



WASHINGTON STATE DEPARTMENT OF TRANSPORTATION



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Conservation Opportunity Framework

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Introduction

This chapter provides additional information about the development and intended use of the Conservation Opportunity Framework introduced in Chapter 3, Strategies 1.1 – 1.3. This framework establishes criteria for assessing both conservation value and risk, from a regional perspective, and for developing maps to display these criteria graphically across the landscape. The maps are intended to be used together with other information sources to guide investments in acquisition, management, and stewardship activities on the land.

Maps provide guidance on where to invest

The maps that the Biodiversity Council generated under this framework are intended to provide guidance on where to invest in conservation activities. They are based on ecoregional assess-

ments, the best and most recent statewide analysis of Washington’s biodiversity as it is currently understood¹, and on projections of future population growth and land use.

The maps are best viewed as illustrating a range of *opportunities* for voluntary and collaborative approaches, where people and organizations can work together to conserve biodiversity and maintain working lands and other important cultural attributes of a landscape. It is important to recognize that “conserve” is a multi-faceted verb, not limited to land acquisition. Conservation activities can range from individual actions, such as creating a backyard wildlife habitat or making informed shopping decisions, to system-wide changes, such as a community employing biodiversity-conscious land use planning measures or building innovative conservation markets. Please see the sidebar for a list of other types of possible approaches.

The maps show opportunities to conserve not only the rarest species or the richest habitats, but also to maintain common species and ecosystems. The methodology and criteria were designed in part to identify a full range of important habitats, and to help avoid future conservation crises.

Conservation Approaches

Conservation efforts can involve many different activities, including but not limited to:

- Best management practices
- Adaptive management
- Scientific inquiry and research
- Citizen science efforts
- Monitoring
- Invasive species control
- Restoration
- Mitigation
- Acquisition
- Conservation easements
- Education and technical assistance
- Land use planning
- Landowner incentives
- Recognition
- Transfer or purchase of development rights
- Conservation markets

Considerations in using the maps

While these maps do a good job of identifying areas of priority from an ecoregional perspective, they are not designed to replace more detailed or specialized assessments, and they do not prescribe specific actions or strategies. They are not intended to be used as the sole source for planning conservation initiatives.

For example, the recently completed assessment of freshwater systems (see p. 112) in the state is a tool that could be used to enhance the level of detail of these maps.² Similarly, information from the Washington Natural Heritage Program, Washington Department of Fish and Wildlife, and other agencies can help provide context and nuance to these maps.

The conservation opportunity maps also do not substitute for local conservation priorities. Some areas may have features important to local residents or communities, but the areas would not necessarily be indicated as high priorities from an ecoregional perspective. Such an area might be smaller than the landscape units measured on the map.

Conditions in Washington are changing rapidly, and these maps will need to be periodically updated. They rely on our current knowledge about biodiversity and about projected population growth. Rather than being static, the maps should be viewed as a dynamic tool, responsive to increased knowledge.

The Council emphasizes that all areas of the state can contribute to biodiversity conservation, no matter how an area ranks on these maps. The maps provide a high-level comprehensive look at a wide range of species, plant communities, and ecological systems in seven of Washington's nine ecoregions.

Methodology for Developing the Conservation Opportunity Maps

Ecoregions as the landscape unit for the Framework

The Council chose ecoregions as the basis for the Conservation Opportunity Framework, and it developed criteria for biodiversity significance and risk to construct the Conservation Opportunity maps. Maps have been developed for seven of the nine ecoregions in Washington State. The Blue Mountains and Canadian Rockies ecoregions' Conservation Opportunity Maps have yet to be completed.

Ecoregions represent a practical unit to use for this framework because they are large enough to encompass populations of species and can help address habitat fragmentation, i.e., the breaking up of a habitat into unconnected patches, which is one of the major causes of biodiversity decline. An ecoregional focus also provides a means for planners to consider conservation on a scale larger than a single watershed or locality. Such a focus enables planners to address regional needs such as connectivity, which is important for wildlife corridors and is a key component of future biotic responses to climate change. Looking at regionally important areas also allows local conservation efforts to understand where and how their efforts contribute to conservation in the larger landscape.

Ecoregions are relatively large geographic areas of land and water, with shared characteristics of climate, vegetation, geology and other ecological and environmental patterns.

Washington's ecoregional assessments are part of a national and international effort. Geographic information systems (GIS) are supplemented with expert local and regional knowledge.

² Skidmore, P.B. 2006. Assessment of Freshwater Systems in Washington State. The Nature Conservancy, Seattle, WA

The Council has analyzed biodiversity significance, future risks, and conservation opportunities for seven of the state's nine ecoregions. As detailed below, the *biodiversity significance* analysis reveals low, medium, and high values for native biodiversity from an ecoregional perspective. The *future risk* analysis indicates low, medium, and high likelihood of increased development pressure in the next 30 years. The overlay of data from these two analyses constructs a map of *conservation opportunities*.

Biodiversity Significance

Data Source: Ecoregional Assessments

The maps of biodiversity significance are based on products from ecoregional assessments that have been completed for seven of Washington's nine ecoregions. The Washington ecoregional assessments are part of a national and international effort, and they were developed in a multi-year collaboration among the Washington Department of Fish and Wildlife, Washington State Department of Natural Resources, The Nature Conservancy, and The Nature Conservancy of Canada.³

Washington's ecoregional assessments were developed over a 10-year period. The methodology evolved during this time and the landscape units differ.

Watersheds are used in these ecoregional assessments:

- Northwest Coast
- West Cascades
- East Cascades

Hexagons are used in these ecoregional assessments:

- Puget Trough
- North Cascades
- Okanogan
- Columbia Plateau

The ecoregional assessments use geographical information systems (GIS) analyses supplemented with expert local and regional knowledge. The participating specialists represented a diverse array of organizations, agencies, and institutions.

The Washington ecoregional assessments were developed over a 10-year period. The methodology evolved during this time and as a result the landscape units used for the assessments differ. Watersheds were used in three of the ecoregions (Pacific Northwest Coast, West Cascades, East Cascades), and hexagon-shaped units were used in the Puget Trough, North Cascades, Okanogan, and Columbia Plateau assessments. The Puget Trough land and nearshore hexagons are a little over one square mile (741 acres or 300 hectares), and the North Cascades, Okanogan, and Columbia Plateau hexagons

are a little less than two square miles (1235 acres or 500 hectares).⁴ Grid cells (988 acres or 400 acres) were used for the nearshore areas of the Pacific Northwest Coast.

The Canadian Rockies and the Blue Mountains ecoregions extend only a small way into Washington. Conservation opportunity maps have not yet been completed.

The areas that were analyzed, whether they are watersheds or hexagons, do not represent ownership, nor do they reflect actual parcels of land.

Measures of Biodiversity Significance

Three commonly accepted measures of biodiversity significance are richness, rarity, and representation.⁵

Richness is the number of target species, plant communities, or ecological systems present in a given area. Common species are captured with this measure.⁶

³ Washington Science and Planning Web Portal, <http://www.waconservation.org>, last accessed August 2007.

⁴ Jesse Langdon and Molly Ingraham, The Nature Conservancy, personal communication (August–November 2007)

⁵ G. F. Wilhere and H. Wang, *CVI: Conservation Value Indices – User's Manual and ArcGIS Script* (Olympia, Wash.: Washington Department of Fish and Wildlife, 2006).

⁶ The data sets used for these maps looked for richness of common ecological systems in a watershed or hexagon. These ecological systems serve as an umbrella for common species and plant communities. Molly Ingraham, The Nature Conservancy, 8/07, personal communication.



THE NATURE CONSERVANCY

Richness

The Olympic Peninsula is one example of Washington’s biodiversity richness. It has a high number of organisms and varied ecosystems that range from ocean beaches to alpine meadows.

Rarity can refer to rare or imperiled species, plant communities, or ecological systems. Factors that characterize rarity are population size, geographic range, and habitat specificity.⁷ If rare species, plant communities, or ecological systems occur in a watershed or hexagon, that will increase its score for biodiversity significance.



SHARON DAVIS

Rarity in a Species

The Greater sage-grouse has been declining in Washington primarily due to loss of habitat through conversion to cropland and degradation of habitat by the invasion of cheat grass and other weeds. The population is estimated to have declined 62% from 1970 to 2003. Sage-grouse currently occur on about 8% of their historical range in the state.

Washington Department of Fish and Wildlife, 2003. Final Sage-grouse Recovery Plan: Executive Summary. http://wdfw.wa.gov/wlm/diversty/soc/recovery/sage_grouse/index.htm, last accessed August 2007.



THE NATURE CONSERVANCY

Rarity in a Plant Community

Oak woodlands are a rare plant community in Washington State. Prior to the 1850s, Native Americans regularly set fire to the prairies. This maintained the special flora; the lack of this treatment contributes to the plant community’s rarity by allowing trees like Douglas-fir to crowd out the oak communities. Oak woodlands are also rare because they have been converted to housing and farms, and they are susceptible to invasive species such as Scotch broom.

Chappell, C.B. 2006. Upland plant associations of the Puget Trough ecoregion, Washington. Natural Heritage Rep. 2006-01. Washington Department of Natural Resources, Natural Heritage Program, Olympia, Wash. <http://www.dnr.wa.gov/nhp/refdesk/communities/pdf/quga-cain-caqu.pdf>, last accessed August 2007.



DEPARTMENT OF NATURAL RESOURCES

Rarity in an Ecological System

Intact estuaries are an example of a rare ecological system in Washington. Many estuaries are threatened by changes in land cover of uplands, storm-water runoff, and shoreline development, such as armoring or bulkheading. These alterations can change nearshore processes and ultimately lead to declines in ecosystem function of the estuary.

Sarah Brace, Puget Sound Partnership, 8/07, personal communication.

Representation is the amount of a species, plant community, or ecological system that occurs in a local area (watershed or hexagon), expressed as a percentage of the total amount known to exist in an ecoregion. Areas with greater numbers of a species or habitat rank higher than those areas with only a single occurrence. Representation can point out largely intact landscapes, including managed or working landscapes, where ecological processes may be maintained.⁸

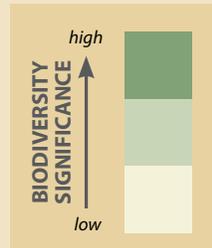
7 Rabinowitz, D., 1981. 'Seven forms of rarity' in *The Biological Aspects of Rare Plant Conservation*, edited by H. Synge. Wiley; Hartley, S. and WKunin, 2003. 'Scale dependency of rarity, extinction risk, and conservation priority.' *Conservation Biology* 3: 149-158.

