

ECOREGIONS:

Overview of Ecoregions

Oregon's diverse landscapes range from lush rainforests to deserts, contributing to diverse combinations of species that differ from one area to another. Differences in vegetation, climate, and history of human use influence how the six key conservation issues affect fish and wildlife at the local level and what actions are needed to address those issues.

Similarly, each community's residents perceive, value and manage their natural resources in ways unique to their respective regions. To capture this regional diversity and local knowledge, the Conservation Strategy examines Oregon's eight ecoregions. Ecoregions are portions of the state with similar climate and vegetation. The Conservation Strategy uses the Environmental Protection Agency's Level III Ecoregion map (www.epa.gov/wed/pages/ecoregions/or_eco.htm), but combines the Snake River Plain with the Northern Basin and Range.

This section provides an overview for each of Oregon's eight ecoregions. Each overview contains information on land uses, economies, and ecology; Strategy Species and Habitats; conservation issues and approaches to address them; documented and potential invasive species; some conservation actions; and example(s) of successful collaborative conservation projects. More specific information on Strategy Habitats and Species is presented in the following chapters.

Conservation Opportunity Areas

Landowners and land managers throughout Oregon can contribute to conserving fish and wildlife by maintaining, restoring, and improving habitats. Conservation actions that benefit Strategy Species and Habitats are important regardless of location. However, focusing investments in certain priority areas can increase likelihood of long-term success over larger landscapes, improve funding efficiency, and promote cooperative efforts across ownership boundaries. Conservation

Opportunity Areas are landscapes where broad fish and wildlife conservation goals would be best met. Conservation Opportunity Areas were developed to guide voluntary actions. Land use or other activities within these areas will not be subject to any new regulations. These maps and the associated data should only be used in ways consistent with these intentions. For more information on how these areas were identified, see Appendix IV (Methods) on page a:34.

The Conservation Strategy envisions that, over time, voluntary conservation actions consistent with local priorities will be carried out within these Conservation Opportunity Areas by a variety of partners (e.g., landowners, land managers, watershed councils, local land trusts, Soil and Water Conservation Districts). The impact of these conservation actions on Strategy Species and Habitats will be monitored. Through this process, additional information will be gained on the habitat elements of importance to Strategy Species. This information will be used to refine the boundaries of Conservation Opportunity Areas in the future.

The Conservation Opportunity Area profiles include information on recommended conservation actions, special features, key species, key habitats, and if the area has been identified as a priority by other planning efforts. These profiles highlight some priority actions to implement in individual Conservation Opportunity Areas, which can range from restoration projects to monitoring for invasive species. These recommendations were identified through existing plans, spatial analysis, and expert review. They are not meant to be exhaustive, so other actions also will be appropriate, as influenced by local site characteristics and management goals. Actions need to be compatible with local priorities, local comprehensive plans and land use ordinances, as well as other local, state, or federal laws. Actions on federal lands must undergo federal planning processes prior to implementation to ensure consistency with existing plans and management objectives for the area.



