 1987, this authority was transferred to the Oregon Department of Agriculture. Under this act, the Oregon Department of Fish and Wildlife has similar statutes regarding threatened and endangered fish and wildlife, but not invertebrates. Both the Department of Agriculture and the Department of Fish and Wildlife currently have Cooperative Agreements with the U.S. Fish and Wildlife Service for the purpose of carrying out research and conservation programs on those plant and vertebrate animal species under the auspices of the federal Endangered Species Act.

In 1991, based on the 1984 Attorney General ruling, the Natural Heritage Council assumed responsibility and jurisdiction over threatened and endangered invertebrates, based on the Natural Heritage Act. As a result, the Council was granted a Section 6, Endangered Species Act, Limited Authority Agreement with the U.S. Fish and Wildlife Service. Because of this agreement and authority, special attention is given to invertebrates in this plan. The following section is a detailed description of the program developed to assist in the protection of rare invertebrates in Oregon.

Although natural heritage conservation areas are not usually dedicated with a single Special Species as the sole consideration, the Natural Heritage Act states that natural areas should include "assemblages of those species determined by the council to have special significance". Concentrations of Special Species will always provide additional impetus for location of a Natural Heritage Conservation Area designed to protect a particular heritage resource, but may also be determined by the Council to be the primary reason to dedicate a Natural Heritage Conservation Area. The use of registry is appropriate for the voluntary protection of all Special Species locations, and the registration of sites with List 1 or List 2 Special Species is a major goal of the Natural Heritage Advisory Council.

Inclusion of any given taxon on these lists is based on several specific criteria. The most important factors are

the total number of known extant populations in Oregon and world wide, and the degree to which they are potentially or actively threatened with destruction. Other criteria include the number of known populations considered to be securely protected and the taxonomic distinctness of each species. Known hybrids, questionable, or undescribed species have not been included. The importance of Oregon to species' total range (local endemic, regional endemic, or peripheral) is considered as its pattern of distribution and the tendency of the species to persist at a given locality.

Special Species are listed alphabetically within a major group (Invertebrates, Vertebrates and Plants). The rationale and justification for inclusion of each species on the list are on file at the Oregon Natural Heritage Program office.

Special Invertebrate Species

The Oregon Natural Heritage Program has been granted limited authority by the U.S. Fish and Wildlife Service to administer and manage a program for federally threatened and endangered invertebrate species as provided under Section 6 of the Federal Endangered Species Act. The primary objective is to gather as much information as possible on those invertebrates that are currently considered rare, threatened or endangered in order to enable managers to protect critical habitat or populations. The secondary objective is to promote inventory and taxonomic work on undescribed or poorly known species which may face significant threats. As part of this effort, the Heritage Program coordinates inventory, management and research projects on the Oregon Silverspot butterfly, the Fender's blue butterfly and other rare invertebrates found in Oregon.

The Natural Heritage Information Center tracks the location and abundance of rare, threatened and endangered invertebrate species in Oregon.

The list of invertebrate species in the Heritage Plan reflects our current understanding of the status of the rare invertebrates in Oregon. The list, however, represents only a fraction of the diversity of invertebrate species found in the state and is generally biased towards groups that have been well studied (e.g., caddisflies, butterflies, mollusks) and is deficient for groups of other species, such as beetles, that are poorly known in Oregon. In cooperation with federal agencies, colleges, and universities, we are hopeful that our continued efforts and partnerships will continue to

build upon our current knowledge of rare invertebrate species in Oregon.

Special Vertebrate Species

The animal lists have been updated every other year from 1983-1995 and every third year since by the Oregon Natural Heritage Information staff in conjunction with the Wildlife Diversity Program of the Oregon Department of Fish and Wildlife, and the Wildlife Community. The process for these updates included contacting as many biologists and land managers in Oregon as possible, making changes based on new data, and circulating a draft list for review. The most recent list (*Rare, Threatened and Endangered Species of Oregon*) was published in February of 2001 by the Oregon Natural Heritage Program. Updated information collected for the 2004 update of this booklet have been used for this edition of the Natural Heritage Plan.

The animal lists include vertebrates and invertebrates that have breeding populations in Oregon. Accidental, migratory or wintering species are considered only when a given species is especially sensitive or vulnerable, or has critical stop-over locations in Oregon, such as the Aleutian Canada goose (*Branta canadensis leucopareia*).

The listing of all bird species is based on the status of nesting populations in the state. Some of these species may otherwise be common seasonally or during migratory periods. Several bird species, such as the solitary sandpiper (*Tringa solitaria*), have nested in Oregon on occasion, but these may be only transient nesting sites. These species are included on Taxa of Concern List until they can be documented as an established nesting species.

A number of open-ocean mammals and sea turtles occur within Oregon's three-mile limit. Because they cannot be protected or monitored based on a system of small geographically fixed areas, they have not been included in the lists. All federal or state listed species and all federal candidate species are included on the animal lists.

Special Plant Species

The lists for special plants were developed in a series of conferences. Special plant conferences have been held frequently between 1976 and the present. The outcomes from the early conferences included major

changes in the composition of the lists and the status of many species. As sensitive plant species have become better known, changes in the lists are less common and significant. Early conferences were sponsored by the Oregon Rare and Endangered Plant Task Force, the later ones by the Oregon Natural Heritage Program and The Native Plant Society of Oregon. These conferences were attended by professional and amateur botanists from throughout the state, and formed the basis for the various editions of the booklet *Rare, Threatened and Endangered Plants and Animals of Oregon*. The changes made as a result of the 2003 conference at Oregon State University are included in this plan.

In the five years since the last update of the Natural Heritage Plan, extensive fieldwork by federal agency, state agency and amateur botanists has greatly increased our knowledge of the abundance and distribution of the species included here. The State of Oregon has, as a result of the Plant Conservation Biology Program in the Oregon Department of Agriculture, established a program to study and protect the highest priority species. This program has listed over 60 plant taxa as threatened or endangered.

For all special species included in the Oregon Natural Heritage Plan, known hybrids, or questionable, or undescribed species have not been included. However, since vascular plant evolution is known to proceed at times via hybridization; it is a long-range goal of the Heritage Program to work towards the eventual recognition and protection of well-defined hybrids when dealing with plant species. Due to federal efforts to collect extensive data on at-risk non-vascular plants (mosses, liverworts, and lichens) and fungi, information on these taxa is greatly improved. However, the taxonomy and distribution of these important but largely overlooked elements of Oregon's native biota need much more research than other species groups.



American Marten
(*Martes americana*)

Chapter 4: Conserving Oregon's Natural Heritage

Protecting Oregon's natural heritage is accomplished through a variety of means. These are sensitive to different landowner needs and interests, different protection needs of various types of natural elements, and different types of threat to the elements. The mechanisms that contribute to the conservation of our natural heritage range from those which merely give formal recognition to the heritage values of the land, to those that provide adequate and secure protection of the resources.

The Register of Natural Heritage Resources provides official state recognition of heritage values on a land parcel. A voluntary management agreement adds a measure of protection; and dedication of a State Natural Heritage Conservation Area provides secure protection. This range of mechanisms ideally provides primary and backup protection to each element in the Heritage Plan.

The Natural Heritage Act of 1979 distinguishes between lands allocated to commodity use versus those allocated to non-commodity uses. Not all lands in the non-commodity category actually protect natural heritage values. However, lands "allocated primarily to special non-commodity uses" should be selected to protect their heritage resources whenever possible. It is important to assure that non-commodity uses to which sites are allocated are compatible with heritage conservation. When they are, the conservation of the heritage elements on that land should be given top priority.

The objective of the Heritage Program is to assure that each element in the Heritage Plan is adequately represented at securely protected sites. A primary partner in this activity is the Pacific Northwest Research Natural Area Committee which works with the federal agencies to establish federal Research Natural Areas (RNAs) on public lands. If an element listed in this Plan is protected in a Research Natural Area, it is not necessary to establish a state area for the same purpose.

This chapter explains the different mechanisms for preserving natural heritage elements. It outlines various public and private land management designations established to conserve natural heritage values. Potential protection mechanisms designed to

protect substantially different resources are not necessarily included in this plan. For example, the Oregon Department of Fish and Wildlife has established some Wildlife Management Areas dedicated largely to the production of a game species. The Oregon Department of Forestry employs a state forest land management classification system that identifies the management emphasis for parcels of state forest lands. Classifications include descriptions of parcels with and without a specific resource identified as being of special interest. Where parcels have resources of special interest, special planning may be employed or management of other resources may be severely restricted or precluded. Such areas are appropriate for designation as a Natural Heritage Conservation Area only if current management plans are consistent with the natural area values present at the site.

Recognition Mechanisms

Register of Natural Heritage Resources

The register is an official list of areas that contain significant natural heritage resources and/or special species. Inclusion on the register is a finding by the Natural Heritage Advisory Council and the State Land Board that an area has significance for conservation. Registration is the first step to strengthen protection of elements at a site, since all areas that are dedicated under the Heritage Act must first be registered.

Registration proceeds differently for private and public lands. For private land to be included on the register, the Council needs only the written consent of the owner. A private site can be removed from the register if the Council receives a letter from the property owner indicating they no longer wish it registered or if the elements for which it was registered are no longer present at the site. For public lands, the Council need only determine that a site has significant natural values to recommend it for inclusion on the register. Upon Council recommendation the land-owning agency or agencies are notified and have ninety days to respond. The Council then considers the agency response at their next scheduled Council meeting.

The Council has developed a summary form for all sites nominated for registry (Figure 3). After the Council reviews the data, it may then recommend the site for inclusion on the register. The State Land Board will then act on this recommendation.

As of December 31, 2003, the Register of Natural Heritage Resources includes 93 sites found on both state and private lands. These sites are listed below in Table 3. More information on these sites is available from the Heritage Information Center.

Figure 3. Summary Form for Sites to be included in the Register of Natural Heritage Resources

NATURAL HERITAGE ADVISORY COUNCIL
OREGON REGISTER OF NATURAL HERITAGE RESOURCES
SUMMARY FORM

1. NATURAL AREA NAME:
 2. LOCATION:
 3. SIZE:
 4. REGISTER CATEGORY:
 5. PRINCIPAL NATURAL HERITAGE RESOURCES:
 6. SPECIAL SPECIES:
 7. EVALUATION OF CRITERIA FOR REGISTRATION
 - A. PRIORITY IN PLAN:
 - B. ADEQUATE REPRESENTATION:
 - C. DEGREE OF DISTURBANCE:
 - D. VIABILITY:
 - E. UNIQUE GEOLOGICAL VALUES:
 - F. PRIORITY FOR SPECIAL SPECIES:
 - G. SPECIAL SPECIES PROTECTION CAPABILITY:
 - H. MANAGEABILITY:
 8. SPECIAL REMARKS OR COMMENTS:
 9. OWNERSHIP:
 10. CONSENT OF OWNER (PRIVATE), DATE:
 11. DATE OF COUNCIL RECOMMENDATION:
 12. DATE OF LAND BOARD APPROVAL:
 13. SOURCES OF ADDITIONAL INFORMATION:
 14. VALUE OF NATURAL AREA IN LAYMAN'S TERMS:
-

Protection Mechanisms

Voluntary Management Agreement

The State Land Board is empowered to develop a management agreement with the owner of any site that has been placed on the Register, if the landowner agrees to manage the site in a way compatible with the maintenance of the natural heritage resource(s) present.

Although this is a non-binding agreement, the owner is required to notify the State Land Board of any planned changes in management. Due to the voluntary and potentially short-term nature of this management agreement, it provides only nominal protection.

State Agency Dedication

Dedication is the primary mechanism for natural area protection on state lands. The Natural Heritage Act states that the Transportation Commission, the Fish and Wildlife Commission, the Board of Forestry, the Board of Higher Education, and the State Land Board "...shall, with the advice and assistance of the Council, establish procedures for the dedication of natural heritage conservation areas on land, the title of which is held by the State of Oregon, and which is under that agency's management and control."

Table 1. Oregon State Register of Natural Heritage Resources as of 31 December 2003

Name (Owner) – Date Registered

Ace Williams Mountain (TNC) - 2/01
Ainsworth (OPRD) - 6/93
Bald Hill (City of Corvallis) - 2/91
Bandon Marsh (TNC) - 12/02
Billy Burr Lake (TNC) - 3/93
Blacklock Point (OPRD) - 6/88
Blind Slough Swamp (TNC) - 6/95
Blowout Ponds (OPRD) - 3/93
Borax Lake (TNC) - 2/94
Bridal Veil Falls (OPRD) - 6/93
Bull Flat (DSL) - 3/90
Camassia (TNC) - 5/03
Cape Blanco (OPRD) - 2/91
Cape Ferrelo (OPRD) - 4/99
Cape Lookout (OPRD) - 6/88
Cape Meares (OPRD) - 6/88
Cape Sebastian (OPRD) - 4/99
Cascade Head (TNC) - dedicated 1985
Clear Lake Ridge (TNC) - 4/89
Collier State Park (OPRD) - 1/92
Columbia Oaks (Hood River County, OPRD) - 6/93
Conley Lake (ODFW, TNC) - 10/99
Coopey Falls (OPRD) - 6/93
Crissey Field (OPRD) - 4/99
Crooked Creek (OPRD) - /91
Crook Point (TNC) -10/98
Crump Lake Preserve (TNC) - 3/93
Crump Lake South (DSL) - 3/90
Davis Slough (DSL) - 4/89
Denman Vernal Pools (ODFW) - 2/94
Eight Dollar Mountain (DSL, TNC) - 6/88
Elowah Falls (OPRD) - 6/93
Flagg Island (ODOT) - 3/93
Gary & Chatham Islands (Multnomah County) - 1/92
Hart Mountain additions (TNC) - 4/94
Humbug Mountain (OPRD) - 4/99
Illinois River Forks (OPRD) - 2/97
Indian Sands (OPRD) - 2/91
Jackson-Frazier Wetlands (Benton County) - 2/91
Juniper Hills (TNC) - 10/98
Kingston Prairie (TNC) - 2/97
Knappa Slough Island (DSL) - 4/99
Ladd Marsh (ODFW) - 6/88
Latourell Falls (OPRD) - 6/93
Lindsay Prairie (TNC) - 6/88
Little Rock Island and Shore (OPRD) - 6/88
Logan Valley (TNC) -4/99
Lower Table Rock (TNC) - 5/86

Name (Owner) – Date Registered

Luckiamute Landing (OPRD) - 3/93
Memaloose (OPRD) - 6/93
Middle Fork John Day River - Dunston (TNC) - 3/90
Middle Fork John Day River - Oxbow (TNC) - 4/99
Mill Creek Ridge (TNC) - 11/91
Miller Island (ODFW) - 1/92
Nehalem Bay (OPRD) - 2/91
Nesika Beach (TNC) -10/98
Nestucca Bay (DSL) - 2/94
Netarts Spit (OPRD) - 4/89
Ochoco State Wayside (OPRD) - 3/90
Onion Peak (DSL, ODF, TNC) - 6/88
Ophir Dunes (ODOT) - 6/88
Otter Point (OPRD) – 4/99
Piute Creek (DSL) - 1/92
Pumpkin Ridge (Private - GROWISER) - 6/94
Ramp Canyon (RC Outside Education Project) - 6/93
Rattlesnake Butte (TNC) - 5/86
Rooster Rock (OPRD) - 3/90
Rough and Ready Creek (TNC) - 10/94
Rough and Ready State Wayside (OPRD) - 4/89
Round Top Butte (TNC) - 5/86
Rowena Plateau (OPRD, TNC) - 6/93
Saddle Mountain (OPRD) - 4/89
Scappoose Bay (OPRD) -10/99
Simpson Reef – Cape Arago (DSL) - 1/92
Skull & Little Wallace Island (DSL) - 11/91
Smith Island (DSL) - 4/89
Snag Boat Bend (TNC) - 6/99
South Grouse Gap (TNC) - 4/98
South Slough (DSL) - 2/91
Succer Creek (PRD) – 6/88
Squally Point Dunes (OPRD, Union Pacific RR) - 6/93
Starvation Creek (OPRD) - 3/90
Steens Mountain – Ankle Creek (TNC) - 4/01
Steens Summit (DSL) - dedicated 1979
Sycan Marsh (TNC) - 6/88
Tom McCall Preserve at Rowena (TNC) - 5/86
Twin Rocks Bluffs (OPRD) - 4/99
Tygh Valley (OPRD) - 3/91
West Sand Island (COE) - 6/88
Whalen Island (OPRD) - 2/01
Whetstone Savanna (TNC) - 6/95
Williamson River Delta (TNC) - 2/97
Willow Creek (TNC) - 4/98
Winchuck Slope (DSL) - dedicated 1979
Woodcock Creek (DSL) - 3/90
Zumwalt Prairie (TNC) - 2/01

COE – Corps of Engineers DSL – Division of State Lands ODF – Department of Forestry ODFW – Department of Fish and Wildlife
ODOT – Department of Transportation OPRD – Parks and Recreation Department TNC – The Nature Conservancy

Selection of Conservation Areas

After the target elements are defined and selected as outlined in Chapter 3, specific sites are identified for field evaluation and comparison. Databases and literature at the Oregon Natural Heritage Information Center, University libraries, herbaria and other information sources are searched to locate potential sites representing a cell. Experts in the scientific and professional community are also contacted. A master list of potential sites is drawn up and the general characteristics of each are analyzed to assure they warrant field evaluation. A field evaluation of a candidate site is required if a recent site survey is not available. Permission for access to the site is essential. Detailed information on the elements present at the site is collected in this process.

Once the necessary data has been gathered from secondary sources and from field visits and entered according to form into the database, a comparative analysis of sites is conducted. Priorities are assigned on the basis of elements and their relative quality and importance. A single site may or may not be identified as the best example for the given cell. A suggested format for the written comparative analysis is as follows:

A. Introduction and Methods

B. Abstract of Each Site

- 1) Site Description - Brief descriptive sentences about the vegetation or elements at the site, its relationship to the landscape, and geomorphology.
- 2) Elements - List of the target and secondary elements present at the site and brief description as to: (a) size, (b) quantity, (c) quality, and (d) natural variation represented for each.
- 3) Legal Considerations
 - a) Preserve Boundaries - Description of boundaries for entire proposed area.
 - b) Tract Ownership Summary - Names and addresses of owners or managers and legal description of property.
 - c) Protection Costs - Costs of buying, if privately owned, or taking out of production, if currently used or designated for commodity use. Includes property values (assessed and real, if applicable).
 - d) Stewardship Costs - Costs of executing any necessary management recommendations, e.g. fencing, burning, etc. Briefly states management needs.

C. Comparison of Sites

- 1) Physical Attributes - Size, aspects, soil, scenic qualities, etc.
- 2) Ecological Attributes - Quality in terms of species composition, absence of invaders, lack of sign of physical disturbance, general vigor, presence of indicator species (for communities) and population viability (for species).
- 3) Overall Attributes - Costs and ease of actual protection.
- 4) Tabular Summary of Ranking Considerations.

Once a site is chosen to fill a cell, the final step in the process is to provide adequate protection. If the site is on federal land, it would be recommended to the federal RNA Committee as a potential to fill the cell. The RNA Committee would then notify the proper agency of the existence of the site and recommend its designation as an RNA. If the site is on private or non-federal public land the first step is the inclusion of the site on the Oregon Register of Natural Heritage Resources following the process outlined earlier in this chapter.

Model Procedures for State Agency Dedication of Conservation Areas

To assist natural resource state agencies in fulfilling their legal mandate to develop procedures for dedicating Natural Heritage Conservation Areas, the Council developed model dedication procedures. These are designed to provide guidelines to the agencies to follow in making dedication decisions. Each agency may wish to develop its own set of rules to further refine these guidelines.

All sites considered for dedication will already be included on the Oregon Register of Natural Heritage Resources. Oregon's Natural Heritage Program has rules in force for dedicating and managing such areas (Oregon Administrative Rules 141-50-500 to 141-50-599). The procedures recommended here are designed to keep the process as simple as possible in conformity with these existing rules.

Step 1: Agency Receives Dedication Proposal from the Council

A letter from the council to the agency includes reasons why the site is proposed for dedication, a general description of the site and its boundaries, and management considerations.

Step 2: Agency Evaluates Dedication Proposal

- 1) Within one month, the agency designates the person responsible for evaluating the proposal and preparing the dedication documents and communicates this information informally or in writing to the council.
- 2) Using staff or consultants and consulting with the council, the agency evaluates the proposal to determine whether or not it is feasible.
- 3) The agency takes into account the Natural Heritage Program rules (referenced above), recognizing that the council is empowered to waive any of its own rules which would prevent dedication of a natural area due to conflict with agency statutes, rules, regulations, or policy.
- 4) The agency determines within six months after receiving the council proposal whether or not to go forward with dedication procedures for that site, and communicates this decision to the council in writing. The council recognizes that evaluations that depend on seasonal opportunities for study may take longer.

Step 3: Agency and Council Draft Dedication Documents

The agency, in consultation with the council, drafts two dedication documents. One is a dedication agreement specifying the boundaries of the site, the natural heritage values the agreement is designed to protect, and any other considerations as needed. A model dedication agreement is included as Figure 4.

The other document is a statement of management objectives for the site. This outlines major known threats to the resources in question, as well as the best and most realistic methods of protecting them. It includes activities to be encouraged, allowed or proscribed, and options for management agreements involving outside parties.

Additional documents to accompany the dedication agreement may also on occasion be required to meet the needs of the agency, the council, the State Land Board, or other parties.

Step 4: Public Notice, Hearing, and Agency Approval

The agency, according to its existing rules and procedures for public notice and hearing, publishes notice of intent to dedicate the site and places the

matter on the agenda of the regular public meeting of the board or commission which oversees the agency. The meeting or meetings at which the dedication proposal is discussed and approved constitute the required public hearing.

After taking into account any public comment, the board or commission revises the dedication documents as needed and accords them final approval.

Step 5: Dedication by State Land Board

The agency and council together bring the dedication agreement and accompanying documents before a regular State Land Board meeting for approval.

Step 6: Dedication Ceremony

This step is optional, and can include whatever ceremony and activities the agency and the council believe are appropriate.

Termination of Dedication

All that is required to terminate a dedication is for the agency to hold a public hearing. There must be adequate public notice and a finding from the hearing that either: (1) there is an "imperative or unavoidable necessity;" or (2) with the approval of the Council, dedication of the site is no longer needed according to the guidelines of the Natural Heritage Plan. To date, no dedicated sites have been terminated.

Acquisition of Private Properties

In addition to dedication of state lands, the State Land Board can receive gifts of private property, to be managed as Natural Heritage Conservation Areas. The Natural Heritage Act clearly states that whenever feasible, areas selected for protection "shall be located on lands which have been allocated primarily to special noncommodity uses". If these lands are privately owned, and they are critical to the representation of a natural heritage element, the State Land Board may receive property. In addition, the State Land Board or other state agencies may acquire property to help protect natural heritage elements.

When the State Land Board or another state agency acquires property to protect significant natural heritage values, the Council will assist in the development or

review of a management plan for the area. Only properties that have been registered and are suitable for dedication can be accepted. The expansion of the state system of Natural Heritage Conservation Areas to include all of the unfilled cells that occur primarily on state lands is a long-term goal of the Natural Heritage Advisory Council. The dedication of state lands, the donation of properties, and acquisition of privately owned lands may be necessary to meet this goal.

Private Dedication

A private individual or organization may voluntarily execute with the State Land Board an Instrument of Dedication, provided the criteria for dedication outlined in Candidate Site Selection of this chapter

have been met. The Council will assure that this Instrument of Dedication shall be recorded in the office of the clerk of the county in which the property exists.

This Instrument may be highly variable in nature. The landowner may terminate the dedication at any time in accordance with the procedures outlined in the dedication agreement. Since participation in Natural Heritage conservation is entirely voluntary for the private landowner, incentives for the dedication of lands have been established.

A comprehensive list of incentives for voluntary protection of private lands was produced for the 2003 legislature as part of a legislative workgroup. A summary of the report is available on-line at <http://www.biodiversitypartners.org/incentives/>

Figure 4. Model Dedication Agreement for Natural Heritage Conservation Areas

The Oregon State Land Board and the [name of agency] hereby agree to the following provisions as they pertain to [name of site] located at [legal description of site location]. By virtue of this agreement, the above-described site is dedicated as a Natural Heritage Conservation Area as provided for in the Oregon Natural Heritage Act, as amended.

This agreement is entered into for the purpose of promoting natural diversity of native species and ecosystems in Oregon, and specifically to protect the designated area as the primary representative site for the natural element(s) [name of element(s) or cell(s)] as identified in the Oregon Natural Heritage Plan of [date].

This agreement includes as additional instruments of dedication the appended documents as follows:

- (a) A statement of management objectives for the site;
- (b) The Natural Heritage Registry Summary Form for the site;
- (c) Any other documents as needed.

Either party to this agreement may terminate it in accordance with the provisions of the Oregon Natural Heritage Act upon 60 days written notice, including specific reasons for termination.

Approved and signed on [date].

Signatures.

Natural Area Designations Included in the Plan

Land designations are the primary mechanism by which most public and many private landowners determine how their lands will be managed. The management that follows these designations can profoundly influence Oregon's natural heritage values. This section outlines the management designations, the level of protection they provide, and the consistency of their management objectives with the goals of Oregon's Natural Heritage Program.

There are agencies and organizations not included in the following list that play a role in the identification and protection of natural areas even though they do not themselves manage lands. In Oregon, the Oregon Watershed Enhancement Board provides funding for easements and acquisitions which can lead to important protections for species and habitats. Federal agencies such as the U.S. Natural Resources Conservation Service, and their local Soil and Water Conservation Districts have an interest in conservation issues and maintain close contact with the agricultural community. Memoranda of understanding with the boards of conservation districts might facilitate cooperation on natural area conservation matters.

In evaluating the protection which agency management designations can provide to heritage conservation, several criteria are applied.

Designation Security or Permanence: Secure protection of a species or resource occurs when the protection designation has assurance of long-term continuity and cannot be easily reversed. The higher the administrative level at which the designation is made, the more secure it will be. Incorporation of specific legal language such as a need to show imperative or unavoidable necessity to reverse a designation makes it more secure.

Adequacy of Protection: Adequate protection is based on the ability of the management agency to assure the survival of the heritage elements into the foreseeable future. Depending on the characteristic of the designation, the protection may be adequate for some, but not all, elements.

For example, a refuge for fish and wildlife may adequately protect rare animals but fail to protect other

elements such as rare plants. In certain cases where a given designation fails to provide secure or adequate protection for a given element, there may be ways to reinforce that protection.

Consistency of Management Objectives: Consistent objectives mean that no major conflict is foreseen by the Council between the primary management objectives of a particular designation and the objectives of heritage conservation. If it is determined that additional protection may be necessary for security or adequacy, that protection should not involve a major management trade-off. For instance, the designation of a Research Natural Area within a Wilderness Area would not appear inconsistent, and it may provide a security against management decisions which may affect the research qualities of the ecosystems.

State Agency Designations

Natural Heritage Conservation Area (NHCA)

Purpose: (1) To protect examples of terrestrial and aquatic ecosystems; (2) to serve as gene pool reserves; (3) to serve as benchmarks against which the influences of human activities may be compared; and (4) to provide outdoor laboratories for research and education.

Administering Agencies: Division of State Lands, State Parks and Recreation Department, Department of Forestry, Department of Fish and Wildlife, Military Department and Conservation Organizations.

Designation: Secure

Protection: Adequate

Comments: Ten sites have been dedicated on state lands to date and several others are currently under consideration.

Registered Natural Heritage Areas

Purpose: To recognize voluntarily protected examples of relatively undisturbed terrestrial and aquatic ecosystems, rare plant and animal species, or unique geologic features.

Administering Agencies: All state agencies, local governments and private landowners.

Designation: Not Secure

Protection: Variable, depending on landowner actions, commitment and land management goals. Short term protection only on private lands; no protection implied on state lands.

Comments: State, federal, municipal, county or private landowners may register lands upon approval of the Natural Heritage Advisory Council.

Estuarine Sanctuaries

Purpose: To (1) maintain the integrity of the estuary; (2) protect the estuary from uses and activities, both within and beyond its boundaries, which may alter or affect the ecosystem and its natural dynamic processes; and (3) preserve the area for long term scientific and educational uses.

Administering Agency: State Land Board via Division of State Lands.

Designation: Secure

Protection: Variable, portions designated as registered or dedicated natural areas are adequately protected, others are not.

Marine Garden (MG)

Purpose: To provide a public focus to enjoy and learn about marine ecosystems while protecting the marine life of popular, accessible sites.

Administering Agency: Ocean Policy Advisory Council of the Ocean Program of the Department of Land Conservation and Development, the Division of State Lands, Parks and Recreation Department and the Department of Fish and Wildlife.

Designation: Secure

Protection: Fair, due to heavy use of many sites. Parks and DSL control access and management of these sites.

Marine Habitat Refuge (HR)

Purpose: To ensure that various representative areas of marine life in Oregon's rocky shores will be managed to protect natural habitat values and to maintain viable populations of marine plants and animals.

Administering Agency: Ocean Policy Advisory Council of the Ocean Program of the Department of Land Conservation and Development.

Designation: Secure

Protection: Variable, since DSL or Parks controls access and management of the resources.

Marine Priority Rock and Reef (PRR)

Purpose: To designate offshore rocks, islands, or reefs determined to need study or management action.

Administering Agency: Ocean Policy Advisory Council of the Ocean Program of the Department of Land Conservation and Development.

Designation: Secure

Protection: Inherently protected, there is no management category designated for these sites.

Marine Research Reserve (RR)

Purpose: To provide sites for marine life in Oregon's rocky shores that will be managed to protect natural habitat values and to maintain viable populations of marine plants and animals.

Administering Agency: Ocean Policy Advisory Council of the Ocean Program of the Department of Land Conservation and Development.

Designation: Secure

Protection: Variable, since DSL or Parks controls access and management of the resources.

Scenic Waterway (SW)

Purpose: To provide examples of wild and scenic rivers.

Administering Agency: State Parks and Recreation Department and the Department of Water Resources.

Designation: Not Secure

Protection: Variable, depending on landowner actions, commitment and land management goals. Short term protection only on private lands; no protection implied on state lands.

Comments: State, federal, municipal, county or private landowners may register lands upon approval of the Natural Heritage Advisory Council. A few areas have been registered to date.

Federal Agency Designations

Area of Critical Environmental Concern (ACEC)

Purpose: An area within the Bureau of Land Management (BLM) public lands where special management attention is required to protect and to prevent irreparable damage to important historic, cultural or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards.

Administering Agency: USDI Bureau of Land Management

Designation: Variable, potentially secure

Protection: Variable, potentially secure

Comments: Elements contained within ACECs are not considered adequately protected in this Plan, but may be so considered in the future if and when site-specific management plans are sufficiently restrictive to warrant it. Each site must be evaluated separately under this designation.

National Natural Landmark (NNL)

Purpose: To encourage the preservation of areas that illustrate the ecological and geological character of the United States, to enhance the educational and scientific values of the areas thus preserved, to strengthen cultural appreciation of natural history, and to foster a wider interest and concern in the conservation of the Natural Landmarks Program's natural heritage.

Administering Agency: USDI National Park Service

Designation: Not secure

Protection: Inadequate

Comments: Designation of a National Landmark carries with it no binding restrictions on management or use of the site.

National Parks (NP) and Monuments (NM)

Purpose: To preserve the outstanding natural, historical and recreational resources of the United States.

Administering Agency: USDI National Park Service

Designation: Secure

Protection: Generally adequate, but occasionally local sites are not adequate

Comments: Elements within National Parks are considered adequately protected if they are included within a management plan compatible with natural values. For example, Research Natural Areas within National Parks provide adequate protection of natural heritage elements.

National Wildlife Refuges (NWR)

Purpose: To provide, preserve, restore, and manage a national network of lands and waters sufficient in size, diversity and location to meet society's needs for areas where the widest possible spectrum of benefits associated with wildlife and wild lands is enhanced and made available.

Administering Agency: USDI Fish and Wildlife Service

Designation: Secure

Protection: Not adequate

Comments: Establishment of Research Natural Areas with specific management plans within Refuges is considered adequate protection for elements in this plan.

Outstanding Natural Areas (ONA)

Purpose: An area of unusual natural characteristics where management of recreation activities is necessary to preserve those characteristics.

Administering Agency: USDI Bureau of Land Management

Designation: Potentially secure

Protection: Potentially adequate

Comments: These are all designated as ACECs as well as ONAs. The designation in the list of ecosystem cells could read ONA/ACEC for these sites.

Research Natural Areas (RNA)

Purpose: (1) To preserve examples of all significant natural ecosystems for comparison with those influenced by man; (2) to provide educational and research areas for ecological and environmental studies; and (3) to preserve gene pools of typical and endangered plants and animals.

Administering Agencies: DOD Army Corps of Engineers, USDA Forest Service, USDI National Park Service, USDI Bureau of Land Management, USDI Fish and Wildlife Service, US Department of Energy.

Designation: Secure

Protection: Adequate

Comments: The U.S. Forest Service (USFS) has a two step process for designation of RNAs. The sites are proposed and evaluated by USFS staff, during which time they are considered Proposed RNAs by the Heritage Program and the USFS. Following this, approved sites are included in the Forest Plans as Research Natural Areas. Once included in an adopted Plan, the areas are managed as fully established RNAs, and because of this the Heritage Program has chosen to recognize these as RNAs in this Heritage Plan. However, they are not considered established by the USFS until an establishment report is completed and signed by the Regional Director. Because of this, many of the RNAs in the plan are still considered by the USFS to be Potential RNAs (PRNAs).

All BLM Research Natural Areas (RNAs) are also designated as ACECs. The designations in the text read RNA, but can be translated to read RNA/ACEC for all BLM areas.

Special Interest Areas (SIA)

Purpose: To protect, and where appropriate, foster public use and enjoyment of areas with scenic, historical, geological, botanical, zoological, paleontological or other special characteristics. To classify areas that possess unusual recreational and scientific values so that these values are available for public study, use or enjoyment.

Administering Agency: USDA Forest Service

Designation: Variable, potentially secure

Protection: Potentially adequate

Comments: These areas are managed for recreational use substantially in their natural condition, which may result in variable protection of natural heritage elements. For example, salvage logging may be allowed in SIA's in certain instances. As a result, SIA's were not used to fill cells.

Wild and Scenic Rivers

Purpose: To protect the river's aesthetic, scenic, historic, archaeologic and scientific features.

Administering Agencies: Several agencies, especially the U.S. Department of the Interior

Designation: Secure

Protection: Inadequate

Comments: Management plans result in varying degrees of protection of elements, based on the special attributes of the area. Salvage logging and grazing are not necessarily excluded from sites with this designation.

Wilderness Areas (WA)

Purpose: Wilderness Areas are devoted to the public purposes of recreational, scenic, scientific, educational, conservation and historical use.

Administering Agencies: USDA Forest Service, USDI Bureau of Land Management

Designation: Secure

Protection: Variable

Comments: Certain activities which are not compatible with natural area management, such as heavy recreational use, domestic livestock grazing, or mining are allowed in Wilderness Areas. For this reason, the Heritage Program and the Research Natural Area Committee continue to try to designate Research Natural Areas within established Wilderness Areas. Wilderness Study Areas (WSAs) are areas under study for inclusion in the wilderness system. These are usually managed in ways equivalent to Wilderness Areas.

International Designations

Biosphere Reserves

Purpose: To conserve for present and future use the diversity and integrity of biotic communities of plants and animals within natural ecosystems, and to safeguard the genetic diversity of species on which their continuing evolution depends.

Administering Agency: UNESCO, United Nations

Designation: Secure

Protection: Potentially adequate

Private Organizations

Nature Conservancy Preserves (TNC)

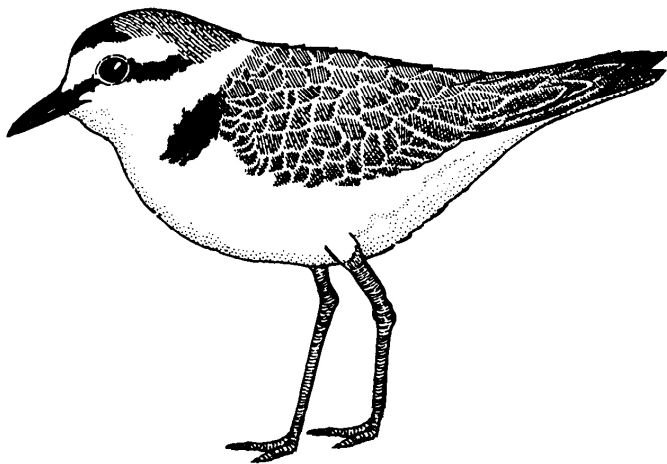
Purpose: (1) To protect examples of high priority terrestrial and aquatic ecosystems, and rare plant and animal species; (2) to serve as gene pool reserves; (3) to serve as benchmarks against which the influences of human activities in similar, disturbed ecosystems may be compared; and (4) to provide outdoor laboratories for scientific research and education.

Administering Agency: The Nature Conservancy

Designation: Secure

Protection: Adequate

Comments: These areas are privately owned equivalents of Research Natural Areas or Dedicated Natural Heritage Conservation Areas.



Drawing of the western snowy plover (*Charadrius alexandrinus nivosus*) by Jay Miner

Part 2

Oregon Natural Heritage Program

2003 Natural Areas Plan

Chapter 5. Ecoregional Lists of Cells

Summary

The lists of natural heritage elements found in the eight Oregon ecoregions are the centerpiece of the Oregon Natural Heritage Plan. They describe the diversity of the different ecoregions, and show how successful Oregon has been at assuring these elements are represented in natural areas.

These lists have been significantly updated for this edition of the plan. The Council hopes that agencies and the public will use these lists in making decisions related to conservation. The Council and the Oregon Natural Heritage Information Center Staff also hope to continue getting feedback to improve the accuracy of the information included in these lists.

Progress to Date

For each update of the Plan, NHAC presents a report to the State Land Board outlining changes in the plan, and a comparison of the number of protected ecosystem cells by ecoregion in this plan with the previous plan. Table 2 (below) summarizes the differences in protection for ecosystem cells between the 1998 and 2003 plans. The main difference is that the number of ecosystem cells has decreased slightly due primarily to the change from 10 to 8 ecoregions

Table 2. Comparison between 2003 and 1998 Plans

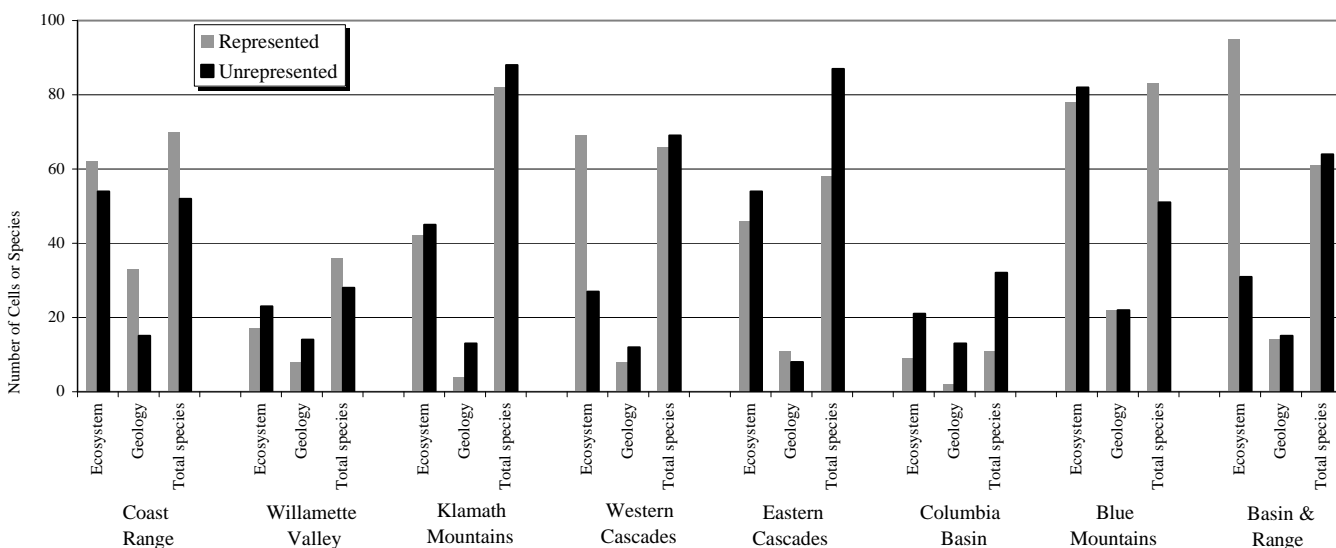
Plan	# Cells	Protected / Proposed	Unfilled
1998	804	252	617
2003	750	416	334
Change	-54	164	-238

Overall, the percentage of unrepresented (or unfilled) cells has dropped from 77% to 44.5%, due to increased agency designations and by the council choosing to recognize areas as protected if they are appropriately managed through a non-natural area designation, such as a Wilderness Area.

Figure 5 (below) shows how well ecosystem cells, geologic cells and species are protected within each of the ecoregions in this 2003 edition of the plan. Because this is the first plan in which geological cells and species are identified by protection needs within ecoregions, it is not possible to examine any trends related to their protection.

The council would like to recognize the very significant progress in designating natural areas made by some federal agencies over the last 5 years. Most notable are the high percentages of filled cells in the West Cascades (about 73%) mostly due to work by the U.S. Forest Service. Also of note is progress made by the BLM in the Basin and Range Ecoregion.

Figure 5. Number of Represented and Unrepresented Cells and Species by Ecoregion



While more than 76% of all the cells in this large region have been filled, these include over 93% of the terrestrial ecosystem cells. This is due to recent designations in management plans by the Vale, Burns and Lakeview BLM Districts.

The fact that terrestrial cells are better protected than wetland and aquatic cells is true for all ecoregions. Part of the reason is that many of the aquatic and wetland types have been described more recently, and the agencies have been working longer to protect the terrestrial cells. However, it also points out the difficulty of protecting aquatic and riparian habitats in Oregon. The Council hopes that progress towards implementing the Oregon Plan for Salmon and Watersheds will help speed up protection of aquatic and riparian ecosystem types.

This is the first plan that allows for an evaluation of how well geologic elements and species are protected in the network of conservation areas (Figure 5). It is interesting that the patterns of which ecoregions are best protected are quite different for Geologic Cells (with only the Coast Range having more than 70% of the cells protected) than for species, best protected in the Blue Mountains. Geologic areas are protected in the coast in the extensive network of shoreline state parks. Species are best protected in the Blue Mountains (at 62%) because many of them are found in established Forest Service Wilderness Areas. It is hoped that highlighting the high number of at-risk species not found in any conservation areas will increase designations for their habitat in the future.

Using Natural Heritage Resource Lists

The Natural Heritage Act of 1979 specifies that: "In selecting conservation areas, the inclusion of natural heritage resources, and especially those that are not adequately protected elsewhere, shall be given primary consideration". It is hoped that all state and federal agencies and the Interagency Research Natural Area Committee will continue to use these lists to guide in their selection of potential Research Natural Areas.

The next eight chapters in the plan include brief ecoregional descriptions followed by the lists of cells. The descriptions are only included to provide the general ecological and social context of each ecoregion.

Also provided is a map showing the ecoregions and the sub-regions as defined by the EPA. Subregions were not used in this plan, but they help identify ecological and geological variation within the ecoregions. More information on the ecology or geology of these regions and more detailed maps are available in the Oregon Ecoregions EPA poster (Thorson *et al.* 2003).

The first cells included in each chapter are the ecosystem cells. The terrestrial cells are first, organized by vegetation zone. They are followed by the aquatic and wetland cells organized by aquatic or wetland type. ORNHIC and NatureServe are continuing to work on updating the aquatic and marine classifications and these are likely to continue to be modified in future editions of the plan. Last in this section are the fairly new ecosystem process cells, which are still preliminary.

These are then followed by the list of geology cells, which have been completely revised. Within each ecoregion, the geology cells are organized by the standard intervals of geological time, from the oldest (Devonian, about 320 million years ago) to the newest (the Quaternary, including the present).

Finally, the ecoregional chapters contain the list of special species elements. The special species are organized by major taxonomic group, with the invertebrates listed first, followed by the vertebrates, and then the plants. Species are listed alphabetically within each group. In this edition of the plan, plants will also include fungi and lichens, since so few of these are included in the lists. In future updates of the plan, fungi and lichens will be included in a separate section.

Table 3 (on page 36 and the back inside cover of this plan) describes and defines the abbreviations used in the lists. Detailed descriptions of the Land Management Designations were outlined in Chapter 4, starting on page 27.

The complete list of established natural areas in Oregon is included with a map as Appendix A, on page 157. The Oregon Natural Heritage Information Center also maintains a GIS cover showing all the conservation lands in Oregon. This "Protected Areas" coverage is available at the Oregon Geospatial Data Clearinghouse.

How the Lists are Organized

Different **TEXT COLOR IN GRAY** and **BLACK** are used in all of the lists of ecological, geological and species elements to distinguish cells that are already protected from those needing designations. Those that are unrepresented are highlighted in black. Ecosystem elements in **gray** are those with designations and management that adequately protects them in the ecoregion. This is not necessarily the case for species elements. Determining if a species is viable at these sites is more difficult. As a result, listing in the plan in black only means the species is currently known to be represented at the natural area(s) listed.

The lists for each of the ecoregions are organized as a series of tables for the different element types (ecological, geological, and species). Each table has four columns. The column headings and definitions are listed below and in Table 3 on page 35.

Agency – The agency or agencies managing lands most likely to contain examples of this type. These agencies should be working to find and designate an example of this cell in this ecoregion. Current agency lists are maintained on file at the Natural Heritage Information Center

Priority – Priorities for elements listed were determined using principles detailed above (page 12 for ecological cells and page 17 for geological and species cells). These priorities are subject to continual update as elements become rarer, more threatened, or more secure. Current priorities, determined by the Natural Heritage Advisory Council, are maintained at the Oregon Natural Heritage Information Center. Determination of adequacy of representation within a proposed area is made by the Natural Heritage Advisory Council, in cooperation with the Federal Research Natural Area Committee. This is done based on the criteria listed in Chapter 3 (page 12). Due to continual status updates, elements added to the "adequately represented" category will be maintained at the Oregon Natural Heritage Information Center.

Cell Name – Cell names are intended to be succinct descriptors for discrete, but often difficult-to-describe, components of the resource spectrum. As such, the name should be considered only a flag. Detailed descriptions of all cells are available at the Oregon Natural Heritage Information Center. Cells are generally composed of one or more ecosystem

elements. Most terrestrial and wetland ecosystem elements are plant communities. Detailed descriptions of the terrestrial and wetland plant community elements, called Community Characterization Abstracts, are being prepared, starting with the rarest types. Abstracts include information on the species present, soil, geomorphology, range and distribution of the communities, as well as references in the scientific literature relating them. These materials are maintained on file at the Oregon Natural Heritage Information Center.