8 G.F. Wilhere and H. Wang.'CVI: Conservation Value Indices. User's manual and ArcGIS script.' Washington Dept. of Fish and Wildlife, Olympia, Washington (2006); John Pierce, Washington Department of Fish and Wildlife, personal communication (July 2007); Molly Ingraham, The Nature Conservancy, personal communication (July 2007)

Scale for Biodiversity Significance⁹

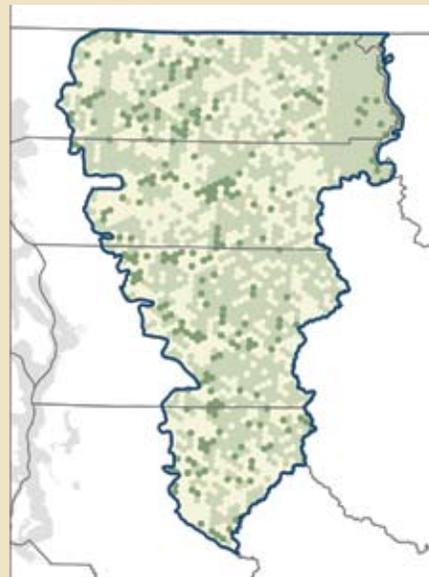
High biodiversity significance

- Significant numbers of rare species, plant communities, and/or ecosystems are known to be present, and they may not be present elsewhere.
- Biodiversity appears healthy; the area ranks high for richness.
- Ecosystems, plant communities, and populations of species are well-represented, more so than elsewhere in ecoregion.



Low biodiversity significance

- Common species or habitats may be abundant here. Biodiversity values found here can typically be found elsewhere in ecoregion.
- Biodiversity may have been affected by current or past disturbances that have lowered richness or representation.
- Ecosystems, plant communities, and/or populations of species may be fragmented compared to others in that region.
- Data or knowledge may be lacking; the analysis gives lower significance scores where data are sparse.



**Sample Map of Biodiversity Significance
(North Cascades Ecoregion)**

⁹ Low biodiversity significance means that a small amount (less than or equal to 25%) of each target (species, plant community, or ecological system) is captured in the analysis. Medium biodiversity significance means that 25-50% is captured and high biodiversity significance means that 50% or greater known occurrences are captured. The underlying analysis is made through a computer program (e.g., the MARXAN), which runs fine- and coarse-filter targets 25 times at 10 different target representation levels. Fine-filter targets (species of concern) require conservation actions or strategies because they are at risk in some way. Coarse-filter targets (plant communities or ecological systems), if present in sufficient quantity, should conserve the vast majority of species. Coarse-filter targets act as a surrogate for habitats, common species, and data gaps. *Okanagan Ecoregional Assessment* (October 2006) available at Washington Science and Planning Web Portal, <http://www.waconservation.org>; John Pierce, Washington Department of Fish and Wildlife, personal communication (October 2007)

Future Risk to Biodiversity

Data Source: Population Projections

The Council based future risk on the likelihood of increased land conversion and development and a corresponding increase in human impact on the natural environment. Areas ranked high are at risk of significant degradation to existing native biodiversity in the next 30 years if directed conservation actions do not take place.

Most major risks to biodiversity are linked to human impact, and most risks intensify as that impact increases. Population growth is a rough but reasonably reliable proxy for future ecosystem stresses, and projected land use is also a reasonable determinant of risk.¹⁰

As discussed in Chapter 2, key threats are population growth and land conversion, invasive species, pollution, and interruption of natural processes. Increasing human densities can be expected to exacerbate these threats. Certain risks are not as directly linked to population density, such as climate change, catastrophic fire, and some infestations of insects or fungi.

Measures of Future Risk to Biodiversity

Projected population density and land use were employed to estimate where the most pressure on native biodiversity will occur. The Western Futures Growth Model, which is based on data from the 2000 U.S. Census, provided these projections.¹¹ The model projects future housing density by applying population estimates and a set of spatial rules to distribute future housing across the landscape. The criteria applied to the maps are current land use (protected lands) and projected population densities for 2040 (dwellings per acre). Due to the coarse nature of this methodology, buffers surrounding areas with relatively high population density may extend over some protected areas (such as Moran State Park in the San Juan Islands). These maps should be used in conjunction with finer scale ownership maps.

The Council has selected the following categories of future risk:

- At *low risk* are all lands regardless of ownership that are currently managed primarily as “protected lands.” Protected lands as defined here are national parks, wilderness areas, wildlife areas and refuges, natural area preserves, and other lands designated as conservation areas.
- At *medium risk* are all lands where the projected population density is < 1 dwelling per 40 acres in year 2040, excluding those captured in the low- and high-risk areas.¹²
- At *high risk* are all lands where the projected population density is > 1 dwelling per 40 acres in year 2040, and all lands and all densities that occur within 5 miles of lands where the projected population density is > 1 dwelling per 10 acres in year 2040.¹³

10 Washington Biodiversity Council, 'Washington's Biodiversity: Status and Threats.' (2007)

11 Travis, W.R., D.M. Theobald, G.W. Mixon, T.W. Dickinson, 2005. 'Western Futures: A look into the patterns of land use and development in the American West. Report #6 from the Center of the American West, University of Colorado at Boulder; <http://www.centerwest.org/futures/>

12 The density threshold of 1 dwelling per 40 acres was selected because as human density increases above this level, wildlife species that are mostly intolerant to human development (e.g. large wide-ranging mammals) begin to drop out of the landscape. J.P. Schuett-Hames, J.M. Azerrad, M.J. Tirhi, J.L. Hayes, J.E. Jacobson, C.L. Sato, J.P. Carleton, and G.F. Wilhere. Draft: Landscape Planning for Washington's Fish and Wildlife: Managing for Biodiversity in Developing Areas. Washington Department of Fish and Wildlife. Olympia, WA (2007); P. Beier. Dispersal of juvenile cougars in fragmented habitat. *Journal of Wildlife Management* 59:228-237. (1995)

13 A large number of species will be excluded from fragmented landscapes where human densities are greater than 1 dwelling per 10 acres. Using a buffer distance from projected human development also recognizes uncertainty in the projections of human density for 2040. High risk includes lands with human densities below 1 dwelling per 40 acres, but because they are near exurban areas (1 dwelling per 10 acres) the biodiversity values are more at risk than areas further away. J.P. Schuett-Hames, J.M. Azerrad, M.J. Tirhi, J.L. Hayes, J.E. Jacobson, C.L. Sato, J.P. Carleton, and G.F. Wilhere. Draft: Landscape Planning for Washington's Fish and Wildlife: Managing for Biodiversity in Developing Areas. Washington Department of Fish and Wildlife. Olympia, WA. (2007)

Scale for Future Risk to Biodiversity

Low future risk

All lands regardless of ownership that are currently managed as “protected.”

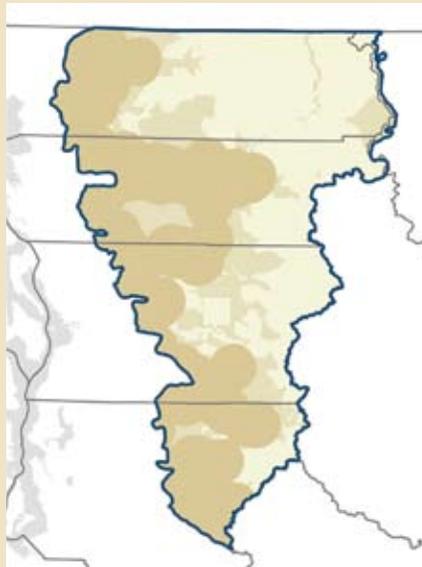
- Low risk of impacts from development or conversion exists here.
- Other threats may still be in play, such as climate change, invasive species, catastrophic fire.
- More flexibility here; time is available for conservation actions, but monitoring is needed.



High future risk

All lands where the projected population density is > 1 dwelling per 40 acres and all lands within 5 miles of those lands where projected population density is expected to be > 1 dwelling per 10 acres in 2040.

- Present and future impacts will probably be highest here.
- Future development and fragmentation are likely in addition to other threats such as climate change, invasive species, or severe fires.
- Urgency and less flexibility here. Pressures are expected to increase; conservation options are urgent and will probably become more costly.



**Sample Map of Future Risk to Biodiversity
(North Cascades Ecoregion)**

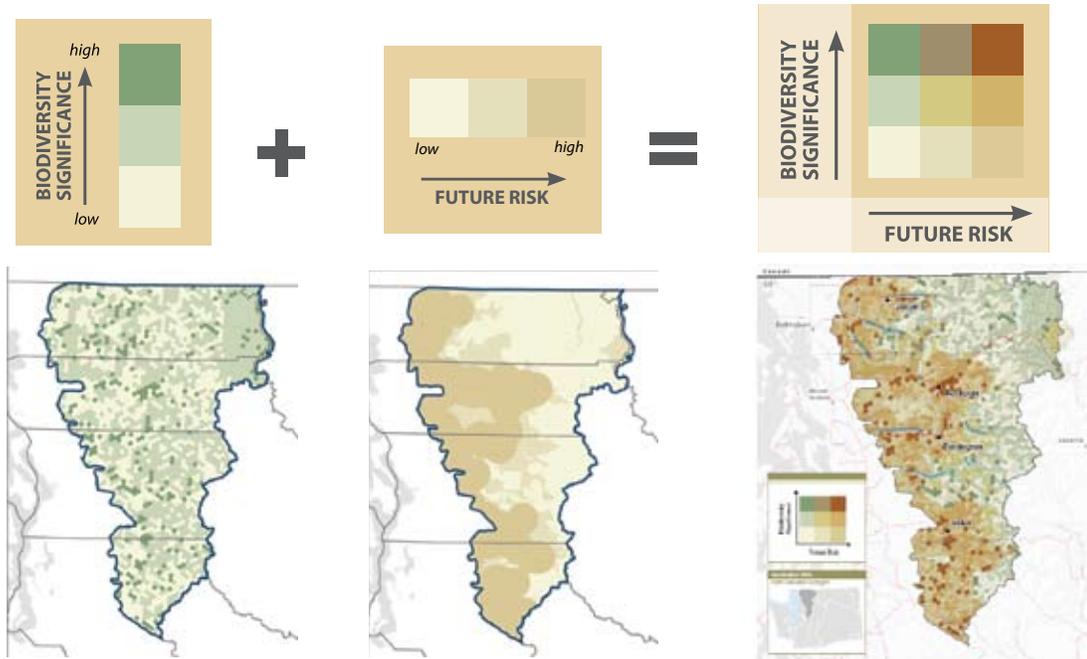


Figure 6. Biodiversity Conservation Opportunity maps. The one at the right is created by combining maps of biodiversity significance (left) with maps of future risk (center). This example shows the North Cascades ecoregion.

Conservation Opportunity and Approaches

The maps of conservation opportunities result from overlaying biodiversity significance and future risk, (Figure 6). These maps show places to target conservation approaches and actions, from an ecoregional perspective. Note that in the overlay, the “conservation opportunity map,” up to nine different colors are present. Each of these colors represents a different level of biodiversity significance and degree of future risk caused by increasing growth and development. Different approaches will be appropriate and effective for each color.