Photo © Martin Nugent

Blue Mountains Ecoregion

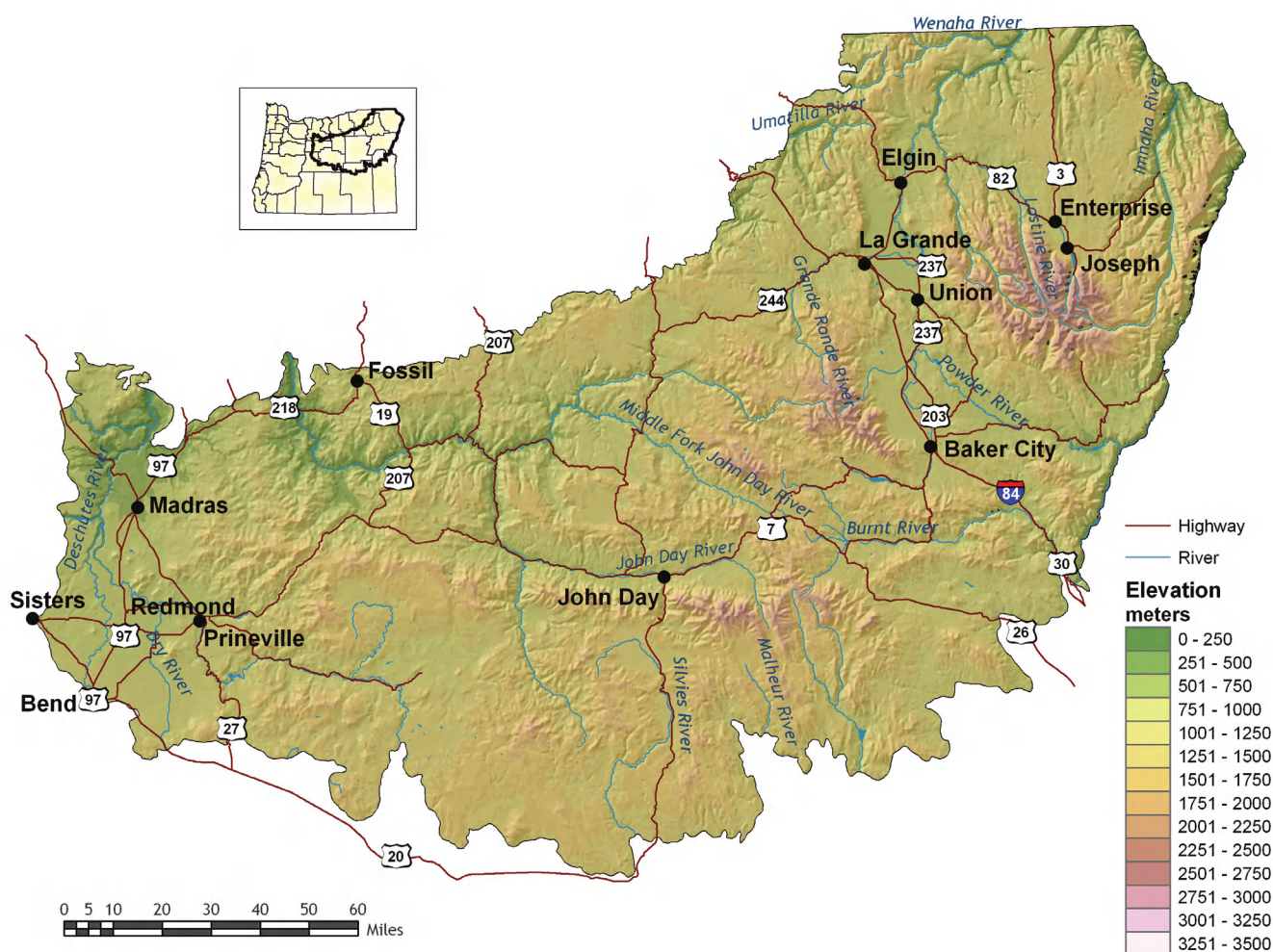
Getting to Know the Blue Mountains Ecoregion

Characteristics

At 23,984 square miles, the Blue Mountains ecoregion is the largest ecoregion in Oregon. Although named for its largest mountain range, the Blue Mountain ecoregion is a diverse complex of mountain ranges, valleys and plateaus that also extends beyond Oregon into the states of Idaho and Washington. There are deep rocky-walled canyons, glacially cut gorges, sagebrush steppe, juniper woodlands, mountain lakes, forests, and meadows. Broad alluvial-floored river valleys support ranches

surrounded by irrigated hay meadows or wheat fields. The climate varies over broad temperature and precipitation ranges because of elevational differences. Overall, the ecoregion has short, dry summers and long, cold winters. Because much of the precipitation falls as snow, snow melt gives life to the rivers and irrigated areas.

Wood products and cattle production dominate the economy of the ecoregion, but dryland wheat and alfalfa are important in the river valleys. The ecoregion supports some of the finest big game hunting



"At a Glance"- Characteristics and Statistics**Land use (% of ecoregion):**

Agriculture	1.3%
Forest and woodland	40.3%
Other (lakes, wetlands, cliffs, etc.)	18.3%
Range, pasture, and grassland	39.9%
Towns and rural residential	0.1%
Urban and suburban	0.1%

Land ownership:

Private	46%
Public, federal	52%
Public, state and local	<1%
Native American	1%

Human population, government and transportation statistics:

Estimated population in 2000	161,000
% of Oregon's population in 2000	4.8%
Number of cities	41
Number of counties	14
<i>(includes part of Baker, Crook, Deschutes, Harney, Jefferson, Lake, Malheur, Morrow, Wasco, Wheeler, Umatilla, counties and all of Grant, Union and Wallowa counties)</i>	
Number of watershed councils	16
<i>(A watershed council is considered present if at least 10% of its area is located within the ecoregion.)</i>	
Miles of road	40,900

Economics:

Important industries: Agriculture, livestock (beef cattle, dairy cattle, sheep, poultry, and hogs), forest products, manufacturing, recreation (hunting, fishing, skiing, camping).