Present Representation – This column contains names of established, proposed and recommended natural areas that contain examples of the cell. Specific formatting and codes are used in this column. These include:

< = The element is present at this protected site, but only in small patches which provide only partial representation of the ecosystem cell. If < is not present, the area is assumed to adequately represent the cell. In this plan, these have only been used for ecosystem cells, not for geologic cells or species.

ITALICS = Areas listed in *italics* have been recommended by agency ecologists or Heritage staff as having excellent examples of the cell, but have no formal designations.

Elements that have been lost or extirpated in the ecoregions are labelled as such. Those known or suspected to be gone are differentiated as "Probably extirpated", "Extirpated" or "Extinct". For these elements considered extirpated or extinct, no agency is designated to seek representation. However, if an example of any of these extirpated types was to be located, it would immediately become a high priority for protection. Sites recommended are those high quality sites currently known. Any site meeting the quality and size criteria for the element would be suitable for designation.

The lists will be updated with each revision of the Oregon Natural Heritage Plan, at five-year intervals. A list of all established natural areas, and a map, are included in Appendix A on page 158. The current status of all cells, elements and natural areas will be maintained on file at the Oregon Natural Heritage Information Center.

Table 3. Codes and abbreviations used in the Natural Heritage Resource lists

Priority for Ecological and Geological Cells	Code
High	H
Moderate	M
Low	L
Unknown	U
Protected adequately at the listed site or sites	*
Adequately protected at the listed site or sites, when final designation is completed	+
Only partially protected due to designation, size, or quality at this site	<
Priority for Species	
Species Threatened or Endangered Throughout Their Range (ORNHIC List 1)	1
Species Threatened or Endangered in Oregon, but More Common Elsewhere (List 2)	2
Protected adequately at the listed site or sites	*
Represented at the listed site or sites, when final designation is completed	+
Potential Acting Agency	
Private Lands	PVT
Oregon Department of Forestry	ODF
Oregon Department of Transportation	DOT
Oregon Division of State Lands	DSL
Oregon Department of Fish and Wildlife	OFW
Oregon Parks and Recreation Department	PRD
Army Corps of Engineers	ACE
Bureau of Land Management	BLM
Department of Defense	DOD
National Park Service	NPS
U.S. Fish & Wildlife Service	FWS
U.S. Forest Service	FS
Present Representation	
Area of Critical Environmental Concern (BLM designation only)	ACEC
Federal Research Natural Area (Federal Agencies)	RNA
Natural Heritage Conservation Area (State Agencies)	NHCA
Proposed designation (for the three agency designations above)	P....
National Monument (Federal Agencies)	NM
National Recreation Area	NRA
National Wildlife Refuge (U.S. Fish and Wildlife Service)	NWR
The Nature Conservancy Preserve	(TNC)
Wilderness Area (Federal Agencies)	WA
Wilderness Study Area (Federal Agencies, primarily BLM)	WSA
Wild and Scenic River (Federal Agencies)	WSR
Wildlife Management Area	WMA
Special Interest Area	SIA
Sites recommended as best example of cell (site name in italics)	<i>Italics</i>

Chapter 6: Coast Range Ecoregion

The Coast Range Ecoregion includes the entire Oregon coastline and the northern and central Oregon Coast Range Mountains, and extends north though the state of Washington to southwestern British Columbia on Vancouver Island, and south almost to Mendocino, California. Elevations in the Oregon Coast Range Ecoregion range from sea level to 4,000 feet, and the marine climate creates the most moderate and wettest habitats in the state. Average annual rainfall of 60 to 180 inches supports spectacular stands of temperate rainforests. Vegetation is characterized by giant conifer forests of Sitka spruce, western hemlock, Douglas fir, and redwood, with some hardwoods including red alder and tanoak.

The Oregon coast has other unique ecological features. Sand deposits from coastal streams and rivers (primarily the Umpqua and Columbia Rivers) have created major coastal dune systems, the largest located at the Oregon Dunes National Recreation Area. In the north coast, steep headlands and cliffs are separated by stretches of flat coastal plain and large estuaries. The south coast includes the warmest areas, with rugged headlands and very mild winters, supporting local endemic species such as the coast redwood and Port Orford cedar.

Almost 40% of the region is in public ownership, primarily in National Forest, Bureau of Land Management and State Forest lands. Population is dispersed in many small towns, most located within a few miles of the ocean. Forest products, tourism and fisheries are the mainstays of the local economy.

In addition to coastal forests, the Coast Range Ecoregion includes all of Oregon's nearshore and offshore coastal resources, including its intertidal, marine and estuarine cells. These resources are currently not well represented in Oregon's system of natural areas. The publication of the *Territorial Sea Plan* (Oregon Ocean Policy Advisory Council, 1994) has created an excellent opportunity to better protect Oregon's marine and intertidal resources. Designations such as a) Marine Garden, b) Habitat Refuge, c) Research Reserve, d) Marine Shore, and e) Priority Rock and Reef Site have been applied to many of Oregon's most significant biological and ecological marine resources. In this plan, we have made an effort to match existing cell needs to these designations. This has worked well for the rocky coastline and intertidal resources, but not for the offshore reefs. Better inventory and classification is needed to define the ecological resources offshore. Fortunately, this is a major focus of ongoing research to examine the potential use of marine reserves to protect fish and marine habitats.

Figure 6. Represented and Unrepresented Cells and Species in the Coast Range

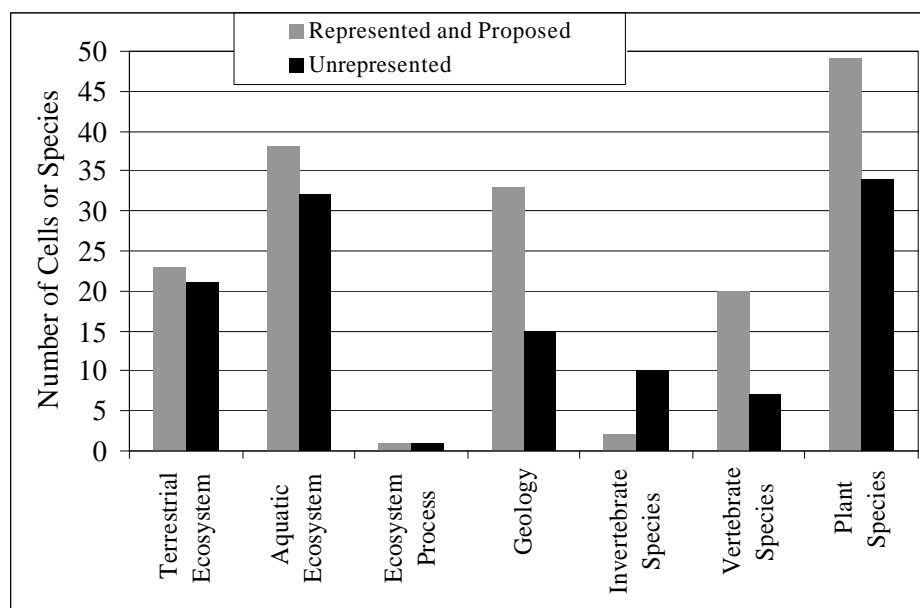
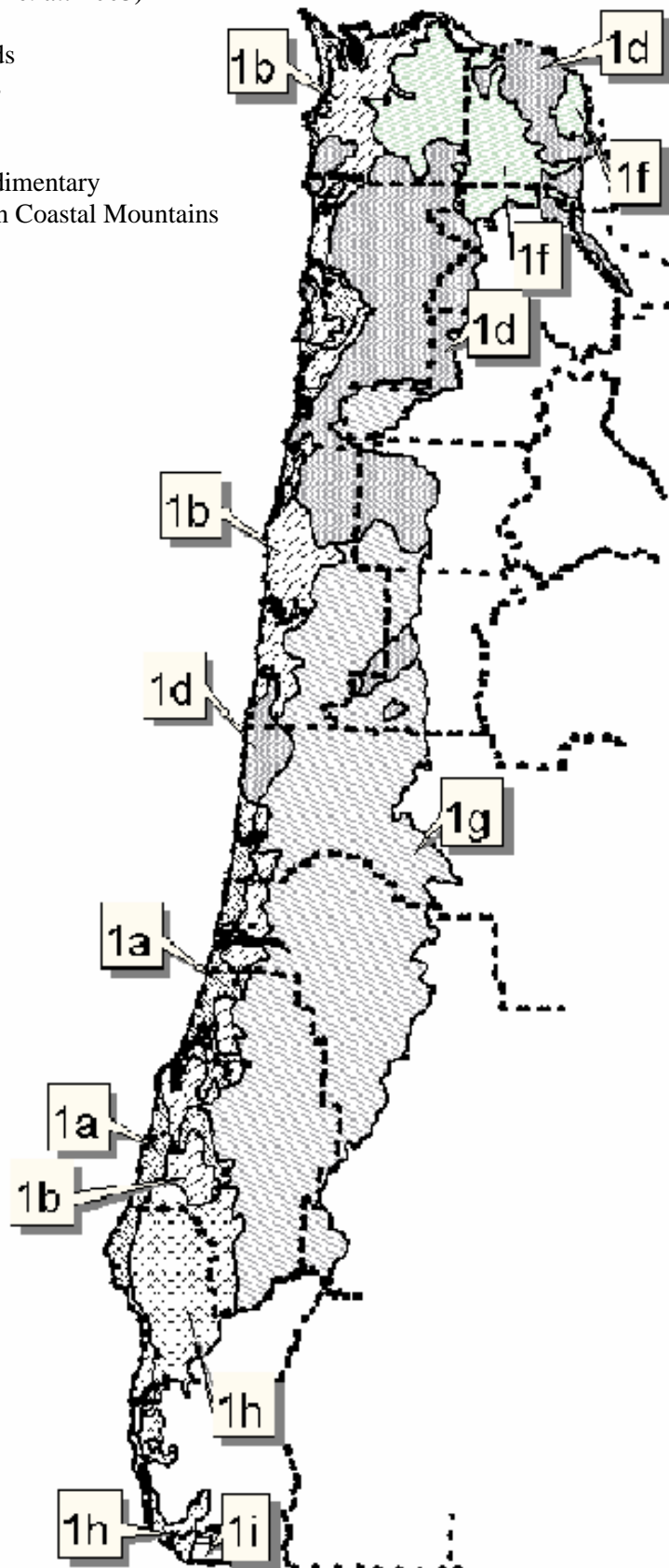


Figure 7. Map of Coast Range Ecoregion and Subregions (Thorson *et al.* 2003)

- 1a – Coastal Lowlands
- 1b – Coastal Uplands
- 1d – Volcanics
- 1f – Willapa Hills
- 1g – Mid-Coastal Sedimentary
- 1h – Southern Oregon Coastal Mountains
- 1i – Redwood Zone



COAST RANGE ECOLOGICAL CELLS (CR)

Agency	Priority	Cell Name	Present Representation
Sitka Spruce			
	*	1. Sitka spruce/salal.	Cape Meares RNA/NHCA Cape Lookout NHCA
	*	2. Sitka spruce/swordfern.	Neskowin Crest RNA Cape Lookout NHCA
FS	H	3. Sitka spruce/oxalis, with devils club if possible.	<i>Drift Creek WA</i>
	*	4. Sitka spruce/salmonberry.	Cummins-Gynne RNA Reneke Creek RNA
FS	H	5. Sitka spruce/fool's huckleberry-red huckleberry.	Neskowin Crest RNA<
	*	6. Grand fir-Sitka spruce forest.	Nesika Beach (TNC)
BLM, FS PVT	H.	7. Sitka spruce-western hemlock-Port Orford cedar forest on coastal terrace.	<i>Coos County Forest</i>
Redwood			
	*	8. Redwood-Douglas fir forest with evergreen shrubs (tanoak, rhododendron, and evergreen huckleberry).	Wheeler Creek RNA
FS	H	9. Redwood/swordfern and tanoak-Douglas fir/evergreen shrub forests.	<i>Peavine Ridge</i> Winchuck Slope NHCA<
Port Orford Cedar			
	*	10. Douglas fir-western hemlock-Port Orford cedar forest with wet shrubs and forbs.	Port Orford Cedar RNA Coquille River Falls RNA
	*	11. Port Orford cedar-Douglas fir-western hemlock forest with dry shrubs and forbs.	Port Orford Cedar RNA Coquille River Falls RNA
	*	12. Port Orford cedar forest types on ultramafic soils.	Hunter Creek Bog ACEC/SIA
Western Hemlock			
	*	13. Western hemlock/swordfern.	Cummins-Gynne RNA High Peak-Moon Creek RNA
	*	14. Western hemlock/oxalis.	Cherry Creek RNA
BLM, FS	H	15. Western hemlock/rhododendron/swordfern and western hemlock/rhododendron-salal communities.	
	*	16. Western hemlock/rhododendron-Oregon grape.	Cherry Creek RNA
BLM, FS	M	17. Western hemlock/devils club with or without grand fir.	<i>Bunker Hill</i>
	*	18. Western hemlock/vine maple, salmonberry and swordfern.	Flynn Creek RNA
FS	H	19. Western hemlock/salmonberry, with salal or hazel.	

COAST RANGE ECOLOGICAL CELLS (CR)

Agency	Priority	Cell Name	Present Representation
BLM, FS	H	20. Western hemlock/evergreen huckleberry.	
	*	21. Western hemlock/vine maple-salal.	High Peak-Moon Creek RNA
BLM, FS	H	22. Western hemlock/salal.	
BLM, FS	H	23. Western hemlock/Oregon grape, with salal if possible.	
BLM, FS	M	24. Douglas fir/oceanspray-salal.	
	*	25. Noble fir-western hemlock forest.	Grass Mountain RNA Saddle Mountain NHCA
	*	26. Pacific silver fir-western hemlock forest.	Saddleback Mountain RNA Onion Peak (TNC)/PNHCA
Shore Pine			
BLM, FS, PRD	M	27. Shorepine/salal-evergreen huckleberry forest.	Blacklock Point PNHCA< Cape Blanco NHCA<
	*	28. Pygmy shorepine forest on Blacklock soil.	Blacklock Point PNHCA
Grasslands and Shrublands			
	*	29. Coastal headland grassland and herbaceous complex with red fescue dominant.	Cascade Head (TNC) Neskowin Crest RNA
FWS, PRD PVT	*	30. Coastal headland or oceanfront grassland with California oatgrass, red fescue, and Romer's fescue.	Cape Blanco NHCA< <i>Crook Point NWR</i>
	*	31. Coastal headland shrublands with salal, coastal sage or evergreen huckleberry.	Cape Lookout NHCA Cascade Head (TNC)
	*	32. Oceanfront shrublands with crowberry and western azalea.	Blacklock Point PNHCA Cape Blanco NHCA
	*	33. Grass bald on Coast Range mountain.	Grass Mountain RNA Saddle Mountain NHCA
	*	34. Rock garden on Coast Range mountain.	Onion Peak (TNC)/PNHCA Saddle Mountain NHCA
Coastal Dune Forests and Grasslands			
	*	35. Coastal dune mosaic with tree islands and open dunes.	Tenmile RNA
FS	H	36. Native stabilized dune grassland with red fescue and dune wildrye.	Tenmile RNA< <i>Tenmile closure area</i>
	*	37. Native unstabilized dune grassland with dune bluegrass and seaside lupine.	Sand Lake RNA

COAST RANGE ECOLOGICAL CELLS (CR)

Agency	Priority	Cell Name	Present Representation
ACE	H	38. Unstabilized foredunes with dune bluegrass and American beachgrass.	<i>West Sand Island</i>
BLM, PRD PVT	H	39. Oceanfront herb-dominated dunes with camissonia, knotweed and silvery phacelia.	Ophir Dunes PNHCA< Sunset Beach PNHCA<
FS, PRD	M	40. Sitka spruce-shore pine/evergreen huckleberry community.	Tenmile RNA< <i>Umpqua Lighthouse State Park</i>
FS	H	41. Shore pine/hairy manzanita communities.	<i>Eel Creek</i>
FS, PRD	H	42. Douglas fir/Rhododendron-evergreen huckleberry mature dune forest.	<i>Lake Marie - Umpqua Lighthouse State Park PNHCA</i>
FS	H	43. Sitka spruce-Port Orford cedar forest on sand dunes.	<i>S. Horsefall Campground</i>
FS	H	44. Western hemlock/rhododendron-evergreen huckleberry.	<i>Tahkenitch dunes Loon Lake</i>
Marine			
DSL	U	45. Subtidal, high-relief rock bottom with <i>Nereocystis</i> kelp bed with little or no algal sub-canopy.	<i>Orford Reef Cape Foulweather</i>
DSL	U	46. Subtidal, high-relief rock bottom with <i>Macrocystis</i> kelp bed with little or no algal sub-canopy.	<i>Simpson Reef PNHCA North Cove – Cape Arago PNHCA</i>
DSL	U	47. Subtidal, high-relief rock bottom with dense algal sub-canopy under kelp bed.	<i>Humbag Mountain</i>
DSL	U	48. Subtidal, high-relief, unvegetated rock bottom.	
DSL	U	49. Subtidal, low-relief rock bottom with <i>Nereocystis</i> kelp bed and if possible with <i>Macrocystis</i> kelp bed.	<i>Pirate Cove Crook Point/Mack Reef</i>
DSL	U	50. Subtidal, low-relief rock bottom with dense algal sub-canopy under kelp.	<i>Nellies Cove Crook Point/Mack Reef</i>
DSL	U	51. Subtidal, low-relief, unvegetated rock bottom.	
DSL, PRD	U	52. Subtidal, high-energy sandy bottom.	<i>Netarts Sand Spit NHCA</i>
DSL, PRD	U	53. Subtidal low-energy sandy bottom.	
DSL	U	54. Subtidal mud bottom.	
DSL	U	55. Subtidal gravel bottom.	<i>Orford Reef</i>
DSL	U	56. Subtidal hard bottoms with reef building animals.	<i>Norton Gulch (Gregory Point)</i>
DSL	U	57. Subtidal, aphotic zone with boulder or bedrock.	
DSL	U	58. Subtidal, aphotic zone with shale or shingle.	

COAST RANGE ECOLOGICAL CELLS (CR)

Agency	Priority	Cell Name	Present Representation
DSL	U	59. Subtidal, aphotic zone sandy bottom.	
	+	60. Intertidal, exposed bedrock, mussell beds.	Boiler Bay PNHCA Yachats PNHCA
	+	61. Intertidal, exposed bedrock, algal dominated.	North Cove - Cape Arago PNHCA
	+	62. Intertidal, exposed bedrock, mussell beds.	Boiler Bay PNHCA Yachats PNHCA
	+	63. Intertidal, exposed bedrock, surfgrass beds.	Boiler Bay PNHCA Otter Crest PNHCA
		64. Intertidal, exposed bedrock, surge channels.	Cape Perpetua PNHCA
	+	65. Intertidal, exposed bedrock/boulders subject to sand scour and periodic sand inundation.	Haystack Rock PNHCA Cape Kiwanda PNHCA
	*	66. Intertidal, exposed boulder field.	North Cove – Cape Arago PNHCA Humbug Mountain – Lookout Rock PNHCA
DSL	U	67. Intertidal, semi-protected, bedrock, surfgrass beds.	
DSL	U	68. Intertidal, semi-protected, bedrock, bedrock shelf.	<i>Chetco Cove</i>
	+	69. Intertidal, semi-protected, boulder field.	North Cove - Cape Arago PNHCA
DSL, PRD	U	70. Intertidal sandy/gravelly beach.	
	*	71. Intertidal, low exposure sandy beach.	Netarts Sand Spit NHCA
DSL, PRD	U	72. Intertidal, high exposure sandy beach.	
DSL, PRD	U	73. Highly erosive seacliffs.	<i>Cape Kiwanda</i> <i>Seal Rock</i>
	*	74. Erosion resistant seacliffs, with caves if possible.	Cascade Head NHAC Cape Lookout NHCA
	*	75. Offshore rocks, awash at high tide.	Rogue Reef PNHCA Simpson Reef PNHCA
DSL, FWS	U	76. Offshore rocks, not awash at high tide, with soil and vegetation.	<i>Goat Island</i> <i>Crook Point NWR</i>
	+	77. Offshore rocks, not awash, unvegetated.	Cape Meares NHCA/RNA
Estuarine			
DSL	U	78. Unvegetated fine (mud to sand) unconsolidated substrata in subtidal zone.	

COAST RANGE ECOLOGICAL CELLS (CR)

Agency	Priority	Cell Name	Present Representation
DSL	U	79. Eelgrass beds, on fine (mud to sand) unconsolidated substrata in subtidal zone.	
	+	80. Unvegetated muds in intertidal zone, including <i>Abarenicola</i> in lower or middle estuary.	South Slough PNHCA
	+	81. Unvegetated muddy sands in intertidal zone, including <i>Mya arenia</i> in upper estuary.	South Slough PNHCA
DSL	U	82. Unvegetated sands in intertidal zone, including <i>Callinassa californionis</i> in lower or middle estuary.	
DSL	U	83. Intertidal, lower estuary, vegetated and unvegetated rocky surfaces, including macroalgal beds (<i>Enteromorpha</i> , <i>Ulva</i> , <i>Fucus</i> , <i>Polysiphonia</i> , and <i>Sargassum</i>).	
	+	84. Intertidal, lower estuary, vegetated fine, unconsolidated substrata, including eelgrass beds and macroalgal mats (<i>Enteromorpha</i> , <i>Ulva</i> , <i>Vaucheria</i> , and <i>Gracilaria</i>).	South Slough PNHCA
	*	85. Low elevation/high salinity intertidal marsh on sand (dominants including Lyngby sedge, saltgrass, glasswort, three-square bulrush, seacoast bulrush, and arrow grass).	Netarts Sand Spit NHCA
	*	86. Low elevation/high salinity intertidal marsh on silt (dominants including Lyngby sedge, saltgrass, glasswort, three-square bulrush, seacoast bulrush, and arrow grass).	Cox Island (TNC) Bull Island NHCA Smith Island NHCA
	*	87. High elevation/low salinity intertidal salt marsh (dominants including Douglas aster, Lyngby sedge, tufted hairgrass, Baltic rush, and silverweed).	South Slough PNHCA Davis Slough NHCA Smith Island NHCA
Lacustrine			
	*	88. Dune-blocked lake with aquatic beds and marshy shore, surrounded by unconsolidated sands.	New River ACEC
BLM, FS PRD, PVT,	H	89. Dune or slump-blocked lake with aquatic beds and marshy shore, surrounded by sedimentary or igneous Formations.	<i>Lake Marie - Umpqua Lighthouse State Park PNHCA</i>
Palustrine			
FS	U	90. Pond in active sand dune area.	
FS, PRD	U	91. Pond in stabilized sand dune area.	
	*	92. Pond at mid to high elevation, including slump ponds.	Wassen Creek ACEC
	*	93. Sparsely-vegetated deflation plain marsh, with Nevada rush, salt rush, creeping spikerush and springbank clover.	Tenmile RNA
	*	94. Deflation plain marsh, dominants including Hooker willow, slough sedge, and silverweed.	Tenmile RNA

COAST RANGE ECOLOGICAL CELLS (CR)

Agency	Priority	Cell Name	Present Representation
	+	95. Freshwater tidal marsh on lower Columbia River.	Russian Island PRNA
	*	96. Slough sedge-Sitka sedge fen.	Gearhart Bog (TNC)
	*	97. Mid to high elevation sedge fen, sphagnum bog and beaver marsh.	Lost Prairie ACEC Fanno Meadows Preserve (TNC)
	*	98. Labrador tea/sphagnum mire on organic soils, including associations with shore pine and western red cedar.	Gearhart Bog (TNC) Bradley Bog (TNC) <i>Neskowin Marsh-Nestucca Bay NWR</i>
	*	99. Labrador tea/sphagnum mire on organic soils, with <i>Darlingtonia</i> , including associations with shore pine and western red cedar.	Bradley Bog (TNC) New River ACEC Woahink Bog (Wetlands Conservancy)
	*	100. Labrador tea/sphagnum mire on floating lake-fill mat.	<i>Neskowin Marsh-Nestucca Bay NWR</i> Woahink Bog (Wetlands Conservancy)
PVT	H	101. Labrador tea-sweet gale heath.	Gearhart Bog (TNC)<
	+	102. Bog blueberry/slough sedge-tufted hairgrass brush prairie.	Blacklock Point PNHCA
PRD, PVT	H	103. Willow-crabapple/slough sedge swamp with spiraea.	Sutton Lake (TNC)<
FS, PRD	H	104. Shore pine/slough sedge seasonal swamp.	Heceta Dunes ACEC<
		105. Cottonwood/willow-creek dogwood tideland swamp.	Tenasillahe RNA
	*	106. Sitka spruce/creek dogwood and willow tideland swamps.	Blind Slough Swamp (TNC)
	*	107. Sitka spruce/slough sedge-skunk cabbage swamp (non-tidal).	Cape Blanco NHCA <i>Neskowin Marsh-Nestucca Bay NWR</i>
	*	108. Western red cedar-western hemlock/skunk cabbage.	Upper Rock Creek ACEC
	*	109. Low elevation pond with aquatic beds and marshy shore.	Port Orford Cedar RNA
	*	110. Oregon myrtle/evergreen shrub riparian forest.	N. Fk. Chetco River ACEC
	*	111. Riparian hardwood forest along a major river.	Myrtle Island RNA
PRD, PVT	H	112. Shallow lake on ancient deflation plain, with aquatic beds and marshy shore, surrounded by dunes.	
	*	113. Pacific reedgrass fen.	Cape Blanco NHCA
	*	114. Oregon ash-red alder swamp.	Port Orford Cedar RNA

Coast Range Ecosystem Process Cells

FS	U	115. Fire in western hemlock zone with stand replacement and partial stand replacement areas.	
	*	116. Coastal Forest blow-down.	Cape Meares NHCA <i>Umpqua Lighthouse State Park</i>

COAST RANGE GEOLOGICAL CELLS (CR)

Agency	Priority	Species Name	Present Representation
Holocene			
	*	1. Baymouth Spit	Netarts Spit NHCA
	*	2. Beach Ridges	Fort Stevens State Park
PVT	H	3. Buried Forest	<i>Neskowin</i>
	*	4. Dune Sheet	Oregon Dunes NRA Tenmile RNA
	+	5. Dune-dammed Lake	Lake Marie - Umpqua Lighthouse State Park PNHCA
	*	6. Estuary	South Slough PNHCA
	*	7. Estuarine Island	Lewis and Clark NWR
PVT, FS	M	8. Landslide	<i>Newport</i> <i>Jumpoff Joe</i>
PVT, FS	M	9. Landslide-dammed Lake	<i>Lost Lake</i>
PVT, FS	M	10. Liquefaction Dike	<i>Marsh Island</i>
	*	11. Ring Dike, Sill	Ecola State Park
	*	12. Sea Arch	Oregon Islands NWR
	*	13. Sea Cave	Cascade Head (TNC) Cape Lookout NHCA
	*	14. Sea Cliff	Cape Kiwanda State Park Cape Blanco NHCA
	*	15. Sea Stack	Harris Beach State Park Oregon Islands NWR
	+	16. Tsunami Deposits	Netarts Bay Cape Lookout – Netarts Spit NHCA
		17. Wave-Cut Terrace	Sunset Bay State Park
Pleistocene			
	*	18. Cape Blanco Terrace	Cape Blanco NHCA Cape Arago State Park
	*	19. Whisky Run Terrace	Cape Arago State Park
	*	20. Pioneer Terrace	Cape Arago State Park
	*	21. Seven Devils Terrace	Cape Arago State Park

COAST RANGE GEOLOGICAL CELLS (CR)

Agency	Priority	Species Name	Present Representation
	*	22. Metcalf Terrace	Cape Arago State Park
PVT, FS	L	23. Port Orford Formation	<i>Port Orford</i>
Miocene			
	*	24. Cape Foulweather Basalt	Depot Bay State Park
	*	25. Sandstone Of Whale Cove	Depot Bay State Park
	*	26. Depot Bay Basalt	Depot Bay State Park
	*	27. Astoria Formation	Cape Kiwanda State Park
PVT, FS	L	28. Nye Mudstone	<i>Junpoff Joe</i> <i>Newport</i>
	*	29. Empire Formation	Cape Balnco NHCA South Slough PNHCA
Oligocene			
PVT	L	30. Scappoose Formation	<i>Manning</i>
PVT	L	31. Yaquina Formation	<i>Depot Bay</i>
Oligocene and Eocene			
PVT, FS	L	32. Pittsburgh Bluff Formation	<i>Buxton</i>
PVT, FS	L	33. Alsea Formation	<i>Waldport</i>
Eocene			
PVT, FS	L	34. Keasey Formation	<i>Buxton</i>
FS, BLM	L	35. Cowlitz Formation	<i>Vernonia</i>
	*	36. Basalt of Yachats	Sea Lion Point Heceta Head ACEC
PVT, FS	L	37. Nestucca Formation	<i>Toledo</i>
	*	38. Tunnel Point Sandstone	Cape Arago State Park
	*	39. Bastendorff Shale	Cape Arago State Park Shore Acres State Park
	*	40. Coaledo Formation	Sunset Bay State Park Shore Acres State Park
PVT, BLM	L	41. Bateman Formation	<i>Elkton</i>
PVT, BLM	L	42. Elkton Formation	<i>Elkton</i>

COAST RANGE GEOLOGICAL CELLS (CR)

Agency	Priority	Species Name	Present Representation
Cretaceous			
	*	43. Hunters Cove Siltstone	Cape Sebastian State Park
	*	44. Cape Sebastian Sandstone	Cape Sebastian State Park
	*	45. Houstonaden Creek Formation	Samuel H. Boardman State Park
	*	46. Rocky Point Formation	Port Orford State Park
	*	47. Humbug Mountain Conglomerate	Humbug Mountain State Park
Jurassic			
	*	48. Otter Point Formation	Cape Blanco State Park Otter Point State Park

COAST RANGE SPECIAL SPECIES (CR)

Agency	List	Species Name	Present Representation
Invertebrates			
DSL	1	1. <i>Algamorda newcombiana</i> - Newcomb's littorine snail	
FS	1	2. <i>Hesperarion mariae</i> - Oregon hesperarion	
PVT	1	3. <i>Hochbergellus hirsutus</i> - Sisters hesperian (snail)	
BLM	2	4. <i>Incisalia polia maritima</i> - Hoary elfin	
PVT	2	5. <i>Lygus oregonae</i> - Oregon plant bug	
FS, PVT	1	6. <i>Plebeius saepiolus littoralis</i> - Insular blue butterfly	<i>Rock Creek – Big Creek</i>
FS	1	7. <i>Pomatiopsis binneyi</i> - Robust walker	<i>Redwood Creek</i>
	*	8. <i>Pterostichus rothi</i> - Roth's blind ground beetle	Grass Mountain RNA Mary's Peak ACEC
FS	1	9. <i>Rhyacophila haddocki</i> - Haddock's rhyacophilan caddisfly	<i>Mary's Peak</i> <i>Parker Creek headwaters</i>
PVT	2	10. <i>Saldula villosa</i> - Hairy shore bug	
FS	2	11. <i>Speyeria zerene bremnerii</i> - Valley silverspot butterfly	<i>Mary's Peak</i>
	*	12. <i>Speyeria zerene hippolyta</i> - Oregon silverspot butterfly	Cascade Head (TNC) <i>Rock Creek – Big Creek</i> <i>Mount Hebo</i>
Vertebrates			
BLM, FS	2	13. <i>Accipiter gentilis</i> - Northern goshawk	
BLM, FS	2	14. <i>Ascaphus truei</i> - Coastal tailed frog	
	*	15. <i>Batrachoseps attenuatus</i> - California slender salamander	Winchuck Slope NHCA
BLM, FS	2	16. <i>Brachyramphus marmoratus</i> - Marbled murrelet	<i>Peavine Ridge</i>
	*	17. <i>Branta canadensis leucopareia</i> - Aleutian Canada goose	Oregon Islands NWR Netarts Spit NHCA
	*	18. <i>Charadrius alexandrinus nivosus</i> - Western snowy plover	New River ACEC Bandon NHCA
	*	19. <i>Clemmys marmorata marmorata</i> - Northwestern pond turtle	New River ACEC Ten Mile Dunes
	*	20. <i>Corynorhinus townsendii townsendii</i> - Pacific western big-eared bat	Ecola State Park (hibernaculum)
	*	21. <i>Dicamptodon copei</i> - Cope's giant salamander	Saddle Mountain NHCA

COAST RANGE SPECIAL SPECIES (CR)

Agency	List	Species Name	Present Representation
	*	22. <i>Eumetopias jubatus</i> - Northern sea lion	Oregon Islands NWR Cape Arago State Park
	*	23. <i>Falco peregrinus anatum</i> - American peregrine falcon	Cape Meares RNA/NHCA Cape Lookout NHCA Oregon Islands NWR
	*	24. <i>Haliaeetus leucocephalus</i> - Bald eagle	Tenasillahe RNA Neskowin Crest RNA Cape Meares NHCA/RNA
FS	2	25. <i>Martes pennanti pacifica</i> - Pacific fisher	Possibly extirpated
	*	26. <i>Myotis thysanodes</i> - Fringed bat	Drift Creek WA
	*	27. <i>Oceanodroma furcata</i> - Fork-tailed storm-petrel	Oregon Islands NWR
	*	28. <i>Odocoileus virginianus leucurus</i> - Columbian white-tailed deer	Julia Butler Hansen NWR Lewis and Clark NWR
	*	29. <i>Oncorhynchus kisutch</i> - Coho salmon (southern Oregon/northern California coast)	Grassy Knob WA Wild Rogue WA
	*	30. <i>Oncorhynchus kisutch</i> - Coho salmon (Oregon coastal runs)	South Slough PNHCA Cascade Head (TNC) Jewell Meadows WMA
	*	31. <i>Oncorhynchus mykiss</i> – Steelhead (Oregon coast winter run)	South Slough PNHCA Cascade Head (TNC) Jewell Meadows WMA
DSL, PVT	1	32. <i>Oregonichthys kalawatseti</i> - Umpqua Oregon chub	
	*	33. <i>Pelecanus occidentalis californicus</i> - California brown pelican	Oregon Islands NWR William P. Keady PNHCA
	*	34. <i>Plethodon elongatus</i> - Del norte salamander	Port Orford Cedar RNA Winchuck Slope NHCA
	*	35. <i>Progne subis</i> - Purple martin	Julia Butler Hansen NWR Lewis and Clark NWR
BLM, FS	2	36. <i>Rana aurora aurora</i> - Northern red-legged frog	
	*	37. <i>Rana boylei</i> - Foothill yellow-legged frog	Grassy Knob WA Coquille River Falls RNA
BLM, DSL	1	38. <i>Rhinichthys cataractae</i> - Millicoma dace	<i>South Fork Coos River</i> <i>West Fork Millicoma River</i>
	*	39. <i>Strix occidentalis caurina</i> - Northern spotted owl	Wheeler Creek RNA Cherry Creek RNA Little Sink RNA

COAST RANGE SPECIAL SPECIES (CR)

Agency	List	Species Name	Present Representation
Plants			
PRD, City	1	40. <i>Abronia umbellata</i> ssp <i>breviflora</i> - Pink sandverbena	Otter Point NHCA< <i>Port Orford</i>
	*	41. <i>Anemone oregana</i> var <i>felix</i> - Bog anemone	Fanno Meadows (TNC)
	*	42. <i>Arctostaphylos hispidula</i> - Hairy manzanita	North Fork Hunter Creek ACEC Pistol River State Park
	*	43. <i>Artemisia pycnocephala</i> - Coastal sagewort	10 Mile Dunes PRNA Oregon Islands NWR
	*	44. <i>Brodiaea terrestris</i> - Dwarf brodiaea	New River ACEC Cape Arago State Park Port Orford Heads State Park
	*	45. <i>Bryoria pseudocapillaris</i> - Lichen	Oregon Dunes NRA closure area Little Grass Mountain ACEC Saddle Mountain NHCA
	*	46. <i>Calypogeia sphagnicola</i> - Liverwort	New River ACEC Darlingtonia State Park
	*	47. <i>Campylopus schmidii</i> - Moss	Heceta Sand Dunes ACEC
	*	48. <i>Cardamine pattersonii</i> - Saddle mountain. bittercress	Onion Peak (TNC) Saddle Mountain NHCA
BLM, FS	2	49. <i>Carex brevicaulis</i> - Short-stemmed sedge	
BLM, FS	2	50. <i>Carex gigas</i> - Siskiyou sedge	
BLM, FS	2	51. <i>Carex gynodynamis</i> - Hairy sedge	
BLM, FS	2	52. <i>Carex livida</i> - Pale sedge	
	*	53. <i>Carex macrochaeta</i> - Alaska long-awned sedge	Saddle Mountain NHCA
BLM, FS	2	54. <i>Carex pluriflora</i> - Several-flowered sedge	
	*	55. <i>Castilleja chambersii</i> - Chamber's paintbrush	Onion Peak (TNC)/PNHCA <i>Sugarloaf Mountain</i>
	*	56. <i>Castilleja mendocinensis</i> - Mendocino coast indian paintbrush	Otter Point NHCA
	*	57. <i>Cephaloziella spinigera</i> - Liverwort	Woahink Bog (The Wetlands Conservancy)
	*	58. <i>Cicendia quadrangularis</i> - Microcala	New River ACEC
BLM, PRD	1	59. <i>Cimicifuga elata</i> - Tall bugbane	

COAST RANGE SPECIAL SPECIES (CR)

Agency	List	Species Name	Present Representation
	2	60. <i>Clintonia andrewsiana</i> - Andrew's bead-lily	Extirpated
	*	61. <i>Cordylanthus maritimus</i> ssp <i>palustris</i> - Salt-marsh bird's-beak	South Slough PNHCA Netarts Spit NHCA
BLM, PRD	2	62. <i>Cryptantha leiocarpa</i> - Seaside cryptantha	
	*	63. <i>Diplophyllum plicatum</i> - Liverwort	Cape Perpetua Scenic Area Saddle Mountain NHCA
	*	64. <i>Dodecatheon austrofrigidum</i> - Frigid shootingstar	Onion Peak (TNC) Saddle Mountain NHCA
	2	65. <i>Eleocharis parvula</i> - Small spikerush	Extirpated
	*	66. <i>Encalypta brevipes</i> - Moss	Saddle Mountain NHCA
	*	67. <i>Erigeron peregrinus</i> var <i>peregrinus</i> - Wandering daisy	Onion Peak (TNC) Saddle Mountain NHCA
	*	68. <i>Erioderma sorediatum</i> - Lichen	Heceta Sand Dunes ACEC Oregon Dunes NRA Closure Area
	*	69. <i>Eriophorum chamissonis</i> - Russet cotton-grass	New River ACEC L.Presley & Vera C.Gill State Park
	*	70. <i>Erysimum menziesii</i> ssp <i>concinnum</i> - Pacific wallflower	Humbug Mountain State Park
	*	71. <i>Erythronium elegans</i> - Coast range fawn-lily	Fanno Meadows (TNC) Lost Prairie ACEC
	*	72. <i>Filipendula occidentalis</i> - Queen-of-the-forest	Onion Peak (TNC) Saddle Mountain NHCA
	*	73. <i>Fritillaria camschatcensis</i> - Indian rice	Lost Prairie ACEC
	*	74. <i>Gentiana setigera</i> - Elegant gentian	Hunter Creek Bog ACEC
	*	75. <i>Geum triflorum</i> var <i>campanulatum</i> - Western red avens	Saddle Mountain NHCA
	*	76. <i>Gilia millefoliata</i> - Seaside gilia	Sunset Beach PNHCA< Chrissy Field PNHCA
BLM, FS	2	77. <i>Haplopappus arborescens</i> - Golden fleece	<i>Bosley Butte - Snaketooth Butte</i>
	*	78. <i>Herbertus aduncus</i> - Liverwort	Saddle Mountain NHCA
FS, PRD	2	79. <i>Hydrocotyle verticillata</i> - Whorled marsh pennywort	<i>William M. Tugman State Park</i> <i>Oregon Dunes NRA</i>
BLM, FS	2	80. <i>Iliamna latibracteata</i> - California globe-mallow	<i>Big Creek</i> <i>Panther Creek</i>

COAST RANGE SPECIAL SPECIES (CR)

Agency	List	Species Name	Present Representation
	*	81. <i>Lasthenia macrantha</i> ssp <i>prisca</i> - Large-flowered goldfields	Cape Blanco NHCA Otter Point NHCA
	*	82. <i>Leioderma soledatum</i> - Lichen	Sutton Creek Recreation Area
	*	83. <i>Lewisia columbiana</i> var <i>rupicola</i> - Rosy lewisia	Onion Peak (TNC) NHCA Saddle Mountain State Natural Area
FS	2	84. <i>Lilium kelloggii</i> - Kellogg lily	<i>Peavine Ridge</i>
	*	85. <i>Lilium occidentale</i> - Western lily	Bastendorff Bog (TNC) Blacklock Point NHCA
	*	86. <i>Limbella fryei</i> - Moss	Sutton Lake Swamp (TNC)
BLM	2	87. <i>Limonium californicum</i> - Western marsh-rosemary	
	*	88. <i>Lophozia laxa</i> - Liverwort	Woahink Bog (Wetlands Conservancy) <i>Sand Lake</i>
BLM, FS	2	89. <i>Lycopodiella inundata</i> - Northern bog clubmoss	<i>Oregon Dunes NRA</i> <i>Jessie M. Honeyman State Park</i>
PRD	2	90. <i>Metzgeria temperata</i> - Liverwort	<i>Oswald West State Park</i>
FWS, PRD	2	91. <i>Microseris bigelovii</i> - Coast microseris	<i>Port Orford Heads State Park</i> <i>Oregon Islands NWR</i>
BLM	2	92. <i>Monardella purpurea</i> - Siskiyou monardella	<i>Rocky Peak</i>
	*	93. <i>Oenothera wolfii</i> - Wolf's evening-primrose	Humbug Mt. PNHCA Otter Point NHCA Cape Blanco NHCA
FS, PRD	2	94. <i>Ophioglossum pusillum</i> - Adder's-tongue	<i>Oregon Dunes NRA</i> <i>Jessie M. Honeyman State Park</i>
BLM	2	95. <i>Pellaea andromedifolia</i> - Coffee fern	
	*	96. <i>Phacelia argentea</i> - Silvery phacelia	New River ACEC Crissey Field PNHCA
	2	97. <i>Phacelia malvifolia</i> - Mallow-leaved phacelia	Extirpated
	*	98. <i>Plagiochila semidecurrens</i> var <i>alaskana</i> - Liverwort	Saddle Mountain NHCA
	*	99. <i>Plantago macrocarpa</i> - North pacific plantain	Yachats Ocean Road Protected Area
	*	100. <i>Poa unilateralis</i> - San francisco bluegrass	Cascade Head (TNC) Oregon Islands NWR
	*	101. <i>Pohlia sphagnicola</i> - Moss	Neskowin Marsh-Nestucca Bay NWR Woahink Bog (Wetlands Conservancy)

COAST RANGE SPECIAL SPECIES (CR)

Agency	List	Species Name	Present Representation
BLM, DOT	2	102. <i>Polystichum californicum</i> - California sword-fern	
FS	2	103. <i>Polytrichum strictum</i> - Hummock haircap moss	
	*	104. <i>Radula brunnea</i> - Liverwort	Saddle Mountain NHCA
PRD	2	105. <i>Rhynchospora capitellata</i> - Brownish beakrush	<i>Harris Beach State Park</i>
BLM	1	106. <i>Romanzoffia thompsonii</i> - Thompson mistmaiden	
	*	107. <i>Saxifraga hitchcockiana</i> - Saddle Mt. saxifrage	Onion Peak (TNC) Saddle Mountain NHCA
FS	2	108. <i>Saxifragopsis fragarioides</i> - Strawberry saxifrage	
	*	109. <i>Scirpus subterminalis</i> - Water clubrush	New River ACEC Jessie M. Honeyman State Park
	*	110. <i>Senecio flettii</i> - Flett groundsel	Onion Peak (TNC)
	*	111. <i>Sidalcea hendersonii</i> - Henderson sidalcea	Cox Island (TNC)
	*	112. <i>Sidalcea hirtipes</i> - Bristly-stemmed sidalcea	Neskowin Crest RNA Cascade Head (TNC) Saddle Mountain NHCA
	*	113. <i>Sidalcea malviflora</i> ssp <i>patula</i> - Coast checker bloom	Port Orford State Wayside Hunter Creek Bog ACEC
BLM, City	1	114. <i>Sidalcea nelsoniana</i> - Nelson's sidalcea	<i>Walker Flat</i> <i>Nestucca River State Scenic Waterway</i>
	*	115. <i>Silene douglasii</i> var <i>oraria</i> - Cascade head catchfly	Cascade Head (TNC) Cape Lookout State Park NHCA
DSL, FS	2	116. <i>Stellaria humifusa</i> - Creeping sandwort	<i>Oregon Dunes NRA</i>
FS, PVT	2	117. <i>Trillium angustipetalum</i> - Siskiyou trillium	<i>Edson Creek</i>
BLM, FS	1	118. <i>Triteleia hendersonii</i> var <i>leachiae</i> - Leach's brodiaea	<i>South Fork Coquille River.</i> <i>Sawtooth Rock</i>
FS	2	119. <i>Triteleia laxa</i> - Ithuriel's spear	
	*	120. <i>Tritomaria quinquedentata</i> - Liverwort	Saddle Mountain NHCA
BLM, FS, PRD	2	121. <i>Utricularia gibba</i> - Humped bladder-wort	<i>Jessie M. Honeyman State Park</i> <i>Oregon Dunes NRA</i>
BLM, FS, PVT	2	122. <i>Utricularia minor</i> - Lesser bladderwort	

Chapter 7: Willamette Valley Ecoregion

The Willamette Valley Ecoregion is located between the Coast Range and the Western Cascades in northwestern Oregon and includes Oregon's largest river valley. From Oregon it extends north to include the Vancouver, Washington bottomlands. The valley is characterized by broad, alluvial flats and low basalt hills. Soils include deep alluvial silts from river deposits and dense heavy clays from pluvial deposits in the valley bottom's numerous oxbow lakes and ponds.