Some of the questions that will help determine appropriate conservation approaches include:

- What is the ownership and use of the land?
- Is the land use compatible with biodiversity conservation?
If so, what resources are available to assist landowners with conservation or stewardship practices?
- What stressors and threats face the land?
- What elements of biodiversity are most abundant or most at risk here?
- What conditions are on the land? Does it need restoration?
- What scale is necessary to meet conservation objectives?

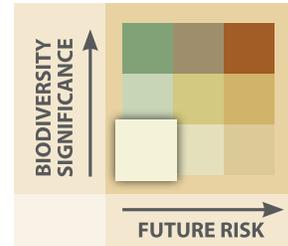
As noted previously, the different ecoregion maps were completed at different times, with slightly different methodologies. Thus, they set opportunities only within a given ecoregion and are not designed to compare opportunities between ecoregions. These maps do not replace detailed local knowledge, nor do they substitute for local priorities. Every place can contribute to the conservation of biodiversity in Washington.

The following sections provide general descriptions for areas classified in the corners of the nine color grid, as well as sample approaches and examples of how conservation tools can work on the ground.

Connect and Discover

Areas ranking Low in Biodiversity Significance and Low in Future Risk

- Known biodiversity not generally significant from an ecoregional perspective, but may be important locally and for human quality of life.
- Protected status likely to continue in the future; lack of imminent threat from land use conversion.
- Low biodiversity score may represent lack of information.
- Conservation concern generally less pressing.



Approaches

- Conservation of common species and habitats is especially important.
- Inexpensive, voluntary, local efforts will help, such as community wildlife habitat programs.
- Ongoing monitoring and management will be needed to understand the effects of climate change, to prevent degradation of native biodiversity by invasive species, and in some areas to reduce catastrophic fire risk.
- Large-scale state investment generally should not be targeted here to conserve biodiversity as we currently know it.
- Our knowledge is incomplete, however, and the ranking of these places may change with greater understanding of biodiversity.
- Increased survey and data collection will help fill knowledge gaps.

Example

Audubon Natural Area, Columbia Park, Kennewick, Columbia Plateau ecoregion

Columbia Park in Kennewick is 400 acres lying between a highway and the Columbia River.¹⁴ The park houses a golf course, boat launches, picnic shelters, play areas, and a band shell. Eight acres make up the Audubon Natural Area, a wooded and well-loved corner of the park.

This small woodland is isolated from other natural areas, which decreases its significance in an ecoregional context. However, it offers an important opportunity for people to interact with natural elements of the ecoregion and provides critical habitat for the many plant and animal species found there.

14 City of Kennewick website: http://www.ci.kennewick.wa.us/recreational_services/parks/columbia.asp (accessed October 2007)
Lower Columbia Basin Audubon Society website: <http://lowercolumbiabasin.audubon.org/history4.htm> (accessed October 2007)

Thickets and groves of willow, cottonwood, and non-native Russian olive are typical for riverside areas of the Columbia Plateau ecoregion. Birdwatchers enjoy the variety of ducks and other birds that reside here or migrate through, including great blue herons, grebes, wrens, vireos, and warblers. Beaver, muskrat, painted turtles, and non-native bullfrogs find a home in marshy Redwing Pond.

As part of the Kennewick parks system, the natural area is protected. Four decades of community involvement, including Eagle Scout projects, service club donations, contributions of time, money, and materials from local businesses, volunteer work parties from the Lower Columbia Basin Audubon Society and other groups, and elementary school field trips indicate the value of this place. Even with these protections, the woodland faces threats such as invasive species, overuse and trampling, and pressure to develop for high intensity recreation uses.

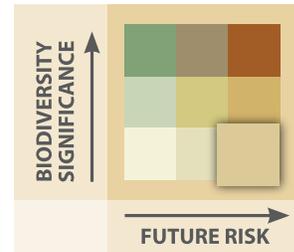
The local community is well-versed in strategies for biodiversity conservation here. These include site management to control trampling, control of invasive species, and use of the park for education and awareness—clearly its proximity to the city center is a big plus. The community and the parks department could engage in a citizen science effort to monitor for species assemblage changes over time.



Learn and Restore

Areas Ranking Low in Biodiversity Significance and High in Future Risk

- Known biodiversity is not generally significant from an ecoregional perspective, though it may be important locally and for human quality of life.
- Areas likely face many pressures and threats from human impact.
- Often close to population centers and thus are important for quality of life (contact with nature and learning about the natural world).
- Conservation concern may be locally urgent.



Approaches

- Conservation of common species and habitats is important.
- Education, restoration, and proactive land use planning can be emphasized.
 - Restoration efforts could emphasize high levels of public engagement.
 - Citizen science projects can identify locally important areas and fill gaps in biodiversity data.
 - Residents could participate in backyard and community wildlife habitat enhancements.
 - Planners and officials can strive to design green spaces that maximize the public's ability to encounter nature in and around urban growth areas.
- Local conservation opportunities can be urgent. Future development and fragmentation are likely, and conversion pressures are expected to increase.
 - Conservation options will probably become costlier and less flexible in the future.
 - Habitat connectivity and wildlife corridors should be integral to decision-making process.

Example:

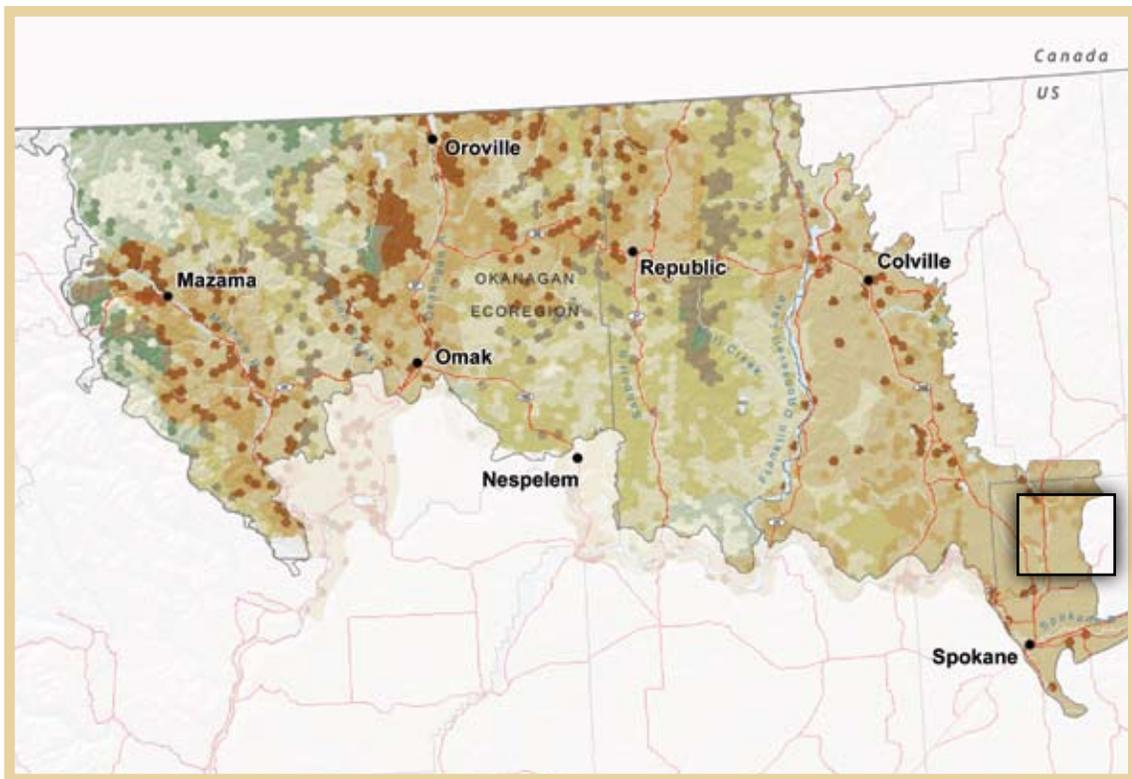
Spokane County Biodiversity Planning, Okanogan Ecoregion

Spokane County is growing rapidly. In the next 20 years, its population is expected to grow approximately 30%, and this growth is likely to put pressure on existing open space. Most of the ecosystems and plant communities in Spokane County are well-represented elsewhere in the ecoregion, which lessens much of the county's biodiversity significance in that larger context.

When the county updated its Comprehensive Plan in 2002, it adopted a new category, *Rural Conservation*, which encourages low impact development and uses clustering and other techniques to protect sensitive areas and preserve open space.¹⁵ The Rural Conservation category is based on wildlife corridor and landscape linkage data that the University of Washington analyzed in a study.¹⁶

The Apple Tree Meadows development in Chattaroy, southeast of Deer Park, exhibits this type of open space planning. The developers have clustered 12 two-acre lots on 133 acres, leaving 82% of the land as open space. The open space includes forest, cliffs, and ponds, with their associated mix of habitats and species. Residents might choose to landscape with native plants or to participate in stewardship of the neighboring landscape.

By maintaining the open space now, present and future county residents will benefit from the ecosystem services that nearby forest and native vegetation provide. The natural area will also provide educational and recreational opportunities and possibilities for citizen science involvement in inventory and monitoring.



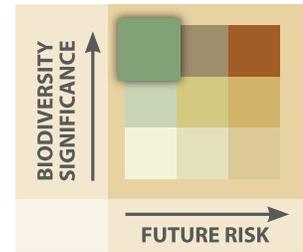
¹⁵ Steve Davenport, Department of Building and Planning, Spokane County, 5/29/07, personal communication; Spokane County Department of Building and Planning, 2006. 'Comprehensive Plan Summary and 5 Year Update.' <http://www.spokanecounty.org/bp>, last accessed 7/07.

¹⁶ University of Washington Department of Urban Design and Planning, Remote Sensing Applications Laboratory, 1998. Wildlife corridors and landscape linkages: An approach to biodiversity planning for Spokane County, Washington; Stephenson, M.R., 1998. Protecting Biodiversity: Applying GAP analysis in Spokane County, Washington. Master's Thesis, University of Washington, Seattle.

Manage and Maintain

Areas Ranking High in Biodiversity Significance and Low in Future Risk

- Significant ecoregional biodiversity values occur in these areas.
- Protected status is likely to continue in the future; no imminent threat from land use conversion.
- Conservation concern generally less pressing.



Approaches

- Conservation of regionally important species and habitats is important. While these areas are at low risk, management needs include the following efforts:
 - Preventing degradation of native biodiversity by invasive species;
 - Reducing risk of catastrophic fire;
 - Minimizing adverse effects of recreation, grazing and other uses; and
 - Restoring ecosystem processes, such as natural fire regimes through prescribed burns, for example.
- Linkages to connect highly significant areas to one another need to be identified and conserved.
- Ongoing monitoring and research will be needed on the following topics:
 - To understand how climate change affects species and plant communities present in these areas; and
 - To assess the accuracy of our understanding of biodiversity and ecological processes.
- Existing conservation lands are valuable and stewardship efforts should be supported.