Major crops: wheat, alfalfa, potatoes, onions, sugar beets, carrots, field corn, mint.

Important nature-based recreational areas: John Day Fossil Beds National Monument, Hell's Canyon National Recreational Area and Hell's Canyon Wilderness, Wallowa Lake, Umatilla National Wildlife Refuge, John Day and Grande Ronde Rivers, Lake Billy Chinook, Smith Rock, and wilderness areas (especially Eagle Cap, Strawberry Mountain, North Fork John Day and Wenaha-Tucannon Wildernesses).

Ecology:

Average annual precipitation	8.00" – 24.29" (snowfall 11.21" - 87.63")
Average July high temperature (1971-2000)	75.9 °F – 90.8 °F
Average January low temperature (1971-2000)	9.9 °F – 28.1 °F
Elevation	1,000 feet (Snake River) – 9,838 feet (Sacajawea Peak)
Number of regularly occurring vertebrate wildlife species	345
Important rivers	Deschutes, Grande Ronde, Imnaha, John Day, Malheur, Powder, Silvies, Snake, Umatilla, Wallowa

Information Sources: Oregon Blue Book (2003-04), Oregon Climate Service data (1971-2000), Oregon State of the Environment Report (2000), Oregon Watershed Enhancement Board (2001), Oregon Wildlife Diversity Plan (1993), U.S. Census Bureau (2000).

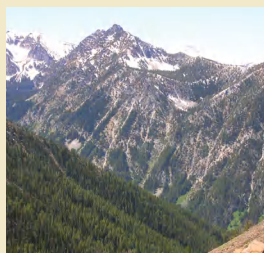






Photo © Martin Nugent

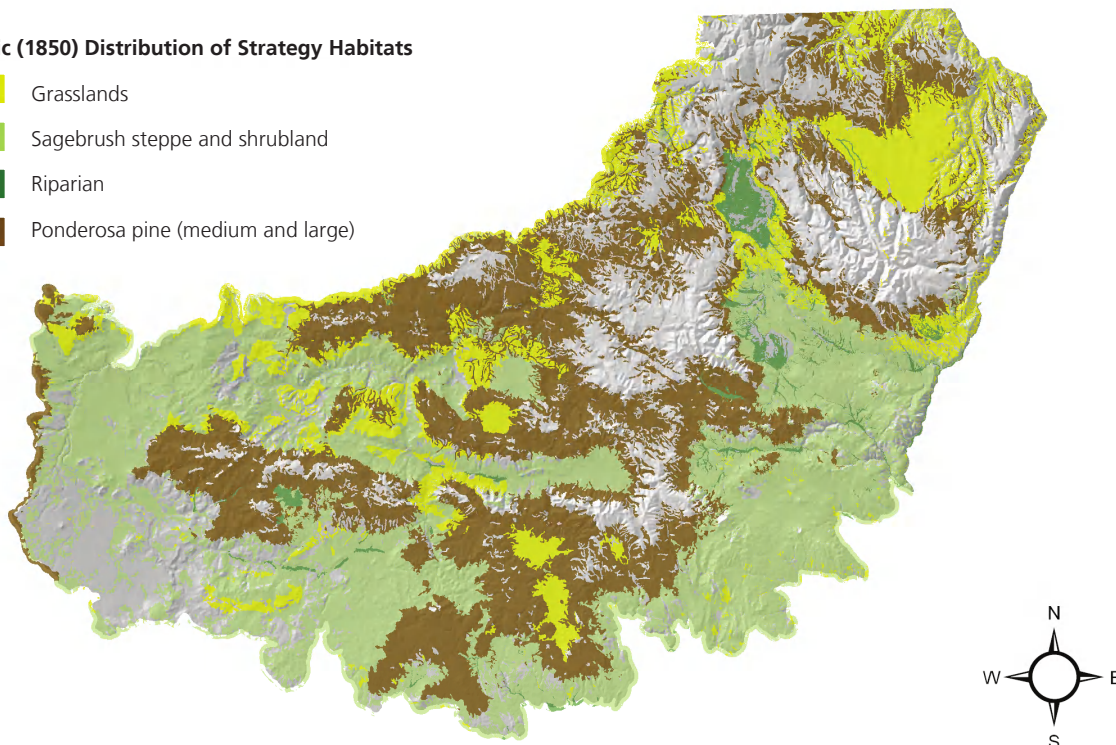
Summary List of Strategy Habitats

Strategy Habitats in the Blue Mountains Ecoregion include: ponderosa pine woodlands, aspen woodlands, grasslands, sagebrush steppe and shrublands, wetlands, riparian, and aquatic habitats.