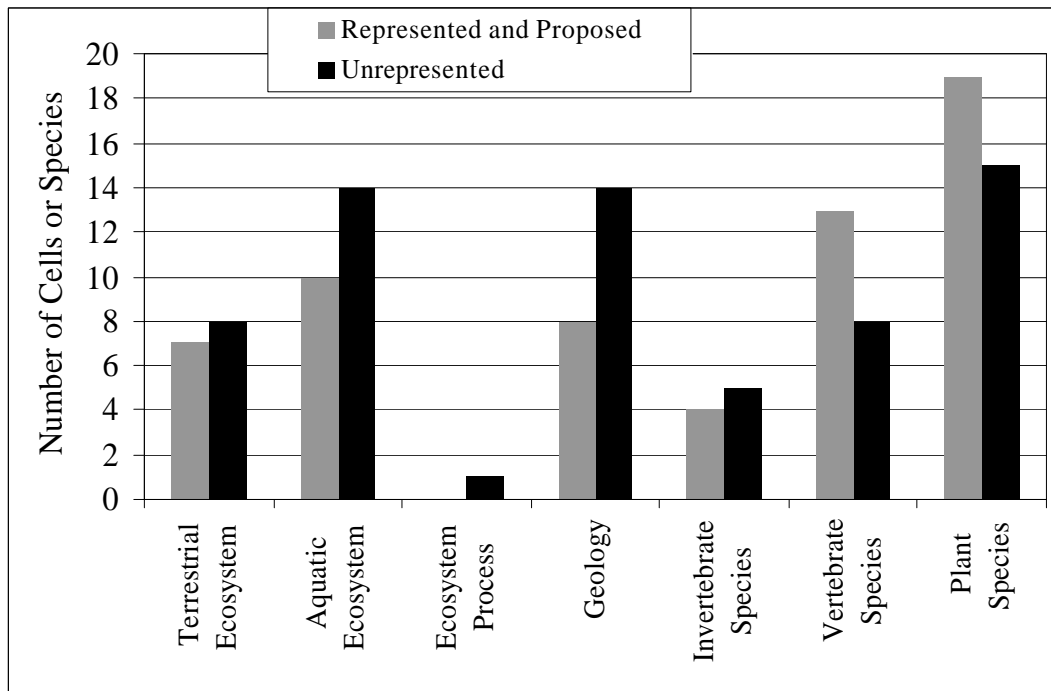
The abundant rainfall and fertile soils make the valley Oregon's most important agricultural region. This has been the case since the first settlers began arriving via the Oregon Trail. As a result, the Willamette Valley is Oregon's most developed area.

When the first European settlers came to Oregon, the valley was a mosaic of gallery riparian forests and wetlands, open white oak savannas and prairie, with valley margins of oak, ponderosa pine and Douglas fir woodlands. Native Americans maintained the prairies, oak savannas and woodlands by regularly burning most of the valley. With settlement, the prairies have been largely farmed and the open oak savannas and oak-conifer woodlands have been logged or become closed canopy forests due to fire suppression.

The Willamette Valley is home to most Oregonians, with more than 70% of the state's population, most of its industry, and almost half of its farmland. It is the fastest growing ecoregion, with the human population expected to double in the next 25 years (Gregory and Sedell 1994).

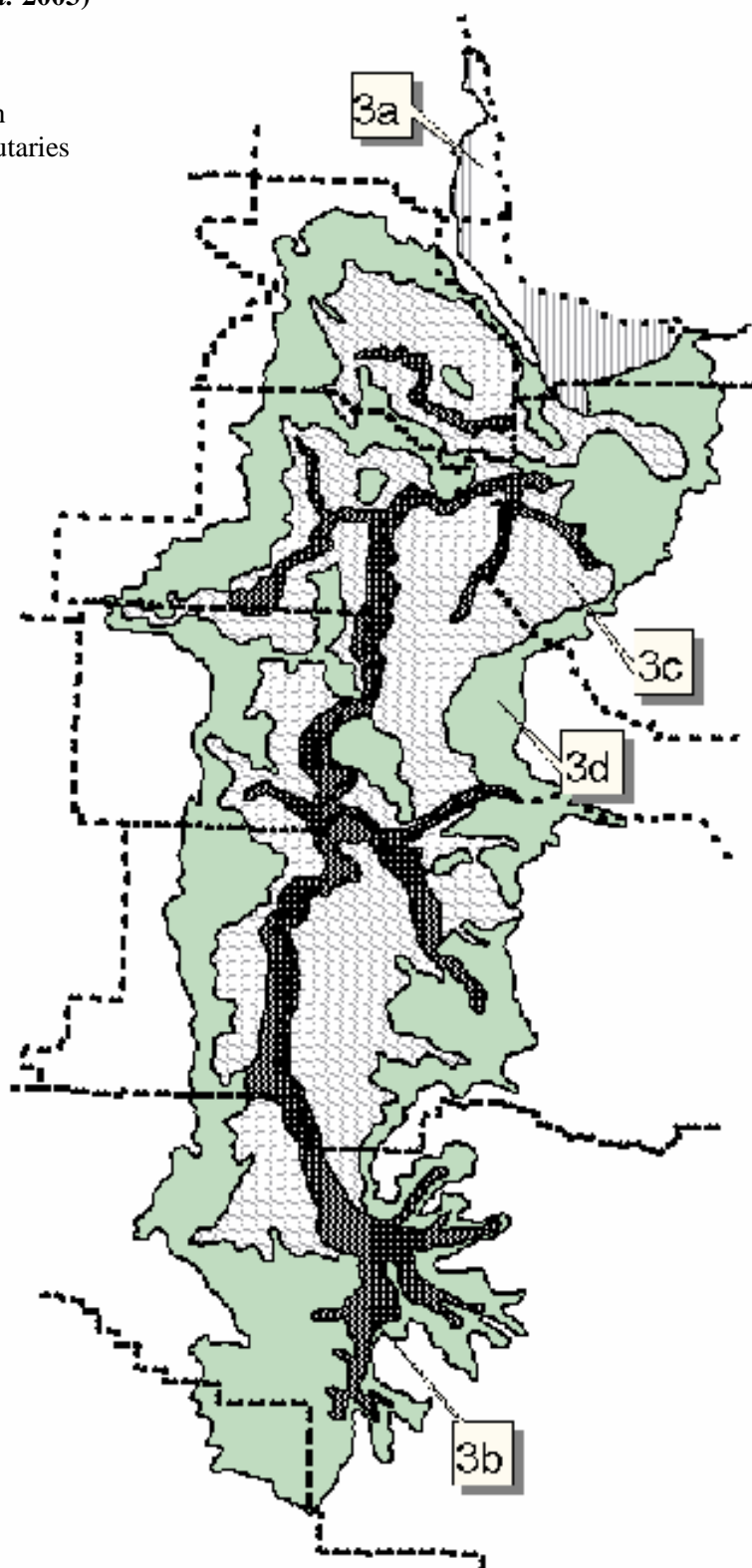
The Willamette Valley's location on the Pacific Flyway makes it an important area for migrating and wintering waterfowl. Geese and shorebirds benefit from flooded agricultural lands, and the Willamette River and its many tributaries support salmon and steelhead runs, mostly of hatchery origin. The valley's few remaining fragments of native prairie support many special plant species and endemic invertebrates, while the remaining wetlands provide habitat to the Oregon chub, the western pond turtle and many other sensitive animal species.

Figure 8. Represented and Unrepresented Cells and Species of the Willamette Valley Ecoregion



**Figure 9. Map of Willamette Valley Ecoregion
and Subregions (Thorson *et al.* 2003)**

- 3a - Portland / Vancouver Basin
- 3b - Willamette River and Tributaries
- Gallery Forest
- 3c - Prairie Terraces
- 3d - Valley Foothills



WILLAMETTE VALLEY ECOLOGICAL CELLS (WV)

Agency	Priority	Cell Name	Present Representation
Conifer Forests			
	*	1. Douglas fir/salal/swordfern and Douglas fir/Oregon grape forest.	Fox Hollow RNA Camas Swale RNA
	*	2. Douglas fir/poison oak forest.	The Butte RNA Forest Peak RNA
	*	3. Douglas fir-western hemlock/Oregon grape and salal forests, with grand fir if possible.	Mohawk RNA Wilhoit Springs ACEC
BLM	H	4. Ponderosa pine-Douglas fir/California fescue woodland.	Fox Hollow RNA< Ponderosa Pine PACEC<
	*	5. Douglas fir-grand fir/vine maple-salal.	Little Sink RNA
BLM, FS	M	6. Western red cedar-western hemlock/hazel forest on alluvial terrace and slopes.	Sandy River (TNC)</ACEC<
Mixed Hardwood-Conifer Forests			
	*	7. Douglas fir-bigleaf maple forest with some grand fir if possible.	Forest Peak RNA< Butte RNA
BLM	M	8. Madrone-Douglas fir-oak woodlands with poison oak and snowberry.	<i>McCully Mountain</i> <i>Fishermen's Bend Campground</i>
BLM, PVT	H	9. Oregon white oak-Douglas fir/snowberry woodland.	<i>McCully Mountain</i>
BLM	H	10. Ponderosa pine-Douglas fir-California black oak woodland.	Ponderosa Pine PACEC< Fox Hollow RNA<
Hardwood Forests			
PVT, BLM FWS	H	11. Oregon white oak/grass savanna.	The Butte RNA< Wren Prairie (TNC)< <i>Baskett Slough NWR</i>
	*	12. Oregon white oak/poison oak-snowberry/blue wildrye woodland.	Pigeon Butte RNA Maple Knoll RNA <i>Baskett Slough NWR</i>
BLM, PVT County	H	13. Oregon white oak-madrone/poison oak/bunchgrass woodland.	<i>Bald Hill Park</i> <i>Buford County Park</i>
Prairies			
PVT, BLM	H	14. Romer fescue valley grassland.	Wren Prairie (TNC)< Kingston (TNC)< <i>Baskett Slough NWR</i>
	*	15. Lemmon's needlegrass-moss bald.	Forest Peak RNA< Rattlesnake Butte (TNC)

WILLAMETTE VALLEY ECOLOGICAL CELLS (WV)

Agency	Priority	Cell Name	Present Representation
Riparian Woodlands			
BLM,FWS, PRD, PVT	H	16. Oregon ash-bigleaf maple-Oregon white oak riparian forest.	Willamette Floodplain RNA
 <i>Mission Bottom</i>
PRD, PVT	M	17. White alder bottomland riparian forest.	
Lacustrine			
FWS, PRD, PVT	H	18. Oxbow lake on Willamette River, with aquatic beds and marshy shore.	<i>Mission Bottom</i>
DSL, OFW, PRD, PVT	H	19. Shallow backwater lake on major river floodplain, with associated marsh and mudflats.	<i>Burlington Bottoms</i> <i>Sauvie Island</i>
Palustrine			
	*	20. Slump pond at margin of valley, with aquatic beds and marshy shore.	Little Sink RNA
	H	21. Low elevation vernal pool.	Possibly Extirpated
FWS, PRD	H	22. Cold spring.	
OFW, PVT	M	23. Tidal marsh on major river, with associated mud flats (including spikerush, bulrush, burreed and wapato).	<i>Rooster Rock</i> <i>Scappoose Bay</i>
OFW, PRD, PVT	M	24. Wapato marsh (including cutgrass, knotgrass and nodding beggars tick).	<i>Sauvie Island</i>
	*	25. Slough sedge-one sided sedge marsh.	Fern Ridge RNA Willamette Floodplain RNA
	*	26. Tufted hairgrass valley bottomland prairie, with vernal pools and brush prairie (including Nootka rose, Douglas spiraea and dwarf blueberry).	Willamette Floodplain RNA Willow Creek (TNC) Fern Ridge RNA
	*	27. Tufted hairgrass-California oatgrass bottomland prairie.	Fern Ridge RNA Willow Creek (TNC)
	*	28. Nootka rose/water parsley shrub swamp.	Jackson-Frazier Wetland
	*	29. Geyer willow-Hooker willow shrub swamp.	Banks Swamp (Metro)
	*	30. Hooker willow-Sitka willow shrub swamp.	Camassia Preserve (TNC) Beggars Tick Marsh (Metro)
OFW, PVT	M	31. Pacific willow shrub swamp.	<i>Luckiamute-Little Luckiamute</i> <i>Scappoose Bay</i>
	*	32. Oregon ash/slough sedge woodland with snowberry.	Willamette Floodplain RNA
FWS, OFW	M	33. Oregon ash/Pacific willow woodland.	<i>Luckiamute River</i> <i>Scappoose Bay</i>

WILLAMETTE VALLEY ECOLOGICAL CELLS (WV)

Agency	Priority	Cell Name	Present Representation
PRD	M	34. Riparian area dominated by river and Pacific willow.	
	+	35. Riparian area dominated by Oregon ash, black cottonwood and creek dogwood.	Gary, Flagg and Chatham Islands PNHCA
PRD, PVT	H	36. Riparian area dominated by Oregon ash, black cottonwood and snowberry.	<i>Multnomah Channel (Sauvie Island)</i> <i>Mission Bottom</i> <i>Santiam Bar</i>
	*	37. Spiraea/sphagnum mire on floating lake-fill mat.	Peach Cove Fen (Metro)
PVT	H	38. Western red cedar-western hemlock/skunk cabbage swamp.	Possibly extirpated
OFW, PVT Metro	H	39. Columbia sedge marsh	<i>Sauvie Island</i> Smith and Bybee Lakes<

Willamette Valley Ecosystem Process Cells

BLM, FWS, U PVT	40. Fire, in conifer or mixed hardwood forests on valley margin, with underburns, partial and total stand replacement burns.
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WILLAMETTE VALLEY GEOLOGICAL CELLS (WV)

Agency	Priority	Cell Name	Present Representation
Holocene			
FWS	M	1. Meandering Stream	<i>Tualatin River</i>
	*	2. River Terraces	Sandy River (TNC)/ACEC Oxbow State Park
	H	3. Talus Caves In Boring Lava Rock Fall	<i>Carver Caves</i>
Pleistocene			
	*	4. Glacial Erratic	Erratic Rock State Wayside
PVT	L	5. Portland Hills Silt	<i>Forest Park</i>
PVT	L	6. Willamette Silt	<i>River Bend</i>
PVT	L	7. Cataclysmic Flood Bedforms	<i>Irvington Bar</i>
	*	8. Cataclysmic Flood Scours	Rock Island State Greenway Site
Pleistocene and Pliocene			
	*	9. Boring Lava	Rocky Butte State Park
	*	10. Boring Volcano	Mt. Scott Park
	*	11. Springwater Terrace Gravel	Milo McIver State Park Eagle Creek Park
Pliocene and Miocene			
	*	12. Troutdale Formation	Oxbow Park Milo McIver Park State
	*	13. Sandy River Mudstone	Oxbow Park Milo McIver State Park
Miocene			
PVT	L	14. Molalla Formation	<i>Molalla</i>
PVT	L	15. Wanapum Basalt	<i>Oregon City</i>
PVT	L	16. Grand Ronde Basalt	<i>Oregon City</i>
Oligocene			
PVT	L	17. Scotts Mills Formation	<i>Drake Crossing</i>
Eocene			
PVT, BLM	L	18. Little Butte Volcanics	<i>Mollala</i>

WILLAMETTE VALLEY GEOLOGICAL CELLS (WV)

Agency	Priority	Cell Name	Present Representation
BLM, PVT	L	19. Eugene Formation	<i>Spores Point</i>
City, PVT	L	20. Fisher Formation	<i>Eugene</i>
City, PVT	L	21. Spencer Formation	<i>Eugene</i>
BLM, PVT	L	22. Yamhill Formation	<i>Mcminnville</i>

WILLAMETTE VALLEY SPECIAL SPECIES (WV)

Agency	List	Species Name	Present Representation
Invertebrates			
	*	1. <i>Acetropis americana</i> - American grass bug	William Finley NWR
	1	2. <i>Chloealtis aspasma</i> - Siskiyou short-horned grasshopper	Possibly extirpated
PRD	1	3. <i>Driloleirus macelfreshi</i> - Oregon giant earthworm	
	*	4. <i>Euphydryas editha taylori</i> - Taylor's checkerspot butterfly	Wren Prairie (TNC)
	2	5. <i>Fisherola nuttalli</i> - Giant Columbia River limpet	Possibly extirpated
	*	6. <i>Icaricia icarioides fenderi</i> - Fender's blue butterfly	Willow Creek (TNC) Wren Prairie (TNC) Baskett Slough NWR
	1	7. <i>Speyeria callippe</i> - Willamette callippe fritillary butterfly	Extirpated
	2	8. <i>Speyeria zerene bremnerii</i> - Valley silverspot butterfly	Extirpated
	*	9. <i>Vespericola</i> sp 1 - Oak springs hesperian (snail)	Willow Creek (TNC)
Vertebrates			
FWS, PVT	2	10. <i>Agelaius tricolor</i> - Tricolored blackbird	
	2	11. <i>Ammodramus savannarum</i> - Grasshopper sparrow	Baskett Slough NWR
BLM, PVT	2	12. <i>Antrozous pallidus pacificus</i> - Pacific pallid bat	
	*	13. <i>Batrachoseps wrighti</i> - Oregon slender salamander	Sandy River Gorge (TNC) Silver Falls State Park
	*	14. <i>Branta canadensis leucopareia</i> - Aleutian canada goose	Ankeny NWR Baskett Slough NWR William Finley NWR
	*	15. <i>Chrysemys picta</i> - Painted turtle	Ankeny NWR Sauvie Island WMA William Finley NWR
	1	16. <i>Clemmys marmorata marmorata</i> - Northwestern pond turtle	Ankeny NWR Luckiamute Landing State Greenway William Finley NWR
PVT	2	17. <i>Coccyzus americanus occidentalis</i> - Western yellow-billed cuckoo	Possibly extirpated
	*	18. <i>Corynorhinus townsendii townsendii</i> - Pacific western big-eared bat	Milo McIver State Park
	*	19. <i>Eremophila alpestris strigata</i> - Streaked horned lark	Baskett Slough NWR

WILLAMETTE VALLEY SPECIAL SPECIES (WV)

Agency	List	Species Name	Present Representation
DOT, PVT	2	20. <i>Falco peregrinus anatum</i> - American peregrine falcon	
	*	21. <i>Haliaeetus leucocephalus</i> - Bald eagle	Sauvie Island WMA Mollala River State Park Basket Slough NWR
ACE, DSL	2	22. <i>Lampetra tridentata</i> - Pacific lamprey	<i>Willamette River</i>
PVT	2	23. <i>Myotis thysanodes</i> - Fringed bat	<i>Carver Caves</i>
	*	24. <i>Odocoileus virginianus leucurus</i> - Columbian white-tailed deer	Burlington Bottoms
ACE, BLM, FS	1	25. <i>Oncorhynchus kisutch</i> - Coho salmon, lower Columbia River/SW Washington coast runs	
	*	26. <i>Oregonichthys crameri</i> - Oregon chub	William Finley NWR Elijah Bristow State Park
	*	27. <i>Pooecetes gramineus affinis</i> - Oregon vesper sparrow	Baskett Slough NWR
	*	28. <i>Progne subis</i> - Purple martin	Fern Ridge WMA Sauvie Island WMA
	*	29. <i>Rana aurora aurora</i> - Northern red-legged frog	William Finley NWR Fern Ridge WMA
	*	30. <i>Rana pretiosa</i> - Oregon spotted frog	William Finley NWR
Plants			
	1	31. <i>Agrostis howellii</i> - Howell's bentgrass	Possibly extirpated
	*	32. <i>Aster curtus</i> - White-topped aster	Fern Ridge RNA Kingston Prairie (TNC)
	*	33. <i>Aster vialis</i> - Wayside aster	Camas Swale RNA/ACEC Willow Creek (TNC)
	*	34. <i>Bruchia flexuosa</i> - Moss	Willow Creek (TNC)
	2	35. <i>Carex comosa</i> - Bristly sedge	Extirpated
BLM	2	36. <i>Carex gynodynamis</i> - Hairy sedge	
OFW	2	37. <i>Carex retrorsa</i> - Retorse sedge	<i>Sauvie Island WMA</i>
	1	38. <i>Castilleja levisecta</i> - Golden indian-paintbrush	Extirpated
	*	39. <i>Cicendia quadrangularis</i> - Microcala	Long Tom ACEC Willow Creek (TNC)
	*	40. <i>Cimicifuga elata</i> - Tall bugbane	The Butte RNA

WILLAMETTE VALLEY SPECIAL SPECIES (WV)

Agency	List	Species Name	Present Representation
ACE, PVT	2	41. <i>Cyperus acuminatus</i> - Short-pointed cyperus	<i>Fern Ridge</i>
	*	42. <i>Delphinium leucophaeum</i> - White rock larkspur	Camassia Natural Area (TNC) Little Rock Island (TNC) Champoeg State Heritage Park
BLM, PVT	2	43. <i>Delphinium nuttallii</i> - Upland larkspur	
BLM, PRD, PVT	1	44. <i>Delphinium oregonum</i> - Willamette valley larkspur	<i>North Santiam State Recreation Area</i>
	*	45. <i>Delphinium pavonaceum</i> - Peacock larkspur	Willamette Floodplain RNA William Findley NWR
	*	46. <i>Enemion stipitatum</i> - Dwarf isopyrum	Buell Park Buford Park
	*	47. <i>Erigeron decumbens</i> var <i>decumbens</i> - Willamette valley daisy	Fern Ridge RNA William Findley NWR Baskett Slough NWR
	*	48. <i>Horkelia congesta</i> ssp <i>congesta</i> - Shaggy horkelia	Fern Ridge RNA Long Tom ACEC Willow Creek (TNC)
	*	49. <i>Howellia aquatilis</i> - Howellia	Willamette Prairie RNA
	2	50. <i>Hydrocotyle verticillata</i> - Whorled marsh pennywort	Possibly extirpated
BLM, FWS, PVT	1	51. <i>Lathyrus holochlorus</i> - Thin-leaved peavine	<i>William Finley NWR</i> <i>Ankeny NWR</i>
	*	52. <i>Lobaria linita</i> - Lichen	Little Sink RNA
	*	53. <i>Lomatium bradshawii</i> - Bradshaw's lomatium	Fern Ridge RNA Long Tom ACEC Willamette Floodplain RNA
	*	54. <i>Lupinus sulphureus</i> ssp <i>kincaidii</i> - Kincaid's lupine	Cogswell-Foster (TNC) Baskett Slough NWR William Finley NWR
	*	55. <i>Mimulus tricolor</i> - Three-colored monkeyflower	Cogswell-Foster (TNC) Ankeny NWR
PVT	2	56. <i>Rotala ramosior</i> - Toothcup	Possibly extirpated
ACE, FWS	2	57. <i>Scirpus pendulus</i> - Drooping bulrush	
	*	58. <i>Sidalcea nelsoniana</i> - Nelson's sidalcea	Willamette Prairie RNA Wren Prairie (TNC) William Finley NWR
	*	59. <i>Sisyrinchium hitchcockii</i> - Pale blue-eyed grass	Willow Creek (TNC)

WILLAMETTE VALLEY SPECIAL SPECIES (WV)

Agency	List	Species Name	Present Representation
City	1	60. <i>Sphaerocarpos hians</i> - Liverwort	<i>Avery Park</i>
PVT	1	61. <i>Sulcaria badia</i> - Lichen	
	*	62. <i>Sullivantia oregana</i> - Oregon sullivantia	Crown Point Rooster Rock State Park
	*	63. <i>Wolffia borealis</i> - Dotted water-meal	Little Sink RNA
	*	64. <i>Wolffia columbiana</i> - Columbia water-meal	Smith Lake City Park Willamette Park

Chapter 8: Klamath Mountains Ecoregion

The Klamath Mountains Ecoregion covers most of southwestern Oregon and northwestern California and includes the Siskiyou Mountains, California's Marble Mountains and Trinity Alps and the interior valleys and foothills between these mountain ranges. Oregon elevations are from 100 to over 7,500 feet.

The ecoregion has the oldest landscapes in Oregon, the only large area of the state not shaped primarily by volcanism. It also is by far the most geologically diverse, having large areas of metamorphic and sedimentary rocks such as serpentine, limestone and gabbro, as well as granite and basalt. Topography ranges from steep, dissected mountains and canyons to gentle foothills and flat valley bottoms. The ecoregion also has major climatic extremes. Far western portions receive more than 100 inches of rain per year, with relatively mild temperatures year-round. The southern interior valleys are much drier, with locations receiving less than 20 inches of rain per year and summer high temperatures averaging more than 90° F.

The combination of exceptional climatic, geologic, and topographic diversity supports the most diverse habitats in Oregon. In addition, the Klamath Mountain Ecoregion is a floristic crossroads, including elements of the Sierra Nevada Mountains, Sacramento Valley and Coast Range Mountains of California; the Cascade Mountains of Oregon and Washington; and the Great Basin to the east.

Its geologic age, stable climate, and unusual geology result in the ecoregion being a major center of species endemism for vascular plants. Of the 4,000 native plant species or subspecies occurring in Oregon, about half are found in this ecoregion, with about a quarter of these known only here. The region is also known for its diversity of conifers, with 30 different species. (In Oregon, the West Cascades has the second largest number of conifer species, with 18 species).

Prior to European settlement, the landscape was dominated by Douglas fir forests, oak woodlands and ponderosa pine woodlands. There were native grasslands and chaparral on the valley bottoms, and diverse conifer and mixed hardwood forests. All of the natural habitats have changed since fire suppression became effective in the early twentieth century. The region has a high frequency of dry, summer lightning storms, leading to natural fire frequency of less than 40 for most of the region, and closer to 20 years in the valleys and eastern portions of the region. Over 50 years of fire suppression has dramatically altered the ecology of the forests, savannas and shrublands in this region.

The human population of the ecoregion is concentrated in the valleys along the Interstate 5 corridor. Forest products, agriculture and tourism are the foundations of the local economy. The region is currently growing at a rate second only to the Willamette Valley.

Figure 10. Represented and Unrepresented Cells and Species of the Klamath Mountains Ecoregion

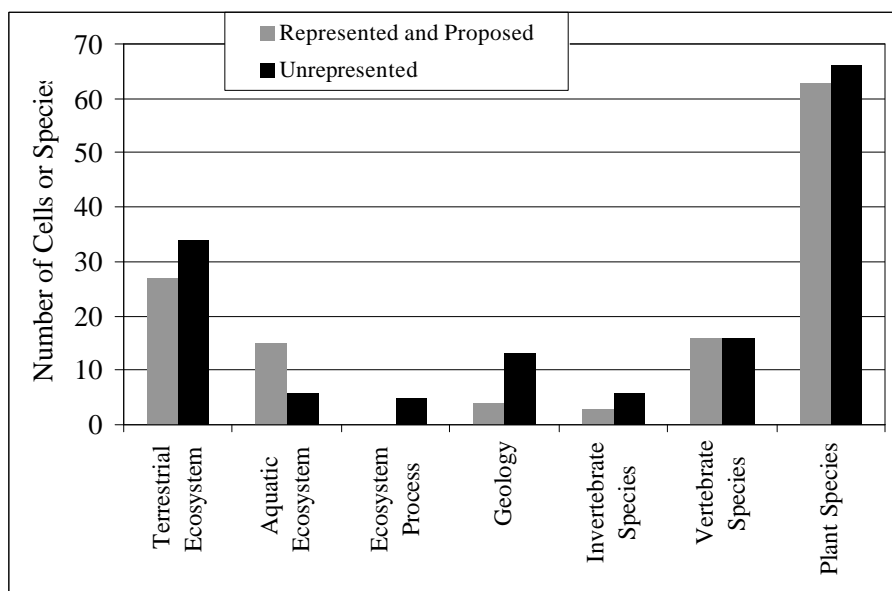
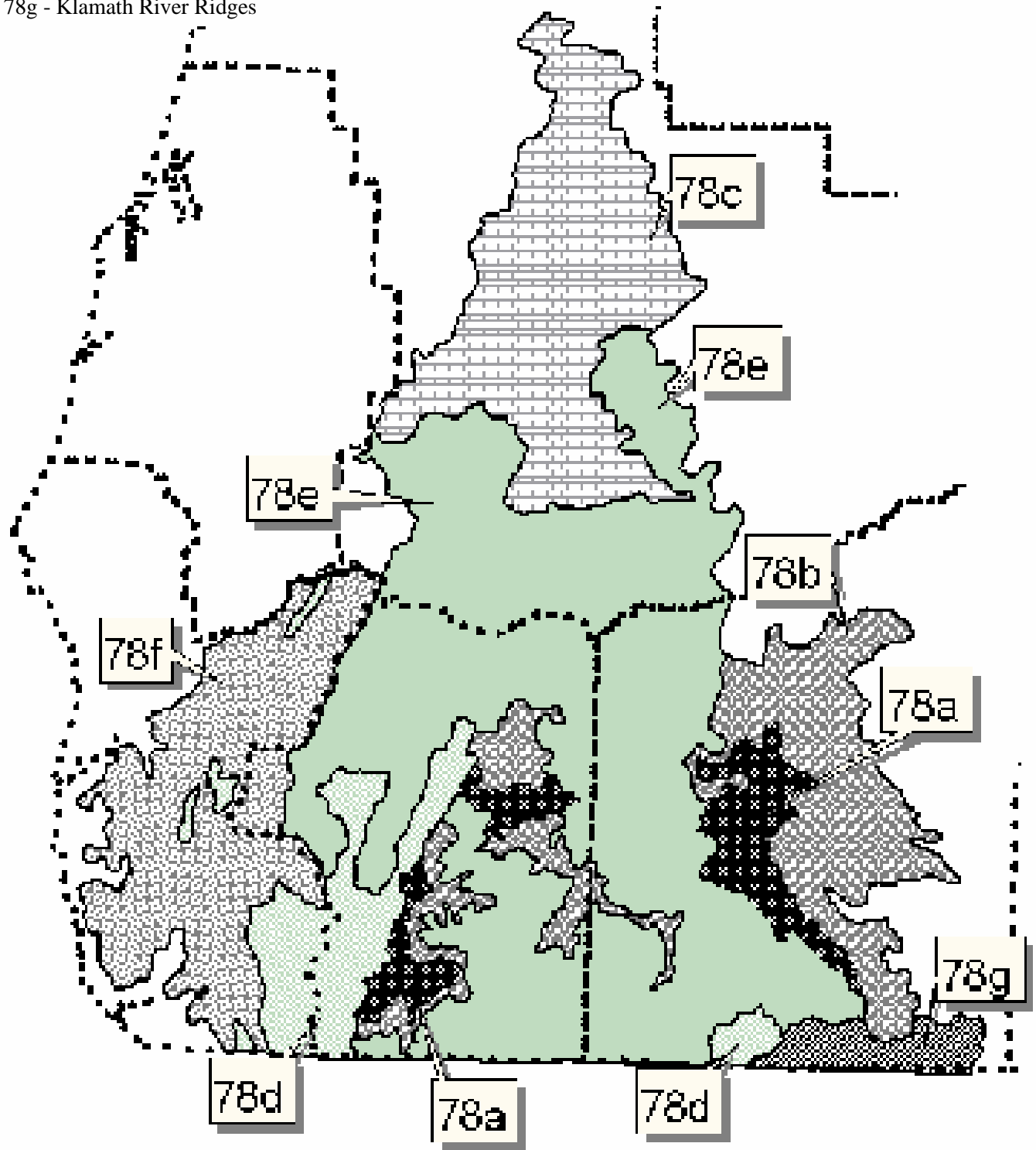


Figure 11. Map of Klamath Mountains Ecoregion and Subregions (Thorson *et al.* 2003)

- 78a - Rogue / Illinois Foothills
- 78b - Siskiyou Foothills
- 78c - Umpqua Interior Foothills
- 78d - Serpentine Siskiyou
- 78e - Inland Siskiyou
- 78f - Coastal Siskiyou
- 78g - Klamath River Ridges



KLAMATH MOUNTAINS ECOLOGICAL CELLS (KM)

Agency	Priority	Cell Name	Present Representation
Oregon White Oak			
	*	1. Oregon white oak savanna or open woodland with forb or grasses.	Round Top Butte (TNC)/RNA Bushnell-Irwin Rocks RNA Whetstone Savanna (TNC)
BLM, PVT	M	2. Oregon white oak-Douglas fir/poison oak woodland.	Bushnell-Irwin Rocks RNA<
Port Orford Cedar			
BLM, FS	H	3. Port Orford cedar/huckleberry oak/beargrass on ultramafic soils.	
	*	4. Port Orford cedar-white fir/Oregon grape and Port Orford cedar-tanoak/salal communities.	Pipe Fork RNA
	*	5. Port Orford cedar-western hemlock with leucothe and swordfern.	North Fork Silver Creek RNA
	*	6. Port Orford cedar/hairy honeysuckle/fescue on ultramafic soils.	Lemmingsworth Gulch RNA Cedar Log Flat RNA
BLM, FS	H	7. Port Orford cedar maritime types with evergreen huckleberry/swordfern or rhododendron-salal.	
Ponderosa Pine			
	*	8. Ponderosa pine-Douglas fir moist forest forest.	Ashland RNA
	*	9. Ponderosa pine-white oak woodland.	Roundtop Butte RNA/(TNC) French Flat ACEC
BLM, PVT	H	10. Ponderosa pine-black oak woodland.	Lower Table Rock (TNC)<
	*	11. Western juniper-Oregon white oak-ponderosa pine/buckbrush/bunchgrass savanna.	Siskiyou Pass ACEC Cascade Siskiyou NM
Douglas Fir			
	+	12. Douglas fir serpentine woodland .	Eight Dollar Mountain ACEC/PNHCA Lemmingsworth Gulch RNA
BLM, FS	M	13. Douglas fir/pinemat manzanita.	
FS	M	14. Douglas fir/vine maple/dwarf Oregon grape.	
BLM, FS	*	15. Douglas fir forest with salal and/or swordfern.	
	*	16. Douglas fir/canyon live oak woodland with poison oak and dwarf Oregon grape if possible.	Bear Gulch RNA Hoover Gulch RNA
BLM, FS	H	17. Douglas fir-California black oak/poison oak.	French Flat ACEC<
	*	18. Douglas fir-Ponderosa pine forest with poison oak, hairy snowberry or Piper's Oregon grape understory.	North Myrtle Creek RNA Oregon Gulch RNA

KLAMATH MOUNTAINS ECOLOGICAL CELLS (KM)

Agency	Priority	Cell Name	Present Representation
BLM, FS	L	19. Douglas fir-white fir forest at high elevation.	
BLM, FS	H	20. Douglas fir/oceanspray or dry shrub community.	
Western Hemlock			
FS	M	21. Western hemlock-white fir forest with dwarf Oregon grape and vine maple.	
BLM, FS	H	22. Western hemlock/salal/swordfern and western hemlock/vine maple-salal with western red cedar.	
BLM, FS	M	23. Western hemlock-tanoak/Pacific rhododendron, western hemlock-incense cedar/salal and western hemlock/salal-dwarf Oregon grape associations.	Bobby Creek RNA<
BLM, FS	M	24. Western hemlock/Pacific rhododendron associations.	Bobby Creek RNA<
BLM, FS	M	25. Western hemlock coastal communities with California laurel, evergreen huckleberry, swordfern, and salmonberry if possible.	
Tan Oak			
BLM, FS	M	26. Tanoak on ultramafics with shrub understory.	Lemmingsworth Gulch RNA<
	*	27. Tanoak - Douglas fir dry site forest with canyon live oak, dwarf Oregon grape and poison oak if possible.	Hoover Gulch RNA Lemmingsworth Gulch RNA
	*	28. Moist tanoak forests (tanoak-bigleaf maple-canyon live oak/swordfern, tanoak-Port Orford cedar/ salal, and tanoak/evergreen huckleberry-rhododendron-salal).	Bobby Creek RNA
BLM, FS	H	29. Tanoak-western hemlock/evergreen huckleberry forest with swordfern if possible.	
BLM, FS	M	30. Tanoak-Douglas fir moist forest with evergreen huckleberry, salal and dwarf Oregon grape.	
FS	H	31. Tanoak on ultramafics with sugar pine and golden chinkapin .	
FS	L	32. Tanoak with white fir and Sadler's oak at a cool site.	
White Fir			
BLM, FS	M	33. White fir/pinemat manzanita on shallow soil.	
FS	L	34. White fir-tanoak/prince's pine forest.	
	*	35. White fir at high elevations (white fir-red fir/Sadler oak or vanillaleaf or prince's-pine-threelaf anemone and whitefir/beargrass associations).	Grayback Glades RNA

KLAMATH MOUNTAINS ECOLOGICAL CELLS (KM)

Agency	Priority	Cell Name	Present Representation
	*	36. White fir/dwarf Oregon grape moderately dry site forest with twinflower and vanillaleaf if possible.	North Fork Silver Creek RNA North Myrtle Creek RNA
BLM, FS	M	37. White fir, moderately dry site forest with baldhip rose, hairy snowberry and starflower if possible.	Oregon Gulch RNA<
	*	38. White fir moist site forest with rhododendron, Dwarf Oregon grape, Sadler oak, salal, and twinflower, often with western hemlock.	Holton Creek RNA
BLM, FS	M	39. White fir/huckleberry oak on ultramafics.	
FS	H	40. White fir with Brewer spruce and Alaska yellow cedar if possible.	Brewer Spruce RNA < Oliver Mathews PRNA<
Red Fir			
	+	41. Red fir-mountain hemlock/pinemat manzanita/prince's pine forest.	Oliver Mathews PRNA
	+	42. Red fir-white fir/baldhip rose/one-sided pyrola.	Oliver Mathews PRNA
FS	L	43. Red fir-white fir/Sadler oak/one-sided pyrola.	
FS	M	44. Red fir-white fir/Sadler oak/prince's pine.	
FS	M	45. Red fir/mountain sweetroot.	
Mountain Hemlock			
	+	46. Mountain hemlock/herb association.	Oliver Mathews PRNA
BLM, FS	L	47. Mountain hemlock-red fir/dwarf bramble/one-sided pyrola.	
Serpentine Pine			
	*	48. Knobcone pine forest.	Lemmingsworth Gulch RNA
	*	49. Jeffrey pine grassland savanna.	Beatty Creek RNA Cedar Log Flat RNA
BLM, PVT	M	50. Jeffrey pine with incense cedar and dry shrubs.	
BLM, DSL, FS	M	51. Jeffrey pine/huckleberry oak-pinemat manzanita forest with box-leaved silk-tassel if possible.	Eight Dollar Mountain PNHCA/ACEC<
Western White Pine			
	+	52. Western white pine/beargrass.	Lemmingsworth Gulch RNA Red Mountain PRNA
	+	53. Western white pine/huckleberry oak/beargrass with tanoak and Jeffrey pine if possible.	Lemmingsworth Gulch RNA Red Mountain PRNA

KLAMATH MOUNTAINS ECOLOGICAL CELLS (KM)

Agency	Priority	Cell Name	Present Representation
Chaparral			
BLM, PVT	H	54. Manzanita-wedgeleaf ceanothus/bunchgrass chaparral.	
	*	55. Sticky manzanita-gray manzanita serpentine chaparral.	Rough & Ready Creek ACEC/(TNC)
BLM, FS, PVT	M	56. Live oak/Fremont silk-tassel-birchleaf mountain mahogany/bunchgrass.	
	*	57. Birchleaf mountain mahogany-ceanothus-rosaceous mixed chaparral.	Scotch Creek RNA
Grasslands			
	+	58. Baker cypress woodland.	Oliver Mathews PRNA
	*	59. Bluebunch wheatgrass-California oatgrass-Lemmon's needlegrass slopes.	Round Top Butte (TNC)/RNA
BLM, PVT	H	60. Idaho fescue-junegrass-Lemmon's needlegrass non-serpentine grassland.	
	*	61. Coastal oak-conifer woodland and meadow mosaic.	North Fork Hunter Creek ACEC
Lacustrine			
BLM, FS, PRD	H	62. Low elevation dune or slump-block lake with aquatic beds and marshy shore.	
	*	63. Valley floor vernal pools on hardpan.	Table Rocks ACEC Agate Desert (TNC)
	*	64. Vernal pools on basaltic andesite.	Table Rocks ACEC Poverty Flat ACEC
	*	65. Mid to high elevation lake with aquatic beds and marshy shore, on serpentine or peridotite.	Red Mountain PRNA
Palustrine			
	*	66. Douglas fir-bigleaf maple forest.	North Myrtle Creek RNA
BLM, FS	M	67. Riparian hardwoods with ash and black cottonwood.	<i>Kelly Slough</i>
BLM, PVT	H	68. Alluvial terrace with ash, Oregon white oak and ponderosa pine.	
	*	69. High elevation alder glade.	Grayback Glades RNA
	*	70. Riparian hardwood forest along a major river (with alder, bigleaf maple and myrtle).	North Fork Chetco River ACEC
	*	71. Mid to high elevation pond with aquatic beds and marshy shore.	Brewer Spruce RNA

KLAMATH MOUNTAINS ECOLOGICAL CELLS (KM)

Agency	Priority	Cell Name	Present Representation
	+	72. Mid to high elevation vernal ponds and large cold springs.	Oliver Mathews PRNA
FS	L	73. Tufted hairgrass-sedge wetland.	
	*	74. Tufted hairgrass-California oatgrass bottomland seasonally flooded prairie.	Round Top Butte RNA/(TNC) French Flat ACEC
	*	75. Few flowered spikerush/brown moss fen on floating lake-fill mat.	Sharon Lake Fen (TNC)
	*	76. Sphagnum mire on floating lake-fill mat.	Sharon Lake Fen (TNC)
FS, NPS	M	77. Hillslope wetland on with willow and saussurea.	<i>Oregon Caves NM</i>
FS	H	78. Montane fen and wet mountain meadow complex.	
	*	79. Darlingtonia fen on serpentine-peridotite, with western azalea and camas along margins.	Lemmingsworth Gulch RNA Woodcock Bog RNA
	*	80. Darlingtonia fen on serpentine-peridotite, with Port Orford cedar.	Eight Dollar Mountain SIA Days Gulch SIA
	*	81. Riparian on serpentine-peridotite, with Port Orford cedar, western azalea and darlingtonia.	Kalmiopsis WA Eight Dollar Mountain ACEC/SIA/ (TNC)/PNHCA
	*	82. California laurel riparian forest.	North Fork Chetco River ACEC

Klamath Mountains Ecosystem Process Cells

BLM, FS	U	82. Fire, including underburns, partial and total stand replacement burns in Douglas fir zone.	<i>Silver Creek</i> <i>Biscuit</i>
BLM, PVT	U	83. Fire, including underburns, partial and total stand replacement fires in Oregon white oak, valley margin Ponderosa pine, chaparral or valley bottom grasslands.	<i>Biscuit</i>
BLM, FS	U	84. Fire, including underburns, partial and total stand replacement fires in the Port Orford cedar, western hemlock or the tan oak zone.	<i>Biscuit</i>
FS	U	85. Fire, including partial and total stand replacement fires in the white fir or red fir zones.	<i>Biscuit</i>
BLM, FS	U	86. Fire, including underburns, partial and total stand replacement fires in the Jeffrey pine zone.	<i>Biscuit</i>

KLAMATH MOUNTAINS GEOLOGICAL CELLS (KM)

Agency	Priority	Cell Name	Present Representation
Quaternary			
	*	1. Limestone Caves	Oregon Caves NM
	*	2. River Gorge	Mule Creek Canyon Rogue WSR
Eocene			
PVT	L	3. Tyee Formation	<i>Reston</i>
PVT	L	4. Camas Valley Formation	<i>Reston</i>
PVT	L	5. White Tail Ridge Formation	<i>Reston</i>
PVT	L	6. Tenmile Formation	<i>Reston</i>
PVT	L	7. Bushnell Rock Formation	<i>Reston</i>
Eocene and Paleocene			
PVT	L	8. Siletz River Volcanics	<i>Reston</i>
Cretaceous			
	*	9. Days Creek Formation	Eight Dollar Mountain SIA/ACEC
Cretaceous and Jurassic			
BLM, FS	M	10. Riddle Formation	<i>Days Creek</i>
PVT	L	11. Dothan Formation	<i>Winston</i>
Jurassic			
FS	M	12. Colebrooke Schist	
FS	L	13. Coast Range Ophiolite	<i>Riddle</i>
BLM, FS	M	14. Galice Formation	<i>Galice</i>
	*	15. Rogue Formation	Rogue River WSR (by Glendale)
BLM, FS	M	16. Josephine Ophiolite	<i>Cave Junction</i>
Jurassic and Triassic			
	L	17. May Creek Schist	<i>Evans Creek</i>

KLAMATH MOUNTAINS SPECIAL SPECIES (KM)

Agency	List	Species Name	Present Representation
Invertebrates			
	*	1. <i>Branchinecta lynchi</i> - Vernal pool fairy shrimp	Lower Table Rock ACEC Table Rocks ACEC Whetstone Savanna (TNC)
FS, BLM	1	2. <i>Chloealtis aspasma</i> - Siskiyou short-horned grasshopper	
BLM	1	3. <i>Fluminicola</i> sp 19 - Keene creek pebblesnail	
FS, BLM	2	4. <i>Lanx alta</i> - Highcap lanx (snail)	
BLM	1	5. <i>Lanx subrotunda</i> - Rotund lanx (snail)	
FS, BLM	1	6. <i>Monadenia fidelis celeuthia</i> - Travelling sideband (snail)	
BLM	2	7. <i>Polites mardon</i> - Mardon skipper butterfly	
	*	8. <i>Speyeria coronis coronis</i> - Coronis fritillary butterfly	Rough & Ready Flat SIA
	*	9. <i>Stygobromus oregonensis</i> - Oregon cave amphipod	Oregon Caves NM
Vertebrates			
BLM	2	10. <i>Accipiter gentilis</i> - Northern goshawk	
	*	11. <i>Agelaius tricolor</i> - Tricolored blackbird	Denman WMA
	*	12. <i>Aneides flavipunctatus</i> - Black salamander	Ashland RNA
BLM	2	13. <i>Antrozous pallidus pacificus</i> - Pacific pallid bat	
	*	14. <i>Ascaphus truei</i> - Coastal tailed frog	Ashland RNA
BLM, PVT	2	15. <i>Athene cunicularia hypugaea</i> - Western burrowing owl	Possibly extirpated
	*	16. <i>Batrachoseps attenuatus</i> - California slender salamander	Wheeler Creek RNA
BLM, FS	2	17. <i>Brachyramphus marmoratus</i> - Marbled murrelet	Peavine Ridge
BLM	1	18. <i>Branta canadensis leucopareia</i> - Aleutian canada goose	
	2	19. <i>Canis lupus</i> - Gray wolf	Extirpated
	*	20. <i>Clemmys marmorata marmorata</i> - Northwestern pond turtle	Lost Lake RNA Denman WMA
	*	21. <i>Corynorhinus townsendii townsendii</i> - Pacific western big-eared bat	Oregon Caves NM
BLM, FS	2	22. <i>Falco peregrinus anatum</i> - American peregrine falcon	
BLM, FS	2	23. <i>Gulo gulo luteus</i> - California wolverine	

KLAMATH MOUNTAINS SPECIAL SPECIES (KM)