Example

Holm Farm Conservation Easement, Thurston County, Puget Trough Ecoregion

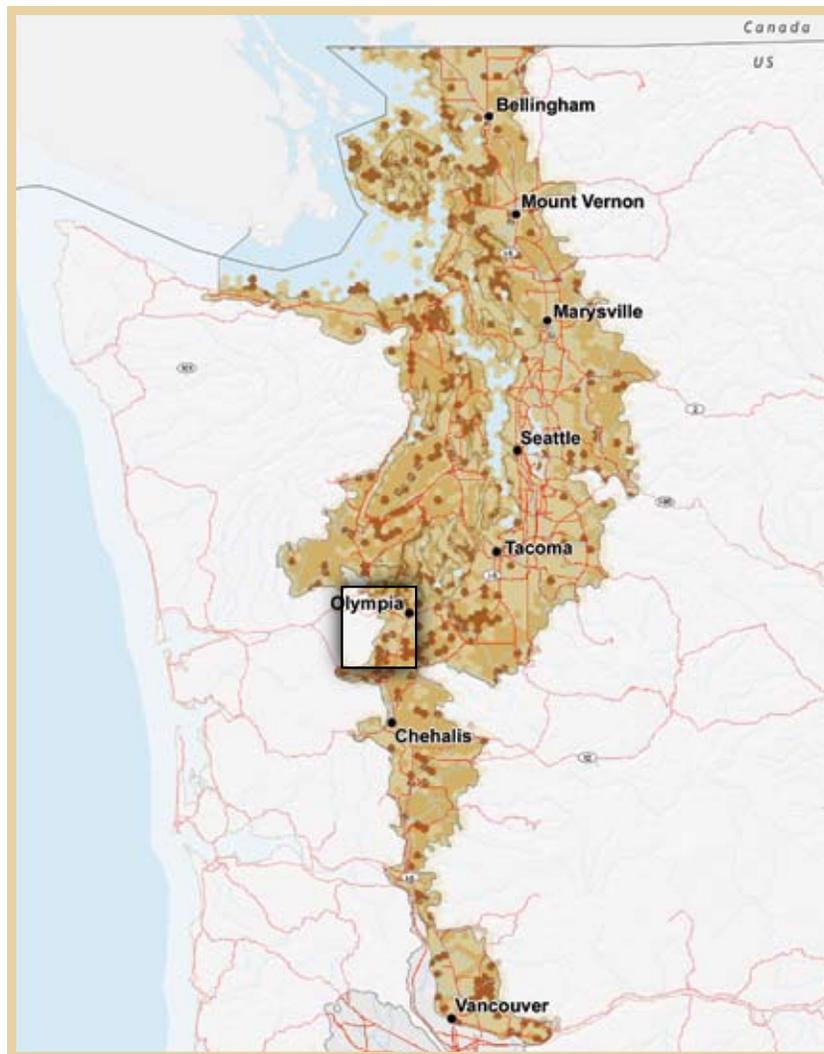
The owners of Holm Farm have embraced a family tradition of stewardship on their farm in southwestern Thurston County.¹⁷ The farm includes nearly 100 acres bounded by an oxbow of the Black River. Two of the owners were raised on the farm when their parents ran it as a dairy. Their grandparents bought the land in the 1920s. The owners now manage the farm for hay production, grazing, and wildlife habitat.

Much of the local wildlife depends on the health of the free-flowing Black River. River otters, muskrats, beaver, and mink live in the river corridor. A gravel bar nearby serves as a spawning area for salmon. Kingfishers, great blue herons, and wood ducks are among the birds foraging on the river. Raptors are also common, including eagles, osprey, red-tailed hawks, Cooper's hawks, kestrels, and northern harriers.

¹⁷ This area does not show up as dark green on the map for two reasons. 1) It is smaller than the landscape unit of 741 acres (300 hectares) measured on the map, and 2) areas protected with privately held conservation easements are not included in the database of protected lands used for this project. Functionally, however, they can be assumed to be of the same risk level as publicly held protected lands.

As in many rural parts of the Puget Trough ecoregion, southwestern Thurston County is increasingly seeing its working farmlands change to primarily residential use. The owners of Holm Farm decided to arrange a conservation easement to maintain the farm for conservation and open space. They designed their conservation easement, held by the Capitol Land Trust, so that development that might harm the farm's conservation values will not be permitted. The easement provides a way to bequeath the farm to their heirs, while saving its natural beauty and its role in protecting the Black River forever.

They worked with the Thurston Conservation District to enroll their land in the federal Conservation Reserve Enhancement Program. This incentive program helped them enhance the buffer along the Black River. These private landowners chose to be involved with local stewardship organizations such as the Chehalis River Council, and in 2005 the Thurston Conservation District recognized them as Wildlife Stewards of the Year.¹⁸

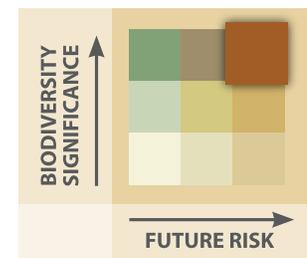


¹⁸ Stewardship Matters: Holm Farm <http://www.biodiversity.wa.gov/ourbiodiversity/holmfarm.html> (last accessed November 2007).

Collaborate and Innovate

Areas Ranking High in Biodiversity Significance and High in Future Risk

- Significant ecoregional biodiversity values occur in these areas.
- These areas likely face many pressures and threats from human impact, and they may be under imminent threat from land conversion.
- These areas are often close to population centers and thus are important for quality of life (contact with nature and learning about the natural world).
- Conservation concern most urgent.



Approaches

- Conservation of regionally important species and habitats is especially important.
- A full toolbox of strategies is needed and collaboration is critical. Tools can include the following efforts:
 - Targeting incentives, such as technical assistance, cost shares, and grant programs.
 - Engaging people in conservation activities, such as restoration, monitoring to understand the threats to biodiversity, and citizen science and stewardship efforts.
 - Restoration for ecological function, as well as public engagement, should be prioritized in these areas. These areas could be good places for mitigation banks and for developing other conservation market tools.
- State investment should be targeted here, where it is suitable, as conversion pressures are expected to increase.
 - Conservation options are urgent and will probably become more costly.
 - Existing conservation lands are especially important and should be managed for their special features.
- Linking conservation areas will be increasingly vital to sustaining healthy populations of some wildlife species.
 - Maintaining ecological processes may be especially challenging.

Example

Upper Skagit River near Rockport, North Cascades ecoregion

The Skagit River drains Washington's second largest watershed, and it is considered the healthiest of the rivers flowing into Puget Sound. Federally designated as a Wild and Scenic River, the Skagit hosts a robust population of at-risk bull trout as well as all five species of wild Pacific salmon. The winter salmon run attracts one of the largest concentrations of bald eagles in the lower 48 states.

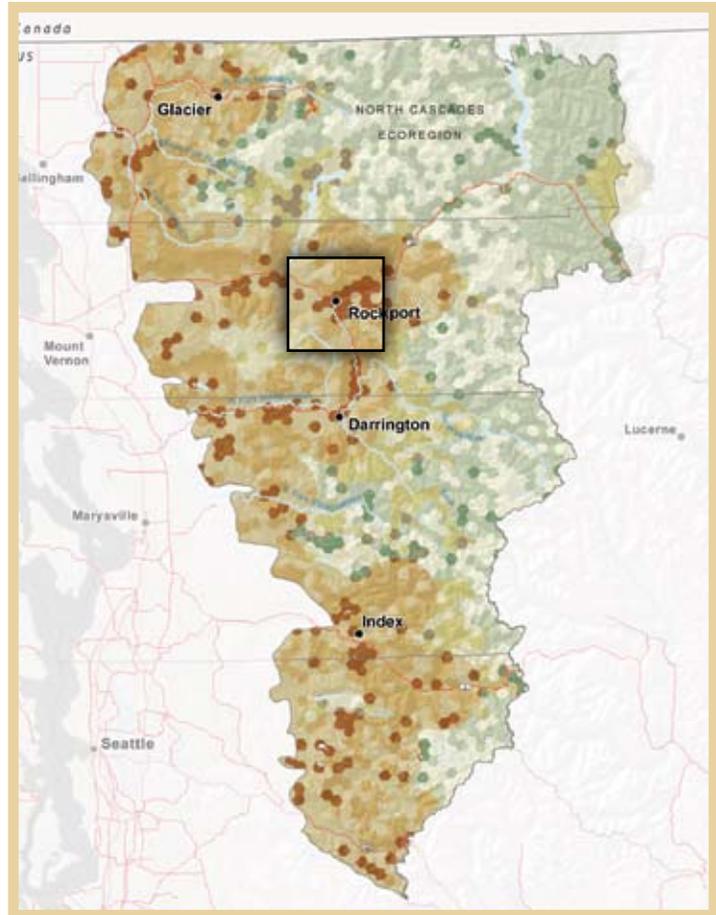
The stretch of river between Rockport and Marblemount faces many future risks. Skagit County has a fast-growing economy, which puts demands on its communities, as does the county's location between

the population centers of greater Seattle (including Everett) to the south and Bellingham to the north.

With the human population rising and the growth rate expected to increase, the Skagit valley faces a primary threat from conversion of agriculture and forest lands to residential use, resulting in increased habitat degradation and fragmentation. Real estate development is becoming more profitable for private landowners than other uses, even as residential land use may have a negative net fiscal impact on the county. As elsewhere, invasive species are present and likely to increase.

Community engagement and landowner incentives are two of the primary strategies here, incorporating stewardship, education, and conservation or agricultural easements.

The following groups and programs are examples of the types of strategies currently being employed along the Upper Skagit:



- **The Skagit County Farmland Legacy Program** is a county initiative that purchases agricultural easements and works to support policies, programs, and plans that enhance the local agricultural industries. It administers the **Skagit County Conservation Futures Program**, which purchases permanent conservation easements on strategically significant lands.
- **The Skagit Conservation District** administers diverse offerings, including technical assistance, Stream Team, Watershed Masters, and a Backyard Conservation program. In addition, the conservation district administers the Natural Resource Conservation Service and Farm Services Administration programs for landowners. An example is the **Conservation Reserve Enhancement Program (CREP)**. CREP provides cost shares and technical assistance to improve wildlife habitat along rivers and streams.
- **Skagit Land Trust.** This land trust works in collaboration with more than 20 local and regional organizations. It focuses on permanently protecting all types of natural and resource lands through conservation easements.
- The **Upper Skagit Bald Eagle Fest** is an annual event that celebrates the eagles on the Skagit River, while educating tourists and building community among residents. It also generates economic activity, which translates biodiversity value directly into local financial returns.