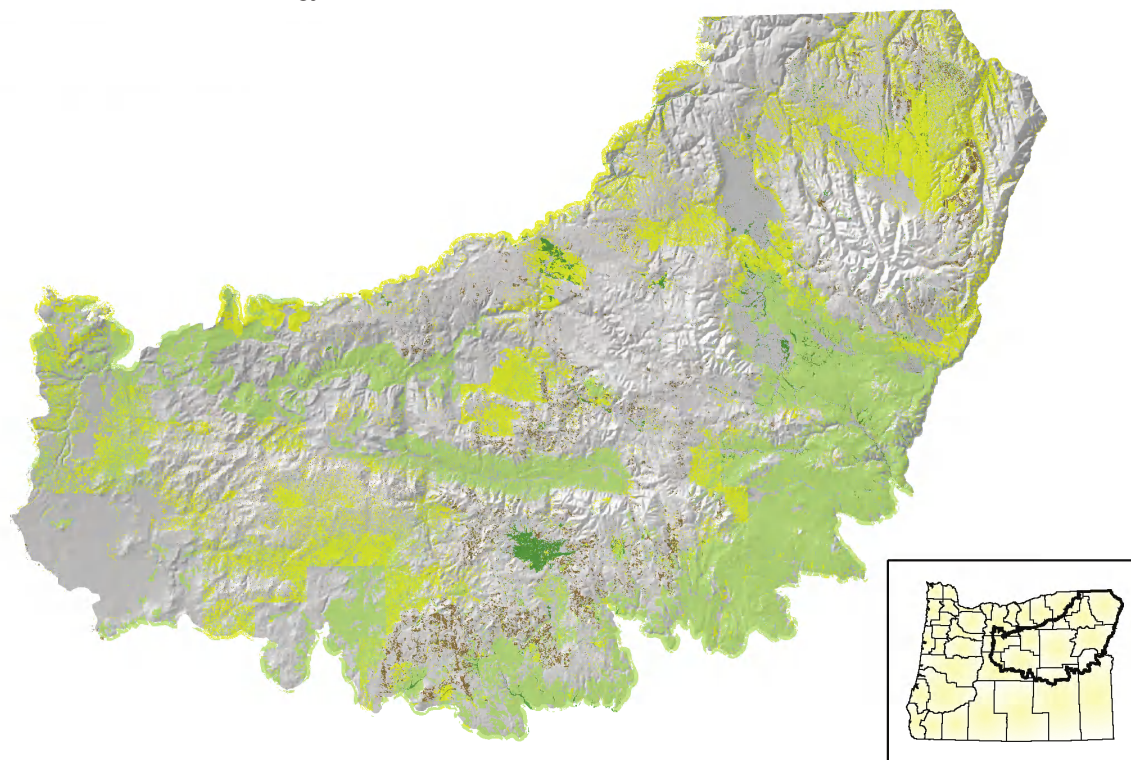
Change in Strategy Habitats

Historic (1850) Distribution of Strategy Habitats

-  Grasslands
-  Sagebrush steppe and shrubland
-  Riparian
-  Ponderosa pine (medium and large)



Current (2004) Distribution of Strategy Habitats



Data Source: Oregon Natural Heritage Information Center, 2004.

in the state and attracts tourists year-round, offering scenic lakes and rivers, geologic features, and alpine areas. It includes the Prineville-Bend-Redmond area, one of the fastest growing places in the state, along with the cities of La Grande, Baker, Enterprise, and John Day.

Conservation Issues and Actions

Overview

While the Blue Mountain ecoregion contains some of the largest intact native grasslands in the state and several large areas managed for conservation values, habitats have been impacted by interrelated changes in ecological processes due to fire suppression, selective harvest practices, and unsustainable grazing. These changes have resulted in undesirable changes in vegetation that has increased vulnerability of forests to insects, disease, and uncharacteristically severe wildfire. Similarly, these changes have led to increased invasive species and increased vulnerability to wildfire in sagebrush shrublands and steppe.