Agency	List	Species Name	Present Representation
	*	24. <i>Haliaeetus leucocephalus</i> - Bald eagle	Wild Rogue WA
BLM, FS	2	25. <i>Lampetra tridentata</i> - Pacific lamprey	
	*	26. <i>Lampropeltis getula</i> - Common kingsnake	Lower Table Rock (TNC) Table Rocks ACEC Denman WMA
	*	27. <i>Lampropeltis zonata</i> - California mountain kingsnake	Lower Table Rock (TNC) Wild Rogue WA
	*	28. <i>Martes pennanti pacifica</i> - Pacific fisher	Eight Dollar Mountain SIA
	*	29. <i>Myotis thysanodes</i> - Fringed bat	Oregon Caves NM
	*	30. <i>Odocoileus virginianus leucurus</i> - Columbian white-tailed deer	North Bank Habitat Area
	*	31. <i>Oncorhynchus kisutch</i> - Coho salmon, southern Oregon/northern California coast	Wild Rogue WA
	1	32. <i>Oncorhynchus kisutch</i> - Coho salmon, Oregon coastal runs	
BLM, PVT	1	33. <i>Oregonichthys kalawatseti</i> - Umpqua oregon chub	
	*	34. <i>Plethodon elongatus</i> - Del norte salamander	Wheeler Creek RNA Wild Rogue WA Kalmiopsis WA
BLM	2	35. <i>Plethodon stormi</i> - Siskiyou mountains salamander	
BLM	2	36. <i>Progne subis</i> - Purple martin	
BLM, FS	2	37. <i>Rana aurora aurora</i> - Northern red-legged frog	
	*	38. <i>Rana boylei</i> - Foothill yellow-legged frog	Wild Rogue WA
BLM	2	39. <i>Rana cascadae</i> - Cascades frog	
	*	40. <i>Strix occidentalis caurina</i> - Northern spotted owl	Bear Gulch ACEC/RNA
	2	41. <i>Tadarida brasiliensis</i> - Brazilian free-tailed bat	
Plants			
	1	42. <i>Agrostis hendersonii</i> - Henderson's bentgrass	Extirpated
FS	2	43. <i>Andreaea schofieldiana</i> - Moss	
	2	44. <i>Androsace elongata</i> ssp <i>acuta</i> - Long-stemmed androsace	Extirpated
BLM, DOT	1	45. <i>Arabis koehleri</i> var <i>koehleri</i> - Koehler's rockcress	

KLAMATH MOUNTAINS SPECIAL SPECIES (KM)

Agency	List	Species Name	Present Representation
	*	46. <i>Arabis macdonaldiana</i> - Red mountain. rockcress	Kalmiopsis WA Rough & Ready Flat SIA
	*	47. <i>Arabis modesta</i> - Rogue canyon rockcress	Rogue River WSR
	*	48. <i>Arctostaphylos hispidula</i> - Hairy manzanita	Green Knob SIA North Fork Hunter Creek ACEC Kalmiopsis WA
BLM	1	49. <i>Aster vialis</i> - Wayside aster	
BLM	2	50. <i>Astragalus californicus</i> - California milk-vetch	
	*	51. <i>Bensoniella oregana</i> - Bensonia	Bear Camp SIA
FS	1	52. <i>Botrychium crenulatum</i> - Crenulate grape-fern	
	*	53. <i>Bryum calobryoides</i> - Moss	Oregon Caves NM
	2	54. <i>Bulbostylis capillaris</i> - Clark sand sedge	Extirpated
BLM	1	55. <i>Calochortus coxii</i> - Cox's mariposa lily	
	*	56. <i>Calochortus greenei</i> - Greene's mariposa lily	Cascade Siskiyou NM
	*	57. <i>Calochortus howellii</i> - Howell's mariposa lily	Woodcock Bog RNA Eight Dollar Mountain ACEC Oregon Mountain SIA
	1	58. <i>Calochortus indecorus</i> - Sexton mountain mariposa-lily	Extinct
BLM	2	59. <i>Calochortus nitidus</i> - Broad-fruit mariposa	
FS	2	60. <i>Calochortus nudus</i> - Shasta star-tulip	
BLM	1	61. <i>Calochortus persistens</i> - Siskiyou mariposa lily	
	*	62. <i>Calochortus umpquaensis</i> - Umpqua mariposa-lily	Eight Dollar Mountain SIA/ACEC Rough and Ready Creek SIA/(TNC)
	*	63. <i>Camassia howellii</i> - Howell camassia	Eight Dollar Mountain <i>Sexton Mountain</i>
BLM, FS	2	64. <i>Camissonia graciliflora</i> - Slender-flowered evening-primrose	
	2	65. <i>Carex comosa</i> - Bristly sedge	Extirpated
	*	66. <i>Carex gigas</i> - Siskiyou sedge	Kalmiopsis WA Red Buttes WA
	*	67. <i>Carex gynodynamis</i> - Hairy sedge	North Bank ACEC

KLAMATH MOUNTAINS SPECIAL SPECIES (KM)

Agency	List	Species Name	Present Representation
	*	68. <i>Carex livida</i> - Pale sedge	Days Gulch SIA Eight Dollar Mountain (TNC) Rough & Ready Flat SIA
FS	2	69. <i>Carex nervina</i> - A sedge	
BLM	2	70. <i>Carex praticola</i> - Meadow sedge	
BLM, FS	2	71. <i>Carex serratodens</i> - Saw-tooth sedge	
	*	72. <i>Castilleja schizotricha</i> - Split-hair indian paintbrush	Red Mountain RNA
BLM	2	73. <i>Cheilanthes intertexta</i> - Coastal lipfern	
BLM	2	74. <i>Chlorogalum angustifolium</i> - Narrow-leaved amole	
BLM	2	75. <i>Cicendia quadrangularis</i> - Microcala	
BLM, FS	1	76. <i>Cimicifuga elata</i> - Tall bugbane	
	*	77. <i>Cirsium ciliolatum</i> - Ashland thistle	Cascade Siskiyou NM
BLM, FS	2	78. <i>Clarkia heterandra</i> - Small-fruit clarkia	
BLM, FS	2	79. <i>Cryptantha milo-bakeri</i> - Milo-baker's cryptantha	
	*	80. <i>Cryptomitrium tenerum</i> - Liverwort	Rogue River WSR
	*	81. <i>Cupressus bakeri</i> - Baker's cypress	Grayback Mountain SIA Miller Lake SIA
	*	82. <i>Cypripedium fasciculatum</i> - Clustered lady's-slipper	Kalmiopsis WA
BLM, FS	2	83. <i>Delphinium nudicaule</i> - Red larkspur	
FS	2	84. <i>Dicentra pauciflora</i> - Few-flower bleedinghearts	
	*	85. <i>Draba howellii</i> - Howell's whitlow-grass	Big Craggies SIA Oliver Mathews RNA
FS	1	86. <i>Encalypta brevicolla</i> var. <i>crumiana</i> - Moss	
	*	87. <i>Enemion stipitatum</i> - Dwarf isopyrum	Scotch Creek RNA
	*	88. <i>Epilobium oreganum</i> - Oregon willow-herb	Cedar Log Flat RNA Woodcock Bog RNA Oregon Mountain SIA
	*	89. <i>Epilobium siskiyouense</i> - Siskiyou willow-herb	Observation Peak Dutchman Peak SIA
	*	90. <i>Erigeron cervinus</i> - Siskiyou daisy	Babyfoot Lake BIA Grayback Mountain SIA Red Flat SIA

KLAMATH MOUNTAINS SPECIAL SPECIES (KM)

Agency	List	Species Name	Present Representation
	*	91. <i>Erigeron petrophilus</i> - Cliff daisy	Oliver Mathews RNA Agate Desert (TNC)
	*	92. <i>Eriogonum lobbii</i> - Lobb's buckwheat	Big Craggies SIA
FS, BLM	2	93. <i>Erodium macrophyllum</i> - Large-leaved filaree	
	*	94. <i>Erythronium howellii</i> - Howell's adder's-tongue	Eight Dollar Mountain SIA/PNHCA
BLM	2	95. <i>Eschscholzia caespitosa</i> - Gold poppy	
BLM	2	96. <i>Festuca elmeri</i> - Elmer's fescue	
	*	97. <i>Frasera umpquaensis</i> - Umpqua swertia	Bear Camp SIA
	*	98. <i>Fritillaria gentneri</i> - Gentner's fritillaria	Cascades – Siskiyou NM
	*	99. <i>Fritillaria glauca</i> - Siskiyou fritillaria	King Mountain Rock Garden ACEC Cedar Log Flat SIA Rough & Ready Flat SIA/ACEC/State Botanical Area
	2	100. <i>Fritillaria purdyi</i> - Purdy's fritillary	
	*	101. <i>Gentiana plurisetosa</i> - Bristly gentian	Grayback Mountain. SIA
	*	102. <i>Gentiana setigera</i> - Elegant gentian	Lemmingsworth Gulch RNA Woodcock Bog RNA
BLM, FS	2	103. <i>Haplopappus arborescens</i> - Golden fleece	
	*	104. <i>Haplopappus whitneyi</i> ssp <i>discoideus</i> - Whitney's haplopappus	Oliver Mathews RNA
	*	105. <i>Hastingsia bracteosa</i> var <i>atropurpurea</i> - Purple flowered rush-lily	Rough & Ready Flat SIA Woodcock Bog RNA
	*	106. <i>Hastingsia bracteosa</i> var <i>bracteosa</i> - Large-flowered rush-lily	Eight Dollar Mountain ACEC Rough & Ready Flat SIA/ACEC
BLM	1	107. <i>Horkelia congesta</i> ssp <i>congesta</i> - Shaggy horkelia	
FS	1	108. <i>Horkelia hendersonii</i> - Henderson's horkelia	
FS	2	109. <i>Horkelia tridentata</i> ssp <i>tridentata</i> - Three-toothed horkelia	
BLM	1	110. <i>Iliamna bakeri</i> - Baker's globe-mallow	
BLM, FS	2	111. <i>Iliamna latibracteata</i> - California globe-mallow	
BLM, FS	2	112. <i>Keckiella lemmonii</i> - Bush beardtongue	
	*	113. <i>Leucothoe davisiae</i> - Sierra laurel	Kalmiopsis WA

KLAMATH MOUNTAINS SPECIAL SPECIES (KM)

Agency	List	Species Name	Present Representation
	*	114. <i>Lewisia cotyledon</i> var <i>purdyi</i> - Purdy's lewisia	Babyfoot Lake Botanical Interest Area Kalmiopsis WA
	*	115. <i>Lewisia leana</i> - Lee's lewisia	Grayback Mountain. SIA
	*	116. <i>Limnanthes floccosa</i> ssp <i>bellingiana</i> - Bellinger's meadow-foam	Roxyanne Peak Park
	*	117. <i>Limnanthes floccosa</i> ssp <i>grandiflora</i> - Big-flowered wooly meadowfoam	Agate Desert (TNC) Whetstone Savanna (TNC)
	*	118. <i>Limnanthes floccosa</i> ssp <i>pumila</i> - Dwarf wooly meadow-foam	Table Rocks ACEC Lower Table Rock (TNC)
BLM, PRD	1	119. <i>Limnanthes gracilis</i> var <i>gracilis</i> - Slender meadow-foam	<i>Illinois River Forks State Park</i>
	*	120. <i>Lomatium cookii</i> - Agate desert lomatium	Woodcock Bog RNA Agate Desert (TNC) Whetstone Savanna (TNC)
	*	121. <i>Lomatium engelmannii</i> - Engelmann's desert-parsley	Chrome Ridge SIA
	2	122. <i>Lomatium tracyi</i> - Tracy lomatium	Possibly extirpated
BLM, FS	2	123. <i>Lotus stipularis</i> - Stipuled trefoil	
FS	1	124. <i>Lupinus aridus</i> ssp <i>ashlandensis</i> - Mt. Ashland lupine	<i>Mt. Ashland</i>
BLM, FS	1	125. <i>Lupinus sulphureus</i> ssp <i>kincaidii</i> - Kincaid's lupine	
	*	126. <i>Lupinus tracyi</i> - Tracy's lupine	Babyfoot Lake SIA Kalmiopsis WA
PVT, BLM	1	127. <i>Meconella oregana</i> - White meconella	
	2	128. <i>Microseris douglasii</i> ssp <i>douglasii</i> - Douglas' microseris	Extirpated
	*	129. <i>Microseris howellii</i> - Howell's microseris	Woodcock Bog RNA North Fork Hunter Creek ACEC Oregon Mountain SIA
	*	130. <i>Microseris laciniata</i> ssp <i>detlingii</i> - Detling's microseris	Cascade Siskiyou NM
BLM, FS	2	131. <i>Mimulus bolanderi</i> - Bolander's monkeyflower	
	*	132. <i>Monardella glauca</i> - Monardella	Bigelow Lake SIA
	*	133. <i>Monardella purpurea</i> - Siskiyou monardella	Lemmingsworth Gulch RNA Rough & Ready Flat SIA/ACEC Kalmiopsis WA
	*	134. <i>Navarretia heterandra</i> - Tehama navarretia	Lower Table Rock ACEC Table Rocks ACEC Agate Desert (TNC)

KLAMATH MOUNTAINS SPECIAL SPECIES (KM)

Agency	List	Species Name	Present Representation
FS, BLM	2	135. <i>Nemacladus capillaris</i> - Slender nemacladus	
	*	136. <i>Pedicularis howellii</i> - Howell lousewort	Oliver Mathews RNA Bigelow Lake SIA Bolan Lake SIA
BLM	2	137. <i>Pellaea andromedifolia</i> - Coffee fern	
BLM	2	138. <i>Pellaea mucronata</i> ssp <i>mucronata</i> - Bird's-foot fern	
	*	139. <i>Perideridia erythrorhiza</i> - Red-root yampah	Eight Dollar Mountain SIA
FS	1	140. <i>Phacelia leonis</i> - Leo's phacelia	
	*	141. <i>Pilularia americana</i> - American pillwort	Agate Desert (TNC)
	*	142. <i>Plagiobothrys figuratus</i> ssp <i>corallicarpus</i> - Coral seeded allocarya	Whetstone Savanna (TNC)
BLM	2	143. <i>Plagiobothrys glyptocarpus</i> - Sculptured allocarya	
BLM	2	144. <i>Plagiobothrys greenei</i> - Greene popcorn flower	
	*	145. <i>Plagiobothrys hirtus</i> - Rough popcorn flower	Wm. A.Oerding Popcorn Swale (TNC)
	1	146. <i>Plagiobothrys lamprocarpus</i> - A popcornflower	Extinct
BLM	2	147. <i>Polystichum californicum</i> - California sword-fern	
BLM	1	148. <i>Pseudoleskeella serpentinensis</i> - Moss	
	*	149. <i>Ranunculus austrooreganus</i> - Southern oregon buttercup	Whetstone Savanna (TNC) Upper Table Rock ACEC
FS	2	150. <i>Rhamnus ilicifolia</i> - Redberry	
BLM	1	151. <i>Romanzoffia thompsonii</i> - Thompson mistmaiden	
	*	152. <i>Salix delnortensis</i> - Del norte willow	Woodcock Bog RNA Kalmiopsis WA Rough & Ready Creek (TNC)
	*	153. <i>Saxifragopsis fragarioides</i> - Strawberry saxifrage	Kalmiopsis WA
BLM, FS	2	154. <i>Scirpus pendulus</i> - Drooping bulrush	
	*	155. <i>Sedum laxum</i> ssp <i>heckneri</i> - Heckner's stonecrop	Beatty Creek RNA
	*	156. <i>Sedum moranii</i> - Rogue river stonecrop	Rogue River WSR
FS, BLM	1	157. <i>Sedum oblongeolatum</i> - Applegate stonecrop	

KLAMATH MOUNTAINS SPECIAL SPECIES (KM)

Agency	List	Species Name	Present Representation
	*	158. <i>Senecio hesperius</i> - Western senecio	Cedar Log Flat RNA Eight Dollar Mountain ACEC/SIA Oregon Mountain SIA
FS, BLM	2	159. <i>Sidalcea malachroides</i> - Maple-leaved sidalcea	
PVT, PRD	1	160. <i>Sidalcea malviflora</i> ssp <i>patula</i> - Coast checker bloom	
BLM	2	161. <i>Silene hookeri</i> ssp <i>bolanderi</i> - Bolander's catchfly	
BLM	1	162. <i>Sisyrinchium hitchcockii</i> - Pale blue-eyed grass	
	*	163. <i>Sophora leachiana</i> - Western necklace	York Creek SIA Kalmiopsis WA
	*	164. <i>Streptanthus howellii</i> - Howell's streptanthus	Lemmingsworth Gulch RNA Rough & Ready Flat SIA/(TNC) Kalmiopsis WA
FS	1	165. <i>Tauschia howellii</i> - Howell's tauschia	
	*	166. <i>Trillium angustipetalum</i> - Siskiyou trillium	North Fork Hunter Creek ACEC
	*	167. <i>Triteleia hendersonii</i> var <i>leachiae</i> - Leach's brodiaea	Rogue WSR
	2	168. <i>Triteleia ixioides</i> ssp <i>anilina</i> - Sierra brodiaea	
	*	169. <i>Viola primulifolia</i> ssp <i>occidentalis</i> - Western bog violet	Lemmingsworth Gulch RNA Woodcock Bog RNA Eight Dollar Mountain ACEC
FS, BLM	2	170. <i>Wolffia columbiana</i> - Columbia water-meal	

Chapter 9: West Cascades and Crest Ecoregion

The Cascades Ecoregion extends from southern British Columbia south almost to the California border. This mountainous, heavily forested ecoregion is bounded on the west by the farms and woodlands of the Puget Trough and the Willamette Valley or the drier forests and valleys of the Klamath Mountains. To the east, it spills over the crest of the Cascade Mountains to the drier pine forests of the East Cascades.

The crest of the Cascade Range is dominated by a series of volcanic peaks. In Oregon, Mount Hood is the highest at 11,240 feet, but a dozen others top 8,000 feet. The western slopes of the range feature long ridges with steep sides and wide, glaciated valleys. Most of the rivers draining the northern two-thirds of the ecoregion flow into the Willamette Valley and then to the Columbia River system; the southern third drains to the Pacific Ocean through the Umpqua and Rogue River systems. The climate varies with elevation and, to a lesser extent, latitude. Higher elevations receive heavy winter snows. The drier southern half has a fire regime similar to the Klamath Mountains, with frequent lightning-caused fires. In the north, the natural fire regime historically produced less frequent but more severe fires.

The ecoregion is almost entirely forested. Douglas fir-western hemlock forests dominate large areas up to

elevations of about 3,300 feet. However, most of the previously-harvested forests of the lowlands and lower slopes now support mixed conifer-deciduous forests, with young Douglas fir and western hemlock forests found in a mosaic with hardwood species such as bigleaf maple and red alder.

Silver fir-mountain hemlock forests occur at mid-elevations. Silver fir is common between 2,600 and 4,200 feet. Mountain hemlock is most common between 3,200 and 6,000 feet. In the higher areas, mountain hemlock or occasionally Alaska yellow cedar, subalpine fir, or whitebark pine woodlands open into alpine parklands with patches of forest interspersed with shrub and meadow communities. Alpine areas feature a variety of habitats ranging from dwarf shrubs, grasses and forbs to wetlands and barren expanses of rocks and ice.

Forests have long been the foundation of the local economy in the West Cascades, and decades of logging put the region at the center of controversies over the northern spotted owl, logging of old growth forests and management of federal lands. Most of the ecoregion's population is found in small towns in the river valleys where increasing recreation use supplements the traditional timber-based economy.

Figure 12. Represented and Unrepresented Cells and Species in the West Cascades and Crest Ecoregion

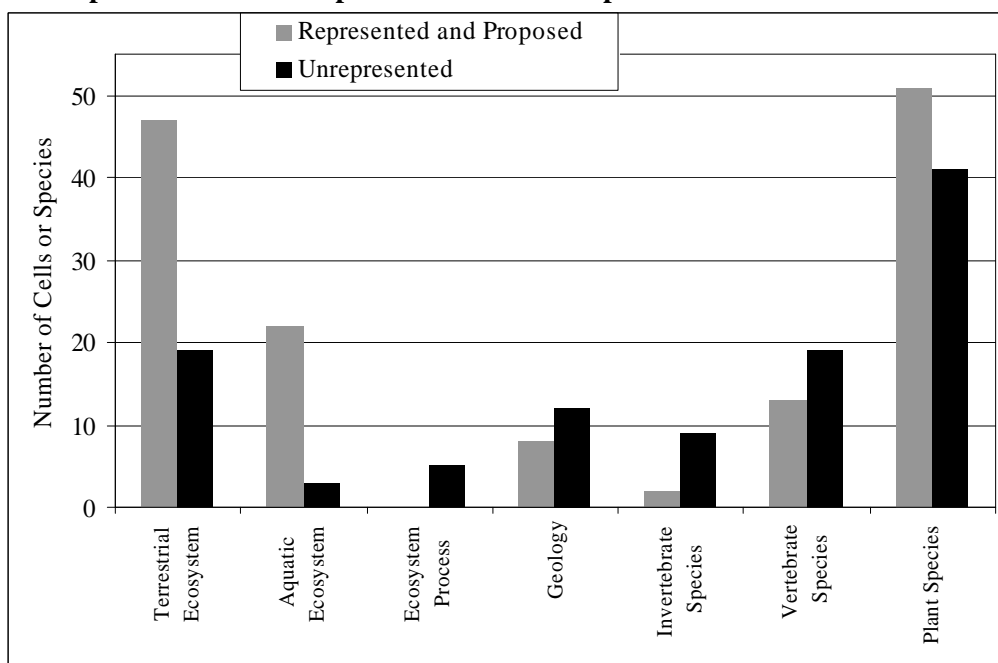
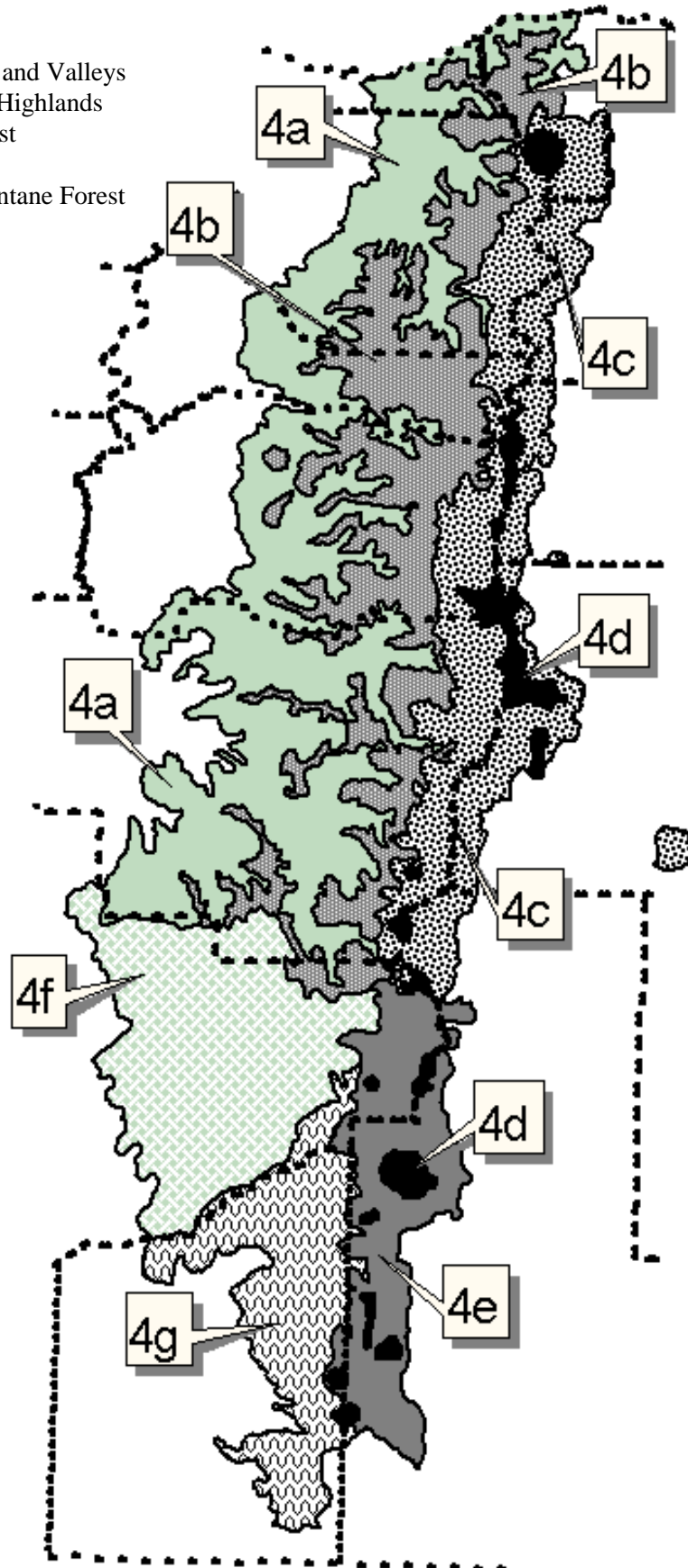


Figure 13. Map of West Cascades and Crest Ecoregion and Subregions (Thorson *et al.* 2003)

- 4a - Western Cascades Lowlands and Valleys
- 4b - Western Cascades Montane Highlands
- 4c - Cascade Crest Montane Forest
- 4d - Cascades Subalpine / Alpine
- 4e - High Southern Cascades Montane Forest
- 4f - Umpqua Cascades
- 4g - Southern Cascades



WEST CASCADES AND CREST ECOLOGICAL CELLS (WC)

Agency	Priority	Cell Name	Present Representation
Western Hemlock			
	*	1. Western hemlock/oceanspray.	Tater Hill RNA Limpy Rock RNA
	*	2. Western hemlock/salal/twinflower with white-flowered hawkweed and common prince's pine if possible.	Hagan RNA
	*	3. Western hemlock/salal-Oregon grape.	Hagan RNA
	*	4. Western hemlock/rhododendron-salal.	Bagby RNA
	*	5. Western hemlock/rhododendron-Alaska huckleberry.	Middle Santiam RNA
	+	6. Western hemlock/Alaska huckleberry-salal.	Menagerie WA
	*	7. Western hemlock/rhododendron/twinflower with beargrass if possible.	Bull Run RNA
	*	8. Western hemlock/dwarf Oregon grape/swordfern.	Middle Santiam RNA
	*	9. Western hemlock/dwarf Oregon grape/oxalis.	Middle Santiam RNA
	+	10. Western hemlock/dwarf Oregon grape/vanilla leaf.	Menagerie WA
	*	11. Western hemlock/dwarf Oregon grape/twinflower.	Hagan RNA
	+	12. Western hemlock/salal.	Columbia WA
FS	H	13. Western hemlock/vanillaleaf.	
	*	14. Western hemlock/oxalis.	Middle Santiam RNA
	*	15. Western hemlock/devil's club.	Carolyn's Crown RNA Columbia WA
BLM, FS, PRD	H	16. River terrace forest with Douglas fir, western red cedar, western hemlock and associated hardwoods.	Middle Santiam River Terrace ACEC<
	*	17. Old growth western red cedar types.	Carolyn's Crown RNA
Pacific Silver Fir			
FS	L	18. Silver fir/dwarf Oregon grape.	
	+	19. Silver fir/rhododendron/beargrass.	Big Bend Mountain PRNA
	*	20. Silver fir/rhododendron-dwarf Oregon grape.	Big Bend Mountain PRNA Bull Run RNA
FS	M	21. Silver fir forest with big huckleberry and dwarf bramble.	
	+	22. Silver fir/big huckleberry/beadlily.	Salmon-Huckleberry WA Big Bend Mountain PRNA

WEST CASCADES AND CREST ECOLOGICAL CELLS (WC)

Agency	Priority	Cell Name	Present Representation
	*	23. Silver fir/big huckleberry/beargrass.	Big Bend Mountain PRNA Bull Run RNA
	*	24. Silver fir/vine maple.	Upper Elk Meadows RNA
	*	25. Silver fir/Alaska huckleberry/bunchberry with rhododendron if possible.	Big Bend Mountain PRNA Wildcat Mountain RNA
	*	26. Silver fir/Oregon oxalis.	Salmon-Huckleberry WA
	*	27. Silver fir/coolwort foamflower and silver fir/vine maple/coolwort foamflower communities.	Wildcat Mountain RNA
	*	28. Silver fir/Cascades azalea with fools huckleberry if possible.	Mt. Hood WA
	*	29. Silver fir/Devil's club.	Big Bend Mountain PRNA Bull Run RNA
FS	M	30. Silver fir-white fir/starry Solomon seal with dwarf Oregon grape if possible.	
FS, BLM	M	31. Douglas fir-canyon live oak forest.	
Douglas Fir			
	*	32. Douglas fir-Oregon white oak/poison oak woodland with associated meadows.	Squaw Flat RNA
BLM, FS	M	33. Douglas fir/poison oak woodland.	
BLM, FS	M	34. Douglas fir/salal/swordfern forest.	Red Ponds RNA<
	*	35. Douglas fir/oceanspray-dwarf Oregon grape.	Rigdon Point RNA
	*	36. Douglas fir/oceanspray/whipplevine with incense cedar if possible.	Limp Rock RNA
FS	H	37. Douglas fir-ponderosa pine-incense cedar/California fescue forest.	
	*	38. Douglas fir-ponderosa pine-sugar pine/evergreen shrub forest.	Abbott Creek RNA
White Fir and Red Fir			
BLM, FS	M	39. White fir-Douglas fir/Piper's Oregon grape.	
	*	40. White fir-incense cedar/dwarf Oregon grape forest.	Abbott Creek RNA
BLM, FS	M	41. White fir/big huckleberry with twinflower and vanilla leaf if possible.	
BLM, FS	M	42. White fir/vine maple/vanilla leaf with snow bramble if possible.	

WEST CASCADES AND CREST ECOLOGICAL CELLS (WC)

Agency	Priority	Cell Name	Present Representation
FS, BLM	M	43. White fir/dwarf Oregon grape – salal.	Red Ponds RNA<
FS, BLM	L	44. White fir-red fir/prince's pine.	Cougar Butte RNA<
FS	M	45. White fir-Douglas fir forest with dwarf Oregon grape and threeleaf anemone and with western serviceberry and Douglas maple if possible.	
	*	46. Ponderosa pine/greenleaf manzanita-bitterbrush.	Desert Creek RNA
	*	47. Shasta red fir/big huckleberry.	Wickiup Springs PRNA Cougar Butte RNA
FS	H	48. Red fir-Alaska yellow cedar forest.	Sky Lakes WA<
	*	49. Mountain meadow-white fir forest mosaic with blue wildrye and Umpqua swertia.	Cougar Butte RNA
Mountain Hemlock			
	*	50. Mountain hemlock/big huckleberry.	Gold Lake Bog RNA Waldo WA
	*	51. Mountain hemlock/rhododendron.	Three Sisters WA Waldo WA
	+	52. Mountain hemlock/grouse huckleberry and mountain hemlock/woodrush forests.	Torrey-Charlton RNA Three Sisters WA
Subalpine and Alpine Types			
	*	53. Engelmann spruce-subalpine fir forest.	Gold Lake Bog RNA
	*	54. Alaska yellow cedar forest mosaic.	Three Creeks RNA
	*	55. Lodgepole pine/Brewer's sedge forest.	Pumice Desert RNA
FS	U	56. Recent lahar (mudflow) with successional forest communities including lodgepole pine/pinemat manzanita.	
FS	L	57. Lodgepole pine/sedge communities on glacial outwash.	
	*	58. Whitebark pine in the high Cascades.	Llao Rock RNA
	*	59. Subalpine meadow mosaic in the high Cascades.	Three Sisters WA Mt. Jefferson WA
	*	60. Alpine mosaic (above treeline with a variety of meadows, rocky areas, and aspects).	Three Sisters WA Mt. Jefferson WA
	*	61. Lava flow with representative vegetation (range from mid to high elevations).	McKenzie Pass RNA

WEST CASCADES AND CREST ECOLOGICAL CELLS (WC)

Agency	Priority	Cell Name	Present Representation
Shrub and Grassland Types			
	*	62. Subalpine pumice and ash fields.	Pumice Desert RNA
	*	63. Subalpine bitterbrush steppe with long stolon sedge and needlegrass.	Desert Creek RNA
	*	64. Alpine needlegrass in the high Cascades.	Sky Lakes WA Mountain Lakes WA
	+	65. Blue wildrye or red fescue grass bald communities.	Horse Rock Ridge RNA Grassy Mountain ACEC
FS	M	66. Chaparral communities dominated by chinquapin, manzanita or snowbrush.	
Lacustrine			
	*	67. Low elevation lake with aquatic beds and marshy shore, surrounded by mixed conifer forest.	Lost Lake RNA
	+	68. Montane lake with aquatic beds and marshy shore.	Waldo WA Mt. Jefferson WA Many Lakes RNA
	+	69. Subalpine lake.	Big Bend Mountain. PRNA
		70. Alpine lake.	Three Sisters WA
Palustrine			
	*	71. Low elevation pond, with aquatic beds and marshy shore.	Red Ponds RNA
	*	72. Subalpine pond, with aquatic beds and marshy shore.	Gold Lake Bog RNA Torrey-Charleton PRNA Many Lakes RNA
	+	73. Alpine pond.	Three Sisters WA
	+	74. Montane vernal pond.	Big Bend Mountain. PRNA Torrey-Charleton PRNA
FS, PVT	H	75. Flowing and pooled hot springs.	
	*	76. Flowing and pooled cold springs.	Big Bend Mountain. PRNA Bull Run RNA
	*	77. Vernal seepage slopes on low to mid elevation rocky bald communities, with monkeyflower, saxifrage and moss.	Horse Rock Ridge RNA Grassy Mountain ACEC
	*	78. Sphagnum mire on floating lake fill mat.	Hidden Lake-Lulu Lake SIA
	+	79. Sitka sedge fen.	Big Bend Mountain. PRNA

WEST CASCADES AND CREST ECOLOGICAL CELLS (WC)

Agency	Priority	Cell Name	Present Representation
		80. Subalpine sedge fen, dominated by black and Holm sedge.	Three Sisters WA Mt. Jefferson WA
	*	81. Few flowered spikerush/brown moss fen, with Engelmann spruce and lodgepole pine.	Gold Lake Bog RNA Sphagnum Bog RNA Many Lakes RNA
	*	82. Bog laurel shrub swamp.	Torrey-Charlton RNA Sphagnum Bog RNA
	*	83. Spring fen on seepage slope (including marsh marigold, shooting-star, bistort, arrowleaf groundsel and false hellebore).	Upper Elk Meadows RNA Many Lakes RNA <i>Three Sisters WA</i> <i>Mt. Jefferson WA</i>
	*	84. Geyer willow shrub swamp.	Gold Lake Bog RNA Many Lakes RNA
	*	85. Sitka alder/devils club swamp on seepy talus slopes or avalanche tracks.	Three Sisters WA Mt. Jefferson WA
	*	86. Sitka alder/lady fern swamp.	Upper Elk Meadows RNA Ollalie Ridge RNA
	*	87. Bog birch shrub swamp.	Gold Lake Bog RNA Many Lakes RNA
	+	88. Mountain alder/sedge on organic soils.	Sphagnum Bog RNA
	*	89. Bog blueberry shrubswamp, with Engelmann spruce, lodgepole pine, and tufted hairgrass.	Gold Lake Bog RNA Many Lakes RNA
BLM, FS	H	90. Western red cedar-western hemlock/skunk cabbage swamp.	
FS	L	91. Alaska yellow cedar/devils club swamp.	

West Cascades and Crest Ecosystem Process Cells

FS	U	92. Fire, including underburns, partial and total stand replacement fires in the Western Hemlock zone.
FS	U	93. Fire, including partial and total stand replacement burns in the Pacific silver fir zone.
FS	U	94. Fire, including underburns, partial and total stand replacement burns in the Douglas fir zone.
FS	U	95. Fire, including underburns, partial and total stand replacement burns in the white or red fir zones.
FS	U	96. Fire, including partial and total stand replacement fires in the mountain hemlock zone.

WEST CASCADES AND CREST GEOLOGICAL CELLS (WC)

Agency	Priority	Cell Name	Present Representation
Holocene			
	*	1. Columbia River Gorge	Columbia River Gorge National Scenic Area
	*	2. Multnomah Falls	Columbia River Gorge National Scenic Area
	*	3. Bridge of the Gods Landslide	Columbia River Gorge National Scenic Area
	*	4. Bagby Hot Springs	Bagby RNA
Pleistocene and Holocene			
	*	5. Eliot Glacier	Mt. Hood WA
FS	M	6. Old Maid Lahar	<i>Sandy River</i>
FS	M	7. Cascades Stratovolcanoes Cone: Mt. McLoughlin	<i>Mt. McLaughlin</i>
	*	8. Cascades Stratovolcanoes Eroded cone: Three-Fingered Jack	Mt. Washington WA
	*	9. Cascades Stratovolcanoes Caldera: Crater Lake	Crater Lake National Park
Pliocene and Miocene			
FS	L	10. Outerson volcanics	<i>Outerson Mountain</i>
FS	L	11. Rhododendron Formation	<i>Rhododendron</i>
Miocene			
	*	12. Eagle Creek Formation	Eagle Creek Columbia River Gorge National Scenic Area
FS	L	13. Sardine Formation	<i>Sardine Mountain</i>
Miocene and Oligocene			
FS, PVT	L	14. Breitenbush Formation	<i>Cleator Bend</i> <i>Breitenbush River</i>
Oligocene and Eocene			
FS	L	15. Heppsie Andesite	<i>Heppsie Mountain</i>
FS	L	16. Wasson Formation	<i>Lake Creek</i>
FS	L	17. Roxy Formation	<i>Ashland</i>
FS	L	18. Tuff of Bond Creek	<i>Diamond Rock</i>

WEST CASCADES AND CREST GEOLOGICAL CELLS (WC)

Agency	Priority	Cell Name	Present Representation
Eocene			
FS	L	19. Colestin Formation	<i>Colostin</i>
Cretaceous			
FS	L	20. Hornbrook Formation	<i>Jacksonville</i>

WEST CASCADES AND CREST SPECIAL SPECIES (WC)

Agency	List	Species Name	Present Representation
Invertebrates			
BLM, FS	2	1. <i>Agonum belleri</i> - Beller's ground beetle	
BLM, FS	1	2. <i>Allomyia scotti</i> - Scott's apatanian caddisfly	
BLM, FS	1	3. <i>Chloealtis aspasma</i> - Siskiyou short-horned grasshopper	
BLM, FS	1	4. <i>Fluminicola</i> sp 19 - Keene creek pebblesnail	
BLM, FS	1	5. <i>Fluminicola</i> sp 4 - Fall creek pebblesnail	
BLM, FS	1	6. <i>Lanx subrotunda</i> - Rotund lanx (snail)	
BLM, FS	1	7. <i>Monadenia fidelis celeuthia</i> - Travelling sideband (snail)	
BLM, FS	1	8. <i>Neothremma andersoni</i> - Columbia gorge caddisfly	
	*	9. <i>Pristiloma arcticum crateris</i> - Crater lake tightcoil (snail)	Crater Lake National Park
BLM, FS	2	10. <i>Vespericola sierranus</i> - Siskiyou hesperian (snail)	
	*	11. <i>Zapada wahkeena</i> - Wahkeena Falls flightless stonefly	Columbia River Gorge National Scenic Area
Vertebrates			
	*	12. <i>Accipiter gentilis</i> - Northern goshawk	Sky Lakes WA
FS	2	13. <i>Antrozous pallidus pacificus</i> - Pacific pallid bat	
	*	14. <i>Ascaphus truei</i> - Coastal tailed frog	Boulder Creek WA
	*	15. <i>Batrachoseps wrighti</i> - Oregon slender salamander	Sandy River (TNC)/ACEC
	2	16. <i>Canis lupus</i> - Gray wolf	Extirpated
BLM	2	17. <i>Catostomus rimiculus</i> - Jenny creek sucker	
BLM, FS	2	18. <i>Chrysemys picta</i> - Painted turtle	
BLM	1	19. <i>Clemmys marmorata marmorata</i> - Northwestern pond turtle	
BLM, FS	2	20. <i>Corynorhinus townsendii townsendii</i> - Pacific western big-eared bat	
FS	2	21. <i>Dicamptodon copei</i> - Cope's giant salamander	
	*	22. <i>Falco peregrinus anatum</i> - American peregrine falcon	Columbia Gorge WA Three Sisters WA Menagerie WA

WEST CASCADES AND CREST SPECIAL SPECIES (WC)

Agency	List	Species Name	Present Representation
	*	23. <i>Gulo gulo luteus</i> - California wolverine	Mt. Jefferson WA Mt. Thielson WA Mt. Washington WA
	*	24. <i>Haliaeetus leucocephalus</i> - Bald eagle	Mt. Jefferson WA
	*	25. <i>Histrionicus histrionicus</i> - Harlequin duck	Boulder Creek WA Three Sisters WA
FS	2	26. <i>Ixobrychus exilis hesperis</i> - Western least bittern	
BLM, FS	1	27. <i>Lampetra minima</i> - Miller lake lamprey	
BLM, FS	2	28. <i>Lampetra tridentata</i> - Pacific lamprey	
	2	29. <i>Lynx canadensis</i> - Canada lynx	Possibly extirpated
	*	30. <i>Martes pennanti pacifica</i> - Pacific fisher	Diamond Peak WA Rogue-Umpqua WA
FS	2	31. <i>Myotis thysanodes</i> - Fringed bat	
	*	32. <i>Oncorhynchus kisutch</i> - Coho salmon, lower Columbia River/SW Washington coast runs	Salmon-Huckleberry WA
FS	1	33. <i>Oncorhynchus kisutch</i> - Coho salmon, Oregon coastal runs	
	*	34. <i>Plethodon larselli</i> - Larch mountain salamander	Columbia River Gorge National Scenic Area
FS	2	35. <i>Podiceps grisegena</i> - Red-necked grebe	Extirpated
FS	2	36. <i>Progne subis</i> - Purple martin	
FS	2	37. <i>Rana aurora aurora</i> - Northern red-legged frog	
FS	2	38. <i>Rana boylei</i> - Foothill yellow-legged frog	
	*	39. <i>Rana cascadae</i> - Cascades frog	Sky Lakes WA
	*	40. <i>Rana pretiosa</i> - Oregon spotted frog	Gold Lake Bog RNA Many Lakes RNA Sky Lakes WA
FS	2	41. <i>Rhyacotriton cascadae</i> - Cascade torrent salamander	
FS	1	42. <i>Salvelinus confluentus</i> - Bull trout, Columbia River population	
	*	43. <i>Strix occidentalis caurina</i> - Northern spotted owl	Limpy Rock RNA Rigdon Point RNA Wildcat Mountain RNA

WEST CASCADES AND CREST SPECIAL SPECIES (WC)

Agency	List	Species Name	Present Representation
Plants			
	*	44. <i>Agoseris elata</i> - Tall agoseris	Mt. Hood WA
	*	45. <i>Agrostis howellii</i> - Howell's bentgrass	Wakana Falls Elowah Falls
FS	2	46. <i>Allium peninsulare</i> - Peninsular onion	Extirpated
	*	47. <i>Anastrophyllum minutum</i> - Liverwort	Mt. Hood WA
	*	48. <i>Arabis hastatula</i> - Hells canyon rockcress	Wildcat Mountain RNA
FS	2	49. <i>Arabis platysperma</i> var <i>platysperma</i> - Broad-seeded rockcress	
FS	2	50. <i>Arabis sparsiflora</i> var <i>atrorubens</i> - Sickie-pod rockcress	
	*	51. <i>Arabis suffrutescens</i> var. <i>horizontalis</i> - Crater lake rockcress	Sky Lakes WA Crater Lake National Park
	*	52. <i>Arnica viscosa</i> - Shasta arnica	Mt. Thielsen WA Three Sisters WA
BLM, FS	2	53. <i>Asplenium septentrionale</i> - Grass-fern	
	*	54. <i>Aster gormanii</i> - Gorman's aster	Bull-of-the Woods WA Mt. Jefferson WA Table Rock WA
FS	1	55. <i>Botrychium crenulatum</i> - Crenulate grape-fern	
	*	56. <i>Botrychium lanceolatum</i> - Lance-leaved grape-fern	Mt. Hood WA
FS	2	57. <i>Botrychium minganense</i> - Gray moonwort	
FS	2	58. <i>Botrychium montanum</i> - Mountain grapefern	
	*	59. <i>Botrychium pumicola</i> - Pumice grape-fern	Three Sisters WA Paulina Peak NM
FS	2	60. <i>Brachydontium olympicum</i> - Moss	
	*	61. <i>Bridgeoporus nobilissimus</i> - Giant polypore fungus, fuzzy sandozi	Three Sisters WA Menagerie WA
	*	62. <i>Bruchia bolanderi</i> - Moss	Sky Lakes WA Three Sisters WA
	*	63. <i>Bryum calobryoides</i> - Moss	Ollalie Ridge RNA
	*	64. <i>Calamagrostis breweri</i> - Brewer reedgrass	Mt. Hood WA Mt. Jefferson WA

WEST CASCADES AND CREST SPECIAL SPECIES (WC)

Agency	List	Species Name	Present Representation
FS	2	65. <i>Calliergon trifarium</i> - Moss	
BLM	2	66. <i>Calochortus monophyllus</i> - One-leaved calochortus	
	*	67. <i>Calochortus umpquaensis</i> - Umpqua mariposa-lily	Ace Williams Mountain ACEC
	*	68. <i>Calypogeia sphagnicola</i> - Liverwort	Gold Lake Bog RNA White Rock Fen ACEC
FS	2	69. <i>Carex abrupta</i> - Abrupt-beaked sedge	
FS	2	70. <i>Carex capitata</i> - Capitata sedge	
FS	2	71. <i>Carex crawfordii</i> - Crawford's sedge	
	*	72. <i>Carex integra</i> - Smooth beaked sedge	Three Sisters WA
FS	2	73. <i>Carex lasiocarpa</i> var <i>americana</i> - Slender sedge	
	*	74. <i>Carex livida</i> - Pale sedge	Big Bend RNA
FS	2	75. <i>Carex macrochaeta</i> - Alaska long-awned sedge	
FS	2	76. <i>Carex praticola</i> - Meadow sedge	
FS	2	77. <i>Carex vernacula</i> - Native sedge	
	*	78. <i>Castilleja chlorotica</i> - Green-tinged paintbrush	Gearhart Mountain WA
	*	79. <i>Castilleja rupicola</i> - Cliff paintbrush	Three Sisters WA Wildcat Mountain RNA
FS	2	80. <i>Castilleja thompsonii</i> - Thompson's paintbrush	
	*	81. <i>Chiloscyphus gemmiparus</i> - Liverwort	Three Sisters WA
	*	82. <i>Cimicifuga elata</i> - Tall bugbane	Three Sisters WA
	*	83. <i>Cirsium ciliolatum</i> - Ashland thistle	Cascade Siskiyou NM
	*	84. <i>Collomia mazama</i> - Mountain mazama collomia	Sphagnum Bog RNA Sky Lakes WA
FS	2	85. <i>Coptis trifolia</i> - Three-leaf gold thread	Crater Creek
	*	86. <i>Corydalis aquae-gelidae</i> - Cold-water corydalis	Clackamas River State Scenic River
	*	87. <i>Cupressus bakeri</i> - Baker's cypress	Oliver Mathews RNA Miller Lake SIA
BLM, FS	2	88. <i>Cypripedium fasciculatum</i> - Clustered lady's-slipper	
BLM, FS	2	89. <i>Delphinium nuttallii</i> - Upland larkspur	

WEST CASCADES AND CREST SPECIAL SPECIES (WC)

Agency	List	Species Name	Present Representation
BLM, FS	2	90. <i>Enemion stipitatum</i> - Dwarf isopyrum	
	*	91. <i>Erigeron howellii</i> - Howell's daisy	Columbia Gorge WA
	*	92. <i>Erigeron oreganus</i> - Oregon daisy	Oneonta Gorge SIA
	*	93. <i>Frasera umpquaensis</i> - Umpqua swertia	Rogue-Umpqua WA Upper Elk Meadows ACEC/RNA
FS	2	94. <i>Fritillaria camschatcensis</i> - Indian rice	<i>West of Mt. Talapus</i>
BLM	1	95. <i>Fritillaria gentneri</i> - Gentner's fritillaria	<i>Gray Creek</i> <i>Dog Creek</i>
	*	96. <i>Fritillaria glauca</i> - Siskiyou fritillaria	Rogue-Umpqua WA
	*	97. <i>Gentiana newberryi</i> - Moss gentian	Mt. Washington WA Sky Lakes WA
	*	98. <i>Gymnomitrium concinnum</i> - Liverwort	Mt. Hood WA
	*	99. <i>Haplopappus whitneyi</i> ssp <i>discoideus</i> - Whitney's haplopappus	Mt. Thielsen WA Rogue-Umpqua WA
	*	100. <i>Herbertus aduncus</i> - Liverwort	Oenonta Falls Latourell Falls State Park
BLM, FS	1	101. <i>Iliamna bakeri</i> - Baker's globe-mallow	
BLM, FS	2	102. <i>Iliamna latibracteata</i> - California globe-mallow	
	*	103. <i>Jamesoniella autumnalis</i> var <i>heterostipa</i> - Liverwort	Waldo Lake
	*	104. <i>Juncus kelloggii</i> - Kellogg's dwarf rush	Horse Rock Ridge ACEC
	*	105. <i>Kalmiopsis fragrans</i> - North umpqua kalmiopsis	Limpy Rock RNA
FS	2	106. <i>Lewisia columbiana</i> var <i>columbiana</i> - Rosy lewisia	
	*	107. <i>Limnanthes floccosa</i> ssp <i>bellingeriana</i> - Bellinger's meadow-foam	Poverty Flat (TNC) <i>Pinehurst</i>
FS	2	108. <i>Lobelia dortmanna</i> - Water lobelia	<i>Dark Lake</i>
FS	2	109. <i>Luzula arcuata</i> ssp <i>unalaschensis</i> - Alaska curved woodrush	<i>Lost Lake</i>
	*	110. <i>Lycopodiella inundata</i> - Northern bog clubmoss	Big Bend RNA Williams Lake ACEC
	*	111. <i>Lycopodium complanatum</i> - Ground cedar	Mt. Hood WA
	*	112. <i>Marsupella emarginata</i> var <i>aquatica</i> - Liverwort	Waldo WA

WEST CASCADES AND CREST SPECIAL SPECIES (WC)

Agency	List	Species Name	Present Representation
BLM, FS	1	113. <i>Microseris laciniata</i> ssp <i>detlingii</i> - Detling's microseris	
BLM	2	114. <i>Nemacladus capillaris</i> - Slender nemacladus	<i>Pinehurst</i>
FS	2	115. <i>Ophioglossum pusillum</i> - Adder's-tongue	
ACE	1	116. <i>Penstemon barrettiae</i> - Barrett's penstemon	Bonneville Dam
	*	117. <i>Phlox hendersonii</i> - Henderson phlox	Mt. Hood WA
BLM	1	118. <i>Plagiobothrys figuratus</i> ssp <i>corallicarpus</i> - Coral seeded allocarya	<i>Pinehurst</i>
BLM	2	119. <i>Plagiobothrys greenei</i> - Greene popcorn flower	<i>Rocky Flat</i>
BLM, FS	2	120. <i>Polystichum californicum</i> - California sword-fern	
	*	121. <i>Potentilla villosa</i> - Villous cinquefoil	Mt. Hood WA
	*	122. <i>Romanzoffia thompsonii</i> - Thompson mistmaiden	Iron Mountain SIA Rogue-Umpqua WA
	*	123. <i>Scapania gymnostomophila</i> - Liverwort	John Yeon State Park
	*	124. <i>Scheuchzeria palustris</i> ssp <i>americana</i> - Scheuchzeria	Big Bend RNA Gold Lake Bog RNA Many Lakes RNA
	*	125. <i>Scirpus pendulus</i> - Drooping bulrush	Horse Rock Ridge RNA/(TNC)
FS	2	126. <i>Scirpus subterminalis</i> - Water clubrush	
FS	1	127. <i>Sisyrinchium sarmentosum</i> - Pale blue-eyed grass	<i>Crater Lake (Mt. Hood)</i>
	*	128. <i>Stereocaulon spathuliferum</i> - Lichen	Crabtree-Schafer Creek RNA
	*	129. <i>Streptopus streptopoides</i> - Kruhsea	Big Bend RNA
FS	2	130. <i>Suksdorfia violacea</i> - Violet suksdorfia	<i>Columbia River Gorge National Scenic Area</i>
	*	131. <i>Sullivantia oregana</i> - Oregon sullivantia	Table Rock WA
FS	2	132. <i>Tauschia stricklandii</i> - Strickland's tauschia	<i>Moffett Creek – Bull Run Watershed</i>
BLM, FS	2	133. <i>Tetraplodon mnioides</i> - Moss	
	*	134. <i>Utricularia minor</i> - Lesser bladderwort	Gold Lake Bog RNA Sphagnum Bog RNA
	*	135. <i>Wolffia columbiana</i> - Columbia water-meal	Red Ponds RNA

Chapter 10: East Cascades Ecoregion

The East Cascades Ecoregion is a transition zone that extends from below the crest of the Cascade Range east to where the ponderosa pine zone meets the sagebrush-juniper steppe. The ecoregion also extends north into Washington and south into California. In Oregon, the ecoregion is variable, including extensive lodgepole forests on deep Mazama ash, the montane and foothill Ponderosa pine forests, Klamath Basin lakes and wetlands, and diverse montane forests.