- **The Nature Conservancy** works in cooperation with eight partner agencies and manages the Skagit River Bald Eagle Natural Area. The natural area's 7,800 acres lie along the river between Marblemount and Rockport.
- The **Skagit Fisheries Enhancement Group** is a nonprofit organization formed in 1990 to engage communities in habitat restoration and watershed stewardship to enhance salmon populations. They have cooperative relationships with local landowners, conservation groups, government agencies, and tribes.

Additional Resources and Research Needs

As noted above, these conservation opportunity maps are intended to be used in conjunction with other resources. Local knowledge and priorities, as well as more specialized evaluations of conditions and risks, will provide needed context and details to guide biodiversity conservation activities on the ground.

Existing Information Resources

The Nature Conservancy's recent assessment of freshwater systems in Washington State offers an example of one such specialized evaluation.¹⁹ This assessment received extensive expert review. The tool provides a unique statewide look at watersheds, rivers, lakes, and wetlands. It examines several relevant factors, including the distribution of freshwater species at risk, current conditions, and expected threats to Washington's freshwater systems.

The freshwater assessment can be used in conjunction with the terrestrial and nearshore conservation opportunity maps presented in this document. While differences in methodology make merging the two assessments impractical, the freshwater assessment can add important information to guide conservation efforts.

Considerations for Future Research

Through the process of developing these maps, the Biodiversity Council has recognized the need to incorporate additional data sources. In particular, the Council identified a need for maps that consider restoration potential, wildlife corridors and habitat connectivity, effects of climate change, and deep-water marine areas.

The science of predicting potential impacts from climate change is in its early stages.²⁰ As these tools become more sophisticated, map products illustrating how conservation opportunities might shift should be developed.

Biodiversity conservation opportunities in deep-water marine areas are not indicated on the maps because adequate data are not yet available. The Puget Sound Partnership and The Nature Conservancy are working together to address this issue.

Enhancements to Future Maps

- Restoration potential
- Wildlife corridors and habitat connectivity
- Effects of climate change
- Deep-water marine areas

¹⁹ Skidmore, PB. 2006. Assessment of Freshwater Systems in Washington State. The Nature Conservancy, Seattle, WA

²⁰ Lawler J. J. and M. Mathias, 2007. 'Report on Climate Change and the Future of Biodiversity in Washington' Report prepared for the Washington Biodiversity Council.



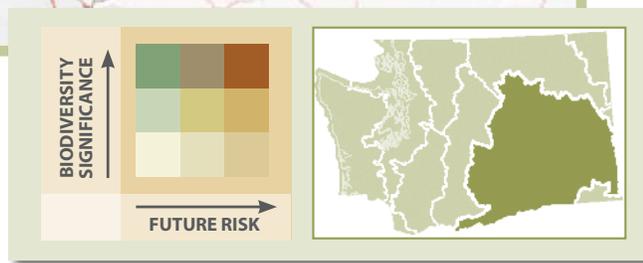
Figure 7. The river basins and lake areas shaded in gray provide the best opportunities for freshwater conservation activities. Rivers highlighted in yellow represent important systems with greater conservation challenges.

Conservation Opportunity Maps for Seven Ecoregions in Washington

Columbia Plateau Ecoregion



Landscape units:
1235 acres (= 500 hectares) hexagons.



A range of opportunities for voluntary and collaborative approaches exist in each area of this map (see pp 103-112). This map does not replace more detailed or specialized assessments or prescribe specific actions or strategies, and it is not intended to be used as the sole source for planning conservation initiatives. The Council recommends that this map be updated periodically.

About the Columbia Plateau Ecoregion

Two great rivers, the Columbia and the Snake, dominate the dramatic dry landscape of Washington's largest ecoregion—home to an inland sea of sagebrush and the state's fertile agricultural heartland.

Location

The semi-arid Columbia Plateau occupies nearly 33% of the state. It is a region bordered by the Cascades, the Okanogan Highlands, the Rockies, and the Blue Mountains. In Washington, the ecoregion is bisected by the Columbia River itself. The plateau tilts upward and southward into the Great Basin.

Outstanding Biodiversity Features

- **Dramatic geological history led to diverse habitats.** Millions of years ago, vast lava flows covered the region in basalt. In more recent millennia, epic glacial floods carved away the deep rock, leaving the coulees and Channeled Scablands of today.
- **Shrub-steppe and grasslands: home to unique plants and iconic birds.** The Columbia Plateau supports 18 endemic plant species and numerous at-risk birds, among them the sharp-tailed grouse and the sandhill crane.
- **The Palouse Hills: Washington's breadbasket.** The region's dryland grain and legume farming is vital to our food security. However, the native grasslands that once carpeted the Palouse have shrunk to just 1% of their original expanse.
- **Powerful rivers: shaping—and shaped by—regional economic development.** Hydropower development helped build the Northwest's economy. A cost has been the inundation and alteration of riparian habitats. Salmon, sturgeon, and lampreys—once abundant—struggle with the changed waterways.

People in the Ecoregion

Human history in the Columbia Plateau dates back 13,000 years, possibly earlier. For at least 5,000 years, native peoples lived in villages along the rivers, fishing for salmon, harvesting plant foods, and hunting. They burned large areas to promote productive habitats and improve grazing.

Lewis and Clark encountered numerous peoples, including the Cayuse, Nez Perce, Palouse, Tenino, Umatilla, Walla Walla, Wanapum, and Yakama. The Yakama Nation remains a large landholder.

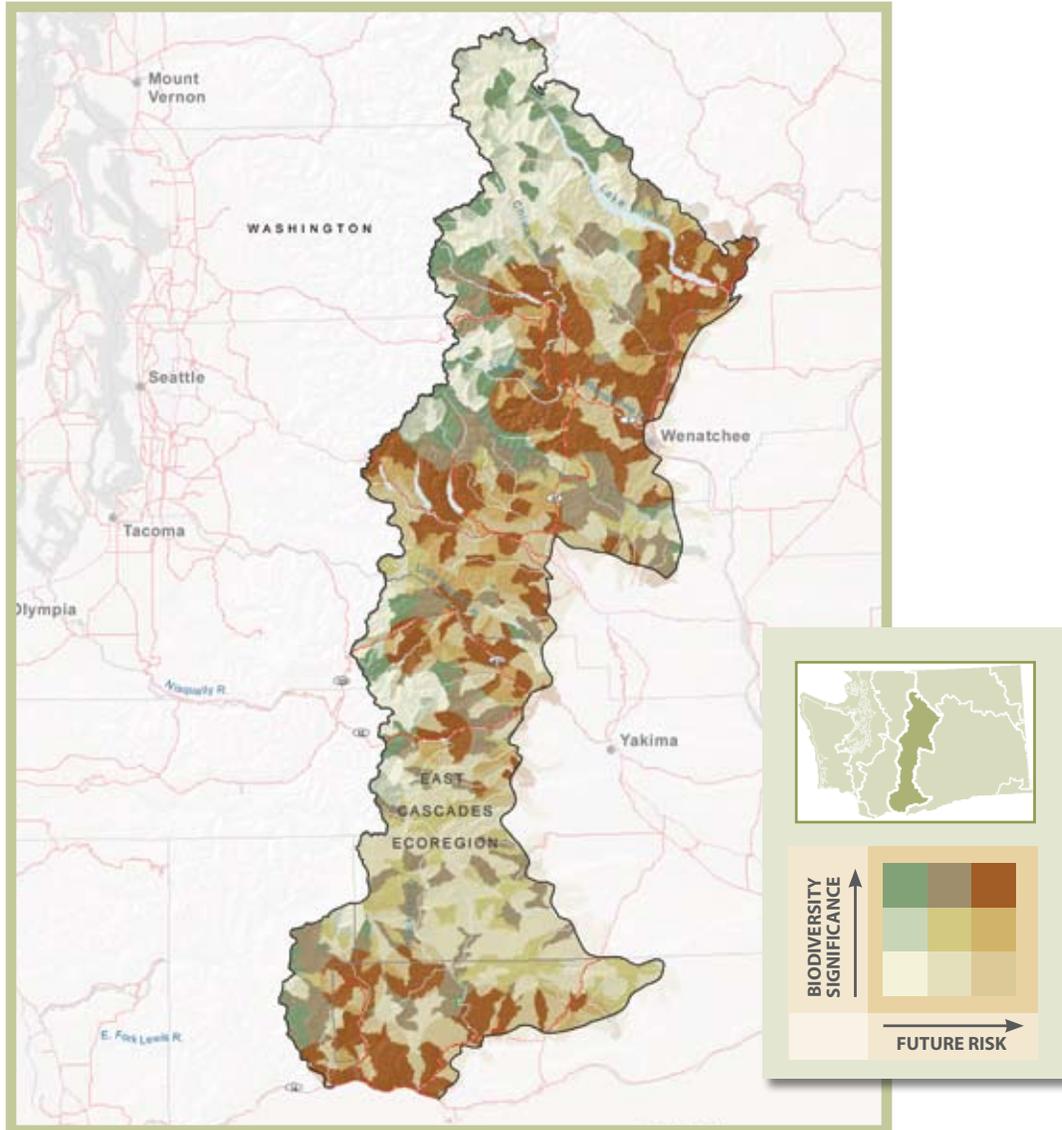
Euro-American settlers put the abundance of the Columbia Plateau to use by harvesting timber, growing crops, and grazing cattle and sheep. The mid-twentieth century brought tremendous changes. Grand Coulee Dam, among others, altered the basin's hydrology. The Hanford Nuclear Site, once central to the nation's atomic weapons program, introduced radioactive waste to the region.

More than 50% of the ecoregion has been converted to agriculture and urban development, with considerable impact on biodiversity. Despite the numerous changes, sizable pieces of the Columbia Plateau's shrub-steppe remain, much of it on lands managed by the Departments of Defense and Energy.

Many partnerships have emerged to tackle the ecoregion's challenges. Programs work to monitor priority species, implement weed control, and encourage rural vitality and stewardship.

For more about this ecoregion visit www.biodiversity.wa.gov

East Cascades Ecoregion



Landscape units: watersheds.

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About the East Cascades Ecoregion

On the dry side of the Cascades lies one of Washington's most diverse ecoregions, rich in biological wealth from its montane crest down through open stands of ponderosa pine and Garry oak to the edge of the shrub-steppe.

Location

The East Cascades ecoregion includes the mountains that lie east of the Cascade crest and the foothills descending into the Columbia Plateau. In Washington it stretches from roughly Lake Chelan to the Columbia River Gorge, encompassing about 10% of the state. The mountainous ecoregion continues south through Oregon.

Outstanding Biodiversity Features

- **High number of rare and endemic plants.** This ecoregion is home to at least 20 endemic plant species, including the Kittitas larkspur and Thompson's clover.
- **Diverse coniferous forests.** These forests include a range of dominant species, from high elevation whitebark pine to ponderosa pine.
- **Mardon skipper butterflies.** Carpets of fescue grass offer prime habitat for the endangered mardon skipper butterfly.