Habitat loss and potential habitat loss are greatest in lower elevation valley bottom habitats (e.g., riparian, wetlands, shrublands), where

native vegetation has been converted to agricultural uses. These low-elevation habitats are highly fragmented, and, maintaining connectivity and corridors for wildlife is important in these areas. Increasing recreational pressure and invasive species can potentially impact all habitats in this ecoregion.

Ecoregion-level limiting factors and recommended approaches

All six of the key conservation issues apply statewide, as do the approaches outlined in the Statewide Perspectives and Approaches chapter. However, invasive species, altered disturbance regimes and land use changes are described further in this section, considering the Blue Mountains' ecoregional characteristics. In addition to the statewide issues, uncontrolled off-highway recreational vehicle use is of increasing concern in this ecoregion.

Factor: Altered fire regimes. In ponderosa pine habitat types, fire suppression and past forest practices have resulted in young, dense mixed-species stands where open, park-like stands of ponderosa pine once dominated. Increasingly dominated by smaller

Summary List of Strategy Species

Mammals

American marten
California myotis (bat)
Fringed myotis (bat)
Hoary bat
Long-legged myotis (bat)
Pallid bat
Silver-haired bat
Spotted bat
Townsend's big-eared bat

Fish

Bull trout
(Columbia Distinct Population Segment [DPS])
Chinook
(Snake River ESU, spring/summer run)
Chinook
(Snake River ESU, fall run)
Inland Columbia Basin redband trout
Malheur mottled sculpin
Margined sculpin
Oregon Basins redband trout
(Silvies River)
Pacific lamprey
Steelhead
(Middle Columbia River ESU, summer run)
Steelhead
(Middle Columbia River ESU, winter run)
Steelhead
(Snake River Basin ESU)
Western brook lamprey
Westslope cutthroat trout

Plants

Arrow-leaf thelypody
Cusick's lupine
Greenman's desert parsley
Howell's thelypody
MacFarlane's four-o'clock
Oregon semaphore grass
Peck's milk-vetch
Red-fruited desert parsley
Snake River goldenweed
South Fork John Day milk-vetch
Spalding's campion

Birds

American three-toed woodpecker
Black-backed woodpecker
Bobolink
Ferruginous hawk
Flammulated owl
Great gray owl
Greater sage-grouse
Lewis' woodpecker
Loggerhead shrike
Pileated woodpecker
Upland sandpiper
White-headed woodpecker

Amphibians and Reptiles

Columbia spotted frog
Inland tailed frog
Western painted turtle
Western toad

Invertebrates

Aquatic snails:
Bulb juga
Purple-lipped juga (Dechutes juga)

Douglas-fir and true firs, the forests are at increased risk of severe wildfire, disease, and damage by insects. Native shrublands and grasslands are more susceptible to the spread of juniper. Dense understories and insect-killed trees make it difficult to reintroduce natural fire regimes because hazardous fuel levels increase the risk of stand-replacing fires. Efforts to reduce fire danger and improve forest health may help restore habitats but require careful planning to provide sufficient habitat features that are important to wildlife (e.g., snags, down logs, hiding cover for big game). Similarly, wildfire reforestation efforts should be carefully planned to create stands with tree diversity, understory vegetation and natural forest openings

Approach: Use an integrated approach to forest health issues that considers historic conditions, wildlife conservation, natural fire intervals, and silvicultural techniques. Encourage forest management at a broad scale to address limiting factors. Implement fuel reduction projects to reduce the risk of forest-destroying wildfires, considering site-specific conditions and goals. Fuel reduction strategies need to consider the habitat structures that are needed by wildlife, such as snags and down logs, and make an effort to maintain them. Reintroduce fire where feasible; prioritize sites and applications. Carefully planned prescribed burns enhance quality of forage and cover for wintering deer and elk. Maintain important wildlife habitat features such as snags and logs at a level to sustain wood-dependent species. Monitor forest health initiatives efforts and use adaptive management techniques to ensure efforts are meeting habitat restoration and wildfire prevention objectives with minimal impacts on wildlife.