The eastern slopes of the Cascades are drier than the Western Slopes, with annual rainfall ranging from 14-26 inches per year. It is less steep and cut by fewer streams than the west. The northern two-thirds of the East Cascades is drained by the Deschutes River system, which includes a series of large lakes and reservoirs near its headwaters. The southern third is drained by the Klamath River, which flows south and west into California.

The Klamath Basin, which extends into the Modoc Plateau in California, is a broad, relatively flat mid-elevation valley that historically supported a vast expanse of lakes and marshes. Oregon's largest lake, Upper Klamath Lake, is the biggest remnant of this wetland system. Most of the basin's wetlands have been drained and converted to agriculture.

The mountains on the northern and eastern edges of the Klamath Basin lack a generally accepted name, but include a series of peaks and ridges extending from Paulina Peak near Bend southward through the headwaters of the Williamson, Sprague and Chewaucan rivers to the Warner Mountains east of Lakeview. These mountains are generally forested, but the valleys and flats between them include large marshes, irrigated meadows and pastures, and arid juniper and sagebrush steppes. These habitats are a critical part of the Pacific flyway, supporting vast number of shorebirds and waterfowl, the densest wintering concentration of bald eagles in the world, and many other wildlife species.

Also of ecological significance is the ecological zone found at the northern end of this region in Oregon, where the Columbia River Gorge created a wealth of diversity. This Columbia Gorge transition zone, the extensive Ponderosa pine forests and woodlands, and the vast wetlands of the Klamath and upper Deschutes basin characterize this region.

The ecoregion's human population is concentrated in Hood River, Bend and Klamath Falls. Forest products, agriculture, recreation and tourism are the biggest contributors to local economies.

Figure 14. Represented and Unrepresented Cells in the East Cascade Ecoregion

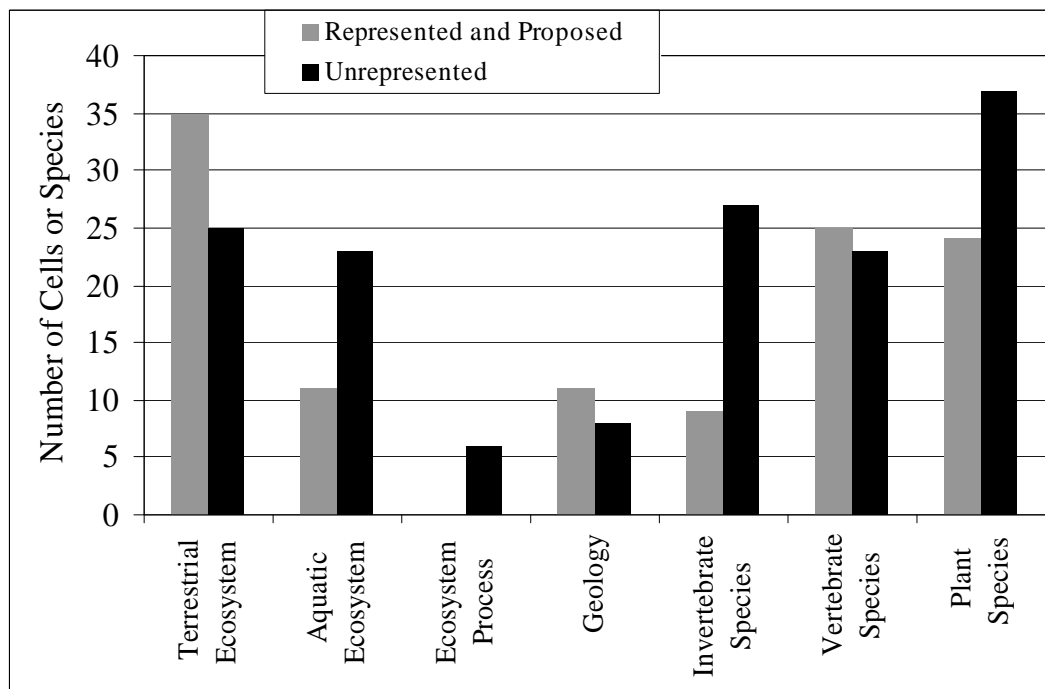
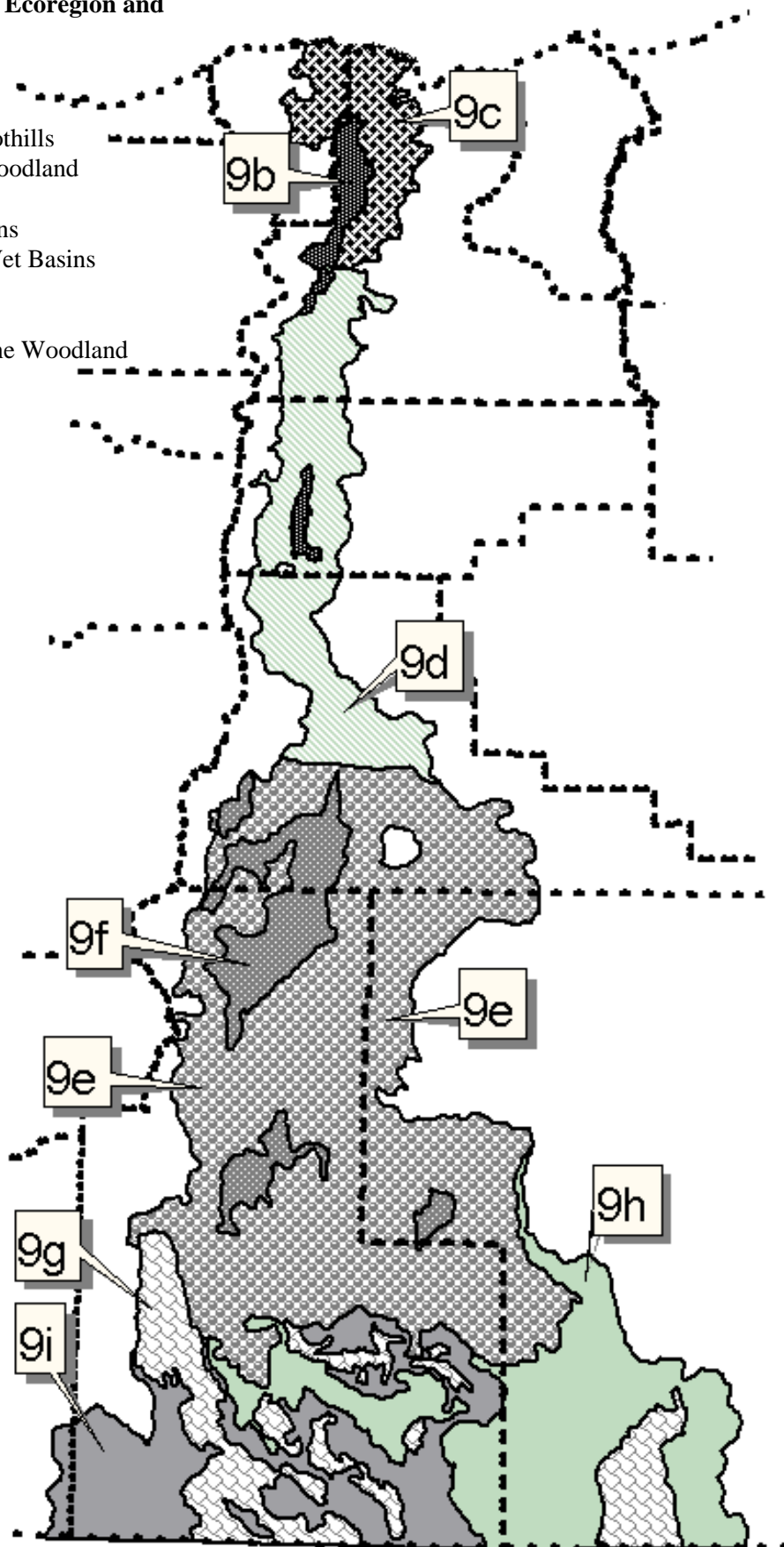


Figure 15. Map of East Cascades Ecoregion and Subregions (Thorson *et al.* 2003)

- 9b - Grand Fir Mixed Forest
- 9c - Oak/Conifer EC Columbia Foothills
- 9d - Ponderosa Pine/Bitterbrush Woodland
- 9e - Pumice Plateau Forest
- 9f - Cold Wet Pumice Plateau Basins
- 9g - Klamath/Goose Lake Warm Wet Basins
- 9h - Fremont Pine/Fir Forest
- 9i - Southern Cascades Slope
- 9j - Klamath Juniper/Ponderosa Pine Woodland



EAST CASCADES ECOLOGICAL CELLS (EC)

Agency	Priority	Cell Name	Present Representation
Western Juniper			
	*	1. Western juniper/big sagebrush/Idaho fescue.	Goodlow Mountain RNA Silver Lake Exclosure RNA
BLM, FS	H	2. Western juniper/big sagebrush/bluebunch wheatgrass.	
	*	3. Western juniper/big sagebrush-bitterbrush/Idaho fescue-western needlegrass.	Peck's Milkvetch ACEC
	*	4. Western juniper/bitterbrush/bluebunch wheatgrass-Thurber's needlegrass.	Wildhaven (TNC)
	*	5. Western juniper/low sagebrush/Idaho fescue and bluebunch wheatgrass communities.	Vee Pasture RNA
Oak Woodlands and Forests			
	*	6 Oregon white oak/bitterbrush/bluebunch wheatgrass.	Mill Creek RNA
FS	H	7. Ponderosa pine-Oregon white oak woodland.	
BLM, PVT	M	8. Oak-Pine woodland, with California black oak.	
BLM, FS, PVT	M	9. Oregon white oak canyon riparian with bittercherry, serviceberry or red-osier dogwood.	
Ponderosa Pine			
	*	10. Ponderosa pine-western juniper/bitterbrush/ Idaho fescue.	Silver Lake Exclosure RNA
	*	11. Ponderosa pine/bitterbrush/western needlegrass and long-stolon sedge communities.	Pringle Falls RNA Bluejay RNA
	*	12. Ponderosa pine/bitterbrush/Idaho fescue.	Metolius RNA
	*	13. Ponderosa pine/snowbrush-bitterbrush.	Goodlow Mountain RNA
	*	14. Ponderosa pine/greenleaf manzanita-bitterbrush.	Metolius RNA Goodlow Mountain RNA
FS	H	15. Ponderosa pine/big sagebrush-bitterbrush.	Silver Lake Exclosure RNA<
FS	H	16. Ponderosa pine/big sagebrush/bunchgrass.	Silver Lake Exclosure RNA<
FS	H	17. Ponderosa pine/mounain big sagebrush/bunchgrass.	Silver Lake Exclosure RNA<
Mixed Conifer and Douglas Fir			
	+	18 Ponderosa pine-white fir/snowberry.	Augur Creek RNA
	*	19. Ponderosa pine-white fir/green manzanita/western needlegrass.	Goodlow Mountain RNA Pringle Falls RNA
	+	20. Ponderosa pine-white fir/snowbrush.	Augur Creek RNA

EAST CASCADES ECOLOGICAL CELLS (EC)

Agency	Priority	Cell Name	Present Representation
FS	H	21. Ponderosa pine-white fir/snowbrush Greenleaf manzanita	
FS	H	22. Ponderosa pine-white fir/chinkquapin forest, with snowbrush and boxwood if possible.	
	*	23. White fir-Douglas fir/snowbrush.	Cherry Basin RNA
	*	24. White fir-Douglas fir/snowberry.	Cherry Basin RNA
FS	L	25. Dry site Douglas fir with vine maple, Douglas maple, and oceanspray.	
FS	H	26. Douglas fir-Pacific silver fir forest.	<i>Big Marsh Headwall</i>
Grand Fir			
	+	27. Englemann spruce bottomland with ponderosa and lodgepole pine.	Cultus River PRNA
	*	28. Grand fir-Englemann spruce/starry solomon seal.	Gumjuwac-Tolo RNA
FS	M	29. Grand fir-Douglas fir/Oregon grape.	
	*	30. Grand fir/skunkleaf polemonium.	Gumjuwac-Tolo RNA
FS	H	31. Grand fir/vanillaleaf.	
FS, PRD	M	32. Grand fir/elk sedge.	
FS, PRD	M	33. Grand fir/snowberry, if possible with ridgetops containing oceanspray and other dry shrubs.	
Lodgepole Pine			
	*	34. Lodgepole pine/bitterbrush/western needlegrass.	Cannon Well RNA Pringle Falls RNA
	*	35. Lodgepole pine/bitterbrush/long-stolon sedge	Cannon Well RNA Bluejay RNA
	*	36. Lodgepole pine/bitterbrush/Idaho fescue.	Pringle Falls RNA
FS	M	37. Lodgepole pine/bitterbrush-squawcurrent.	
	*	38. Lodgepole pine/grouse huckleberry.	Cherry Basin RNA Cache Mountain RNA
FS	M	39. Lodgepole pine/big sagebrush.	
FS, PRD	M	40. Lodgepole pine/snowberry/blue wildrye and sedge at moist site.	
FS	M	41. Lodgepole pine/long-stolon sedge.	
FS	M	42. Lodgepole pine/western needlegrass.	

EAST CASCADES ECOLOGICAL CELLS (EC)

Agency	Priority	Cell Name	Present Representation
	*	43. Lodgepole pine/kinnikinnik	Cultus River PRNA Bluejay RNA
	*	44. Lodgepole pine/beargrass.	Cache Mountain RNA
	+	45. Whitebark pine-lodgepole pine forest.	Augur Creek RNA
		White Fir and Red Fir	
FS	H	46. White fir/snowbrush-squawcarpet ceanothus with kinnikinnik if possible.	
	*	47. White fir-Pacific silver fir/snowberry.	Cache Mountain RNA
	*	48. White fir-red fir/long-stolon sedge forest with chinkapin if possible.	Cherry Basin RNA
	*	49. Red fir-mountain hemlock/pinemat manzanita with mountain hemlock/grouseberry if possible.	Cherry Basin RNA
		Cinder Cone Forests	
	+	50. Entire undisturbed cinder cone at mid-elevations with ponderosa pine-lodgepole pine climax.	Wechee Butte PRNA
	*	51. Entire undisturbed forested cinder cone, in white fir zone; pre-Mazama.	Moskt Butte RNA
	+	52. Entire forested cinder cone, in white fir zone; post-Mazama.	Katsuk Butte PRNA
	*	53. Entire undisturbed cinder cone in mountain hemlock zone.	Moskt Butte RNA
		Grasslands and Shrubland Steppe	
	*	54. Bluebunch wheatgrass-Sandberg bluegrass.	Mill Creek RNA
	*	55. Idaho fescue-hawkweed.	McCall Preserve at Rowena (TNC)
	*	56. Big sagebrush-bitterbrush/Idaho fescue-western needlegrass.	Peck's Milkvetch ACEC
BLM, FS	L	57. Mountain big sagebrush/bunchgrass.	
	*	58. Low sagebrush vegetation complex, with Idaho fescue, bluegrass, and bluebunch wheatgrass.	Vee Pasture RNA
PVT	H	59. Bitterbrush / bunchgrass steppe.	
BLM, PVT	H	60. Big sagebrush, greasewood or meadow (Nevada bluegrass or basin wildrye).	
	*	61. Chaparral communities dominated by chinquapin and manzanita.	Old Baldy RNA

EAST CASCADES ECOLOGICAL CELLS (EC)

Agency	Priority	Cell Name	Present Representation
Lacustrine and Riverine			
	*	62. Mid elevation lake, with aquatic beds and marshy shore.	Cache Mountain RNA
	*	63. High elevation lake, with aquatic beds and marshy shore.	Cherry Basin RNA
	+	64. Flowing and pooled cold springs.	Cultus River PRNA
FS, PVT	H	65. Flowing and pooled hot springs.	
FS, PVT	H	66. Mare's egg springs.	<i>Big Marsh Headwall</i>
Palustrine			
	*	67. Vernal pond at mid to high elevation	Sycan Marsh (TNC)
	*	68. Subalpine pond.	Cherry Basin RNA
	*	69. Bulrush-pondlily marsh with aquatic beds.	Sycan Marsh (TNC)
	*	70. Few flowered spikerush/brown moss fen, with Engelmann spruce and lodgepole pine.	Sycan Marsh (TNC)
	+	71. Spring fen on seepage slope (including shooting-star, bistort, arrowleaf groundsel and false hellebore).	Sycan Marsh (TNC)
BLM, FS, FWS	M	72. Beaked sedge marsh.	
FS	M	73. Woolly sedge marsh.	<i>Big Marsh</i>
	*	74. Creeping spikerush meadow.	Sycan Marsh (TNC)
	*	75. Cusick or Nevada bluegrass meadow.	Sycan Marsh (TNC) Bluejay RNA
	*	76. Tufted hairgrass meadow, with lodgepole pine and sedge at margin.	Sycan Marsh (TNC)
FS	M	77. Geyer willow shrub swamp.	
FS	M	78. Bog birch shrub swamp.	
FS	M	79. Undergreen willow-mountain willow shrub swamp.	
FS	M	80. Booth willow-Geyer willow shrub swamp.	
FS	M	81. Bog blueberry shrub-swamp, with Engelmann spruce, lodgepole pine and tufted hairgrass.	
BLM, PVT	M	82. Silver sagebrush/Nebraska sedge-Cusick bluegrass playa.	Sycan Marsh (TNC)<
BLM, FS	H	83. Riparian dominated by white alder.	
BLM, PVT	H	84. Mountain alder-creek dogwood riparian.	

EAST CASCADES ECOLOGICAL CELLS (EC)

Agency	Priority	Cell Name	Present Representation
FS	H	85. Black cottonwood/mountain alder riparian.	
FS	H	86. Mountain alder-Douglas spiraea riparian.	
FS	H	87. Mountain alder-snowberry riparian.	
FS, PVT	M	88. Geyer willow-Lemmon willow riparian.	
FS	H	89. Booth willow-mountain willow riparian.	
FS, PVT	M	90. Booth willow-Lemmon willow riparian.	
BLM, PVT	M	91. Pacific willow-coyote willow riparian.	
FS	M	92. Geyer willow and Lemmon willow riparian.	
FS	H	93. Black cottonwood/widefruit sedge riparian.	
FS	M	94. Engelmann spruce/widefruit sedge swamp.	
FS	M	95. Lodgepole pine-quaking aspen/Douglas spiraea woodland.	Bluejay RNA<

East Cascades Ecosystem Process Cells

FS	U	96. Fire in Ponderosa pine zone with stand replacement, partial stand replacement and underburns.	
FS	U	97. Fire in lodgepole pine zone with stand replacement and partial stand replacement.	Pringle Falls RNA<
FS	U	98. Fire in mixed conifer zone with stand replacement, partial stand replacement and underburns.	
FS	U	99. Fire in grand fir zone with stand replacement and partial stand replacement.	
FS	U	100. Fire in western juniper zone with stand replacement and partial stand replacement.	
BLM, FS	U	101. Fire in sagebrush steppe/grassland zone with stand replacement and partial stand replacement.	

EAST CASCADES GEOLOGICAL CELLS (EC)

Agency	Priority	Cell Name	Present Representation
Holocene			
	M	1. Active Fault Plane	<i>Modoc Point</i>
	*	2. Ash-Dammed Marsh	Klamath Marsh NWR
FS	H	3. Metolius Springs	<i>Metolius Headwater Springs</i>
	*	4. Mazama Ash	Collier State Park
	*	5. Mima Mounds	Mayer State Park McCall Preserve at Rowena (TNC)
Pleistocene			
FS, PVT	M	6. Shevlin Park Tuff	<i>Bend</i>
	*	7. Tumalo Ash-Flow Tuff	Bull Flat ACEC
BLM, FS	M	8. Bend Air-Fall Pumice	<i>Bend</i>
FS	M	9. Desert Spring Tuff	
Pleistocene and Pliocene			
	*	10. Lava Butte Cinder Cone	Lave Butte SIA
	*	11. Newberry Shield Volcano	Newberry Crater NM
	*	12. Newberry Crater	Newberry Crater NM
	*	13. Newberry Lava Caves And Tubes	Newberry Crater NM
FS, BLM	H	14. Lava-Dammed Lake	<i>Sparks Lake</i>
	*	15. Hole-In-The-Ground Maar	Fort Rock State Park
Pliocene and Miocene			
FS	L	16. Yonna Formation	<i>Merrill</i>
	*	17. Deschutes Formation	Cove Palisades State Park
Miocene			
	*	18. Simtustus Formation	Cove Palisades State Park
FS	L	19. Palagonitic duff	<i>Devil's Garden</i>

EAST CASCADES SPECIAL SPECIES (EC)

Agency	List	Species Name	Present Representation
Invertebrates			
FS	1	1. <i>Amnicola</i> sp 5 – Klamath duskysnail	<i>Williamson River</i>
	*	2. <i>Amnicola</i> sp 7 - Mare's Egg duskysnail	Kimball State Park
FS	1	3. <i>Amnicola</i> sp 8 - Nodose duskysnail	<i>Ouxy Spring</i>
	*	4. <i>Deroceras hesperium</i> - Evening fieldslug	Sycan Marsh (TNC)
BLM	1	5. <i>Fluminicola</i> sp 11 - Nerite pebblesnail	
FS	1	6. <i>Fluminicola</i> sp 12 – Odessa pebblesnail	
FS	1	7. <i>Fluminicola</i> sp 13 - Ouxy Spring pebblesnail	<i>Ouxy Spring</i>
PVT	1	8. <i>Fluminicola</i> sp 14 - Tall pebblesnail	<i>Harriman Spring</i>
FS	1	9. <i>Fluminicola</i> sp 15 - Tiger lily pebblesnail	
BLM	1	10. <i>Fluminicola</i> sp 16 – Toothed pebblesnail	<i>Schoolhouse Meadow</i>
	*	11. <i>Fluminicola</i> sp 18 - Wood River pebblesnail	Kimball State Park Klamath State Fish Hatchery
BLM	1	12. <i>Fluminicola</i> sp 19 - Keene Creek pebblesnail	<i>Blue Jay Spring Run</i>
FS	1	13. <i>Fluminicola</i> sp 2 - Casebeer pebblesnail	
	*	14. <i>Fluminicola</i> sp 20 - Crooked Creek pebblesnail	Kimball State Park
BLM	1	15. <i>Fluminicola</i> sp 3 - Diminutive pebblesnail	
BLM	1	16. <i>Fluminicola</i> sp 4 - Fall Creek pebblesnail	<i>Schoolhouse Meadow</i>
	*	17. <i>Fluminicola</i> sp 5 - Klamath pebblesnail	Upper Klamath NWR
BLM	1	18. <i>Fluminicola</i> sp 6 - Klamath Rim pebblesnail	
BLM, PVT	1	19. <i>Fluminicola</i> sp 7 - Lake of the Woods pebblesnail	
BLM, PVT	1	20. <i>Fluminicola</i> sp 8 - Lost River pebblesnail	
FS	1	21. <i>Fluminicola modoci</i> - Modoc pebblesnail	
FS	1	22. <i>Fluminicola turbiniformis</i> - Turban pebblesnail	
FS, PVT	1	23. <i>Helisoma newberryi newberryi</i> - Great Basin ramshorn (snail)	
BLM	1	24. <i>Juga acutifilosa</i> - Scalloped juga (snail)	<i>Schoolhouse Meadows</i>
	*	25. <i>Lanx alta</i> - Highcap lanx (snail)	Collier State Park

EAST CASCADES SPECIAL SPECIES (EC)

Agency	List	Species Name	Present Representation
FS, PVT	1	26. <i>Lanx klamathensis</i> - Scale lanx (snail)	
	*	27. <i>Pisidium</i> sp 1 - Modoc peaclam	Upper Klamath NWR
FS, BLM	1	28. <i>Pisidium ultramontanum</i> - Montane peaclam	
	*	29. <i>Pyrgulopsis archimedis</i> - Archimedes springsnail	Upper Klamath NWR
BLM, PVT	1	30. <i>Pyrgulopsis</i> sp 7 - Lost River springsnail	
FWS, PVT	1	31. <i>Pyrgulopsis</i> sp 9 - Klamath Lake springsnail	
BLM	2	32. <i>Vespericola sierranus</i> - Siskiyou hesperian (snail)	
PVT	1	33. <i>Vorticifex effusus dalli</i> - Dall's ramshorn (snail)	Upper Klamath Lake
	*	34. <i>Vorticifex effusus diagonalis</i> - Lined ramshorn (snail)	Collier State Park Klamath State Fish Hatchery
FS, PVT	1	35. <i>Vorticifex klamathensis klamathensis</i> - Klamath ramshorn (snail)	
FS, PVT	1	36. <i>Vorticifex klamathensis sinitsini</i> - Sinitsin ramshorn (snail)	
Vertebrates			
	2	37. <i>Accipiter gentilis</i> - Northern goshawk	Sycan Marsh (TNC) Metolius RNA
	*	38. <i>Agelaius tricolor</i> - Tricolored blackbird	Lower Klamath NWR Upper Klamath NWR
BLM	2	39. <i>Antrozous pallidus pacificus</i> - Pacific pallid bat	
	*	40. <i>Athene cunicularia hypugaea</i> - Western burrowing owl	Upper Klamath NWR
	*	41. <i>Bartramia longicauda</i> - Upland sandpiper	Sycan Marsh (TNC)
	*	42. <i>Brachylagus idahoensis</i> - Pygmy rabbit	Slide Mountain SIA
	2	43. <i>Canis lupus</i> - Gray wolf	Extirpated
FS	1	44. <i>Catostomus microps</i> - Modoc sucker	
BLM, FS	2	45. <i>Catostomus occidentalis lacusanserinus</i> - Goose lake sucker	
	*	46. <i>Catostomus snyderi</i> - Klamath largescale sucker	Williamson River Delta (TNC)
BLM, FS	1	47. <i>Centrocercus urophasianus phaios</i> - Western greater sage-grouse	
	*	48. <i>Charadrius alexandrinus nivosus</i> - Western snowy plover	Lower Klamath NWR

EAST CASCADES SPECIAL SPECIES (EC)

Agency	List	Species Name	Present Representation
	*	49. <i>Chasmistes brevirostris</i> - Shortnose sucker	Williamson River Delta (TNC)
	*	50. <i>Clemmys marmorata marmorata</i> - Northwestern pond turtle	Klamath WMA
BLM, FS	2	51. <i>Corynorhinus townsendii pallescens</i> - Pale western big-eared bat	
	*	52. <i>Cottus tenuis</i> - Slender sculpin	Williamson River Delta (TNC)
	*	53. <i>Coturnicops noveboracensis</i> - Yellow rail	Sycan Marsh (TNC) Klamath Forest NWR
	*	54. <i>Deltistes luxatus</i> - Lost river sucker	Williamson River Delta (TNC) Upper Klamath NWR
	*	55. <i>Falco peregrinus anatum</i> - American peregrine falcon	Seneca Fouts State Natural Area Starvation Creek State Park
FS	1	56. <i>Gila bicolor oregonensis</i> - Oregon Lakes tui chub	
	*	57. <i>Gulo gulo luteus</i> - California wolverine	Three Sisters WA Mountain Lakes WA Crater Lake National Park
	*	58. <i>Haliaeetus leucocephalus</i> - Bald eagle	Mountain Lakes WA Bear Valley NWR Upper Klamath NWR
FS	2	69. <i>Histrionicus histrionicus</i> - Harlequin duck	
	*	60. <i>Ixobrychus exilis hesperis</i> - Western least bittern	Upper Klamath NWR
FS	1	61. <i>Lampetra minima</i> - Miller Lake lamprey	<i>Miller Lake</i>
BLM	1	62. <i>Lampetra tridentata</i> – Goose Lake lamprey	
BLM, FS	2	63. <i>Lavinia symmetricus mitrulus</i> - Pit roach	
FS	2	64. <i>Lynx canadensis</i> - Canada lynx	
	*	65. <i>Martes pennanti pacifica</i> - Pacific fisher	Diamond Peak WA Three Sisters WA Crater Lake National Park
BLM	2	66. <i>Myotis thysanodes</i> - Fringed bat	
FS	2	67. <i>Oncorhynchus mykiss gairdneri</i> - Inland Columbia basin redband trout	<i>White River WMA</i>
BLM	1	68. <i>Oncorhynchus mykiss</i> - Jenny creek redband trout	
FS	1	69. <i>Oncorhynchus mykiss</i> - Warner valley redband trout	

EAST CASCADES SPECIAL SPECIES (EC)

Agency	List	Species Name	Present Representation
FS	1	70. <i>Oncorhynchus mykiss</i> - Goose lake redband trout	
	*	71. <i>Pelecanus erythrorhynchos</i> - American white pelican	Upper Klamath NWR Klamath WMA
	*	72. <i>Podiceps auritus</i> - Horned grebe	Sycan Marsh (TNC)
	*	73. <i>Podiceps grisegena</i> - Red-necked grebe	Klamath Forest NWR Upper Klamath NWR
	*	74. <i>Progne subis</i> - Purple martin	Upper Klamath NWR Mayer State Park
	*	75. <i>Rana cascadae</i> - Cascades frog	Sky Lakes WA
FS	1	76. <i>Rana pretiosa</i> - Oregon spotted frog	
	*	77. <i>Salvelinus confluentus</i> - Bull trout, Klamath River population	Sycan Marsh (TNC) Gearhart Mountain WA Crater Lake National Park
FS	1	78. <i>Salvelinus confluentus</i> - Bull trout, Columbia River population	
FS	2	79. <i>Seiurus noveboracensis</i> - Northern waterthrush	
	*	80. <i>Strix occidentalis caurina</i> - Northern spotted owl	Badger Creek WA Mt. Jefferson WA Crater Lake National Park
DOD	1	81. <i>Tadarida brasiliensis</i> - Brazilian free-tailed bat	<i>Kingsley Field</i>
	*	82. <i>Taricha granulosa mazamae</i> - Crater lake newt	Crater Lake National Park
	1	83. <i>Tympanuchus phasianellus columbianus</i> - Columbian sharp-tailed grouse	Extirpated
	1	84. <i>Vulpes macrotis</i> - Kit fox	Extirpated
Plants			
	*	85. <i>Agoseris elata</i> - Tall agoseris	Mt. Hood WA Metolius Scenic Area
	*	86. <i>Arabis sparsiflora</i> var <i>atrorubens</i> - Sickie-pod rockcress	Mill Creek RNA
	*	87. <i>Arnica viscosa</i> - Shasta arnica	Diamond Peak WA Crater Lake National Park
FS	1	88. <i>Artemisia ludoviciana</i> ssp <i>estesii</i> - Estes' artemisia	<i>Meadow Campground</i>
FS	2	89. <i>Asplenium septentrionale</i> - Grass-fern	

EAST CASCADES SPECIAL SPECIES (EC)

Agency	List	Species Name	Present Representation
	*	90. <i>Astragalus applegatei</i> - Applegate's milk-vetch	Ewauna Flat (TNC) Klamath WMA
	*	91. <i>Astragalus hoodianus</i> - Hood river milk-vetch	Tom McCall (TNC) Mayer State Park
	*	92. <i>Astragalus tyghensis</i> - Tygh valley milk-vetch	White River State Park
	*	93. <i>Botrychium minganense</i> - Gray moonwort	Badger Creek WA
	*	94. <i>Botrychium montanum</i> - Mountain grapefern	Badger Creek WA
	*	95. <i>Botrychium pinnatum</i> - Pinnate grape-fern	Badger Creek WA
	*	96. <i>Botrychium pumicola</i> - Pumice grape-fern	Three Sisters WA Newberry Craters NM
	*	97. <i>Bryoerythrophyllum columbianum</i> - Moss	Tom McCall (TNC)
	*	98. <i>Calliergon trifarium</i> - Moss	Sycan Marsh (TNC) <i>Buck Lake Fen</i>
BLM	1	99. <i>Calochortus greenei</i> - Greene's mariposa lily	
	*	100. <i>Carex capitata</i> - Capitate sedge	Sycan Marsh (TNC)
FS	2	101. <i>Carex diandra</i> - Lesser panicled sedge	
	2	102. <i>Carex eleocharis</i> - Sedge	Extirpated
FS	2	103. <i>Carex integra</i> - Smooth beaked sedge	
FS	2	104. <i>Carex vernacula</i> - Native sedge	<i>Drakes Peak</i>
	*	105. <i>Castilleja chlorotica</i> - Green-tinged paintbrush	Gearhart Mountain WA
FS	2	106. <i>Castilleja thompsonii</i> - Thompson's paintbrush	
	2	107. <i>Cicuta bulbifera</i> - Bulb-bearing water-hemlock	Extirpated
	*	108. <i>Collomia mazama</i> - Mt. Mazama collomia	Crater Lake National Park
FS	2	109. <i>Delphinium nuttallii</i> - Upland larkspur	
BLM, FS	1	110. <i>Eriogonum prociduum</i> - Prostrate buckwheat	
FS	1	111. <i>Eriogonum umbellatum</i> var <i>glaberrimum</i> - Green buckwheat	
FS	1	112. <i>Galium serpticum</i> ssp <i>warnerense</i> - Warner mountain bedstraw	<i>Drakes Peak</i>
FS	2	113. <i>Gentiana newberryi</i> - Moss gentian	

EAST CASCADES SPECIAL SPECIES (EC)

Agency	List	Species Name	Present Representation
FS	1	114. <i>Iliamna bakeri</i> - Baker's globe-mallow	
FS	2	115. <i>Ivesia shockleyi</i> - Shockley's ivesia	<i>Drakes Peak</i>
BLM	1	116. <i>Limnanthes floccosa</i> ssp <i>bellingiana</i> - Bellinger's meadow-foam	
FS	2	117. <i>Lipocarpha occidentalis</i> - Western lipocarpha	
	2	118. <i>Lobelia dortmanna</i> - Water lobelia	Extirpated
BLM	1	119. <i>Lomatium suksdorfii</i> - Suksdorf's lomatium	
BLM, FS	2	120. <i>Lomatium watsonii</i> - Watson desert-parsley	
FS	2	121. <i>Lycopodiella inundata</i> - Northern bog clubmoss	
	*	122. <i>Meconella oregana</i> - White meconella	Tom McCall (TNC) Koberg Beach State Park Mayer State Park
PVT	1	123. <i>Mimulus evanescens</i> - Disappearing monkeyflower	<i>Drews Reservoir</i>
	*	124. <i>Mimulus tricolor</i> - Three-colored monkeyflower	Sycan Marsh (TNC)
	*	125. <i>Penstemon barrettiae</i> - Barrett's penstemon	Koberg Beach State Park
	*	126. <i>Penstemon glaucinus</i> - Blue-leaved penstemon	Yainax Butte ACEC Deadhorse Rim-Whitebark Pine RNA Slide Mountain SIA
	*	127. <i>Penstemon peckii</i> - Peck's penstemon	Metolius River (TNC)
FS	1	128. <i>Perideridia erythrorhiza</i> - Red-root yampah	
BLM	2	129. <i>Pilularia americana</i> - American pillwort	
FS	2	130. <i>Plagiobothrys salsus</i> - Desert allocarya	
	*	131. <i>Pleuropogon oregonus</i> - Oregon semaphore grass	Mud Creek Managed Area (TNC)
PVT	2	132. <i>Potamogeton diversifolius</i> - Rafinesque's pondweed	<i>McFall Reservoir</i>
	2	133. <i>Potamogeton foliosus</i> var <i>fibrillosus</i> - Fibrous pondweed	Extirpated
	*	134. <i>Ranunculus reconditus</i> - Dalles Mt. buttercup	Mill Creek Ridge ACEC
	*	135. <i>Rorippa columbiae</i> - Columbia cress	Sky Lakes WA
	2	136. <i>Salix bonplandiana</i> - Polished willow	Extirpated
FS	2	137. <i>Scheuchzeria palustris</i> ssp <i>americana</i> - Scheuchzeria	
FS	2	138. <i>Scirpus pendulus</i> - Drooping bulrush	<i>Mares Egg Spring</i>

EAST CASCADES SPECIAL SPECIES (EC)

Agency	List	Species Name	Present Representation
	*	139. <i>Scirpus subterminalis</i> - Water clubrush	Big Marsh PRNA
FS	2	140. <i>Splachnum ampullaceum</i> - Moss	<i>Buck Lake Fen</i>
	*	141. <i>Suksdorfia violacea</i> - Violet suksdorfia	Mayer State Park Memaloose State Park
BLM, FWS, OFW	2	142. <i>Thelypodium brachycarpum</i> - Short-podded thelypody	<i>Klamath WMA</i> <i>Lower Klamath NWR</i>
	2	143. <i>Thelypodium howellii</i> ssp <i>howellii</i> - Howell's thelypody	Possibly extirpated
FS	2	144. <i>Tritomaria exsectiformis</i> - Liverwort	
PVT	2	145. <i>Utricularia minor</i> - Lesser bladderwort	<i>Spencer Creek</i>

Chapter 11: Columbia Basin Ecoregion

The Oregon portion of the Columbia Basin Ecoregion is sometimes referred to as the Umatilla Plateau. It extends from the eastern slopes of the Cascades Mountains south and east from the Columbia River to the Blue Mountains. The region continues northward throughout most of eastern Washington, including a small portion of west central Idaho. The region includes the Columbia Basin proper, and the Palouse, which is recognized by many geographers as a separate region.

The Columbia River, with its historic floods and large deposits of loess (wind-borne silt and sand) from the end of the last ice age, has greatly influenced the region. Most of the Oregon portion of the ecoregion is a lava plateau broken by basalt canyons carved out by the Deschutes, John Day, and Umatilla rivers and other streams that flow into the Columbia. The climate is arid, with cold winters and hot summers. Most of the ecoregion receives less than 15 inches of precipitation per year (some areas as little as eight inches), much of that in the form of snow.

The majority of the ecoregion's natural vegetation is native bunchgrass prairie, often called palouse prairie because of the deep, loess soils and plentiful grass. The majority of the ecoregion in Washington was originally sagebrush steppe. Sandy deposits along the

Columbia River support open dunes, bitterbrush, sagebrush steppe and western juniper. A few species of ground-squirrel and plants (milkvetch species among others) adapted to these habitats. The rivers are characterized by riparian vegetation, with black cottonwood, willows, chokecherry and aspen dominating riverbanks. Less common are riparian areas dominated by black hawthorn and white alder.

Early travelers along the Oregon trail found vast natural grasslands broken by brushy draws and tree- and rimrock-bordered streams with numerous springs. Because of the deep loess soils, mild climate (due to low elevations) and the presence of adequate water (either from wells or from the Columbia, Snake and Umatilla rivers), much of this region provided model farmland. The human population is concentrated in the northeastern portion of the ecoregion, where Pendleton, Hermiston and other smaller communities serve as commercial centers for the agricultural economy.

The Columbia Basin Ecoregion is second only to the Willamette Valley in the percentage of landscape converted to non-native habitats and human uses. Protected areas and public lands are very limited in this region -- with the only vegetation types that have not declined dramatically found on lands that cannot be farmed: the steep canyon grasslands and scabland.