People in the Ecoregion

The ecoregion has long been inhabited by the Wenatchee, the Chelan, the Kittitas, and the Yakama. The East Cascades provide hunting, fishing, and plant foods, such as camas bulbs and biscuitroot—key ingredients for a traditional bread.

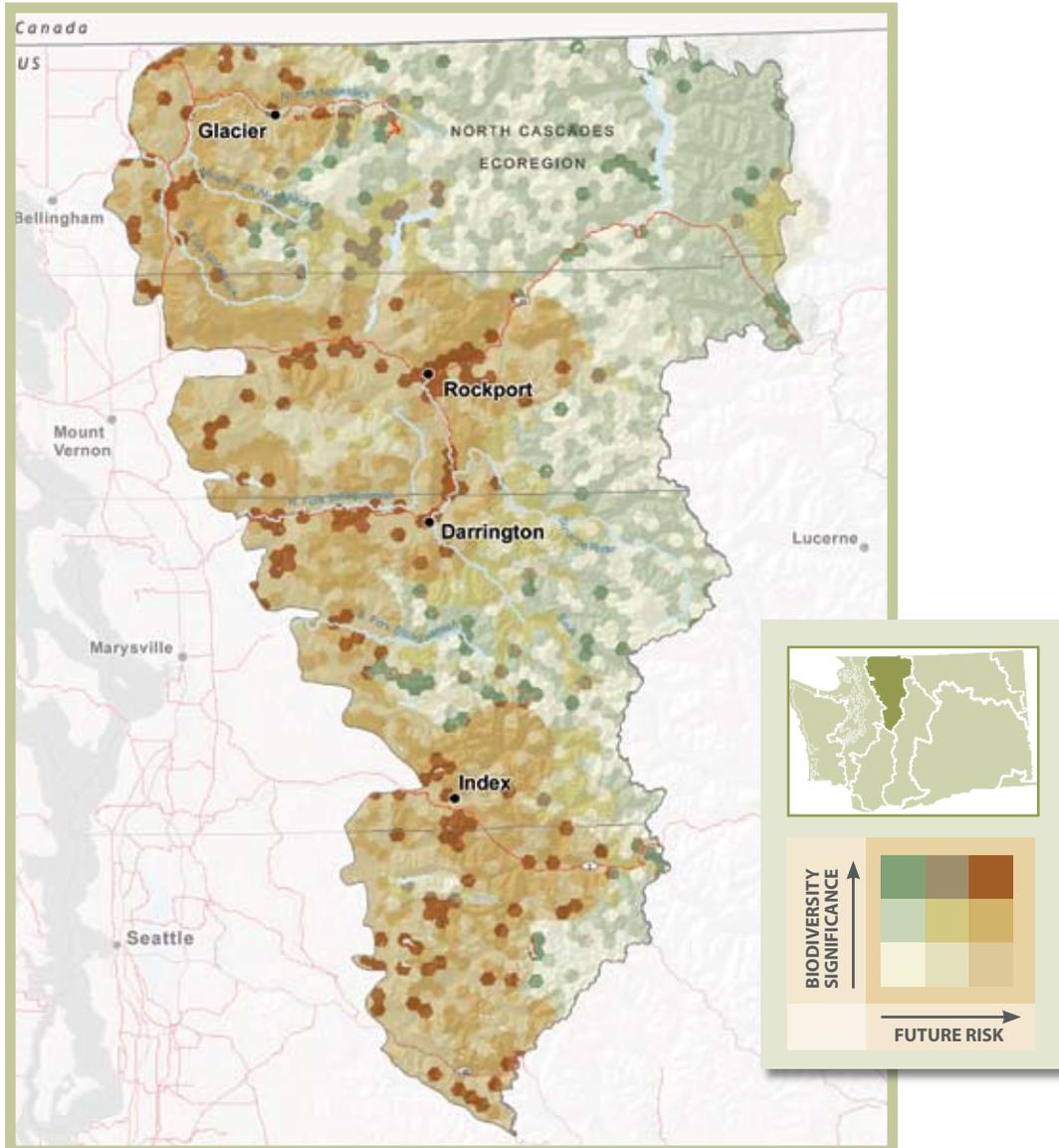
Settlement began about 1875. Farmers in the semi-arid valleys irrigated the land, and the area became well known for its bountiful fruit orchards as well as grazing and ranching. The climate also suits vineyards, an industry that has grown in recent years.

Logging in East Cascades' forests began more than a century ago and remains an important livelihood. A mining boom from the 1880s through the 1930s brought miners representing 20 different nationalities, who scoured the mountains for gold, copper, and coal.

Roughly three quarters of the East Cascades ecoregion is federally owned. Several wilderness areas, including Alpine Lakes and Mount Adams, offer protected high elevation habitats. Other major landholders are the Yakama Nation, with lands on the eastern slopes of Mount Adams, and Washington State, which manages more than 113,000 acres.

For more about this ecoregion visit www.biodiversity.wa.gov

North Cascades Ecoregion



Landscape units: 1235 acres (= 500 hectares) hexagons.

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About the North Cascades Ecoregion

Home to lynx and mountain goats, rare alpine daisies and thousand-year old cedars, the North Cascades ecoregion contains some of the largest expanses of wilderness in the lower forty-eight.

Location

The ecoregion (about 10% of Washington) includes the Cascade Mountains north of Snoqualmie Pass and west of the Cascade crest northward into British Columbia. Only a small part of this ecoregion lies in Washington; in British Columbia, it encompasses the entire mainland coast.

Outstanding Biodiversity Features

- **Important habitats for wide-ranging carnivores.** The North Cascades is one of the few ecoregions in Washington with a variety of large carnivores, including lynx, gray wolf, grizzly bear, and wolverine.
- **Semi-natural or natural vegetation is prevalent.** The North Cascades ecoregion contains large stretches of relatively intact vegetation, including low elevation western hemlock–Douglas-fir–western red cedar forests.
- **Home to several boreal species.** These species, including several rare plants, are at the southern edge of their geographic ranges.
- **Major concentration of over-wintering bald eagles** along the Skagit River. The eagles, feeding on salmon, are perhaps the largest concentration in the U.S. outside of Alaska

People in the North Cascades

People have inhabited the North Cascades for at least 8,400 years, perhaps 10,000 years. The ancestors of Salish-speaking peoples lived in the area, and archaeological evidence shows that they hunted, gathered, and processed plant foods here.

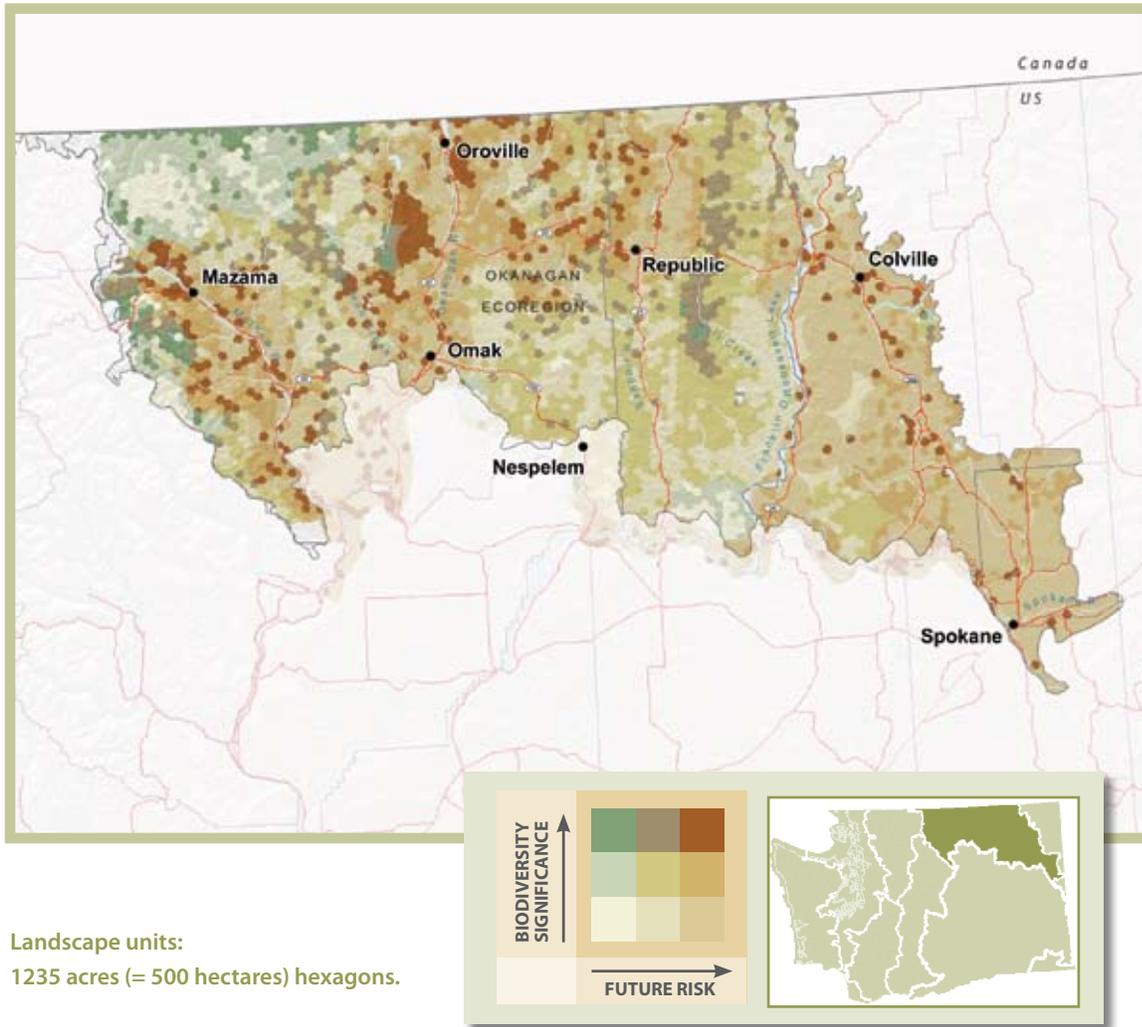
Euro-American settlement within the remote and rugged North Cascades occurred slowly. Access was difficult and good farmland was scarce. Much of the North Cascades ecoregion belongs to the public. It is administered by the National Park Service, the USDA Forest Service (Mt. Baker-Snoqualmie National Forest), and the Washington Department of Natural Resources. Much of the federal land is designated wilderness.

The Upper Skagit River Hydroelectric Project supplies about 20% of the electrical power used in the city of Seattle. It has three dams on the Skagit River. Planning for the dams began in 1905, and construction finished in 1961.

Private land in the ecoregion is a legacy of the 1864 Northern Pacific Land Grant, which bestowed vast amounts of land on the railroad that built a trans-continental link to the Pacific Northwest. Many towns in the region got their start by housing and feeding railroad construction workers. Now the economic activities for people in the North Cascades ecoregion are primarily forestry and tourism.