Factor: Low elevation sites vulnerable. Although a large number of acres in this ecoregion are managed for wildlife and recreational values, these areas are primarily limited to higher mountain forests and alpine areas, or steep canyonlands. Lower elevation vegetation types such as valley bottom grasslands, dry forests, wetlands, and shrublands are mostly on private lands. Most remnant low-elevation fish and wildlife habitats occur as fragmented patches with poor connectivity.

Approach: Because important low-elevation habitats are primarily privately-owned, working with private landowners and local governments on voluntary cooperative approaches to improve habitat is the key to long-term conservation using tools such as financial incentives, regulatory assurance agreements, and conservation easements. Where feasible, maintain and restore habitats using a landscape approach to increase connectivity between habitat patches.

Factor: Development and increased growth. The western portion of the Blue Mountains includes the Madras, Redmond, Prineville and eastern Bend area, one of the fastest growing places in the state. Rapid conversion to urban uses threatens habitats and traditional land uses such as agriculture. Impacts to mule deer winter range are of particular concern. Northeast Oregon is increasingly popular with vacationers, and habitat fragmentation due to rural development is a concern in some areas.

Approach: As in low-elevation habitats, cooperative approaches with private landowners are critical. Work with community leaders and agency partners to ensure planned, efficient growth. Support and implement existing land use regulations to preserve farmland and rangeland, open spaces, recreation areas, and natural habitats.

Factor: Recreational vehicle use. Use by off-highway vehicles (OHVs) has increased dramatically, with permits doubling statewide during 1999-2004. When limited and controlled, OHV use can be compatible with wildlife conservation. However, unlimited and uncontrolled use can impact riparian, aquatic, and other sensitive habitats, spread invasive plant seeds, increase fire danger, and affect wildlife behavior and distribution, especially during critical breeding and wintering periods. Also, use of forests roads can affect wildlife behavior and distribution, depending on road type and traffic levels.

Approach: Work cooperatively with land managers and OHV groups to direct use to maintained trails in low-impact areas and minimize growth of OHV use. Conduct research on effects of OHVs on wildlife behavior and populations (e.g., current research conducted at Starkey Experimental Forest, U.S. Forest Service [USFS]). Support efforts to control OHV use on public lands, particularly in highly sensitive habitats and restore damaged areas (for example, see USFS Draft Travel Management Plan). Close non-priority forest roads, encourage development and use of designated roads and trails, maintain hiding cover along open roads, and/or seasonally close roads during sensitive periods such as calving or wintering.

Factor: Water distribution in arid areas and wildlife entrapment in water developments. In arid areas, water availability can limit animal distribution. Water developments established for cattle, deer, and elk can significantly benefit birds, bats, and small mammals as well. However, some types of these facilities, particularly water developments for livestock, can have unintentional hazards. These hazards include over-hanging wires that act as trip lines for bats, steep side walls that act as entrapments under low water conditions, or unstable perches that cause animals to fall into the water. If an escape ramp is not provided, small animals cannot escape and will drown.

Invasive Non-native Species

Invasive species currently are considered to be one of the primary causes of species becoming threatened and endangered, second only to habitat conversion. Many species are as threatening to people's livelihoods as they are to fish, wildlife and their habitats. This section identifies the species with the greatest current and potential impact in the Blue Mountains. These species were determined through an analysis of Oregon Department of Agriculture's Noxious Weed List, ODFW's Wildlife Integrity Rules, ODFW's Introduced Fish Management Strategies report, information from Portland State University Center for Lakes and Reservoirs, and local expert review. Although some of these species also cause significant economic damage to farms, ranches, and managed forests, this list is focused on those that cause the most severe ecological damage. Impacts from introduced game fish vary from species to species and within ecoregions. As a result, the impacts need to be evaluated more locally (ODFW Introduced Fish Management Strategies Report).

Known invasive non-native animal and plant species

These species are established or documented in this ecoregion, and are known to impact native fish and wildlife populations and habitats. They may range from small, controllable populations to widespread infestations.