Figure 16. Represented and Unrepresented Cells in the Columbia Basin Ecoregion

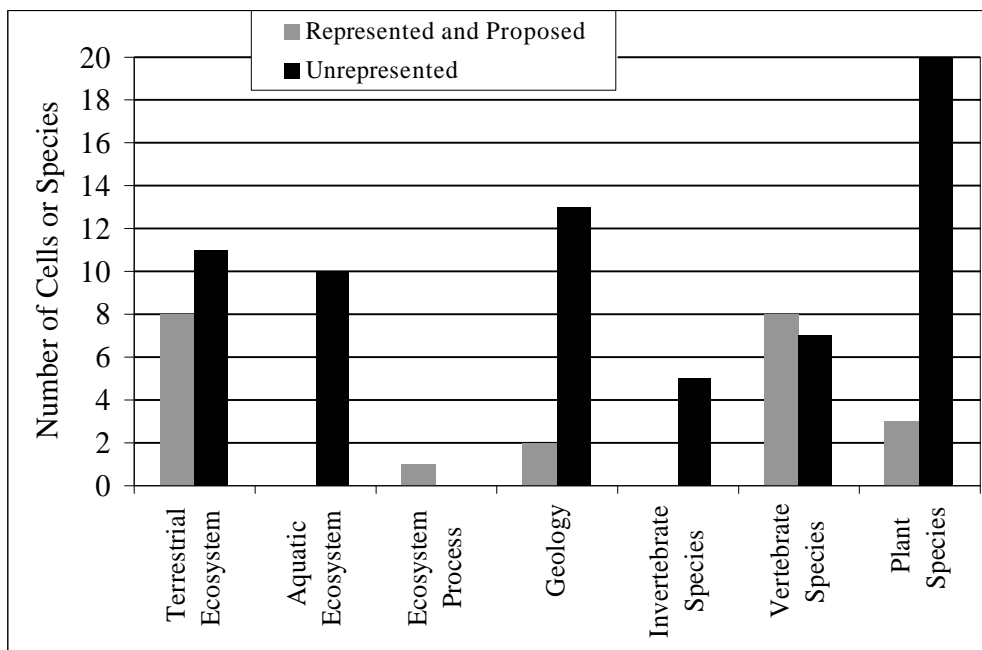
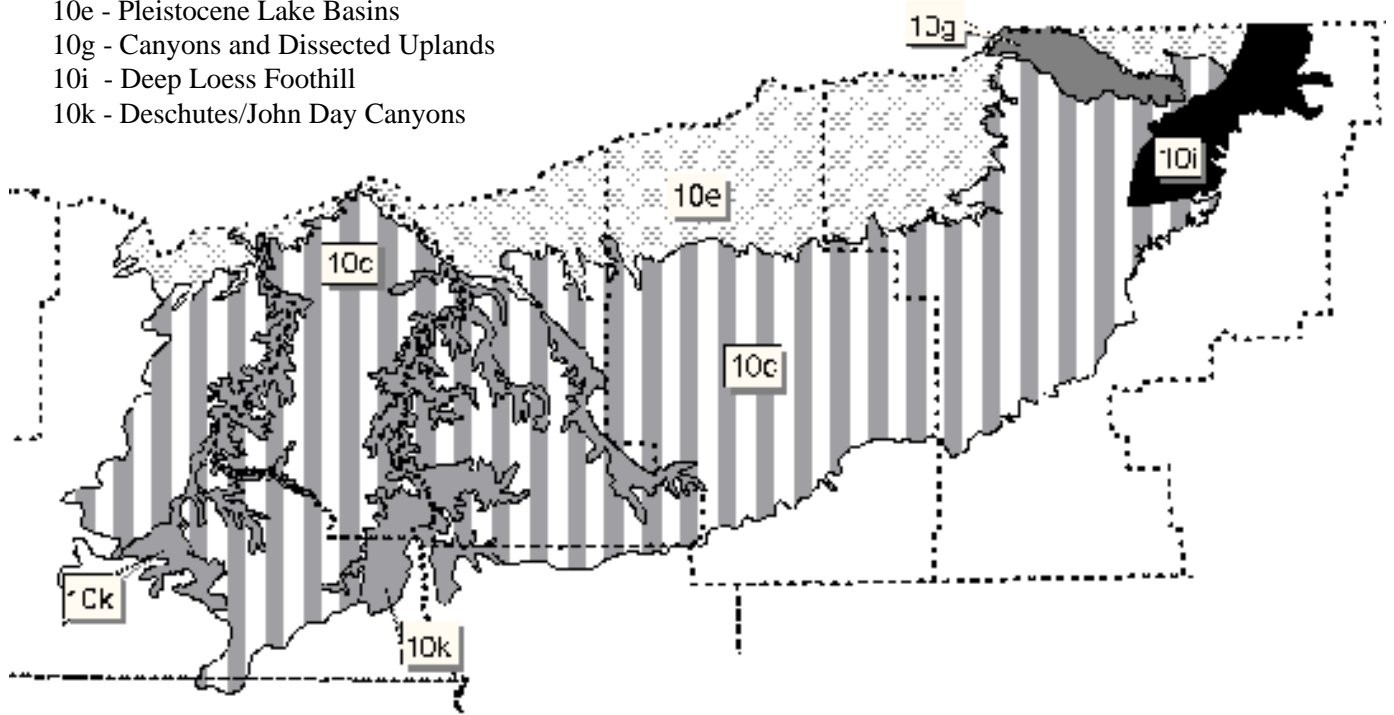


Figure 17. Map of Columbia Basin Ecoregion and Subregions (Thorson *et al.* 2003)

- 10c - Umatilla plateau
- 10e - Pleistocene Lake Basins
- 10g - Canyons and Dissected Uplands
- 10i - Deep Loess Foothill
- 10k - Deschutes/John Day Canyons



COLUMBIA BASIN ECOLOGICAL CELLS (CB)

Agency	Priority	Cell Name	Present Representation
Ponderosa Pine and Western Juniper			
BLM, FS	H	1. Ponderosa pine/hawthorn grassland mosaic.	
	+	2. Western juniper/big sagebrush/bunchgrass.	Boardman PRNA addition Boardman Grasslands (TNC)
Shrub Steppe			
BLM, PVT	H	3. Big sagebrush/Idaho fescue.	
BLM, PVT	H	4. Big sagebrush/needle-and-thread.	Lindsay Prairie (TNC)<
	*	5. Big sagebrush/bluebunch wheatgrass-Sandberg bluegrass.	Boardman RNA
	*	6. Rigid sagebrush/Sandberg bluegrass.	Lawrence Grassland (TNC)
	+	7. Bitterbrush/needle-and-thread.	Boardman Grasslands (TNC)
FWS, PVT	H	8. Big sagebrush-bitterbrush/bunchgrass.	
BLM, FS	M	9. Black hawthorn, snowberry, rose shrubland mosaic.	
	*	10. Unstabilized, inland sand dune series, from active open dunes through partially stabilized dunes (with bitterbrush, big sagebrush, rabbitbrush, and Indian ricegrass).	Boardman RNA Boardman Grasslands (TNC)
Grasslands			
	*	11. Sandy grasslands (Needle-and-thread-Sandberg bluegrass, downy wheatgrass-needle-and-thread).	Boardman RNA Boardman Grasslands (TNC)
	*	12. Bluebunch wheatgrass-Needle-and-thread-Sandberg bluegrass palouse.	Boardman RNA Lindsay Prairie (TNC)
BLM, PVT	H	13. Idaho fescue-bluebunch wheatgrass.	
PVT	H	14. Idaho fescue-junegrass.	
BLM, PVT	L	15. Sandberg bluegrass-serrate balsamroot scabland.	
BLM, PVT	L	16. Buckwheat-Sandberg bluegrass scabland.	
BLM, PVT	H	17. Bunchgrass mounds/grassland scabland complex.	
	*	18. Bunchgrass mounds/rigid sagebrush scabland complex.	Lawrence Grassland (TNC)
BLM, PVT	H	19. Great Basin wildrye.	
Lacustrine			
BLM, PVT	U	20. Permanent Pond.	

COLUMBIA BASIN ECOLOGICAL CELLS (CB)

Agency	Priority	Cell Name	Present Representation
Palustrine			
BLM, PVT	H	21. Bare playas with annual forbs and grasses including mousetail and annual foxtail.	
BLM, PVT	H	22. Greasewood flats with Great Basin wildrye.	
BLM, OFW, PVT	H	23. Riparian dominated by peachleaf willow, coyote willow, or Pacific willow.	
BLM, PVT	H	24. Riparian dominated by white alder.	
BLM	H	25. Riparian dominated by black hawthorn.	
BLM	H	26. Riparian dominated by western birch, with quaking aspen if possible.	
BLM, PVT	M	27. Black cottonwood/creek dogwood or rose riparian.	
BLM, PVT	M	28. Black cottonwood/snowberry riparian.	
PVT	M	29. Black cottonwood/black hawthorn riparian..	

Columbia Basin Ecosystem Process Cells

*	30. Fire in sagebrush steppe or grassland zone, with some stand replacement or partial stand replacement.	Boardman RNA
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COLUMBIA BASIN GEOLOGICAL CELLS (CB)

Agency	Priority	Cell Name	Present Representation
Holocene			
ACE, BLM	H.	1. Eolian Dunes	Boardman Grasslands (TNC)< <i>Boardman Naval Training Center</i>
PVT	H.	2. Mima Mounds	<i>Eight Mile Mounds</i>
Pleistocene			
DOD, FWS	H	3. Flood Bar	<i>Umatilla Weapons Depot</i>
	*	4. Flood Scour	Hat Rock State Park
ACE, BLM	H	5. Bar and Crescentric Dunes	<i>Petersburg</i>
PVT	M	6. Scabland Topography	<i>Blalock</i>
ACE, PVT	M	7. Rhythmites (Missoula floods)	<i>Arlington</i>
BLM, PVT	M	8. Mt. St. Helens Tephra	<i>Arlington</i>
Pliocene and Miocene			
PVT	L	9. Chenoweth Formation	<i>Chenoweth Creek</i>
BLM, FS	L	10. Tygh Valley Formation	<i>Tygh Valley</i>
PVT	M	11. Alkali Canyon Formation	<i>Alkali Canyon</i>
PVT	L	12. McKay Formation	<i>McKay Reservoir</i>
Miocene			
	*	13. Saddle Mountains Basalt	Hat Rock State Park
PVT	L	14. Wanapum Basalt Formation	<i>Umatilla River/Pendelton</i>
BLM, FS	L	15. Grande Ronde basalt Formation	<i>Umatilla River/Pendelton</i>

COLUMBIA BASIN SPECIAL SPECIES (CB)

Agency	List	Species Name	Present Representation
Invertebrates			
ACE	2	1. <i>Fisherola nuttalli</i> – Shortface lanx, giant Columbia river limpet	<i>Columbia River</i>
ACE	1	2. <i>Juga bulbosa</i> – Bulb juga (snail)	<i>Columbia River</i> <i>Deschutes River</i>
ACE, BLM	1	3. <i>Juga hemphilli maupinensis</i> – Purple-lipped juga (snail)	<i>Deschutes River</i>
ACE	1	4. <i>Monadenia fidelis minor</i> – Oregon snail (Dalles sideband)	<i>Columbia River</i>
BLM	1	5. <i>Oreohelix variabilis variabilis</i> – Dalles mountainsnail	<i>Columbia River</i>
Vertebrates			
	*	6. <i>Agelaius tricolor</i> – Tricolored blackbird	Umatilla NWR
	*	7. <i>Ammodramus savannarum</i> – Grasshopper sparrow	Boardman RNA Boardman Grasslands (TNC)
	*	8. <i>Amphispiza bilineata</i> – Black throated sparrow	Boardman RNA Boardman Grasslands (TNC)
	*	9. <i>Athene cunicularia hypugaea</i> – Western burrowing owl	Boardman RNA Boardman Grasslands (TNC)
BLM	2	10. <i>Bufo woodhousii</i> – Woadhouse's toad	
	*	11. <i>Buteo regalis</i> – Ferruginous hawk	Boardman RNA Boardman Grasslands (TNC)
	*	12. <i>Chrysemys picta</i> – Painted turtle	Umatilla NWR
	2	13. <i>Falco peregrinus anatum</i> – American peregrine falcon	Extirpated
ACE	2	14. <i>Lampetra tridentate</i> – Pacific lamprey	<i>Columbia River</i>
BLM	1	15. <i>Oncorhynchus mykiss</i> – steelhead, Middle Columbia River ESU	<i>Deschutes River</i> <i>John Day River</i>
BLM	2	16. <i>Oncorhynchus mykiss gairdneri</i> – Inland Columbia basin redband trout	
	*	17. <i>Pelecanus erythrorhynchos</i> – American white pelican	Umatilla NWR
BLM	1	18. <i>Salvelinus confluentus</i> – Bull trout, Columbia River pops	<i>Deschutes River</i>
	*	19. <i>Spermophilus washingtoni</i> – Washington ground squirrel	Boardman RNA Boardman Grasslands (TNC)
	1	20. <i>Tympanuchus phasianellus columbianus</i> – Columbian sharp-tailed grouse	Extirpated

COLUMBIA BASIN SPECIAL SPECIES (CB)

Agency	List	Species Name	Present Representation
Plants			
	*	21. <i>Achnatherum hendersonii</i> – Henderson ricegrass	Lawrence Grasslands (TNC)
	*	22. <i>Aloina bifrons</i> – Moss	Boardman RNA Boardman Grasslands (TNC)
	2	23. <i>Allium robinsonii</i> – Robinson’s onion	Extirpated
	1	24. <i>Arenaria franklinii</i> var <i>thompsonii</i> – Thompson’s sandwort	Extirpated
	1	25. <i>Artemisia campestris</i> var <i>wormskioldii</i> – Northern wormwood	Extirpated
DOT, PVT	1	26. <i>Astragalus collinus</i> var <i>laurentii</i> – Laurence’s milk-vetch	
	1	27. <i>Astragalus kentrophyta</i> var <i>douglasii</i> – Douglas’ milk-vetch	Extinct
BLM, PVT	1	28. <i>Astragalus tyghensis</i> – Tygh Valley milk-vetch	
PVT	2	29. <i>Balsamorhiza rosea</i> – Rosy balsamroot	
	*	30. <i>Bryoerythrophyllum columbianum</i> – Moss	Boardman RNA Boardman Grasslands (TNC)
BLM, PVT	2	31. <i>Carex hystericina</i> – Porcupine sedge	
	2	32. <i>Carex retrorsa</i> – Retorse sedge	Extirpated
BLM, PVT	2	33. <i>Coryphantha vivipara</i> var <i>vivipara</i> – Cushion coryphantha	
	2	34. <i>Cryptantha leucophaea</i> – Gray cryptantha	Extirpated
BLM, PVT	2	35. <i>Lomatium farinosum</i> var <i>hambleniae</i> – Hamblen’s lomatium	
	2	36. <i>Lomatium salmoniflorum</i> – Salmon-flowered lomatium	Extirpated
	2	37. <i>Lomatium watsonii</i> – Watson desert-parsley	Extirpated
	2	38. <i>Lupinus sericeus</i> var <i>egglestonianus</i> – Silky lupine	Extirpated
	1	39. <i>Mimulus evanescens</i> – Disappearing monkeyflower	Extirpated
ACE, BLM	1	40. <i>Mimulus jungermannioides</i> – Hepatic monkeyflower	<i>Mouth of John Day River</i>
BLM, PVT	1	41. <i>Myosurus sessilis</i> – Sessile mousetail	<i>Shutler Playas</i>
ACE	1	42. <i>Rorippa columbiae</i> – Columbia cress	<i>Columbia River</i>
BLM, PVT	2	43. <i>Talinum spinescens</i> – Spiny flame-flower	

Chapter 12: Blue Mountains Ecoregion

The Blue Mountains Ecoregion occupies nearly all of northeastern Oregon and extends into small portions of southern Washington and western Idaho. It encompasses three major mountain ranges—the Ochoco, Blue and Wallowa mountains. It also includes the High Lava Plains, an ecoregion recognized in past versions of this plan, which occupies most of the non-forested lands at the western edge of the region.

Landscapes include deep, rocky-walled canyons, glacially-cut gorges, dissected plateaus, broad alluvial river valleys, and numerous mountain lakes, forests and meadows. Due to sharp elevational differences, the climate varies over broad temperature and precipitation ranges. Overall, the ecoregion is characterized by short, dry summers and long, cold winters.

The flora is intermediate between the east Cascades and the western Rocky Mountains of Idaho and Montana. Species composition changes with altitude and longitude. Western juniper dominates the western portion of the region, sagebrush and grassland steppes dominate the entire eastern length of the region, ponderosa pine woodlands are characteristic at mid-elevations and mixed coniferous forests dominate at higher altitudes. Extensive grasslands occur in and north of the Wallowa Mountains and sagebrush steppe is prevalent in the southeastern and southwestern parts.

The region is thinly populated, with small towns in the major valleys. Timber, ranching, agriculture and tourism provide the foundations for the local economy in most areas. However, rapid population growth and increasing recreation around Bend have increased development pressures dramatically in the juniper woodlands and sagebrush steppes of this area.

Before European settlement, ponderosa pine savannas, basin big sagebrush steppe, native grasslands and riparian woodlands were widespread in this region. Today, many bottomland habitats have been replaced by irrigated alfalfa, juniper has expanded into many former shrub-steppe vegetation types, and ponderosa pine savannas have been cut or are being invaded by Douglas fir and grand fir.

The diversity in elevation, soils and climate yields diverse habitats and many endemic plant species. The Wallowa Mountains alone have more than 10 plant species found nowhere else. Bighorn sheep, elk and large mammal populations here are among the largest in the state. The variety in habitats, including low, mid and high elevation grasslands, shrublands and forests results in this ecoregion having more habitat diversity than all but the Klamath Mountains Ecoregion. As a result, there are a correspondingly high number of ecosystem cells which follow.

Figure 18. Represented and Unrepresented Cells in the Blue Mountains Ecoregion

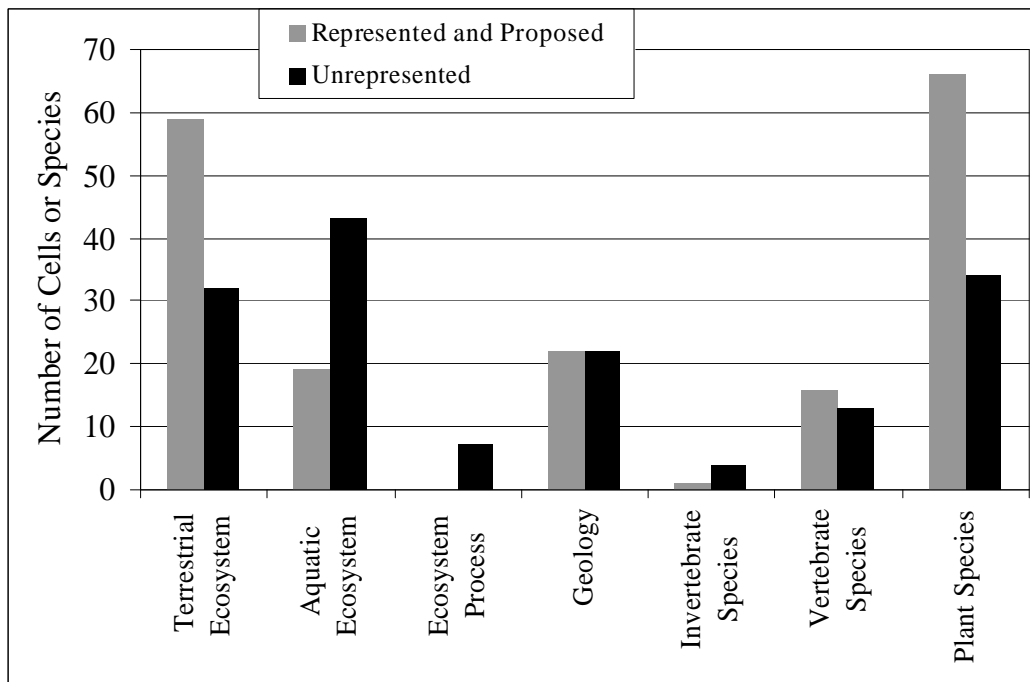
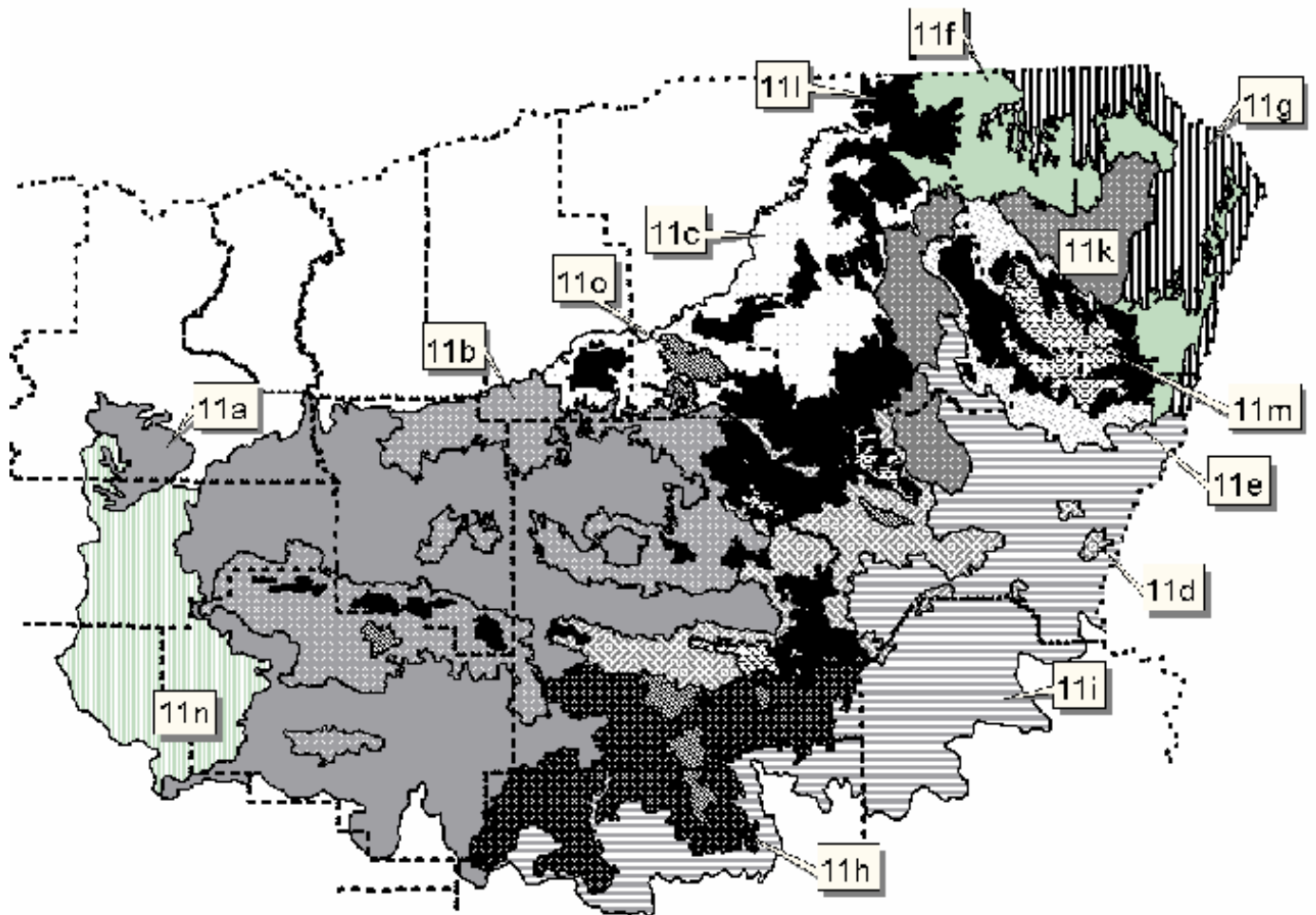


Figure 19. Map of Blue Mountains Ecoregion and Subregions (Thorson *et al.* 2003)



- 11a - John Day / Clarno Uplands
- 11b - John Day / Clarno Highlands
- 11c - Maritime-Influenced Zone
- 11d - Melange
- 11e - Wallowas / Seven Devils Mountains
- 11f - Canyons and Dissected Highlands
- 11g - Canyons and Dissected Uplands
- 11h - Continental Zone Highlands
- 11i - Continental Zone Foothills
- 11k - Blue Mountains Basins
- 11l - Mesic Forest Zone
- 11m - Subalpine Zone
- 11n - Deschutes River Valley
- 11o - Cold Basins

BLUE MOUNTAINS ECOLOGICAL CELLS (BM)

Agency	Priority	Cell Name	Present Representation
Western Juniper			
	+	1. Western juniper/low sagebrush/bunchgrass.	Shaketable PRNA
BLM, FS	L	2. Western juniper/stiff sagebrush.	<i>Magpie Table</i>
BLM, FS	M	3. Western juniper/mountain shrub (bitterbrush, mountain snowberry, serviceberry or squawapple).	<i>Magpie Table</i>
	*	4. Western juniper/mountain mahogany.	Baldy Mountain PRNA Canyon Creek RNA
	*	5. Western juniper/big sagebrush/threadleaf sedge.	Horse Ridge RNA
	*	6. Western juniper/big sagebrush/bluebunch wheatgrass.	Sheep Rock RNA Powell Buttes RNA
	*	7. Western juniper/big sagebrush/Idaho fescue.	Haystack Butte PRNA Powell Buttes RNA
	*	8. Western juniper/big sagebrush-bitterbrush/ bluebunch wheatgrass & Idaho fescue vegetation.	The Island RNA Dry Mountain RNA
	*	9. Western juniper/big sagebrush-bitterbrush/ needle-and-thread.	Badlands ACEC
	*	10. Western juniper/bluebunch wheatgrass.	Sheep Rock RNA Powell Buttes RNA
	*	11. Western juniper/Thurber needlegrass on ash.	Sheep Rock RNA <i>Crooked River Ash Beds</i>
	*	12. Western juniper/Idaho fescue.	Benjamin Pasture RNA
Ponderosa Pine			
BLM, FS	M	13. Ponderosa pine-western juniper/big sagebrush-bitterbrush vegetation mosaic.	
FS, PVT	H	14. Ponderosa pine/bluebunch wheatgrass.	
FS	H	15. Ponderosa pine/Idaho fescue.	<i>Garrett Basin</i>
	+	16. Ponderosa pine/pinegrass with elk sedge if possible.	Dugout Creek PRNA
	+	17. Ponderosa pine/bitterbrush/Ross sedge with elk sedge if possible.	Silver Creek PRNA
FS	M	18. Ponderosa pine/mountain snowberry.	<i>Soldier Creek</i>
	*	19. Ponderosa pine/mountain mahogany communities with elk sedge & bunchgrasses if possible.	Dry Mountain RNA Stinger Creek PRNA
FS	H	20. Ponderosa pine/common snowberry floodplain.	

BLUE MOUNTAINS ECOLOGICAL CELLS (BM)

Agency	Priority	Cell Name	Present Representation
Douglas Fir			
	*	21. Douglas fir/pinegrass.	Canyon Creek RNA Ochoco Divide RNA Stinger Creek PRNA
	+	22. Douglas fir/elk sedge.	Gerald S. Strickler RNA
	+	23. Douglas fir/common snowberry, including riparian type if possible.	Mill Creek PRNA
FS	M	24. Douglas fir/mountain snowberry.	<i>Eagle Cap WA</i>
	+	25. Douglas fir/mallow ninebark.	Pleasant Valley PRNA <i>Moore Flat</i>
FS	M	26. Douglas fir/Rocky Mountain maple-mallow ninebark bottomland.	
FS	M	27. Douglas fir/oceanspray.	
Grand Fir			
		28. Grand fir/beadlily.	
	+	29. Grand fir/swordfern-wild ginger with grand fir/oakfern if possible.	Mill Creek PRNA
FS	M	30. Grand fir/ladyfern.	
	+	31. Grand fir/twinflower forest.	Elk Flats-Wenaha PRNA
	+	32. Grand fir/pinegrass forest.	Dugout Creek PRNA Canyon Creek RNA
FS	H	33. Grand fir/Columbia brome forest.	
	+	34. Grand fir/big huckleberry forest.	Duck Lake PRNA Elk Flats-Wenaha PRNA
FS	L	35. Grand fir/grouse huckleberry	
FS	M	36. Grand fir/birchleaf spiraea.	Canyon Creek RNA<
	+	37. Grand fir/Pacific yew communities.	Elk Flats-Wenaha PRNA
	*	38. Grand fir/common snowberry with grand fir/douglas maple if possible.	Wenaha-Tucannon WA
	*	39. Grand fir/ninebark with grand fir/douglas maple if possible.	Wenaha-Tucannon WA

BLUE MOUNTAINS ECOLOGICAL CELLS (BM)

Agency	Priority	Cell Name	Present Representation
Subalpine Fir			
	+	40. Subalpine fir/big huckleberry forest.	Point Prominence PRNA
	*	41. Subalpine fir/grouse huckleberry.	Indian Creek RNA
FS	L	42. Subalpine fir/elk sedge.	
	*	43. Subalpine fir-Engelmann spruce/beadlily.	Eagle Cap WA
FS	L	44. Subalpine fir-Engelmann spruce/Labrador tea/mixed sedge.	<i>N. Minam Meadows</i>
	*	45. Subalpine fir/arrowleaf groundsel or Engelmann spruce/arrowleaf groundsel.	Eagle Cap WA
FS	M	46. Subalpine fir/ladyfern or Engelmann spruce/ladyfern.	
FS	M	47. Subalpine fir/bog blueberry/Holms sedge wetland.	<i>Elkhorn Mountains</i>
	*	48. Subalpine fir/Labrador tea/Holms sedge.	Eagle Cap WA
	+	49. Subalpine fir-whitebark pine.	Strawberry Mountain PRNA McCully-East Peak PRNA
	*	50. Mountain hemlock/grouse huckleberry forest.	Indian Creek RNA
	*	51. Limber pine forest or woodland.	Slickrock Creek - Eagle Cap WA Marble Mountain – Eagle Cap WA
Lodgepole Pine			
	*	52. Lodgepole pine/grouse huckleberry/pinegrass.	Indian Creek RNA
	+	53. Lodgepole pine/big huckleberry.	Elk Flats-Wenaha PRNA
FS	M	54. Lodgepole pine montane valley wetland with aquatic sedge, bluejoint reedgrass and tufted hairgrass if possible.	
FS	M	55. Lodgepole pine-quaking aspen/Douglas spiraea/forb.	
Shrubland Communities			
	*	56. Big sagebrush/Idaho fescue.	Silver Creek PRNA Sheep Rock RNA
	*	57. Big sagebrush/bluebunch wheatgrass.	Dry Mountain RNA Sheep Rock RNA
BLM, DSL	H	58. Big sagebrush/needle-and-thread community.	
BLM, PRD	H	59. Big sagebrush/needlegrass community.	
BLM, DSL	H	60. Big sagebrush/Thurber needlegrass community.	

BLUE MOUNTAINS ECOLOGICAL CELLS (BM)

Agency	Priority	Cell Name	Present Representation
	+	61. Low sagebrush/Idaho fescue.	Shaketable PRNA
BLM	L	62. Low sagebrush/bluebunch wheatgrass.	<i>Sutton Mountain</i>
BLM, FS	L	63. Low sagebrush/Sandberg bluegrass.	
	+	64. Rigid sagebrush/Sandberg bluegrass scabland.	Kelly Creek Butte PRNA Gerald S. Strickler RNA Shaketable PRNA
	+	65. Hells Canyon shrublands, including netleaf hackberry/ bunchgrass, mockorange-poison ivy terraces and toeslopes and spiny greenbush/bluebunch wheatgrass..	Pleasant Valley PRNA
	+	66. Mountain big sagebrush/Idaho fescue.	Vinegar Hill PRNA
FS	M	67. Mountain big sagebrush/Cusick's bluegrass, with bluegrass openings if possible.	
	+	68. Smooth sumac/bluebunch wheatgrass.	Bob Creek PRNA
	+	69. Bitterbrush/bunchgrass.	Shaketable PRNA
	+	70. Mountain mahogany/bunchgrass.	Pleasant Valley PRNA Dry Mountain RNA
BLM, PVT	H	71. Valley margin or bottomland shrubland/grassland with big sagebrush, threetip sagebrush, and bunchgrasses.	
BLM, PVT	L	72. Bitterbrush biscuit scabland.	<i>Warm Springs</i>
Forb and Grasslands			
	+	73. Buckwheat-Sandberg bluegrass complex.	Pleasant Valley PRNA
	+	74. Buckwheat-bluebunch wheatgrass complex.	Lake Fork PRNA
	*	75. Bluebunch wheatgrass-Idaho fescue-silky lupine.	Zumwalt Prairie (TNC)
	+	76. Bluebunch wheatgrass-Idaho fescue-arrowleaf balsamroot.	Haystack Butte PRNA Horsepasture Ridge PRNA
	*	77. Bluebunch wheatgrass-Sandberg bluegrass, Balsamroot canyon grassland.	Sheep Rock RNA
	+	78. Biscuit scabland grasslands.	Vance Knoll RNA
	*	79. Sandberg bluegrass-onespike oatgrass.	Vance Knoll PRNA Clear Lake Ridge (TNC)
	+	80. Snake River grassland canyon mosaic including: sand dropseed, red threeawn, Sandberg bluegrass, prickly pear cactus and bluebunch wheatgrass if possible.	Pleasant Valley PRNA

BLUE MOUNTAINS ECOLOGICAL CELLS (BM)

Agency	Priority	Cell Name	Present Representation
	*	81. Idaho fescue-junegrass high elevation and ridgetop communities.	Clear Lake Ridge (TNC)
	+	82. Low elevation, Idaho fescue-junegrass.	Basin Creek PRNA
FS	M	83. Maidenhair fern cobble/boulder bank.	
	*	84. Annual forb communities on exposed ash beds.	Painted Hills - John Day Fossil Beds NM
Subalpine and Alpine			
	+	85. High elevation Idaho fescue grasslands.	Baldy Mountain PRNA
FS	M	86. Green fescue-spurred lupine with Parry rush and Hood sedge if possible.	Standley PRNA Tenderfoot Basin PRNA Nebo Lookout Ridge PRNA
BLM, FS	L	87. Rocky Mountain juniper shrubland.	<i>Hurricane Creek-Eagle Cap WA</i>
	+	88. Red mountain-heather communities.	Razz Lake PRNA
	+	89. Alpine vegetation mosaic, including fellfields, heaths, and tundra.	Mt. Joseph PRNA Eagle Cap WA
	+	90. Alpine sedge communities.	Dixie Butte PRNA
	+	91. Serpentine vegetation types.	Baldy Mountain PRNA
Lacustrine			
BLM	U	92. Low-elevation alkaline lake.	
BLM, PVT	U	93. Freshwater lake with aquatic beds and marshy shore.	
	+	94. Mid to high elevation lake, with aquatic beds and marshy shore.	Razz Lake PRNA
	+	95. Mid elevation pond, with aquatic beds and marshy shore.	Elk Flats-Wenaha PRNA
BLM, PVT	U	96. Vernal pond on loess or alluvium.	
BLM, PVT	U	97. Pond with aquatic beds and marshy shore.	
OFW, PVT	M	98. Low elevation vernal pond with saltgrass and cordgrass.	Ladd Marsh PNHCA<
	+	99. Subalpine pond, with aquatic beds and marshy shore including pondweeds and water lily if possible.	Craig Mountain Lake PRNA
	*	100. Mid to high elevation vernal pond.	Indian Creek RNA
	+	101. Alpine pond with quilworts if possible.	Razz Lake PRNA

BLUE MOUNTAINS ECOLOGICAL CELLS (BM)

Agency	Priority	Cell Name	Present Representation
Palustrine			
	+	102. Alpine laurel/black sedge and black sedge communities at high elevation.	Craig Mountain Lake PRNA
	*	103. Vernal seepage slopes on tabular basalt, with Cusick camas and California oatgrass.	Hells Canyon WA
FS	M	104. Shrubby cinquefoil/tufted hairgrass.	
	*	105. Seeps on avalanche slopes, with bluebells and nettle	<i>Eagle Cap WA</i>
	*	106. Sitka alder with ladyfern, and mesic forbs if possible.	<i>Eagle Cap WA</i>
OFW, PVT	U	107. Hot springs.	
	+	108. Bulrush-cattail marsh, with aquatic beds.	Ladd Marsh PNHCA
	*	109. Spring fen on seepage slope (including marsh marigold, cowparsnip, shooting-star, bistort, tall larkspur, arrowleaf groundsel and false hellebore).	Eagle Cap WA
	+	110. Subalpine sphagnum mire, with floating mat and buckbean.	Duck Lake PRNA
	*	111. Subalpine sedge fen, with black and Holm sedge.	Eagle Cap WA
FS, PVT	M	112. Small-fruited bullrush wetland.	
FS, PVT	M	113. Nebraska sedge meadow.	
FS, PVT	H	114. Cusick bluegrass meadow.	
FS	M	115. Devil's club/mixed forb seeps.	<i>Sheep Creek</i>
	+	116. Tufted hairgrass meadow.	Cougar Meadow PRNA Elk Flats-Wenaha PRNA
FS, PVT	M	117. Geyer willow shrub swamp.	
FS	M	118. Undergreen willow-mountain willow shrub swamp on organic soils.	
FS	M	119. Booth willow-Geyer willow shrub swamp on organic soils.	
FS	L	120. Prairie sage levee.	<i>Eagle Cap WA</i>
BLM, OFW, H PVT		121. Alkali playa and wetlands, including creeping wildrye, spikerush, Baltic rush, Nevada bulrush, alkali bluegrass and Lemmon alkaligrass.	
BLM, PVT	M	122. Sedge and rush fen, with grass meadows.	

BLUE MOUNTAINS ECOLOGICAL CELLS (BM)

Agency	Priority	Cell Name	Present Representation
BLM, OFW, L PVT		123. Bulrush-cattail marsh with aquatic beds.	
BLM, PVT	H	124. Great Basin wildrye bottomland.	
BLM, PVT	M	125. Silver sagebrush/bunchgrass playa.	
BLM, PVT	M	126. Greasewood/saltgrass with greasewood/basin wildrye if possible.	
Riparian			
BLM, PVT	H	127. Low elevation riparian dominated by coyote willow, Pacific willow, or arroyo willow.	
BLM, FS	H	128. Red-osier dogwood-mockorange riparian.	
	+	129. Quaking aspen/bluejoint reedgrass forest.	Cougar Meadow PRNA
FS	M	130. Quaking aspen/aquatic sedge wetland woodland.	
FS	M	131. Quaking aspen/wooly sedge woodland with wooly sedge meadows if possible.	
FS	M	132. Quaking aspen/common snowberry forest.	
FS	H	133. Mid elevation riparian forest, dominated by birch, mountain alder and mixed conifers.	S. Fork Walla-Walla River ACEC< N. Fork Crooked River ACEC<
	+	134. Western birch-mixed shrub riparian.	Pleasant Valley PRNA
	*	135. Mountain alder-creek dogwood riparian.	Forest Creeks RNA
FS	M	136. Mountain alder/common horsetail riparian with ladyfern or tall mannagrass if possible.	
FS, PVT	M	137. Quaking aspen/mountain alder-snowberry.	
FS, PVT	M	138. Mountain alder-snowberry riparian.	
	*	139. Mountain alder-black hawthorn riparian.	Keating Riparian RNA
FS, PVT	M	140. Tall willow (Booth, Geyer, Lemmon, Bebb, or Missouri willow)/bladder sedge.	
FS, PVT	M	141. Tall willow willow/aquatic sedge.	
FS, PVT	M	142. Tall willow/wooly sedge.	
BLM, FS	M	143. Missouri willow-coyote willow riparian.	
BLM, FS	M	144. White alder/creek dogwood, snowberry or rose.	
BLM, FS	H	145. White alder/mockorange.	

BLUE MOUNTAINS ECOLOGICAL CELLS (BM)

Agency	Priority	Cell Name	Present Representation
FS	H	146. White alder-black cottonwood riparian.	
FS	M	147. Black cottonwood/mountain alder-red-osier dogwood.	
BLM, FS, PVT	M	148. Black cottonwood/common snowberry.	
FS, PVT	M	149. Black cottonwood/red-osier dogwood.	
FS, PVT	M	150. Black cottonwood/Pacific willow, with coyote willow if possible.	
	*	151. Black cottonwood/black hawthorn	Joseph Canyon ACEC
FS, PVT	M	152. Black cottonwood/snowberry.	
FS	M	153. Quaking aspen-lodgepole pine/Douglas spiraea forb.	

Blue Mountains Ecosystem Process Cells

FS	U	154. Fire, including underburns and partial and total stand replacement in the Ponderosa pine zone.	
FS	U	155. Fire, including recent underburns, partial and total stand replacement burns in Douglas fir zone.	<i>Eagle Cap WA</i>
FS	U	156. Partial and total stand replacement burns in grand fir zone.	
FS	U	157. Partial and total stand replacement burns in the subalpine fir zone.	<i>Eagle Cap WA</i>
BLM, FS	U	158. Fire in grassland zone.	
BLM	U	159. Fire in western juniper zone containing areas of total and partial stand replacement and some underburns.	
BLM	U	160. Fire in sagebrush steppe zone, including stand replacement and partial stand replacement.	

BLUE MOUNTAINS GEOLOGICAL CELLS (BM)

Agency	Priority	Cell Name	Present Representation
Holocene			
BLM	M	1. Landslides	<i>Hole-in-the-Wall Slide</i> <i>Powder and Snake River confluence</i>
BLM, PVT	M	2. Alder Springs	<i>Deschutes Canyon</i> <i>Deschutes Formation Intersection</i>
	*	3. Deschutes Canyon	Cove Palisades State Park
	*	4. Hells Canyon Gorge	Hells Canyon NRA – WA
Pleistocene			
PVT	H	5. Glacial moraines	<i>Wallowa Lake</i>
	*	6. Glacial features – Horns, Cirques, Arêtes...	Matterhorn Mountain
	M	7. Entrenched meander	<i>Grande Ronde River/Perry</i>
Miocene			
	*	8. Mascall Formation	Picture Gorge RNA
	*	9. Picture Gorge Basalt	Picture Gorge RNA
	*	10. Grande Ronde Basalt	Hells Canyon WA
	*	11. Imnaha Basalt	Imnaha Canyon - Hells Canyon WA
Oligocene			
	*	12. John Day Formation	Sheep Rocks Unit - John Day Fossil Bed NM
Eocene			
	*	13. Clarno Formation	Clarno Unit-John Day Fossil Beds NM
Cretaceous			
	*	14. Gable Creek Formation	Painted Hills Unit - John Day Fossil Beds NM
	L	15. Hudspeth Shale	<i>Mitchell</i>
	L	16. Bernard Formation	<i>Suplee</i>
Jurassic			
	*	17. Coon Hollow Formation	Pittsburg Landing – Hells Canyon NRA
BLM, PVT	L	18. Lonesome Formation	<i>Suplee</i>

BLUE MOUNTAINS GEOLOGICAL CELLS (BM)

Agency	Priority	Cell Name	Present Representation
BLM, PVT	L	19. Trowbridge Formation	<i>Suplee</i>
BLM, PVT	L	20. Snowshoe Formation	<i>Suplee</i>
BLM, PVT	L	21. Hyde Formation	<i>Suplee</i>
BLM, PVT	L	22. Nicely shale	<i>Suplee</i>
BLM, PVT	L	23. Suplee Formation	<i>Suplee</i>
BLM, PVT	L	24. Robertson Formation	<i>Suplee</i>
BLM, PVT	L	25. Weatherby Formation	<i>Huntington</i>
FS, PVT	L	26. Keller Creek Shale	<i>Seneca</i>
Jurassic and Triassic			
FS, PVT	L	27. Murder's Creek Graywacke	<i>Ingle Rock</i>
	*	28. Hurwal Formation	Hurwal Divide - Eagle Cap WA
Triassic			
	*	29. Martin Bridge Limestone	Big Bar – Hells Canyon NRA Matterhorn – Eagle Cap WA Marble Mountain – Eagle Cap WA
	*	30. Doyle Creek Formation	Hells Canyon WA Cook Creek SR
	*	31. Wild Sheep Creek Formation	Cottonwood Cr. - Hells Canyon WA
	*	32. Laycock Graywacke	Aldrich Mountain SIA
	*	33. Fields Creek Formation	Aldrich Mountain SIA
	*	34. Vester Formation	Aldrich Mountain SIA
BLM	M	35. Huntington Formation	<i>Huntington</i>
Triassic and Permian			
BLM, FS	L	36. Burnt River schist	<i>Bridgeport</i>
	*	37. Canyon Mountain Ophiolite	Strawberry Mountains WA
Triassic, Permian, and Pennsylvanian			
FS	L	38. Elkhorn Ridge Argillite	<i>Sumpter</i>
Permian			
	*	39. Coyote Butte Limestone	Strawberry Mountains WA

BLUE MOUNTAINS GEOLOGICAL CELLS (BM)

Agency	Priority	Cell Name	Present Representation
	*	40. Hunsaker Creek Formation	Oxbow (Snake River – Hells Canyon NRA)
	*	41. Windy Ridge Formation	Oxbow (Snake River – Hells Canyon NRA)
Pennsylvanian			
BLM, FS	M	42. Spotted Ridge Formation	<i>Suplee</i>
Mississippian			
BLM, FS	M	43. Coffee Creek Formation	<i>Suplee</i>
Devonian			
BLM, FS	M	44. Fossiliferous Limestone	<i>Suplee</i>

BLUE MOUNTAINS SPECIAL SPECIES (BM)

Agency	List	Species Name	Present Representation
Invertebrates			
BLM	2	1. <i>Boloria selene atrocostalis</i> - Silver-bordered fritillary butterfly	
	*	2. <i>Fisherola nuttalli</i> - Shortface lanx, giant columbia river limpet	Cove Palisades State Park Deschutes R. State Scenic Waterway Hells Canyon WA
ACE, BLM	1	3. <i>Juga bulbosa</i> - Bulb juga (snail)	<i>Deschutes River St. Scenic Waterway</i>
ACE	1	4. <i>Juga hemphilli maupinensis</i> - Purple-lipped juga (snail)	<i>Deschutes River St. Scenic Waterway</i>
FS, PVT	2	5. <i>Ochlodes yuma</i> - Yuma skipper butterfly	<i>Imnaha</i>
Vertebrates			
	*	6. <i>Accipiter gentilis</i> - Northern goshawk	Elkhorn WMA Wenaha Tucannon WA
	*	7. <i>Agelaius tricolor</i> - Tricolored blackbird	John Day Fossil Beds NM
BLM, PVT	2	8. <i>Ammodramus savannarum</i> - Grasshopper sparrow	
	*	9. <i>Ascaphus montanus</i> - Inland tailed frog	Wenaha Tucannon WA Eagle Cap WA Hells Canyon WA
BLM, PVT	2	10. <i>Athene cunicularia hypugaea</i> - Western burrowing owl	
	*	11. <i>Bartramia longicauda</i> - Upland sandpiper	Bridge Creek WMA
BLM	2	12. <i>Brachylagus idahoensis</i> - Pygmy rabbit	
	2	13. <i>Buteo regalis</i> - Ferruginous hawk	Clear Lake Ridge (TNC) Zumwalt Prairie (TNC)
	2	14. <i>Canis lupus</i> - Gray wolf	Extirpated
BLM	1	15. <i>Centrocercus urophasianus phaios</i> - Western greater sage-grouse	
	*	16. <i>Chrysemys picta</i> - Painted turtle	John Day Fossil Beds NM
	2	17. <i>Coccyzus americanus occidentalis</i> - Western yellow-billed cuckoo	Possibly extirpated
	*	18. <i>Corynorhinus townsendii pallescens</i> - Pale western big-eared bat	Hells Canyon WA John Day Fossil Beds NM
BLM, FS	2	19. <i>Euderma maculatum</i> - Spotted bat	<i>Hells Canyon NRA</i> <i>John Day River. St. Scenic Waterway</i>

BLUE MOUNTAINS SPECIAL SPECIES (BM)

Agency	List	Species Name	Present Representation
	*	20. <i>Falco peregrinus anatum</i> - American peregrine falcon	Eagle Cap WA Hells Canyon NRA
	*	21. <i>Gulo gulo luteus</i> - California wolverine	Hells Canyon WA Strawberry Mountain WA North Fork John Day WA
	*	22. <i>Haliaeetus leucocephalus</i> - Bald eagle	Murderers Creek WMA Elkhorn WMA Wenaha WMA
	*	23. <i>Histrionicus histrionicus</i> - Harlequin duck	Eagle Cap WA
	*	24. <i>Lynx canadensis</i> - Canada lynx	Eagle Cap WA
	2	25. <i>Martes pennanti pacifica</i> - Pacific fisher	Possibly extirpated
FS	2	26. <i>Myotis thysanodes</i> - Fringed bat	
ACE, FS	2	27. <i>Oncorhynchus mykiss gairdneri</i> - Inland Columbia basin redband trout	
ACE, FS	1	28. <i>Oncorhynchus tshawytscha</i> - Chinook salmon, Snake River - fall run	
	*	29. <i>Oncorhynchus tshawytscha</i> - Chinook salmon, Snake River - spring/summer run	Eagle Cap WA Wenaha Tucannon WA
	*	30. <i>Podiceps auritus</i> - Horned grebe	Clear Lake Ridge (TNC)
	*	31. <i>Rana luteiventris</i> - Columbia spotted frog	Strawberry Mountain WA North Fork John Day WA
BLM, PVT PRD	1	32. <i>Rana pretiosa</i> - Oregon spotted frog	Cline Falls State Park Deschutes River St. Scenic Waterway
	*	33. <i>Salvelinus confluentus</i> - Bull trout, Columbia River population	Wenaha Tucannon WA Eagle Cap WA North Fork John Day WA
FS, PVT	1	34. <i>Tympanuchus phasianellus columbianus</i> - Columbian sharp-tailed grouse	
Plants			
	*	35. <i>Achnatherum hendersonii</i> - Henderson ricegrass	North Fork Crooked River WSR
	*	36. <i>Achnatherum wallowaensis</i> - Wallowa ricegrass	Clear Lake Ridge (TNC)
FS	1	37. <i>Allium dictuon</i> - Blue mountain onion	
	*	38. <i>Allium geyeri</i> var <i>geyeri</i> - Geyer's onion	Hells Canyon WA