For more about this ecoregion visit www.biodiversity.wa.gov

Okanogan Ecoregion



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About the Okanogan Ecoregion: Biodiversity

In north-central Washington, the Cascades, the Rockies, and the Columbia Plateau converge to form the Okanogan ecoregion, which boasts highland landscapes and lowland waterways, grizzly bears and sage grouse.

Location

The Okanogan ecoregion could be called the mountains between mountains—the broad highland area separating the North Cascades and the Canadian Rockies. Scenic river valleys, like the Methow, the Okanogan, and the Colville, run roughly north-south. The ecoregion covers about 14% of Washington, and it extends significantly into the shrub-steppe country of British Columbia.

Outstanding Biodiversity Features

- **Large tracts of little disturbed land.** Much of the Okanogan ecoregion's vegetation remains in a natural or semi-natural state, hosting 100 wildlife habitat types, from alpine grasslands and upland aspen forests to shrub-steppe.
- **North meets south in a diverse landscape.** Boreal species like snowshoe hares and northern flying squirrels share the ecoregion with Great Basin species like pallid bats and burrowing owls.
- **Park-like stands of ponderosa pine and Douglas-fir.** The Okanogan's dry climate results in open grassy stands of ponderosa pine and Douglas-fir.
- **Wide-roaming carnivores still find a home.** Though diminished in numbers, grizzly bears, wolves, and wolverines all range through large areas of Okanogan wild lands.

People in the Ecoregion

Numerous Interior Salish tribes have made their homes in the Okanogan for millennia. Okanogan tribes wintered in longhouses made of tules (hardstem bulrush), bark, and hides. They harvested scores of types of berries, nuts, and roots. Traveling seasonally, they hunted game and gathered at Kettle Falls to fish for salmon and to trade.

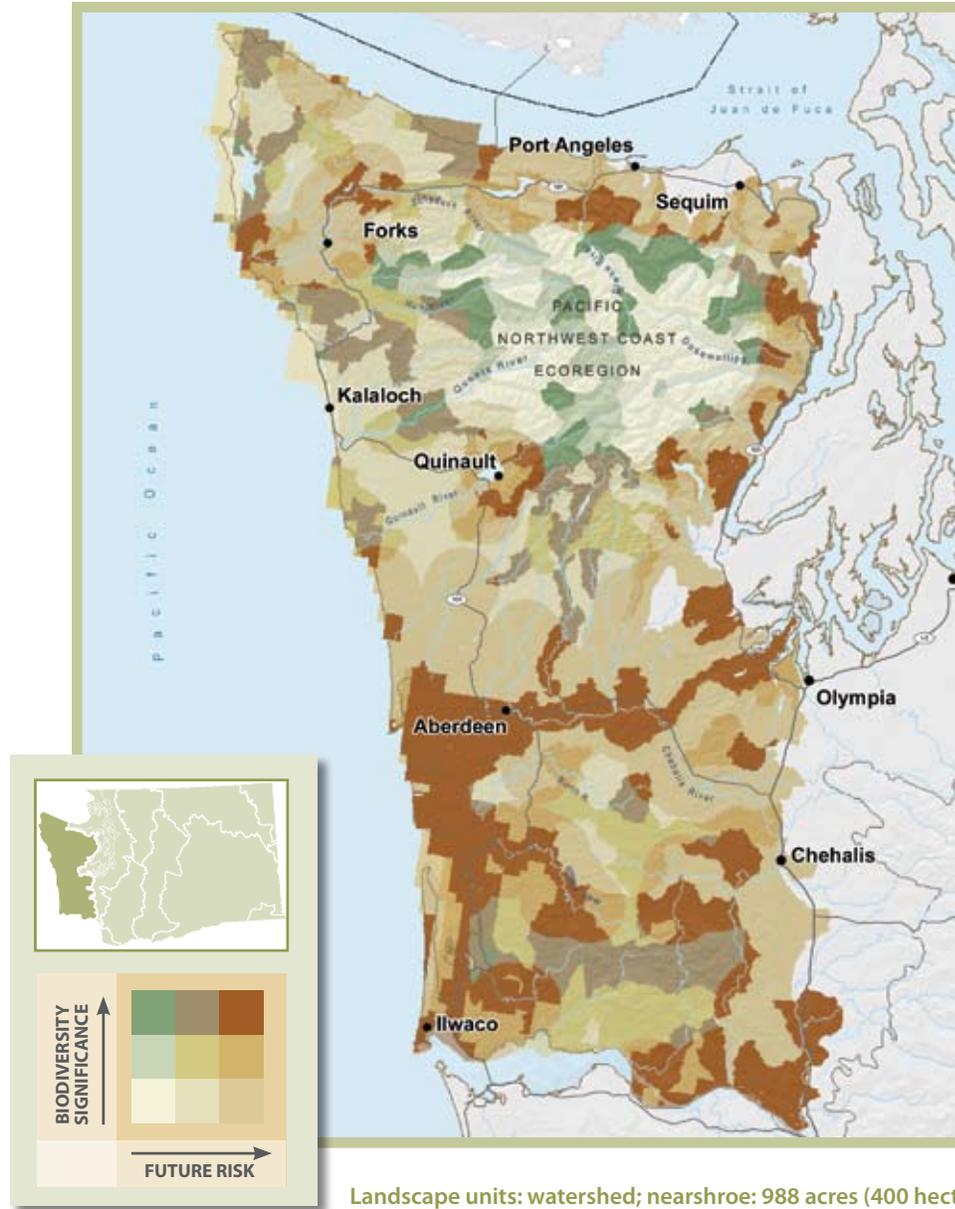
The Hudson Bay Company established a post at Kettle Falls in 1825, which speaks to the abundance of fur-bearing animals available. Gold was discovered near Republic in the 1890s and a mining boom followed. The timber industry developed about the same time.

Current land use varies and depends largely on elevation. The high country sees mostly recreational uses, though mineral exploration and development continue. At mid-elevations, logging and grazing occur. In the valleys, milder temperatures support agriculture (especially hay, alfalfa, and tree fruit) and ranching.

Grand Coulee Dam and boating opportunities in Franklin D. Roosevelt Lake draw people to the ecoregion. The sunny climate makes it popular for vacation homes. Roughly two-thirds of the Okanogan ecoregion is held by the state or federal governments, or by the Colville and Spokane tribes.

For more about this ecoregion visit www.biodiversity.wa.gov

Pacific Northwest Coast Ecoregion



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About the Pacific Northwest Coast Ecoregion

Washington's westernmost and wettest ecoregion extends from ocean depths to the Olympic Mountains' glaciated peaks. Steller sea lions swim among the greatest number of kelp species in the world, and the Olympic marmot burrows in alpine meadows.

Location

The Pacific Northwest Coast ecoregion fronts about 150 miles of shoreline and encompasses roughly 11% of Washington State. It runs from Cape Flattery in the north and to the mouth of the Columbia River in the south, extending into British Columbia and along the Oregon coast. Inland is a band of coastal plain, the Olympic Mountains, and the gentler Willapa Hills.

Outstanding Biodiversity Features

- **Geographic separation and unique species.** Isolated by ocean, strait, and Sound, a host of flora and fauna have evolved in the Olympic Mountains. These mountains offer the only home in the world to endemic rodents, trout, and rare plants, such as Piper's bellflower.
- **Tracts of verdant temperate rainforests.** In Olympic National Park, the world's largest remaining stands of temperate rainforest hold more living biomass than any tropical forest. The forest drips with ferns, mosses, and lichens.
- **Three vital estuaries for waterfowl, shorebirds, and fish.** The Columbia River Estuary is critical for waterfowl, fish, and the endangered Columbia white-tailed deer. The marshes and mudflats of Willapa Bay and Grays Harbor are vital nurseries for salmon and stopovers for tens of thousands of migrating shorebirds.
- **Iconic marine species facing threats.** Some of the most remarkable animals of the Northwest Coast— Orcas, Steller sea lions, sea otters, snowy plovers, and marbled murrelets—are species at risk.

People in the Ecoregion

Indigenous peoples have long made their home on the Pacific Northwest Coast. The Makah, Quileute, Quinault, Queets, Humptulips, Satsop, Wynoochee, Copalis, Chinook, and Lower Chehalis are among those whose ancestors lived on the rainy coast. These peoples ate well: salmon, shellfish, game, whales, seals, berries, and many other plant foods.

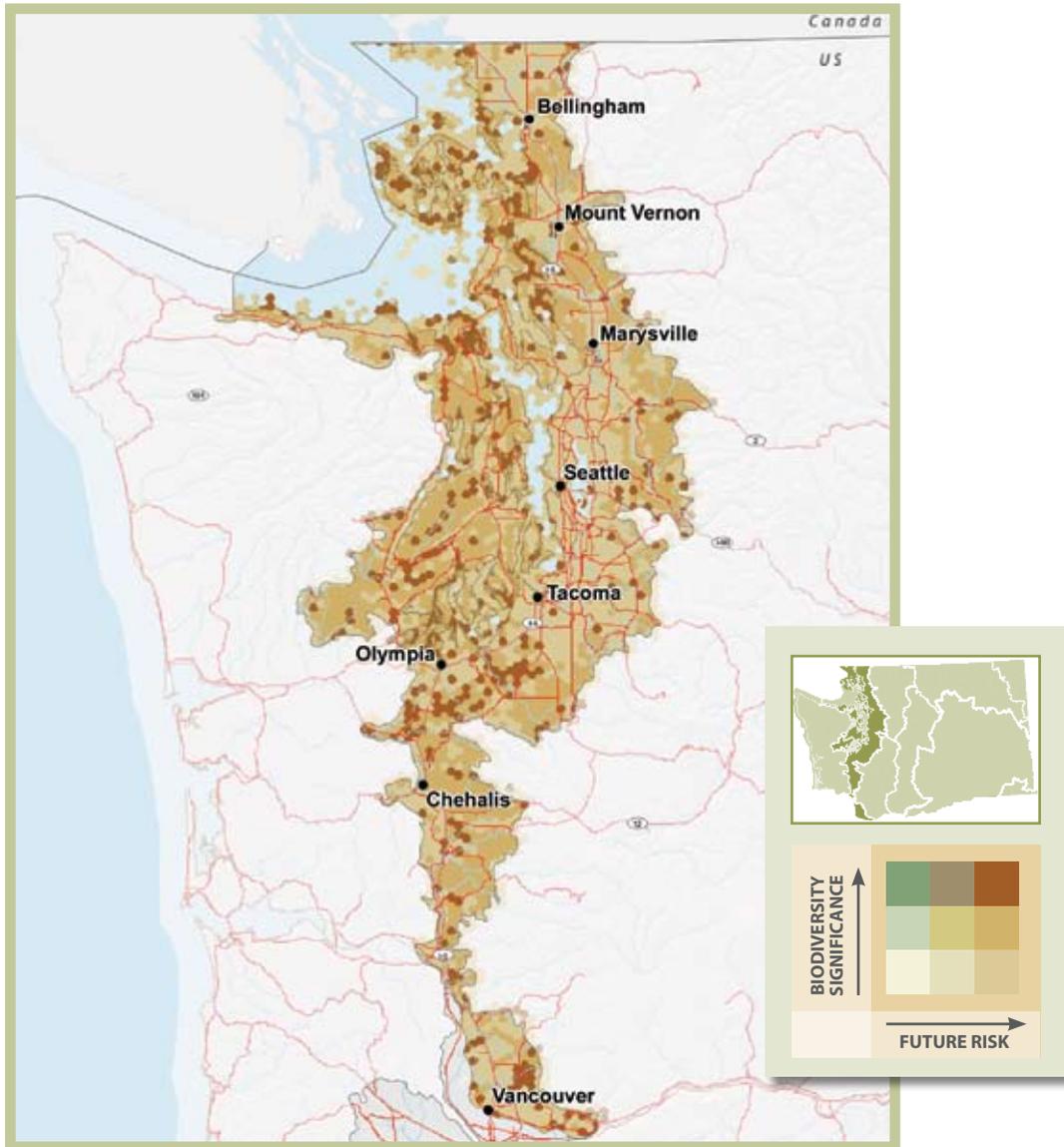
The rich timber resource of Douglas-fir, western red cedar, western hemlock, and Sitka spruce provided livelihoods for generations. While timber remains an economic powerhouse, non-timber forest products such as mushrooms, ferns, mosses, and salal are increasingly important.