BLUE MOUNTAINS SPECIAL SPECIES (BM)

Agency	List	Species Name	Present Representation
	*	39. <i>Arabis hastatula</i> - Hells Canyon rockcress	Hells Canyon WA Eagle Cap WA
	*	40. <i>Artemisia ludoviciana</i> ssp <i>estesii</i> - Estes' artemisia	Tumalo State Park Cline Falls State Park
	*	41. <i>Asplenium trichomanes-ramosum</i> - Green spleenwort	Eagle Cap WA
BLM, PVT	1	42. <i>Astragalus diaphanus</i> var <i>diurnus</i> - South John Day milk-vetch	<i>Murderers Creek WMA</i>
	*	43. <i>Astragalus peckii</i> - Peck's milk-vetch	Bull Flat ACEC "Innes Market Road" ACEC
BLM, FS	1	44. <i>Astragalus tegetarioides</i> - Bastard kentrophyta	
	*	45. <i>Botrychium ascendens</i> - Upward-lobed moonwort	Eagle Cap WA
	*	46. <i>Botrychium campestre</i> - Prairie moonwort	Eagle Cap WA
	*	47. <i>Botrychium crenulatum</i> - Crenulate grape-fern	Eagle Cap WA
	*	48. <i>Botrychium lanceolatum</i> - Lance-leaved grape-fern	Eagle Cap WA
	*	49. <i>Botrychium lineare</i> - Skinny moonwort	Eagle Cap WA
	*	50. <i>Botrychium lunaria</i> - Moonwort	Eagle Cap WA
	*	51. <i>Botrychium minganense</i> - Gray moonwort	Eagle Cap WA
	*	52. <i>Botrychium montanum</i> - Mountain grapefern	Eagle Cap WA
FS	1	53. <i>Botrychium paradoxum</i> - Twin-spike moonwort	
FS	1	54. <i>Botrychium pedunculatum</i> - Stalked moonwort	
	*	55. <i>Botrychium pinnatum</i> - Pinnate grape-fern	Eagle Cap WA
	*	56. <i>Bupleurum americanum</i> - Bupleurum	Eagle Cap WA
	*	57. <i>Calochortus longebarbatus</i> var <i>peckii</i> - Peck's mariposa-lily	North Fork Crooked River WSR Bridge Creek WA
	*	58. <i>Calochortus macrocarpus</i> var <i>maculosus</i> - Green-band mariposa-lily	Wenaha Tucannon WA Hells Canyon WA
BLM, FS	2	59. <i>Calochortus nitidus</i> - Broad-fruit mariposa	<i>Hells Canyon NRA</i>
	*	60. <i>Camissonia pygmaea</i> - Dwarf evening-primrose	John Day River (mainstem) WSR
	*	61. <i>Carex abrupta</i> - Abrupt-beaked sedge	Eagle Cap WA
	*	62. <i>Carex atrata</i> var <i>atrosquama</i> - Blackened sedge	Eagle Cap WA

BLUE MOUNTAINS SPECIAL SPECIES (BM)

Agency	List	Species Name	Present Representation
	*	63. <i>Carex backii</i> - Back's sedge	Wenaha Tucannon WA Hells Canyon WA
	*	64. <i>Carex bebbii</i> - Bebb's sedge	Keating Riparian ACEC/RNA
	*	65. <i>Carex capillaris</i> - Capillary sedge	Eagle Cap WA
	*	66. <i>Carex concinna</i> - Low northern sedge	Eagle Cap WA
	*	67. <i>Carex dioica</i> var <i>gynocrates</i> - Yellow bog sedge	Eagle Cap WA
	2	68. <i>Carex eleocharis</i> – Sedge	Extirpated
	*	69. <i>Carex hystericina</i> - Porcupine sedge	Black Canyon WA Hells Canyon WA
	*	70. <i>Carex nardina</i> - Spikenard sedge	Eagle Cap WA
	*	71. <i>Carex norvegica</i> - Scandinavian sedge	Eagle Cap WA
	*	72. <i>Carex nova</i> - A sedge	Eagle Cap WA
FS	2	73. <i>Carex parryana</i> ssp <i>idaho</i> - Idaho sedge	
	*	74. <i>Carex praticola</i> - Meadow sedge	Eagle Cap WA Hells Canyon NRA
	*	75. <i>Carex pyrenaica</i> - Pyrenaean sedge	Eagle Cap WA
FS	2	76. <i>Carex retrorsa</i> - Retorse sedge	
	*	77. <i>Carex saxatilis</i> var <i>major</i> - Russet sedge	Eagle Cap WA
	*	78. <i>Carex subnigricans</i> - Dark alpine sedge	Eagle Cap WA
	*	79. <i>Carex vernacula</i> - Native sedge	Eagle Cap WA
	*	80. <i>Castilleja fraterna</i> - Fraternal paintbrush	Eagle Cap WA
	*	81. <i>Castilleja rubida</i> - Purple alpine paintbrush	Eagle Cap WA
	*	82. <i>Cheilanthes feei</i> – Fee’s lipfern	Hells Canyon WA
BLM	2	83. <i>Coryphantha vivipara</i> var <i>vivipara</i> - Cushion coryphantha	
FS	2	84. <i>Cryptogramma stelleri</i> - Steller's rock-brake	
	*	85. <i>Cymopterus nivalis</i> - Hayden's cymopterus	Strawberry Mountain WA
	*	86. <i>Cyperus schweinitzii</i> - Schweinitz cyperus	Hells Canyon WA
	*	87. <i>Erigeron disparipilus</i> - White cushion fleabane	Wenaha-Tucannon WA

BLUE MOUNTAINS SPECIAL SPECIES (BM)

Agency	List	Species Name	Present Representation
FS	2	88. <i>Erigeron engelmannii</i> var <i>davisii</i> - Engelmann's daisy	<i>Hells Canyon NRA</i>
	*	89. <i>Geum rossii</i> var <i>turbinatum</i> - Slender-stemmed avens	<i>Eagle Cap WA</i>
BLM, PVT	1	90. <i>Haplopappus radiatus</i> - Snake river goldenweed	
	*	91. <i>Juncus triglumis</i> var <i>albescens</i> - Three-flowered rush	<i>Eagle Cap WA</i>
	*	92. <i>Kobresia bellardii</i> - Bellard's kobresia	<i>Eagle Cap WA</i>
	*	93. <i>Kobresia simpliciuscula</i> - Simple kobresia	<i>Eagle Cap WA</i>
	*	94. <i>Leptodactylon pungens</i> ssp <i>hazeliae</i> - Hazel's prickly-phlox	<i>Hells Canyon WA</i>
FS	2	95. <i>Lipocarpa aristulata</i> - Aristulate lipocarpa	
	*	96. <i>Listera borealis</i> - Northern twayblade	<i>Eagle Cap WA</i>
FS	1	97. <i>Lomatium erythrocarpum</i> - Red-fruited lomatium	<i>Cougar Saddle</i>
BLM	2	98. <i>Lomatium farinosum</i> var <i>hambleniae</i> - Hamblen's lomatium	
	*	99. <i>Lomatium greenmanii</i> - Greenman's lomatium	<i>Eagle Cap WA</i>
BLM, FS	1	100. <i>Lomatium ochocense</i> - Ochoco lomatium	<i>Forest Creeks WSA</i> <i>North Fork Crooked River WSR</i>
BLM	2	101. <i>Lomatium ravenii</i> - Raven's lomatium	
	*	102. <i>Luina serpentina</i> - Colonial luina	<i>Strawberry Mountain WA</i>
BLM	1	103. <i>Lupinus cusickii</i> - Cusick's lupine	<i>Denny Flat</i>
FS	2	104. <i>Lycopodium complanatum</i> - Ground cedar	
FS	1	105. <i>Mimulus evanescens</i> - Disappearing monkeyflower	<i>Extirpated</i>
FS	1	106. <i>Mimulus hymenophyllus</i> - Membrane-leaved monkeyflower	<i>Horse Creek</i> <i>Hells Canyon NRA</i>
BLM, PVT	1	107. <i>Mimulus jungermannioides</i> - Hepatic monkeyflower	<i>North of Steehead Falls Camp</i>
	*	108. <i>Mirabilis macfarlanei</i> - Macfarlane's four-o'clock	<i>Pleasant Valley RNA</i> <i>Hells Canyon WA</i>
BLM, PVT	1	109. <i>Myosurus sessilis</i> - Sessile mousetail	<i>Extirpated</i>
	2	110. <i>Pellaea bridgesii</i> - Bridge's cliff-brake	<i>Eagle Cap WA</i>
FS	2	111. <i>Peltolepis quadrata</i> - Liverwort	
FS	1	112. <i>Phacelia minutissima</i> - Tiny-flower phacelia	<i>Hells Canyon NRA</i>

BLUE MOUNTAINS SPECIAL SPECIES (BM)

Agency	List	Species Name	Present Representation
BLM, FS	2	113. <i>Phlox multiflora</i> - Many-flowered phlox	
	*	114. <i>Platanthera obtusata</i> - Small northern bog-orchid	Eagle Cap WA
PVT	1	115. <i>Pleuropogon oregonus</i> - Oregon semaphore grass	<i>Ladd Canyon</i>
	*	116. <i>Primula cusickiana</i> - Wallowa primrose	Eagle Cap WA Hells Canyon WA
	*	117. <i>Rubus bartonianus</i> - Bartonberry	Hells Canyon WA
	*	118. <i>Salix farriar</i> - Farr's willow	Eagle Cap WA
	*	119. <i>Salix wolfii</i> - Wolf willow	Eagle Cap WA
	*	120. <i>Saxifraga adscendens</i> ssp <i>oregonensis</i> - Wedge-leaf saxifrage	Eagle Cap WA
	*	121. <i>Senecio dimorphophyllus</i> - Payson's groundsel	Eagle Cap WA
	2	122. <i>Senecio porteri</i> - Porter's butterweed	Extirpated
	*	123. <i>Silene spaldingii</i> - Spalding's campion	Clear Lake Ridge (TNC) Zumwalt Prairie (TNC)
PRD	2	124. <i>Suksdorfia violacea</i> - Violet suksdorfia	<i>Minam State Recreation Area</i>
BLM	2	125. <i>Talinum spinescens</i> - Spiny flame-flower	
	*	126. <i>Texosporium sancti-jacobi</i> - Woven-spored lichen	The Island RNA Crooked River National Grassland
	*	127. <i>Thalictrum alpinum</i> var <i>hebetum</i> - Alpine meadowrue	Eagle Cap WA
BLM, FS	1	128. <i>Thelypodium eucosmum</i> - Arrow-leaf thelypody	<i>Sutton Mountain WSA</i>
	2	129. <i>Thelypodium howellii</i> ssp <i>howellii</i> - Howell's thelypody	Extirpated
	*	130. <i>Thelypodium howellii</i> ssp <i>spectabilis</i> - Howell's spectacular thelypody	<i>Powder River Easement(TNC)</i> <i>Rodeo Grounds Easement(TNC)</i>
	*	131. <i>Townsendia montana</i> - Mountain townsendia	Eagle Cap WA
	*	132. <i>Townsendia parryi</i> - Parry townshend-daisy	Eagle Cap WA
FS	1	133. <i>Trifolium douglasii</i> - Douglas clover	
	*	134. <i>Trollius laxus</i> ssp <i>albiflorus</i> - American globeflower	Hells Canyon WA

Chapter 13: Northern Basin and Range Ecoregion

The Northern Basin and Range Ecoregion includes most of southeastern Oregon's high desert, extending into Nevada and extreme northeastern California. The ecoregion's name reflects its topography and geology, with numerous flat basins separated by isolated, generally north-south trending mountain ranges. Many of the mountains are fault blocks, with gradual slopes on one side and precipitous basalt rims on the other. In Oregon, elevations range from 2,500 feet in the lowest parts of the Owyhee and Malheur Rivers to more than 9,700 feet on Steens Mountain. Soils are generally rocky and thin, low in organic matter and high in minerals.

The volcanic history is clearly a key influence for the vegetation and landscape of the ecoregion. In large portions of the landscape, soils have been derived from underlying layers of basalt and rhyolite, or occasionally from sedimentary layers that have been exposed by erosion. Of more interest than these "normal soils" are soils derived from volcanic ash and welded tuffs, which are found in distinct sites such as Leslie Gulch and Succor Creek near the Idaho border, or the extensive recent lava flows such as Devil's Garden, Diamond Craters, Jordan Craters or Saddle Butte Lava Field.

The climate is arid, with extreme ranges of daily and seasonal temperatures – with areas in the Alvord Desert (Oregon's driest location) receiving less than 7 inches of rain annually. Runoff from precipitation and mountain snowpacks in the basins often flows into flat, alkaline playas, where it forms seasonal shallow lakes and marshes.

Also known as the sagebrush desert or high desert, the Northern Basin and Range Ecoregion is characterized by shrublands. The most significant of these are the sagebrush steppe types, salt desert scrub, riparian and wetland types. Western juniper, mountain mahogany and aspen woodlands are locally important. The large wildlife refuges here support some of the largest populations of pronghorn antelope, white pelicans, and sage waterfowl, and are well known for their wildlife diversity.

Much of the ecoregion is uninhabited. The only towns with more than a few hundred residents are Burns and Lakeview, with populations of about 3,000 each. Livestock, agriculture and tourism are the foundations of the regional economy. Lumber production, formerly a major source of employment in the Burns and Lakeview areas, has declined with lower harvests on nearby national forests.

Also included within this section of the plan is a small inclusion of the Snake River Plains ecoregion. The Snake River Plains, a major feature in southern Idaho, extends into Oregon in northeastern Malheur County. It includes the lower Snake River valley from the county line to where the Snake leaves the state, and includes the the lower valley of the Malheur River from Ontario to Harper.

The Snake River Plain Ecoregion has similar vegetation as the adjacent Northern Basin and Range Ecoregion, but differs markedly in its terrain. The Snake River Plain is basically a broad river valley with low, adjacent foothills. In Oregon, most of the population is concentrated in the northeastern corner, where irrigated agriculture in the fertile lowlands along the Snake and Malheur rivers is the foundation of the local economy.

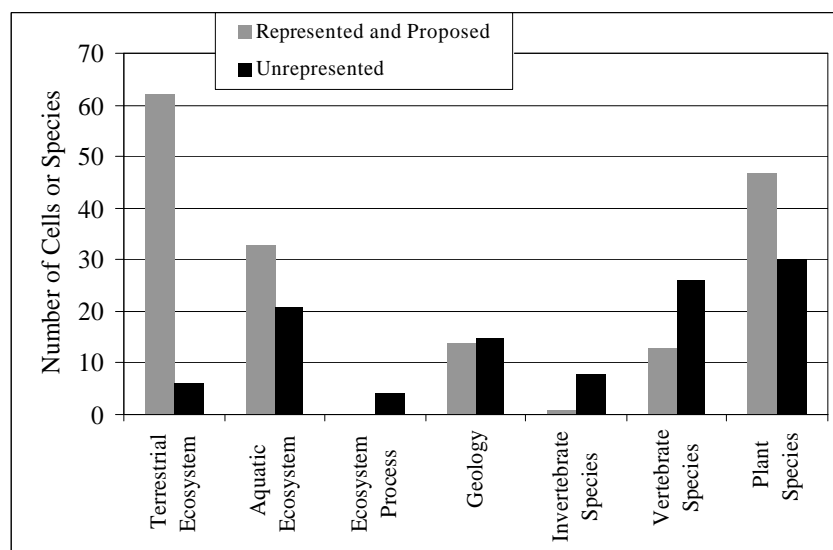


Figure 20. Represented and Unrepresented Cells and Species in the Northern Basin and Range Ecoregion

Note how well the terrestrial ecosystem cells are protected in this ecoregion.

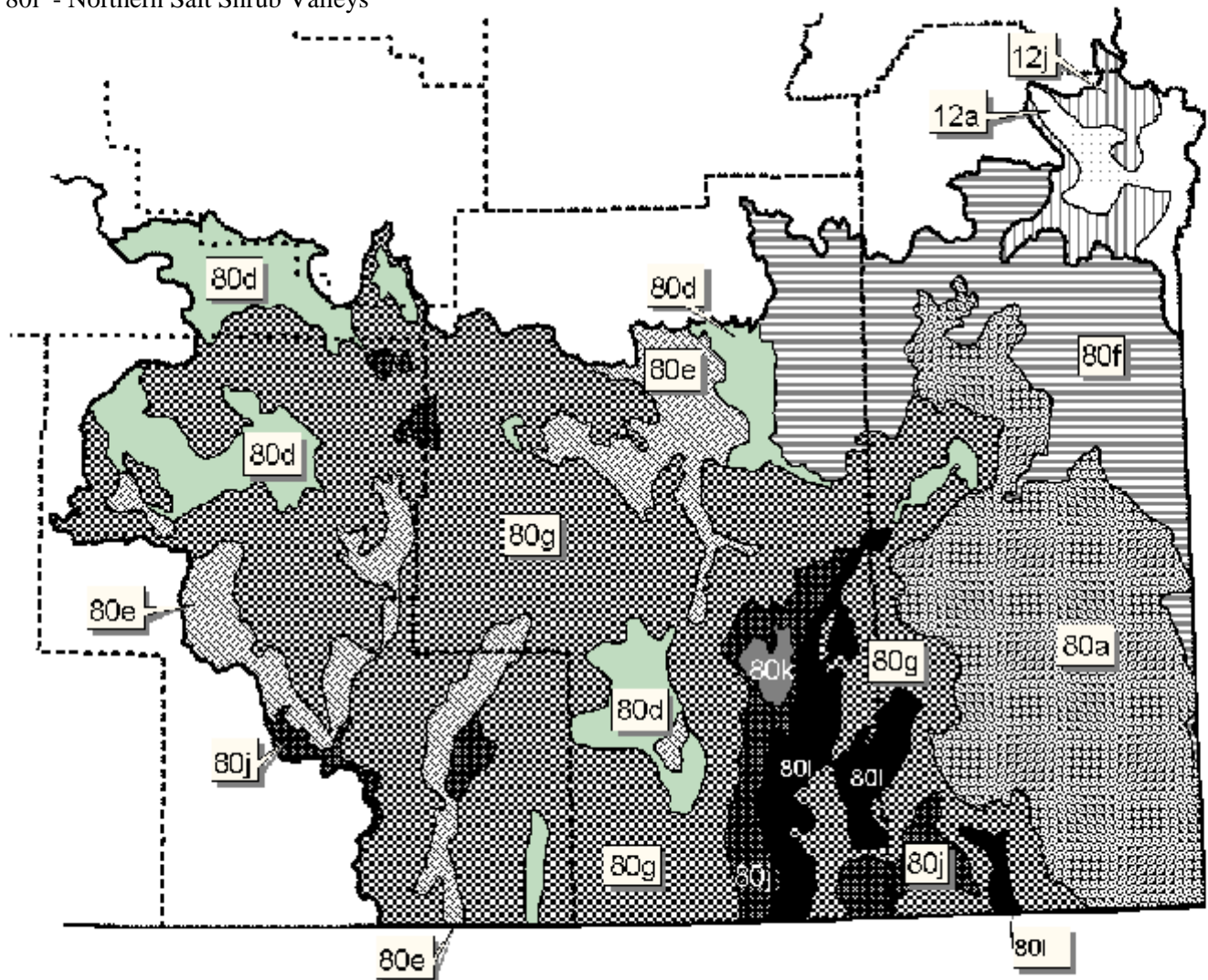
Figure 21. Map of Northern Basin and Range Ecoregion and Subregions (with the Oregon Portions of the Snake River Plains Ecoregion, from Thorson *et al.* 2003)

Northern Basin and Range

- 80a - Dissected High Lava Plateau
- 80d - Pluvial Lake Basins
- 80e - High Desert Wetlands
- 80f - Owyhee Uplands and Canyons
- 80g - High Lava Plains
- 80j - Semiarid Uplands
- 80k - Partly Forested Mountains
- 80l - Partly Forested Mountains
- 80l - Northern Salt Shrub Valleys

Snake River Plains

- 12a - Treasure Valley
- 12b - Unwooded Alkaline Foothills



NORTHERN BASIN AND RANGE ECOLOGICAL CELLS (BR)

Agency	Priority	Cell Name	Present Representation
Ponderosa Pine and Western Juniper			
	*	1. Ponderosa pine/big sagebrush-bitterbrush (isolated stand within steppe.	Lost Forest RNA
	*	2. Ponderosa pine-western juniper/big sagebrush/ needle-and-thread.	Lost Forest RNA
	*	3. Ponderosa pine-western juniper/sagebrush-bitterbrush vegetation mosaic.	Sheep Mountain RNA
	*	4. Ponderosa pine-western juniper/low sagebrush vegetation mosaic.	Silver Creek RNA
	*	5. Western juniper/big sagebrush/bluebunch wheatgrass.	Connley Hills RNA Stockade Mountain RNA Black Canyon RNA
	*	6. Western juniper/big sagebrush/Idaho fescue.	Juniper Mountain RNA
	*	7. Western juniper/big sagebrush-bitterbrush.	Rahilly-Gravelly RNA
	*	8. Western juniper/bluebunch wheatgrass.	Connley Hills RNA
	*	9. Western juniper/Idaho fescue.	Connley Hills RNA Vee Pasture RNA<
	*	10. Western juniper/low sagebrush/Idaho fescue.	Poker Jim Ridge RNA
	*	11. Western juniper/big sagebrush-bitterbrush steppe.	Juniper Mountain RNA
BLM, PVT	M	12. Western juniper-mountain mahogany/mountain big sagebrush/bunchgrass.	
	*	13. Western juniper/low sagebrush/Sandberg bluegrass.	Poker Jim Ridge RNA
Big Sagebrush			
	*	14. Wyoming big sagebrush/bluebunch wheatgrass.	Connley Hills RNA< Big Alvord Creek RNA Hawksie-Walksie RNA
	*	15. Wyoming big sagebrush/Idaho fescue.	Hawksie-Walksie RNA
	*	16. Wyoming big sagebrush/Thurber needlegrass.	North Ridge Bully Creek RNA South Ridge Bully Creek RNA
BLM	H	17. Wyoming big sagebrush/western needlegrass.	
	*	18. Wyoming big sagebrush/needle-and-thread.	Guano Creek/Sink Lakes RNA
	*	19. Wyoming big sagebrush/needle-and-thread on cinders.	Honeycombs RNA
	*	20. Wyoming big sagebrush/Indian ricegrass.	Long Draw RNA

NORTHERN BASIN AND RANGE ECOLOGICAL CELLS (BR)

Agency	Priority	Cell Name	Present Representation
	*	21. Wyoming big sagebrush/Indian ricegrass and Wyoming big sagebrush/needle and thread mosaic.	South Alkali Sand Hills ACEC
	*	22. Basin big sagebrush/bluebunch wheatgrass.	Jordan Crater RNA
BLM, PVT	H	23. Basin big sagebrush/basin wildrye.	<i>Three Forks</i>
Mixed Sagebrush and Mountain Big Sagebrush			
	*	24. Big sagebrush-greasewood vegetation.	Stinking Lake RNA Harney Lake RNA
	*	25. Big sagebrush-bitterbrush/Idaho fescue.	Fish Creek Rim RNA
	*	26. Mountain brush (Mountain big sagebrush-bitterbrush-squawapple.	Rahilly-Gravelly RNA
	*	27. Snowbrush and bittercherry shrub complex.	Fish Creek Rim RNA
	*	28. Big sagebrush-bitterbrush/Idaho fescue.	South Bull Canyon RNA Fish Creek Rim RNA
	*	29. Big sagebrush-bitterbrush/Indian ricegrass and big sagebrush/needle and thread mosaic on sandy soils.	Hammond Hills Sand Hills RNA South Alkali Sand Hills ACEC
	*	30. Wyoming big sagebrush-squawapple/bluebunch wheatgrass-Thurber needlegrass.	North Ridge Bully Creek RNA
	*	31. Wyoming big sagebrush-squawapple/Idaho fescue.	South Ridge Bully Creek RNA
	*	32. Mountain big sagebrush/Idaho fescue.	Spring Mountain RNA Steens Mountain ACEC
	*	33. Mountain big sagebrush/needlegrass.	Steens Mountain ACEC< Little Blitzen RNA
	*	34. Mountain big sagebrush/basin wildrye.	Warner Creek RNA
	*	35. Mountain big sagebrush-mountain snowberry/Idaho fescue.	Spring Mountain RNA
	*	36. Mountain big sagebrush, bitterbrush, mountain snowberry/Thurber needlegrass mosaic.	Little Blitzen RNA Rahilly-Gravelly RNA
	*	37. Big sagebrush-threetip sagebrush/bunchgrass.	North Ridge Bully Creek RNA South Ridge Bully Creek RNA
	*	38. Threetip sagebrush/bluebunch wheatgrass.	North Ridge Bully Creek RNA South Ridge Bully Creek RNA
	*	39. Threetip sagebrush/Idaho fescue.	Jordan Crater RNA
	*	40. Silver sagebrush/bluegrass flat or playa.	Lake Ridge RNA< Toppin Creek Butte RNA Jordan Crater RNA<

NORTHERN BASIN AND RANGE ECOLOGICAL CELLS (BR)

Agency	Priority	Cell Name	Present Representation
Low and Black Sagebrush			
	*	41. Low sagebrush/bluebunch wheatgrass.	Poker Jim Ridge RNA< Lake Ridge RNA Spring Mountain RNA
	*	42. Low sagebrush/Idaho fescue.	Fish Creek Rim RNA Toppin Creek Butte RNA Lake Ridge RNA<
BLM, FWS	M	43. Low sagebrush/Thurber needlegrass.	Desert Lake RNA< <i>Sagehen Hills</i>
	*	44. Low sagebrush/Sandberg bluegrass scabland.	Guano Creek - Sink Lakes RNA< Stockade Mountain RNA Steens Mountain WA
	*	45. Montane low sagebrush/sheep fescue-Idaho fescue mosaic.	Warner Creek RNA
	*	46. Black sagebrush/bunchgrass community complex.	Foley Lake RNA Mendi Gore Playa RNA<
	*	47. Rigid sagebrush/Sandberg bluegrass.	Black Canyon RNA
Desert or Salt Desert Shrub			
		48. Big sagebrush-spiny hopsage salt desert scrub playa.	Harney Lake RNA TumTum Lake RNA
	*	49. Big sagebrush-spiny hopsage-budsage mosaic on ash.	Coal Mine Basin RNA Dry Creek Gorge ACEC
	*	50. Shadscale-spiny hopsage-green mormon tea salt desert scrub.	Pueblo Foothills RNA
	*	51. Black greasewood-shadscale/bunchgrass playa margin vegetation.	Harney Lake RNA TumTum Lake RNA Spanish Lake RNA
	*	52. Shadscale-budsage/bunchgrass salt desert scrub.	Spanish Lake RNA
BLM	M	53. Shadscale/bunchgrass steppe.	<i>Dry Creek Buttes</i> <i>Diamond Craters ACEC</i>
	*	54. Black greasewood flat.	Hammond Hills Sand Hills RNA Crooked Creek PNHCA<
	*	55. Shadscale-big sagebrush mosaic.	Palamino Playa RNA Crooked Creek PNHCA
	*	56. Winterfat playa.	Mickey Basin RNA Mendi Gore Playa RNA
	*	57. Iodine bush playa.	Tum Tum Lake RNA<

NORTHERN BASIN AND RANGE ECOLOGICAL CELLS (BR)

Agency	Priority	Cell Name	Present Representation
			Stinking Lake RNA< Micky Hot Springs ACEC<
	*	58. Sand dune series, from active unvegetated dunes through stabilized (with greasewood, hopsage, Indian ricegrass, and wildrye).	Harney Lake RNA Alvord Desert ACEC
	*	59. Annual forb communities on exposed ash beds.	Leslie Gulch ACEC Honeycombs RNA Black Hills RNA Coal Mine Basin RNA
		Mountain Mahogany	
	*	60. Mountain mahogany/mountain big sagebrush community with bitterbrush if possible.	Fish Creek Rim RNA Mahogany Ridge RNA
	*	61. Mountain mahogany/mountain big sagebrush-snowberry/bunchgrass.	Dry Creek Bench RNA Warner Creek RNA
PVT	H	62. Mountain mahogany/pinegrass.	
	*	63. Mountain mahogany-aspen-cherry snowbank.	Spring Mountain RNA Mahogany Ridge RNA Addition
	*	64. Mountain mahogany/bluebunch wheatgrass canyon.	Rooster Comb RNA
		Forest and Alpine Types	
	*	65. White fir forest.	Hart Canyon PRNA Fir Groves PACEC
	*	66. Aspen/blue wildrye.	Little Blitzen RNA
	*	67. High elevation fescue grassland.	East Kiger Plateau RNA Little Blitzen RNA
	*	68. Alpine upland vegetation including grasslands with alpine oatgrass, sedge and spikerush meadows, and alpine buckwheat.	Steens Mountain Summit NHCA Little Wildhorse Lake RNA Little Blitzen RNA Steens Mountain ACEC
		Lacustrine	
	*	69. Low elevation lake with aquatic beds and marshy shore.	Jordan Crater RNA
	*	70. Faultblock lake.	Lake Abert ACEC
	*	71. Low elevation hot lake and associated elevated mineral springs.	Borax Lake (TNC) Micky Hot Springs ACEC
	*	72. Low elevation alkaline lake	Harney Lake RNA Stinking Lake RNA Tumtum Lake RNA

NORTHERN BASIN AND RANGE ECOLOGICAL CELLS (BR)

Agency	Priority	Cell Name	Present Representation
	*	73. Mid to high elevation lake.	Little Wildhorse Lake RNA
Palustrine			
BLM, DSL, FWS	M	74. Low elevation alkaline pond with aquatic beds and marshy shore.	
BLM, DSL, FWS	H	75. Low elevation freshwater pond with aquatic beds and marshy shore.	
BLM, DSL	L	76. Mid to high elevation pond with aquatic beds and marshy shore.	
	*	77. Low elevation vernal pond.	Guano Creek - Sink Lakes RNA Jordan Crater RNA
	*	78. Mid to high elevation vernal pond.	Little Blitzen RNA
	*	79. Large hot springs.	Borax Lake (TNC)/ACEC Mickey Hot Springs ACEC
BLM, FWS	M	80. Running hot springs	<i>Three Forks</i> <i>Harney Hot Springs</i>
	*	81. Cold springs.	Little Blitzen RNA
	*	82. Bulrush-cattail marsh, with aquatic beds.	Jordan Crater RNA
	*	83. Burreed marsh.	Crump Lake PNHCA
	*	84. Reedgrass marsh.	Crump Lake PNHCA South Warner Basin (TNC)<
BLM, PVT	M	85. Nebraska sedge meadow.	
	*	86. Wet sedge meadow in alpine cirque.	Little Blitzen RNA South Fork Willow Creek RNA Little Wildhorse RNA
	*	87. Alkaline marsh, with sedge, spikerush, rush and bulrush.	Harney Lake RNA Stinking Lake RNA Borax Lake ACEC/(TNC)
	*	88. Silver sagebrush/Great Basin wildrye.	Guano Slough PRNA Guano Creek - Sink Lakes RNA
	*	89. Silver sagebrush/Nevada bluegrass	Foster Flat RNA
	*	90. Silver sagebrush complex with common spikerush, Nebraska sedge, and Cusick bluegrass if possible.	Foster Flat RNA
BLM, PVT	M	91. Silver sagebrush/mat muhly playa.	
BLM, PVT	H	92. Spiny saltbush/saltgrass playa.	Borax Lake ACEC/(TNC)<

NORTHERN BASIN AND RANGE ECOLOGICAL CELLS (BR)

Agency	Priority	Cell Name	Present Representation
	*	93. Bare playa with playa margin communities, including creeping wildrye, Baltic rush, Nevada bulrush, alkali bluegrass and Lemmon alkaligrass	Harney Lake RNA Alvord Desert ACEC
	*	94. Playa with greasewood and Great Basin wildrye.	Serrano Point ACEC
	*	95. Greasewood/saltgrass playa.	Harney Lake RNA Borax Lake ACEC/(TNC) Stinking Lake RNA
	*	96. Greasewood/seablite playa.	Tum Tum Lake RNA Stinking Lake RNA
	*	97. Open basin valley bottom alkaline wetland mosaic, with greasewood/saltgrass and greasewood/Basin wildrye.	Serrano Point ACEC Borax Lake ACEC
	*	98. Bare playa with Davis' peppergrass if possible.	Palomino Lake RNA
	*	99. Bare playa with poverty weed.	Spanish Lake RNA
Riparian Palustrine			
BLM, PVT	H	100 Missouri willow/golden currant.	
BLM, PVT	H	101. Booth willow-Lemmon willow riparian.	
	*	102. Subalpine willow shrub swamp, with Booth and Drummond willows.	Fish Creek Meadows – Steens Mountain WA
BLM, PVT	H	103. Lemmon willow-bog blueberry shrub swamp on organic soils.	
BLM	M	104. Lemmon willow, mid elevation riparian.	Spring Mountain RNA<
BLM, PVT	H	105. Low elevation riparian community dominated by coyote willow, Pacific willow and arroyo willow.	Guano Creek - Sink Lakes RNA<
BLM	H	106. Riparian community dominated by arroyo willow, red-osier dogwood and Woods rose.	
	*	107. Riparian dominated by coyote willow and Pacific willow.	Black Canyon RNA
BLM, FS, PVT	M	108. Rigid willow/golden currant riparian.	
BLM, DSL	M	109. Geyer willow riparian.	
	*	110. Riparian community dominated by mountain alder and creek dogwood or snowberry.	Little Whitehorse Exclosure RNA
	*	111. Mountain alder-quaking aspen riparian.	Little Blitzen RNA
BLM, PVT	H	112. Riparian community dominated by quaking aspen and Scouler willow.	East Fork Trout Creek RNA<

NORTHERN BASIN AND RANGE ECOLOGICAL CELLS (BR)

Agency	Priority	Cell Name	Present Representation
	*	113. Riparian community dominated by black cottonwood and creek dogwood.	Rooster Comb RNA< Little Blitzen RNA
	*	114. Riparian community dominated by black cottonwood and coyote willow.	Big Alvord Creek RNA
BLM, PVT	H	115. Black cottonwood/mountain alder riparian.	Big Alvord Creek RNA<
BLM, PVT	H	116. Black cottonwood/snowberry riparian.	
	*	117. Narrowleaf cottonwood riparian area.	Pueblo Foothills RNA
	*	118. Aspen/mountain snowberry woodland or forest.	Spring Mountain RNA
BLM	M	119. Dwarf aspen-bittercherry-serviceberry snowbank.	Spring Mountain RNA<
	*	120. White alder riparian.	Succor Creek PNHCA
BLM, DSL	H	121. Bittercherry-coyote willow-rose riparian.	
BLM, DSL	M	122. Intermittent stream dominated by mock orange, bitterbrush or serviceberry.	<i>Canyon south of Namorf</i>

Northern Basin and Range Ecosystem Process Cells

BLM	U	123. Fire in Ponderosa pine/western juniper zone containing areas of total and partial stand replacement and some underburns.
BLM	U	124. Fire in big sagebrush zone with both total and partial stand replacement.
BLM	U	125. Fire in mountain big sagebrush or bitterbrush zone with both total and partial of stand replacement.
BLM	U	126. Fire in low or black sagebrush zone with both total and partial stand replacement.

NORTHERN BASIN AND RANGE GEOLOGICAL CELLS (BR)

Agency	Priority	Cell Name	Present Representation
Holocene			
	*	1. Active fault scarp	Abert Rim ACEC
BLM	M	2. Landslides	<i>Winter Ridge</i>
	*	3. Eolian dunes	Alvord Dunes ACEC Warner Lakes Dunes
	*	4. Playa Lakes	Alvord Lake - Alvord ACEC
	*	5. Tyfoni Weathering	Leslie Gulch ACEC
BLM	L	6. Pinnacles	<i>Sand Creek</i>
Pleistocene			
	*	7. Cinder cones and craters	Diamond Craters Outstanding Natural Area Jordan Craters RNA
	*	8. Desert deposits and features	Alvord Desert ACEC
	*	9. Glacial valleys	Steens Mountains WA Little Blitzen RNA
	*	10. Lake deposits and features	Fort Rock State Park Harney Lake RNA
BLM, PVT	M	11. Landslides	<i>Rome</i>
BLM	H	12. Lava Tube Caves	<i>Saddle Butte</i>
	*	13. Lava Field	Jordan Craters RNA Devils Garden ACEC
	*	14. Rhyolite pillars	Leslie Gulch Lower Owyhee Gorge
	*	15. Tuff Ring	Fort Rock State Park
Pliocene			
BLM	L	16. Glenns Ferry Formation	<i>Malheur Butte</i>
BLM	L	17. Harney Formation	<i>Burns</i>
Miocene			
PVT	L	18. Rattlesnake Ash-Flow Tuff	<i>Burns</i>
	*	19. Jump Creek Rhyolite	Succor Creek State Park
BLM, PVT	L	20. Wildcat Creek Welded Ash-Flow Tuff	<i>Skull Springs</i>

NORTHERN BASIN AND RANGE GEOLOGICAL CELLS (BR)

Agency	Priority	Cell Name	Present Representation
BLM	L	21. Rhyolite and Rhyodacite of Dry Creek	<i>Skull Springs</i>
BLM	L	22. Prater Creek Ash-Flow Tuff	<i>Burns</i>
BLM	L	23. Devine Canyon Ash-Flow Tuff	<i>Burns</i>
BLM	L	24. Littlefield Rhyolite	<i>Namorf</i>
BLM, PRD	L	25. Owyhee Basalt	<i>Owyhee River Canyon</i>
	*	26. Sucker Creek Formation	Succor Creek State Park
	*	27. Steens Mountain Basalt	Steens Mountain WA
BLM	M	28. Pike Creek Volcanics	<i>Steens Mountain NRA</i>
BLM	M	29. Alvord Creek Formation	

NORTHERN BASIN AND RANGE SPECIAL SPECIES (BR)

Agency	List	Species Name	Present Representation
Invertebrates			
DSL, PVT	1	1. <i>Amerigoniscus malheurensis</i> - Malheur isopod	<i>Malheur Cave</i>
DSL, PVT	1	2. <i>Apochthonius malheuri</i> - Malheur pseudoscorpion	<i>Malheur Cave</i>
BLM	1	3. <i>Kenkia rhynchida</i> - A flatworm (planarian)	
BLM	2	4. <i>Ochlodes yuma</i> - Yuma skipper butterfly	
BLM	1	5. <i>Pisidium ultramontanum</i> - Montane peaclam	
	*	6. <i>Planorbella oregonensis</i> - Borax Lake ramshorn (snail)	Borax Lake (TNC)
FWS	1	7. <i>Pyrgulopsis hendersoni</i> - Harney Lake springsnail	
BLM, PRD	1	8. <i>Pyrgulopsis intermedia</i> - Crooked Creek springsnail	
BLM, PVT	1	9. <i>Stygobromus hubbsi</i> - Malheur Cave amphipod	<i>Malheur Cave</i>
Vertebrates			
BLM, FS	2	10. <i>Accipiter gentilis</i> - Northern goshawk	
BLM, FWS	2	11. <i>Athene cunicularia hypugaea</i> - Western burrowing owl	
BLM	2	12. <i>Brachylagus idahoensis</i> - Pygmy rabbit	
	2	13. <i>Buteo regalis</i> - Ferruginous hawk	Jordan Craters RNA
BLM	2	14. <i>Catostomus tahoensis</i> - Tahoe sucker	
BLM, PVT	1	15. <i>Catostomus warnerensis</i> - Warner sucker	
	1	16. <i>Centrocercus urophasianus phaios</i> - Western greater sage-grouse	Jordan Craters RNA Summer Lake WMA
	2	17. <i>Charadrius alexandrinus nivosus</i> - Western snowy plover	Harney Lake RNA Lake Abert ACEC
	2	18. <i>Corynorhinus townsendii pallascens</i> - Pale western big-eared bat	Saddle Butte Lava Flow ACEC Jordan Crater RNA
BLM	2	20. <i>Euderma maculatum</i> - Spotted bat	
BLM, FS	2	21. <i>Falco peregrinus anatum</i> - American peregrine falcon	
BLM, PVT	2	22. <i>Gila alvordensis</i> - Alvord chub	
BLM	2	23. <i>Gila bicolor eury soma</i> - Sheldon tui chub	
BLM	1	24. <i>Gila bicolor oregonensis</i> - Oregon Lakes tui chub	
BLM	1	25. <i>Gila bicolor</i> - ssp 1, Hutton Springs tui chub	

NORTHERN BASIN AND RANGE SPECIAL SPECIES (BR)

Agency	List	Species Name	Present Representation
PVT	1	26. <i>Gila bicolor</i> - ssp 13, Summer Basin tui chub	
BLM, PVT	1	27. <i>Gila bicolor</i> - ssp 2, Catlow tui chub	<i>Steens Mountain NRA</i>
	1	28. <i>Gila boraxobius</i> - Borax lake chub	Borax Lake (TNC)
	2	29. <i>Gulo gulo luteus</i> - California wolverine	Little Blitzen RNA Steens Mountain WA
BLM, PVT	2	30. <i>Haliaeetus leucocephalus</i> - Bald eagle	<i>Silver Creek</i>
FWS, BLM	2	31. <i>Ixobrychus exilis hesperis</i> - Western least bittern	
	*	32. <i>Larus pipixcan</i> - Franklin's gull	Malheur NWR
	2	33. <i>Lynx canadensis</i> - Canada lynx	Possibly extirpated
	2	34. <i>Oncorhynchus clarki henshawi</i> - Lahontan cutthroat trout	Steens Mountain WA
	1	35. <i>Oncorhynchus clarki</i> - Alvord cutthroat trout	Extirpated
BLM	2	36. <i>Oncorhynchus mykiss gairdneri</i> - Inland Columbia basin redband trout	
BLM, PVT	1	37. <i>Oncorhynchus mykiss</i> - Catlow Valley redband trout	
BLM, PVT	1	38. <i>Oncorhynchus mykiss</i> - Warner Valley redband trout	
	2	39. <i>Pelecanus erythrorhynchos</i> - American white pelican	Harney Lake RNA Jordan Crater RNA
	*	40. <i>Podiceps auritus</i> - Horned grebe	Malheur NWR
	*	41. <i>Rana luteiventris</i> - Columbia spotted frog	Malheur NWR
BLM	2	42. <i>Rana pipiens</i> - Northern leopard frog	
BLM	1	43. <i>Rhinichthys osculus</i> - Foskett Spring speckled dace	<i>Fosket Springs</i>
BLM	2	44. <i>Richardsonius egregius</i> - Lahontan redband trout	
BLM	2	45. <i>Sonora semiannulata</i> - Ground snake	
	2	46. <i>Spermophilus elegans nevadensis</i> - Wyoming ground squirrel	Extirpated
	1	47. <i>Tympanuchus phasianellus columbianus</i> - Columbian sharp-tailed grouse	Extirpated
	*	48. <i>Vulpes macrotis</i> - Kit fox	Saddle Butte Lava Flow ACEC Alvord Desert ACEC

NORTHERN BASIN AND RANGE SPECIAL SPECIES (BR)

Agency	List	Species Name	Present Representation
Plants			
	*	49. <i>Agastache cusickii</i> - Cusick's giant-hyssop	Pueblo Mountain WSA
	*	50. <i>Allenrolfea occidentalis</i> - Iodine bush	Tum Tum Lake RNA
BLM	2	51. <i>Argemone munita</i> ssp <i>rotundata</i> - Prickly-poppy	
BLM	2	52. <i>Artemisia papposa</i> - Owyhee sagebrush	Upper West Little Owyhee WSA
BLM	2	53. <i>Astragalus calycosus</i> - King's rattleweed	
	*	54. <i>Astragalus mulfordiae</i> - Mulford's milk-vetch	South Alkali ACEC
	1	55. <i>Astragalus sterilis</i> - Sterile milk-vetch	Honeycombs RNA Leslie Gulch ACEC
BLM, FS	1	56. <i>Astragalus tegetarioides</i> - Bastard kentrophyta	
	*	57. <i>Botrychium crenulatum</i> - Crenulate grape-fern	Steens Mountain WA
	*	58. <i>Botrychium lanceolatum</i> - Lance-leaved grape-fern	Little Blitzen RNA South Fork Willow Creek RNA
	*	59. <i>Botrychium lunaria</i> - Moonwort	Little Blitzen RNA
	*	60. <i>Botrychium minganense</i> - Gray moonwort	Little Blitzen RNA South Fork Willow Creek RNA
	*	61. <i>Botrychium pinnatum</i> - Pinnate grape-fern	South Fork Willow Creek RNA
BLM	1	62. <i>Camissonia pygmaea</i> - Dwarf evening-primrose	
	2	63. <i>Carex abrupta</i> - Abrupt-beaked sedge	Extirpated
	*	64. <i>Carex atrata</i> var <i>atrosquama</i> - Blackened sedge	Steens Mountain WA
	*	65. <i>Carex backii</i> - Back's sedge	Steens Mountain WA
	2	66. <i>Carex capillaris</i> - Capillary sedge	South Fork Willow Creek RNA
	*	67. <i>Carex capitata</i> - Capitata sedge	Steens Mountain WA
	*	68. <i>Carex hystericina</i> - Porcupine sedge	Owyhee River ACEC
	*	69. <i>Carex nova</i> - A sedge	Little Blitzen RNA
	*	70. <i>Carex scirpoidea</i> var <i>stenochlaena</i> - Alaskan single-spiked sedge	Steens Mountain WA
	*	71. <i>Carex subnigricans</i> - Dark alpine sedge	Little Wildhorse RNA
	*	72. <i>Carex vernacular</i> - Native sedge	Steens Mountain WA

NORTHERN BASIN AND RANGE SPECIAL SPECIES (BR)

Agency	List	Species Name	Present Representation
BLM	2	73. <i>Caulanthus major</i> var. <i>nevadensis</i> - Slender wild cabbage	Owyhee Butte
	*	74. <i>Chaenactis xantiana</i> - Desert pincusion	Steens Mountain WA
BLM	1	75. <i>Collomia renacta</i> - Barren valley collomia	
	*	76. <i>Cymopterus acaulis</i> var <i>greeleyorum</i> – Greeley's cymopterus	Leslie Gulch ACEC
	*	77. <i>Cymopterus nivalis</i> - Hayden's cymopterus	Little Blitzen RNA
	*	78. <i>Cymopterus purpurascens</i> - Purple cymopterus	Long Draw RNA
BLM	2	79. <i>Eriogonum brachyanthum</i> - Short-flowered eriogonum	
BLM	1	80. <i>Eriogonum chrysops</i> - Golden buckwheat	Skull Springs
BLM	1	81. <i>Eriogonum crosbyae</i> - Crosby's buckwheat	
BLM	1	82. <i>Eriogonum cusickii</i> - Cusick's erigonum	Sagehen
BLM, FWS	1	83. <i>Eriogonum prociduum</i> - Prostrate buckwheat	Hart Mountain NWR
	*	84. <i>Eriogonum salicornioides</i> - Playa buckwheat	Crooked Creek State Park PNHCA
BLM	1	85. <i>Eriogonum umbellatum</i> var <i>glaberrimum</i> - Green buckwheat	
	*	86. <i>Gentiana prostrata</i> - Pygmy gentian	Steens Mountain WA
	*	87. <i>Gentianella tenella</i> ssp <i>tenella</i> - Slender gentian	South Fork Willow Creek RNA
BLM	1	88. <i>Gratiola heterosepala</i> - Boggs Lake hedge-hyssop	
	*	89. <i>Hackelia cronquistii</i> - Cronquist's stickseed	South Alkali PACEC
	*	90. <i>Hackelia ophiobia</i> - Three Forks stickseed	North Fork Owyhee WSR
BLM	2	91. <i>Hymenoxys lemmonii</i> - Cooper's goldflower	
	*	92. <i>Ivesia rhypara</i> var <i>rhypara</i> - Grimy ivesia	Leslie Gulch ACEC
BLM	1	93. <i>Ivesia rhypara</i> var <i>shellyi</i> - Shelly's ivesia	Venator Canyon
	*	94. <i>Kobresia bellardii</i> - Bellard's kobresia	Steens Mountain WA
	*	95. <i>Lepidium davisii</i> - Davis' peppergrass	Palimino Playa
	*	96. <i>Lomatium ravenii</i> - Raven's lomatium	Leslie Gulch ACEC
	*	97. <i>Mentzelia mollis</i> - Smooth mentzelia	Coal Mine Basin RNA
	*	98. <i>Mentzelia packardiae</i> - Packard's mentzelia	Leslie Gulch ACEC

NORTHERN BASIN AND RANGE SPECIAL SPECIES (BR)

Agency	List	Species Name	Present Representation
BLM, PVT	1	99. <i>Mimulus evanescens</i> - Disappearing monkeyflower	<i>Anderson Crossing</i>
BLM, PVT	2	100. <i>Mimulus latidens</i> - Broad-toothed monkeyflower	
BLM, FWS	2	101. <i>Mimulus tricolor</i> - Three-colored monkeyflower	
	*	102. <i>Mirabilis bigelovii</i> var. <i>retrorsa</i> - Bigelow's four-o'clock	Alvord Desert ACEC Borax Lake ACEC
	*	103. <i>Muhlenbergia minutissima</i> - Annual dropseed	Jordan Crater RNA
	*	104. <i>Phacelia gymnoclada</i> - Naked-stemmed phacelia	Pueblo Foothills RNA
	*	105. <i>Phacelia inundata</i> - Playa phacelia	Warner Potholes ACEC Silver Lake RNA
	*	106. <i>Phacelia lutea</i> var <i>mackenzieorum</i> - Mackenzie's phacelia	Leslie Gulch ACEC
BLM	2	107. <i>Pilularia americana</i> - American pillwort	<i>South of Hampton</i>
	*	108. <i>Plagiobothrys salsus</i> - Desert allocarya	Lake Abert ACEC
BLM, PVT	1	109. <i>Pogogyne floribunda</i> - Profuse-flowered pogogyne	<i>Foley Lake</i>
BLM, PVT	1	110. <i>Polyctenium fremontii</i> var <i>confertum</i> - Desert combleaf	
	*	111. <i>Potamogeton diversifolius</i> - Rafinesque's pondweed	Steens Mountain WA
	2	112. <i>Potamogeton foliosus</i> var <i>fibrillosus</i> - Fibrous pondweed	Extirpated
BLM	1	113. <i>Rorippa columbiae</i> - Columbia cress	<i>Malheur Lake Exclosures</i>
	*	114. <i>Salix wolfii</i> - Wolf willow	Steens Mountain WA
	*	115. <i>Saxifraga adscendens</i> ssp <i>oregonensis</i> - Wedge-leaf saxifrage	Little Blitzen RNA
	*	116. <i>Senecio ertterae</i> - Ertter's senecio	Leslie Gulch ACEC
	*	117. <i>Sesuvium verrucosum</i> - Verrucose sea-purslane	Tum Tum Lake RNA
BLM	1	118. <i>Stanleya confertiflora</i> - Biennial stanleya	
	*	119. <i>Stephanomeria malheurensis</i> - Malheur wire-lettuce	South Narrows ACEC
	*	120. <i>Stipa speciosa</i> - Desert needlegrass	Micky Hot Springs ACEC Serrano Point RNA
	*	121. <i>Symphoricarpos longiflorus</i> - Long-flowered snowberry	Whitehorse Basin ACEC Steens Mountain WA
	2	122. <i>Thelypodium brachycarpum</i> - Short-podded thelypody	Probably extirpated
	2	123. <i>Thelypodium howellii</i> ssp. <i>howellii</i> - Howell's thelypody	Probably extirpated

NORTHERN BASIN AND RANGE SPECIAL SPECIES (BR)

Agency	List	Species Name	Present Representation
BLM	1	124. <i>Trifolium leibergii</i> - Leiberg's clover	<i>Drewsey</i>
	*	125. <i>Trifolium owyheense</i> - Owyhee clover	Leslie Gulch ACEC Honeycombs RNA

Acknowledgments

The Natural Heritage Information Center staff and Advisory Council are grateful for the work of all the volunteers and experts who helped make this update of the Natural Heritage Plan possible. In particular, we would like to mention our partnership with the interagency Research Natural Area committee, the staff coordinator Sarah Greene, and all the Forest Service and BLM Natural Area Coordinators who have worked hard to assure this plan remains scientifically valid. Hal Salwasser and other staff from Oregon State University have helped make sure we simply did not just bring forward language from past editions of the plan, but made sure statements were accurate and scientifically valid.