The marine environment sustains commercial and sport fishing, crabbing, clamming, and oyster growing. On land, agriculture includes dairies and cranberry bogs. Tourism and recreation increase yearly.

More than 50% of the land is privately held—much of it by timber companies. Another 30% is federally owned, with Olympic National Park recognized as a global treasure. Biodiversity conservation in the Pacific Northwest Coast ecoregion, with its wealth of ecosystem diversity, holds both promise and challenge.

For more about this ecoregion visit www.biodiversity.wa.gov

Puget Trough Ecoregion



Landscape units: 741 acres (300 hectares) hexagons.

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About the Puget Trough Ecoregion

A great inland arm of the sea—Puget Sound—flanked by forested foothills and freshened by many rivers. The Puget Trough ecoregion is home to over 75% of Washington’s people.

Location

The Puget Trough ecoregion runs the length of Washington, rising to about 1000 feet elevation between the Cascade Mountains on the east and the Olympic Peninsula on the west. Encompassing about 8% of the state, it is densely populated. The larger Willamette Valley-Puget Trough-Georgia Basin ecoregion extends into Oregon and British Columbia.

Outstanding Biodiversity Features

- **Puget Sound—a globally important estuary.** Home to orcas, porpoises, and harbor seals, with rich nearshore and deepwater habitats. Puget Sound’s distinctive underwater topography makes it vulnerable to activities onshore and upstream.
- **Salmon, linking freshwater and saltwater habitats.** Several species of salmon—icons of the region—are at risk due to habitat degradation.
- **Grasslands and oak woodlands that support rare species.** Many grassland species are declining because their available habitat has dwindled. Fire suppression and invasive species are significant problems.
- **Accessibility, rich natural resources, and economic potential.** These factors have encouraged over 75% of Washingtonians to live here. The result is a mosaic of land uses that fragment high quality native habitats.

People in the Puget Trough ecoregion

The earliest archaeological evidence of people in the Puget Trough ecoregion in Washington dates back about 8,000 years. The ancestors of Salishan-speaking peoples flourished and developed eighteen or more linguistic traditions.

These peoples created prosperous maritime cultures. They employed the region’s rich biodiversity, including salmon, shellfish, and western red cedar. Plants such as nettle, berries, bracken, and camas supplied food and fiber.

Euro-Americans also utilized the marine and forest resources. Land use patterns were established early, and by 1991 more than 50% of the Puget Trough had been converted to urban and agricultural uses, including intensive forestry, pasture, and cropland.

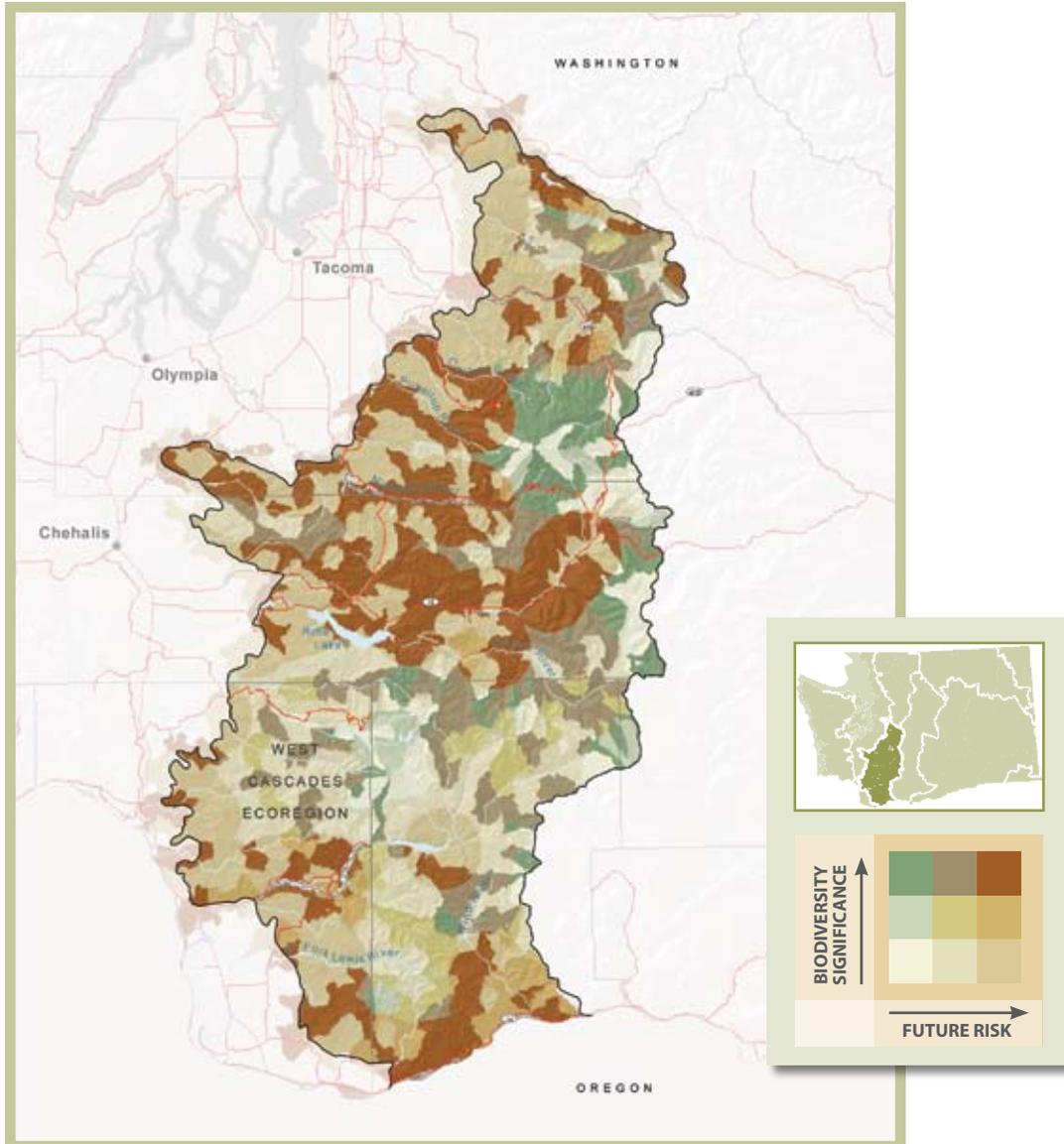
In 1999, the ecoregion’s population was nearly 3.9 million—double that of the 1960s. It is expected to grow to 5 million by 2020. The remaining natural areas and working lands are under pressure.

Puget Sound itself suffers from pollution and other ills, including multiple Superfund sites. The Endangered Species Act listing of wild Chinook salmon was the first to affect such an urban area. The southern resident orca population has also been listed as endangered.

Although altered and under stress, both the terrestrial and marine environments of the Puget Trough ecoregion are still extremely productive. Partnerships, political will, and creativity will be key to biodiversity conservation in the face of rapid growth.

For more about this ecoregion visit www.biodiversity.wa.gov

West Cascades Ecoregion



Landscape units: watersheds.

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About the West Cascades Ecoregion

Rumbling volcanoes and ancient forests distinguish Washington's West Cascades ecoregion.

Location

The West Cascades ecoregion encompasses the west-side midsection of the great Cascades cordillera. In Washington, the ecoregion runs southward from Snoqualmie Pass to the Columbia Gorge, the only lowland divide in the range. Across the Columbia, it extends south into Oregon. The crest of the Cascades marks the ecoregion's eastern edge. The western boundary dips to meet the foothills of the Puget Trough at about 1,000 feet. The ecoregion covers about 8% of state.

Outstanding Biodiversity Features

- **A great forested mountain range.** The West Cascades still retain significant tracts of natural, or at least semi-natural, forest, although management practices have altered forest structure at lower elevations.
- **Spectacular—and active—volcanoes host lowland to alpine species.** Mount Rainier is home to 723 native plants, amounting to 30% of the flora found in Washington. Mount Rainier and Mount Saint Helens are natural laboratories for studying how ecosystems respond to eruptions.
- **Columbia Gorge: a mountain range divided.** The Columbia Gorge, the ecoregion's low point at roughly 50 feet above sea level, splits the Cascades. It is notable as a place where coastal and inland species converge.

People in the Ecoregion

The West Cascades ecoregion is sparsely populated but long utilized. Human history in the West Cascades dates back at least 8,500 years, when the montane glaciers began to recede.

Tribes from both sides of the Cascades gathered huckleberries in the summer and fall. They hunted large and small game, from elk and mountain goats, to pikas and porcupines. The Nisqually, Puyallup, Squaxin Island, Muckleshoot, Yakama, and Cowlitz are among the peoples with long ties to the ecoregion.

The search for a wagon route over the Cascades led to some exploration of the West Cascades near Mount Rainier in the 1860s. That effort eventually resulted in settlement near Packwood in the 1880s. In the generations since, the timber industry has provided many livelihoods. Agriculture, particularly grazing and hay production, continues in the river valleys. Tourism has played an increasingly important role in recent years.

Nearly two-thirds of the ecoregion is public land, most of it federal. The ecoregion features numerous protected areas, including Mount Rainier National Park, Mount Saint Helens National Volcanic Monument, and several Forest Service wilderness areas.

This forested and mountainous ecoregion is near several urban centers, creating challenges to its future ecological integrity. Forward-thinking partnerships are looking for ways to conserve both the vitality of farms and working forests and the biodiversity of this ecoregion.

For more about this ecoregion visit www.biodiversity.wa.gov