This version of the plan has had some very significant changes, mostly related to the Geology section of the plan, and the way at-risk species were included. The geology update was compiled by Charles Carter under the direction of Ian Madin of the Oregon Department of Geology and Mineral Industries (DOGAMI). Geologists whose ideas and reviews were particularly helpful were Marv Beeson, Gerry Black, Mark Ferns, Margi Jenks, George Priest, Tracy Vallier, and Tom Wiley.

Unlike most previous editions of the plan, there was very little change in the way Ecosystem Cells were treated, aside from the changes related to Oregon's adoption of the new ecoregional scheme. However, all of the Ecosystem Cells were carefully reviewed by a number of U.S. Forest Service area ecologists and agency Research Natural Area coordinators. In addition, Dick Vander Schaaf of The Nature Conservancy spent time assuring that the newly designated natural areas in southeastern Oregon were all represented in this plan.

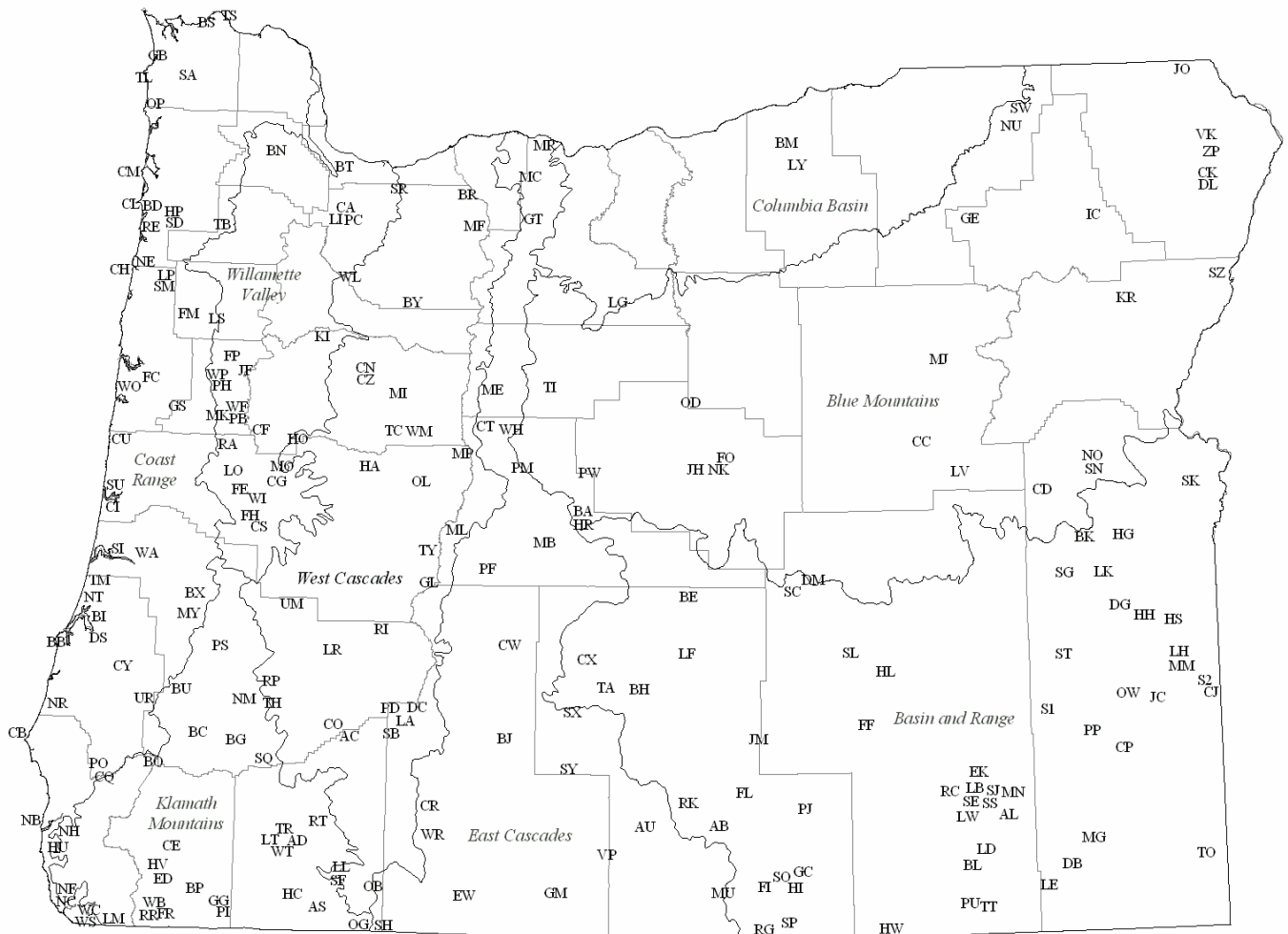
Thanks also to Bob Baily, Mike Graybill, Jan Hodder and David Fox for their work to revise the Marine and Intertidal Ecosystem Cells in the Oregon Coast Range Ecoregion. Bruce Taylor and others at the Oregon Biodiversity Project provided most of the ecoregional descriptions.

Sue Vrilakas and Eric Scheuering of the Oregon Natural Heritage Information Center were responsible for the revision of the special species section. Thanks also go to the many people who helped them to revise the lists of special plant and animals included in this plan. These comments not only helped in the production of this plan, but also in the development of the recently updated ODFW sensitive species list, and the 2001 edition of *Rare, Threatened and Endangered Species of Oregon*.

Literature Cited

- Bailey, R.G. 1995. Descriptions of the Ecoregions of the United States (2nd Edition). Miscellaneous Publication No. 1391, Map scale 1:7,500,000, U.S. Department of Agriculture, Forest Service, 108 pp.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S.D.I. Fish and Wildlife, Biological Services publication, Washington D.C., FWS/OBS-79-31. 103 pp.
- Cox, J., R. Kautz, M. MacLaughlin, and T. Gilbert. 1994. Closing the Gap in Florida's wildlife habitat conservation system. Office of Environmental Services, Florida Fish and Game Commission, Tallahassee. 239 pp.
- Dyrness, C.T., J.F. Franklin, C. Maser, S.A. Cook, J.D. Hall, and G. Faxon. 1975. Research Natural Area Needs in the Pacific Northwest, Contribution to Land-Use Planning. U.S.D.A. Forest Service, PNW Forest and Range Experiment Station, Portland, OR. General Technical Report PNW-38. 231 pp.
- Franklin, J.F. and C.T. Dyrness. 1973. Natural Vegetation of Oregon and Washington. U.S.D.A. Forest Service, PNW Forest and Range Experiment Station, Portland, OR. General Technical Report PNW-8. 231 pp.
- Gregory, S.V. and J.R. Sedell. 1994. Analysis of past, present, and future stresses on the ecological resources of the mid-Willamette Valley, Oregon. Unpublished proposal to EPA.
- Oregon Natural Heritage Program. 2001. Rare, Threatened and Endangered Species of Oregon. Oregon Natural Heritage Program, Portland, Oregon.
- Oregon Ocean Policy Advisory Council. 1994. State of Oregon Territorial Sea Plan. Oregon Department of Land Conservation and Development, Salem, Oregon. 250 pp.
- Scott, J.M., F. Davis, B. Csuti, R. Noss, B. Butterfield, C. Groves, H. Anderson, S. Caicco, F. D'Erchia, T.C. Edwards, Jr., J. Ulliman and R.G. Wright. 1993. Gap analysis: a geographic approach to protection of biological diversity. Wildlife Monographs 123:1-41.
- Starr, R.M. 1979. Oregon Marine and Estuarine Habitat Classification Systems. Oregon Natural Area Preserves Advisory Committee to the State Land Board, Division of State Lands, Salem, Oregon. 48 pp.
- Thorson, T.D., Bryce, S.A., Lammers, D.A., Woods, A.J., Omernik, J.M., Kagan, J.S., Pater, D.E., and Comstock, J.A., 2003. Ecoregions of Oregon (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,500,000).

Appendix A. Established Natural Areas of Oregon



Symbol	Name	Ecoregion	Ownership	Area (ha*)
BA	Badlands ACEC	BM	BLM	6826
BE	Benjamin Pasture RNA	BM	BLM	256
CC	Canyon Creek RNA	BM	USFS	283
CD	Castle Rock ACEC	BM	BLM	9227
CK	Clear Lake Ridge Preserve	BM	TNC	1410
DM	Dry Mountain RNA	BM	BLM/USFS	893
FO	Forest Creeks RNA	BM	BLM	148
GE	Gerald S. Strickler RNA	BM	USFS	72
HR	Horse Ridge RNA	BM	BLM	244
IC	Indian Creek RNA	BM	USFS	396
JO	Joseph Canyon ACEC	BM	BLM	1359
JH	Juniper Hills Preserve	BM	TNC	5682
KR	Keating Riparian RNA	BM	BLM	75
LV	Logan Valley/Oxbow Preserve	BM	TNC	718
MJ	Middle Fork John Day River Preserve	BM	TNC	485
NK	North Fork Crooked River ACEC	BM	BLM	2728
NL	North Fork Malheur River ACEC	BM	BLM	732
NU	North Fork Umatilla River Preserve	BM	TNC	1004
NO	North Ridge Bully Creek RNA	BM	BLM	913
OD	Ochoco Divide RNA	BM	USFS	777

Symbol	Name	Ecoregion	Ownership	Area (ha*)
PM	Pecks Milkvetch ACEC	BM	BLM	17405
PW	Powell Buttes RNA	BM	BLM	204
SZ	Sheep Mountain RNA	BM	BLM	777
SW	South Fork Walla-Walla River ACEC	BM	BLM	508
SN	South Ridge Bully Creek RNA	BM	BLM	795
TI	The Island RNA	BM	BLM/USFS	80
VK	Vance Knoll RNA	BM	USFS	78
ZP	Zumwalt Prairie	BM	TNC	26,320
AB	Abert Lake ACEC	BR	BLM	27605
AL	Alvord Desert ACEC	BR	BLM	6755
BK	Black Canyon RNA	BR	BLM	1131
BH	Black Hills RNA	BR	BLM	1234
BL	Borax Lake Preserve/ACEC	BR	TNC/BLM	340
CJ	Coal Mine Basin RNA	BR	BLM	306
CX	Connley Hills RNA	BR	BLM	1456
CP	Crooked Creek RNA	BR	BLM	429
DB	Dry Creek Bench RNA	BR	BLM	705
DG	Dry Creek Gorge ACEC	BR	BLM	6638
EK	East Kiger Plateau RNA	BR	BLM	502
FI	Fish Creek Rim RNA	BR	BLM	3531
FL	Foley Lake RNA	BR	BLM	902
FF	Foster Flat RNA	BR	BLM	1089
GC	Guano Creek-Sink Lakes RNA	BR	BLM	4532
HH	Hammond Hill Sand Hills RNA	BR	BLM	1502
HL	Harney Lake RNA	BR	FWS	12000
HW	Hawksie-Walksie RNA	BR	BLM	7017
HI	High Lakes ACEC	BR	BLM	15777
HG	Hog Creek Ridge RNA	BR	BLM	364
HS	Honeycombs RNA	BR	BLM	4830
JC	Jordan Craters RNA	BR	BLM	12709
JM	Juniper Mountain RNA	BR	BLM	2564
LK	Lake Ridge RNA	BR	BLM	2227
LH	Leslie Gulch ACEC	BR	BLM	4714
LB	Little Blitzen RNA	BR	BLM	1028
LE	Little Whitehorse Exclosure RNA	BR	BLM	317
LW	Little Wildhorse RNA	BR	BLM	97
LD	Long Draw RNA	BR	BLM	178
LF	Lost Forest RNA	BR	BLM	3595
LF	Lost Forest-Sand Dunes-Fossil Lakes ACEC	BR	BLM	17,488
MM	Mahogany Ridge RNA	BR	BLM	130
MG	Mendi Gore Playa RNA	BR	BLM	1145
MN	Mickey Basin RNA	BR	BLM	227
OW	Owhyee River Below the Dam ACEC	BR	BLM	4548
PP	Palomino Playa RNA	BR	BLM	642
PJ	Poker Jim Ridge RNA	BR	FWS	259
PU	Pueblo Foothills RNA	BR	BLM	1020
RG	Rahilly-Gravelly RNA	BR	BLM	7951
RK	Red Knoll ACEC	BR	BLM	4503
RC	Rooster Comb RNA	BR	BLM	291
S1	Saddle Butte ACEC	BR	BLM	2855
SC	Silver Creek RNA	BR	BLM	259

Symbol	Name	Ecoregion	Ownership	Area (ha*)
SK	South Alkali Sand Hills ACEC	BR	BLM	2247
SG	South Bull Canyon RNA	BR	BLM	552
SJ	South Fork Willow Creek RNA	BR	BLM	92
SO	South Warner Basin Preserve	BR	TNC	741
SP	Spanish Lake RNA	BR	BLM	1902
S2	Spring Mountain RNA	BR	BLM	607
SE	Steens Mountain ACEC	BR	BLM	20427
SS	Steens Mountain Summit NHCA	BR	DSL	191
SL	Stinking Lake RNA	BR	FWS	626
ST	Stockade Mountain RNA	BR	BLM	308
TA	Table Rock ACEC	BR	BLM	2080
TO	Toppin Butte Creek RNA	BR	BLM	1879
TT	Tum Tum Lake RNA	BR	BLM	616
BM	Boardman RNA	CB	DOD	1923
LG	Lawrence Memorial Grassland Preserve	CB	TNC	150
LY	Lindsay Prairie Preserve	CB	TNC	157
BB	Bastendorf Bog Preserve	CR	TNC	4
BS	Blind Slough Swamp Preserve	CR	TNC	91
BD	Bradley Bog Preserve	CR	TNC	19
BX	Brads RNA	CR	BLM	20
BI	Bull Island NHCA	CR	DSL	173
CB	Cape Blanco NHCA	CR	OPRD	124
CL	Cape Lookout/Netarts Sand Spit NHCA	CR	OPRD	221
CM	Cape Meares NHCA/RNA	CR	OPRD/FWS	66
CH	Cascade Head Preserve	CR	TNC	109
CY	Cherry Creek RNA	CR	BLM	226
CQ	Coquille River Falls RNA	CR	USFS	202
CI	Cox Island Preserve	CR	TNC	76
CU	Cummins-Gynne RNA	CR	USFS	2631
DS	Davis Slough NHCA	CR	DSL	24
FM	Fanno Meadows Preserve	CR	TNC	241
FC	Flynn Creek RNA	CR	USFS	271
GB	Gearhart Bog Preserve	CR	TNC	19
GS	Grass Mountain RNA	CR	BLM	295
HP	High Peak-Moon Creek RNA	CR	BLM	618
HU	Hunter Creek Bog ACEC	CR	BLM	288
LP	Lost Prairie ACEC	CR	BLM	23
MY	Myrtle Island RNA	CR	BLM	11
NB	Nesika Beach Preserve	CR	TNC	16
NE	Neskowin Crest RNA	CR	USFS	476
NR	New River ACEC	CR	BLM	454
NH	North Fork Hunter Creek ACEC	CR	BLM	770
NT	North Spit ACEC	CR	BLM	290
OP	Onion Peak Preserve	CR	TNC	17
PO	Port Orford Cedar RNA	CR	USFS	454
RE	Reneke Creek RNA	CR	USFS	194
SA	Saddle Mountain NHCA	CR	OPRD	669
SM	Saddleback Mountain RNA	CR	BLM	61
SD	Sand Lake RNA	CR	USFS	97
SI	Smith Island NHCA	CR	DSL	5
SU	Sutton Lake Preserve	CR	TNC	6
TS	Tenasillahe Island RNA	CR	FWS	75

Symbol	Name	Ecoregion	Ownership	Area (ha*)
TM	Tenmile RNA	CR	USFS	482
TL	Tillamook Head Preserve	CR	TNC	365
TB	The Butte RNA	CR	BLM	16
UR	Upper Rock Creek ACEC	CR	BLM	188
WA	Wassen Creek ACEC	CR	BLM	1358
WS	Winchuck Slope NHCA	CR	DSL	78
WO	Woahink Bog	CR	TWC	16
AU	Augur Creek RNA	EC	USFS	
BJ	Blue Jay RNA	EC	USFS	325
CT	Cache Mountain RNA	EC	USFS	596
CW	Cannon Well RNA	EC	USFS	270
CR	Cherry Basin RNA	EC	USFS	3900
EW	Ewauna Flat Preserve	EC	TNC	4
GM	Goodlow Mountain RNA	EC	USFS	510
GT	Gumjuwac-Tolo RNA	EC	USFS	1440
MR	McCall Preserve at Rowena	EC	TNC	93
ME	Metolius River Preserve/RNA	EC	TNC/USFS	545
MC	Mill Creek Ridge RNA	EC	USFS/BLM	379
MB	Mokst Butte RNA	EC	USFS	506
MU	Mud Creek Preserve	EC	TNC	200
OB	Old Baldy RNA	EC	BLM	219
PF	Pringle Falls RNA	EC	USFS	545
SH	Scotch Creek RNA	EC	BLM	728
SX	Silver Lake Exclosure RNA	EC	USFS	119
SY	Sycan Marsh Preserve	EC	TNC	9423
VP	Vee Pasture RNA	EC	USFS	304
WH	Wildhaven Preserve	EC	TNC	65
WR	Williamson River Delta Preserve	EC	TNC	2953
YB	Yainax Butte ACEC	EC	BLM	286
AD	Agate Desert Preserve	KM	TNC	20
AS	Ashland RNA	KM	USFS	570
BG	Bear Gulch RNA	KM	BLM	134
BC	Beatty Creek RNA	KM	BLM	294
BO	Bobby Creek RNA	KM	BLM	689
BP	Brewer Spruce RNA	KM	BLM	645
BU	Bushnell-Irwin Rocks RNA	KM	BLM	388
CE	Cedar Log Flat RNA	KM	USFS	166
ED	Eight Dollar Mountain Preserve/ACEC	KM	TNC/BLM	518
FR	French Flat ACEC	KM	BLM	266
GG	Grayback Glade RNA	KM	BLM	433
HC	Holton Creek RNA	KM	BLM	171
HV	Hoover Gulch RNA	KM	USFS	511
LM	Lemmingsworth Gulch	KM	USFS	495
LL	Lost Lake RNA	KM	BLM	155
LT	Lower Table Rock Preserve	KM	TNC	761
NC	North Fork Chetco River ACEC	KM	BLM	241
NF	North Fork Silver Creek RNA	KM	BLM	499
NM	North Myrtle Creek RNA	KM	BLM	288
OG	Oregon Gulch RNA	KM	BLM	424
PI	Pipe Fork RNA	KM	BLM	214
PS	Popcorn Swale Preserve	KM	TNC	12
RR	Rough and Ready Creek Preserve/ACEC	KM	TNC/BLM	495

Symbol	Name	Ecoregion	Ownership	Area (ha*)
RT	Round Top Butte Preserve/RNA	KM	TNC/BLM	302
SF	Sharon Lake Fen Preserve	KM	TNC	729
SQ	Squaw Flat RNA	KM	USFS	226
TR	Table Rocks ACEC	KM	BLM	502
WC	Wheeler Creek RNA	KM	USFS	135
WT	Whetstone Savanna Preserve	KM	TNC	58
WB	Woodcock Bog RNA	KM	BLM	112
AC	Abbott Creek RNA	WC	USFS	1077
BY	Bagby RNA	WC	USFS	227
BR	Bull Run RNA	WC	USFS	146
CN	Carolyn's Crown RNA	WC	BLM	105
CO	Cougar Butte RNA	WC	USFS	1047
CZ	Crabtree-Shafer Creek ONA/RNA	WC	BLM	389
DC	Desert Creek RNA	WC	NPS	757
GL	Gold Lake Bog RNA	WC	USFS	188
HA	Hagan RNA	WC	USFS	456
HO	Horse Rock Ridge RNA	WC	BLM	153
LR	Limpy Rock RNA	WC	USFS	760
LA	Llao Rock RNA	WC	NPS	176
ML	Many Lakes RNA	WC	USFS	260
MP	McKenzie Pass RNA	WC	USFS	480
MI	Middle Santiam RNA	WC	USFS	463
MF	Multorpor Fen Preserve	WC	TNC	36
OL	Ollalie Ridge RNA	WC	USFS	291
PD	Pumice Desert RNA	WC	NPS	1236
RP	Red Ponds RNA	WC	BLM	54
RI	Rigdon Point RNA	WC	USFS	185
SB	Sphagnum Bog RNA	WC	NPS	69
TH	Tater Hill RNA	WC	BLM	181
TC	Three Creeks RNA	WC	USFS	280
TY	Torrey-Charlton RNA	WC	USFS	1145
UM	Upper Elk Meadows RNA	WC	BLM	90
WM	Wildcat Mountain RNA	WC	USFS	623
BN	Banks Swamp	WV	Metro	75
BT	Beggars Tick Marsh	WV	Metro	2
CS	Camas Swale RNA	WV	BLM	127
CA	Camassia Preserve	WV	TNC	10
CG	Coburg Ridge Preserve	WV	TNC	575
CF	Cogswell-Foster Preserve	WV	TNC	36
FE	Fern Ridge RNA	WV	ACE	47
FP	Forest Peak RNA	WV	BLM	54
FH	Fox Hollow RNA	WV	BLM	65
JF	Jackson Frazier Wetlands	WV	Benton Co.	53
KI	Kingston Prairie Preserve	WV	TNC	52
LI	Little Rock Island Preserve	WV	TNC	11
LS	Little Sink RNA	WV	BLM	32
LO	Long Tom ACEC	WV	BLM	3
MK	Maple Knoll RNA	WV	FWS	40
MO	Mohawk RNA	WV	BLM	119
PC	Peach Cove Fen	WV	Metro	10
PH	Philomath Preserve	WV	TNC	52
PB	Pigeon Butte RNA	WV	FWS	28

Symbol	Name	Ecoregion	Ownership	Area (ha*)
RA	Rattlesnake Butte Preserve	WV	TNC	20
SR	Sandy River Gorge Preserve/ACEC	WV	TNC/BLM	537
WL	Wilhoit Springs ACEC	WV	BLM	69
WF	Willamette Floodplain RNA	WV	FWS	210
WI	Willow Creek Preserve	WV	TNC	135
WP	Wren Prairie Preserve	WV	TNC	6

1 hectare = 2.48 acres

Appendix B. Oregon Protected Areas in Plan

Name	Ecoregion	Ownership
Bald Hill Park	WV	Benton Co.
Baldy Mountain PRNA	BM	FS
Basin Creek PRNA	BM	FS
Baskett Slough NWR	WV	FWS
Big Bend Mountain PRNA	WC	FS
Big Marsh	EC	FS
Big Marsh Headwall	EC	FS
Blacklock Point PNHCA	CR	PRD
Bob Creek PRNA	BM	FS
Boiler Bay PNHCA	CR	PRD
Buford County Park	WV	Lane Co.
Burlington Bottoms	WV	OFW
Bushnell-Irwin Rocks ACEC	KM	BLM
Cape Kiwanda PNHCA	CR	PRD
Cape Perpetua PNHCA	CR	PRD
Cascade Siskiyou NM	KM	BLM
Columbia WA	WC	FS
Cougar Meadow PRNA	BM	FS
Craig Mountain Lake PRNA	BM	FS
Crook Point NWR	CR	FWS
Crook Point/Mack Reef	CR	DSL
Crooked Creek PNHCA	BR	PRD
Crump Lake PNHCA	BR	DSL
Cultus River PRNA	EC	FS
Diamond Craters ACEC	BR	BLM
Dixie Butte PRNA	BM	FS
Drift Creek WA	CR	FS
Dry Creek Bench PRNA	BR	BLM
Dry Creek Buttes	BR	BLM
Duck Lake PRNA	BM	FS
Dugout Creek PRNA	BM	FS
Eagle Cap WA	BM	FS
Elk Flats-Wenaha PRNA	BM	FS
Fir Groves PACEC	BR	BLM
Fish Creek Meadows - Steens Mountain WA	BR	BLM
Gary, Flagg and Chatham Islands PNHCA	WV	METRO
Goat Island PNHCA	CR	DSL
Grassy Mountain ACEC	WC	BLM
Guano Slough PRNA	BR	BLM

Name	Ecoregion	Ownership
Harney Hot Springs	BR	BLM/FWS
Hart Canyon PRNA	BR	FWS
Haystack Butte PRNA	BM	BLM
Haystack Rock PNHCA	CR	PRD
Heceta Dunes ACEC	CR	BLM
Hells Canyon WA	BM	FS
Hidden Lake-Lulu Lake SIA	WC	FS
Horsepasture Ridge PRNA	BM	BLM
Humbug Mountain State Park	CR	PRD
Humbug Mountain - Lookout Rock PNHCA	CR	DSL
Hunter Creek Bog ACEC/SIA	CR	BLM/FS
Hurricane Creek-Eagle Cap WA	BM	FS
Jackson-Frazier Wetland	WV	Benton Co.
Kalmiopsis WA	KM	FS
Katsuk Butte PRNA	EC	FS
Kelly Creek Butte PRNA	BM	FS
Ladd Marsh PNHCA	BM	OFW
Lake Abert ACEC	BR	BLM
Lake Fork PRNA	BM	FS
Lake Marie - Umpqua Lighthouse State Park PNHCA	CR	PRD
Luckiamute River PNHCA	WV	PRD
McCully-East Peak PRNA	BM	FS
Menagerie WA	WC	FS
Mickey Hot Springs ACEC	BR	BLM
Middle Santiam River Terrace ACEC	WC	BLM
Mill Creek PRNA	BM	FS
Mountain Lakes WA	WC	FS
Mt. Hood WA	WC	FS
Mt. Jefferson WA	WC	FS
Mt. Joseph PRNA	BM	FS
N. Fk. Chetco River ACEC	CR	BLM
N. Fork Crooked River ACEC	BM	BLM
Nebo Lookout Ridge PRNA	BM	FS
Neskowin Marsh-Nestucca Bay NWR	CR	FWS
North Cove - Cape Arago PNHCA	CR	PRD
Oliver Mathews PRNA	KM	FS
Ophir Dunes PNHCA	CR	DOT
Oregon Caves NM	KM	NPS
Otter Crest PNHCA	CR	PRD
Painted Hills - John Day Fossil Beds NM	BM	NPS
Pleasant Valley PRNA	BM	FS
Point Prominence PRNA	BM	FS

Name	Ecoregion	Ownership
Ponderosa Pine PACEC	WV	BLM
Poverty Flat ACEC	KM	BLM
Razz Lake PRNA	BM	FS
Red Mountain PRNA	KM	FS
Rogue Reef PNHCA	CR	DSL
Rooster Rock PNHCA	WV	PRD
Russian Island PRNA	CR	FWS
South Fork Walla-Walla River ACEC	BM	FS
Salmon-Huckleberry WA	WC	FS
Serrano Point ACEC	BR	BLM
Shaketable PRNA	BM	FS
Sheep Rock RNA	BM	NPS
Silver Creek PRNA	BM	FS
Simpson Reef PNHCA	CR	DSL
Siskiyou Pass ACEC	KM	BLM
Sky Lakes WA	WC	FS
Slickrock Creek - Eagle Cap WA	BM	FS
South Slough PNHCA	CR	DSL
Standley PRNA	BM	FS
Steens Mountain WA	BR	BLM
Stinger Creek PRNA	BM	FS
Strawberry Mountain PRNA	BM	FS
Strawberry Mountain WA	BM	FS
Succor Creek PNHCA	BR	PRD
Sunset Beach PNHCA	CR	PRD
Tenderfoot Basin PRNA	BM	FS
Tenmile Closure Area	CR	FS
Three Sisters WA	WC	FS
Umpqua Lighthouse State Park	CR	PRD
Vinegar Hill PRNA	BM	FS
Waldo WA	WC	FS
Wechee Butte PRNA	EC	FS
Wenaha-Tucannon WA	BM	FS
West Sand Island PRNA	CR	ACE
Wickiup Springs PRNA	WC	FS
Yachats PNHCA	CR	DSL

Appendix C. Oregon Natural Heritage Act, As Amended

273.563 Definitions for ORS 273.563 to 273.591. As used in ORS 273.563 to 273.591, unless the context requires otherwise:

- (1) "Agency" means a local, state or federal agency, board, commission or department.
- (2) "Board" means the State Land Board.
- (3) "Candidate natural area" means a natural resource area that may be considered for registration or dedication.
- (4) "Commodity" means timber, minerals, livestock, agricultural products or any other product of the land which is an important economic resource.
- (5) "Council" means the Natural Heritage Advisory Council established in ORS 273.571.
- (6) "Data bank" means the Natural Heritage Program element inventory of element classification, data analysis, priority setting, owner and other data provided in ORS 273.576 (1)(a).
- (7) "Dedicate" means the formal recognition and protection of a natural area for natural heritage conservation purposes.
- (8) "Elements" means both the natural heritage resources and the special species.
- (9) "Instrument" means any written document intended to convey an interest in real property under ORS 93.710, or an agreement between parties according to the Natural Heritage Program or the Oregon Natural Heritage Plan.
- (10) "Natural area" means a unit of land or water or both that may be considered for dedication under ORS 273.563 to 273.591 and that has substantially retained its natural character, or, if altered in character, shall in addition to its natural heritage resource values, be valuable as habitat for plant and animal species or for the study and appreciation of the natural features.
- (11) "Natural heritage conservation area" means an area dedicated under the provisions of ORS 273.586.
- (12) "Natural heritage resources" means the terrestrial ecosystem types, aquatic ecosystem types and unique geologic types as defined in the Oregon Natural Heritage Plan or a unit of land or water that contains a natural resource.
- (13) "Plan" means the Oregon Natural Heritage Plan established under ORS 273.576, which governs the Natural Heritage Program in selecting areas for natural heritage conservation.
- (14) "Program" means the Natural Heritage Program as established in ORS 273.566.
- (15) "Register" means the Oregon Register of Natural Heritage Areas established under ORS 273.581.
- (16) "Special species" means those species of plants and animals determined by the council to be significant in value in a natural heritage conservation area and defined in the Oregon Natural Heritage Plan. [1983 c.786 §2; 2001 c.114 §1]

273.566 Legislative findings.

(1) The Legislative Assembly finds that many valuable natural heritage elements are represented in natural areas which can be protected through the voluntary cooperation of private landowners and public land managers. These areas will comprise a discrete and limited system of natural heritage conservation areas which are selected to represent the full range of Oregon's natural heritage resources. These areas shall have substantially retained their natural character, or, if altered in character, shall in addition to their natural heritage resource values be valuable as habitat for plant and animal species or for the study and appreciation of the natural features. As such they will be living museums for scientific research, educational purposes and nature interpretation.

(2) The Legislative Assembly also finds that it is necessary to establish a process and means for public and private sector cooperation in the development of this system of conservation areas. Private landowners and public land managers should be encouraged to voluntarily participate in the program through conservation activities which benefit all Oregonians.

(3) In order to assure that natural heritage conservation activities cause the minimum of conflict with other resource uses and that they are cost effective, the Legislative Assembly finds that the Natural Heritage Advisory Council should provide a specific framework for natural heritage conservation decision making through a classification and planning process known as the Natural Heritage Program. Future natural heritage conservation areas should avoid unnecessary duplication of already protected natural heritage elements. Each natural heritage conservation decision should address alternative methods of accomplishing the same purpose and should consider cost effectiveness.

(4) The Legislative Assembly recognizes that there is a need for systematic, accessible information concerning the locations of the resources of Oregon's natural heritage including special plant and animal species, native terrestrial ecosystems, aquatic ecosystems, and geologic features, and especially including the areas already protected that contain these elements.
[1979 c.711 §2; 1983 c.786 §3]

273.571 Natural Heritage Advisory Council; members; terms; qualifications; compensation; duties; rules; property gifts and donations.

(1) The Natural Heritage Advisory Council is hereby established. The council shall consist of 17 members, nine of whom shall be chosen as follows and who shall elect from its membership a chairperson:

(a) Four individuals, appointed by the Governor, shall be recognized experts in the ecology of natural areas. Desirable fields of expertise are botany, zoology, terrestrial ecology, aquatic biology and geology; and

(b) Five citizens, appointed by the Governor, shall be selected from the various regions of the state. These members shall have interest in natural resource conservation, management or the commodity use of natural resources.

(2) Appointed members shall serve for four-year terms.

(3) In addition to the nine members appointed by the Governor, the State Fish and Wildlife Director, the State Forester, the Director of Transportation, the Chancellor of the Oregon University System, the Director of Agriculture, the State Parks and Recreation Director, the State Geologist and the Director of the Division of State Lands or an authorized representative of each such officer, shall serve as ex

officio, nonvoting members of the council.

(4) Any vacancy on the council shall be filled by appointment of the Governor.

(5) Members of the council shall serve without compensation, but the State Land Board may pay the expenses reasonably incurred by the council in the performance of its functions upon presentation of vouchers signed by the chairperson of the council pursuant to ORS 292.495.

(6) The council shall:

(a) Meet at least quarterly;

(b) Develop policy for the Natural Heritage Program through the review and approval of the Oregon Natural Heritage Plan;

(c) Review nominations for registration and the voluntary dedication of natural heritage conservation areas, and approve instruments of dedication for such areas;

(d) Advise the State Land Board, State Board of Forestry, State Fish and Wildlife Commission, State Parks and Recreation Commission, State Board of Higher Education and Oregon Transportation Commission regarding areas under their respective jurisdictions which are appropriate for dedication; and

(e) Advise the board in the adoption of rules that it considers necessary in carrying out ORS 273.563 to 273.591.

(7) The board shall adopt any rules pursuant to ORS 183.310 to 183.550 that it considers necessary to carry out ORS 273.563 to 273.591.

(8) Acting through the Division of State Lands, the council may accept gifts or donations of real property. Such real property shall be held in the name of the State of Oregon by the State Land Board and shall be used for the purpose of carrying out the provisions of ORS 273.563 to 273.591. [1979 c.711 §3; 1983 c.786 §4; 1987 c.172 §1; 1989 c.63 §1; 1991 c.121 §1; 1993 c.741 §24; 1997 c.632 §3; 1999 c.238 §1]

273.576 State Land Board duties; Oregon Natural Heritage Plan; contents; implementing plan.

(1)(a) The State Land Board, with the assistance of the Natural Heritage Advisory Council, shall maintain a natural heritage office to provide assistance in the selection and nomination of areas containing natural heritage elements for registration or dedication. The office shall maintain a classification of natural heritage elements, an inventory of their locations and a data

bank for such information. All data obtained after October 3, 1979, through personal observation on private land shall be entered into the data bank only with the written permission of the landowner.

(b) The Oregon Natural Heritage Plan established by ORS 273.578 shall govern the Natural Heritage Program in the conduct of activities to create and manage a system of natural heritage conservation areas which are complementary to and consistent with the research natural area program on federal lands in Oregon. This plan lists the natural heritage elements that should be represented on the Oregon Register of Natural Heritage Areas and in natural heritage conservation areas and provides criteria for the selection and approval of candidate natural areas for registration and dedication under ORS 273.563 to 273.591. In selecting natural heritage conservation areas, the inclusion of natural heritage resources, and especially those which are not adequately protected elsewhere, shall be given primary consideration. Inclusion and protection of special species shall be an important additional consideration in selecting natural heritage conservation areas, and wherever possible, individual species shall be protected in association with natural heritage resources or in assemblages of those species determined by the council to have special significance.

(2) The board may advise owners of natural heritage conservation areas concerning the management and use of such areas and may make available to state, federal and local agencies that manage lands within Oregon, information concerning the conservation of natural heritage elements.

(3) The board may apply for and accept grants, contributions and assistance from any federal, state or local government agency and any foundation, individual or organization for the purpose of carrying out the provisions of ORS 273.563 to 273.591.

[1979 c.711 §5; 1983 c.786 §5]

273.578 Plan approval; review of modifications by board.

(1) The Sixty-first Legislative Assembly approves the Oregon Natural Heritage Plan submitted under ORS 273.576.

(2) The State Land Board may review and approve or disapprove any modification to the plan submitted by the Natural Heritage Advisory Council.

[1981 c.208 §§2,3; 1983 c.786 §6]

273.581 Natural heritage areas register; contents; agreements between board and landowners.

(1) The Natural Heritage Advisory Council shall maintain a state register of areas containing significant natural heritage elements to be called the Oregon Register of Natural Heritage Areas.

(2) The council shall from time to time identify areas from the natural heritage data bank which qualify for registration. Priority shall be based on the Oregon Natural Heritage Plan and shall generally be given to those elements which are rarest, most threatened or underrepresented in the heritage conservation system on a statewide basis. Natural heritage conservation areas shall not unnecessarily duplicate resources or special species already adequately protected by other methods of land protection. Whenever feasible, areas that qualify for registration shall be located on lands which have been allocated primarily to special noncommodity uses.

(3) The council shall review each registration proposal, including the landowner's written permission for registration if the area is located on privately owned land.

(4) After review by the council, the State Land Board may place sites onto the register or remove sites from the register.

(5) A voluntary management agreement may be developed between the board and the owners of the sites on the register.

[1979 c.711 §6; 1983 c.786 §7]

273.586 Dedication of land for natural heritage conservation purposes; notice and hearing; termination of dedication.

(1) A private individual or organization which is the owner of any registered natural area may voluntarily agree to dedicate that area as a natural heritage conservation area by executing with the State Land Board an instrument of dedication. The instrument of dedication shall be effective upon its recording in the real property records of the office of the clerk of the county in which any or all of the natural heritage conservation area is located.

(2) Any public agency may dedicate lands under the provisions of ORS 273.563 to 273.591 following the providing of opportunity for adequate public notice and hearing by the agency. The Oregon Transportation Commission, the State Fish and Wildlife Commission,

the State Board of Forestry, the State Board of Higher Education, the State Parks and Recreation Commission and the State Land Board shall, with the advice and assistance of the Natural Heritage Advisory Council, establish procedures for the dedication of natural heritage conservation areas on land, the title of which is held by the State of Oregon, and which is under that agency's management and control.

(3) The instrument of dedication shall contain any information or provisions as the private owner, organization or agency and council consider necessary to complete the dedication.

(4) Dedication of a natural heritage conservation area may be terminated as follows:

(a) The dedication of a natural heritage conservation area by a public agency may be terminated following the providing of opportunity for adequate public notice and hearing and a finding by that agency of an imperative and unavoidable necessity, or a finding by that agency, with the approval of the council, that the natural heritage conservation area is no longer needed according to the guidelines of the Oregon Natural Heritage Plan.

(b) The dedication of a natural heritage conservation area by a private individual or organization may be terminated by the private individual or organization after the council is assured that there has been compliance with the procedures required by the terms of the dedication instrument.

(c) The dedication of a natural heritage conservation area may be terminated by the board upon the advice of the council if the area is no longer needed according to the guidelines of the plan, or has permanently lost its natural character.

[1979 c.711 §7; 1983 c.786 §8; 1991 c.121 §2]

273.591 Natural Heritage Program Account. The Natural Heritage Program Account is established within the General Fund of the State Treasury. All moneys received by the State Land Board for the purposes of ORS 273.563 to 273.591 shall be paid into the State Treasury and credited to the account. All moneys in the account are continuously appropriated for the use of the board in carrying out the provisions of ORS 273.563 to 273.591.

[1979 c.711 §8]

Codes and abbreviations used in the Natural Heritage Resource lists (pages 39-153)

Priority for Ecological and Geological Cells**Code**

High	H
Moderate	M
Low	L
Unknown	U
Protected adequately at the listed site or sites	*
Adequately protected at the listed site or sites, when final designation is completed	+
Only partially protected due to designation, size, or quality at this site	<

Priority for Species

Species Threatened or Endangered Throughout Their Range (ORNHIC List 1)	1
Species Threatened or Endangered in Oregon, but More Common Elsewhere (List 2)	2
Protected adequately at the listed site or sites	*
Adequately protected at the listed site or sites, when final designation is completed	+

Potential Acting Agency

Private Lands	PVT
Oregon Department of Forestry	ODF
Oregon Department of Transportation	DOT
Oregon Division of State Lands	DSL
Oregon Department of Fish and Wildlife	OFW
Oregon Parks and Recreation Department	PRD
Army Corps of Engineers	ACE
Bureau of Land Management	BLM
Department of Defense	DOD
National Park Service	NPS
U.S. Fish & Wildlife Service	FWS
U.S. Forest Service	FS

Present Representation

Area of Critical Environmental Concern (BLM designation only)	ACEC
Federal Research Natural Area (Federal Agencies)	RNA
Natural Heritage Conservation Area (State Agencies)	NHCA
Proposed designation (for the three agency designations above)	P....
National Monument (Federal Agencies)	NM
National Recreation Area	NRA
National Wildlife Refuge (U.S. Fish and Wildlife Service)	NWR
The Nature Conservancy Preserve	(TNC)
Wilderness Area (Federal Agencies)	WA
Wilderness Study Area (Federal Agencies, primarily BLM)	WSA
Wild and Scenic River (Federal Agencies)	WSR
Wildlife Managment Area	WMA
Special Interest Area	SIA
Sites recommended as best example of cell (site name in italics)	<i>Italics</i>