Documented Invasive Animals

Atlantic salmon
Brown bullhead
Bluegill
Brook trout
Bullfrog
Bullhead catfish
Carp
Channel catfish
Crappie
Easter gray squirrel
Eastern fox squirrel
European red fox
European starling
Fathead minnow
Feral pig
Feral horse
Golden Shiner
House sparrow
Lake trout
Largemouth bass
Mosquito fish (*Gambusia*)
Mute swan
Norway rat
Nutria
Perch
Smallmouth bass
Sunfishes
Utah chub
Virginia opossum
Walleye
Yellow perch

Documented Invasive Plants

Barbed goatgrass
Black locust
Bloodrop/Pheasant eye
Bouncing bette
Buffalo bur

Cheatgrass
Clary sage
Common bugloss
Common cockle bur
Common crupina
Dalmation toadflax
Dyers woad
False hoary allysum
Foxtail
Himalayan blackberry
Hungarian brome
Jointed goatgrass
Knapweeds (diffuse, meadow, squarrose, Russian)
Knotweeds (Japanese, giant)
Lambsquarter
Leafy spurge
Marsh elder
Mediterranean sage
Medusahead rye
Mullein
Myrtle spurge
North Africa grass
Orange hawkweed
Oxeye daisy
Perennial pepperweed
Plumeless thistle
Purple loosestrife
Rush skeletonweed
Russian olive
Sulfur cinquefoil
Tamarisk (salt cedar)
Tansy ragwort
Thistles (musk, plumeless, Scotch, Russian)
Tree of Heaven
Whitetop
Yellow starthistle
Yellow toadflax

Non-native animals and plants of potential concern

Preventing the establishment of invasive non-native species is far more cost-effective and practical than trying to eradicate them once they are established. To make the best use of financial and personnel resources, prevention efforts need to be prioritized to address the greatest threats, especially since many non-native species do not pose a significant threat to fish and wildlife populations and habitats. Potentially harmful non-native species can be identified by examining biological factors, potential impacts and invasion patterns in similar climates. The species listed here are included because: 1) they are not known to occur in this ecoregion, but could pose a threat to fish and wildlife populations and habitats if they become established; or 2) they are known to occur in this ecoregion but the extent to which they impact native species and disrupt ecological processes is unclear at this time.

Potentially Invasive Non-native Animals

Asian carp (bighead, silver)
Asiatic clam
Chinese fine-scaled loach
Grass pickerel
Muskellunge, northern pike
New Zealand mud snail
Oriental weatherfish
Round goby
Ruffe
Snakeheads
Zebra mussel

Potentially Invasive Non-native Plants

African rue
King devil weed
Skeletonleaf bursage
Syrian bean caper
Texas blueweed
Yellow hawkweed

Conservation actions in the Blue Mountains Ecoregion identified through other planning efforts

Landowners and land managers can benefit a variety of fish and wildlife species by managing and restoring Strategy Habitats. The following recommendations are relevant to Strategy Habitats. They were identified through a review of existing plans.

Actions	Strategy Habitat and General Location	Source Document
In cooperation with interested landowners and agencies, initiate grassland restoration on private and public land and secure conservation status for ponderosa pine habitats.	Ponderosa pine and grassland habitats throughout ecoregion	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended targets: Wallowa Plateau and County 15,000 ac; Malheur Headwaters 15,000 ac; John Day River 20,000 ac; North Fork Crooked River 32,000 ac; Aldrich Mts 30,000 ac; King Mt. 35,000 ac; Emigrant Creek/Silver Creek 100, 000 ac]
In cooperation with interested landowners and agencies, manage ponderosa pine stands to maintain conditions suitable for white-headed woodpecker	Ponderosa pine habitats throughout ecoregion	OR-WA Partners in Flight – Northern Rocky Mountains Conservation Strategy (Altman 2000) [recommended targets: At appropriate sites, five patches of ponderosa pine habitat more than 5,000 acres each]
In cooperation with interested landowners and agencies, initiate sagebrush steppe and shrubland restoration on private and public land and secure conservation status for grasslands.	Sagebrush steppe and shrubland grassland habitats throughout ecoregion	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended targets: Crooked River National Grasslands 50,000 ac; High Desert South Fork Crooked River 600,000 ac; Powder River 100,000 ac]
In cooperation with interested landowners and agencies, initiate grassland restoration where needed on private and public land and secure conservation status for grasslands.	Grassland habitats throughout ecoregion	Eastside All-Bird Implementation Plan (Ivey 2000) [Wallowa Plateau and County 300,000 ac; Malheur Headwaters 9,000 ac]
In cooperation with interested landowners and agencies, initiate wet meadow restoration on private and public land and secure conservation status for wet meadows.	Wet meadows habitats throughout ecoregion	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended targets: Malheur Headwaters 2,000 ac; John Day River 2,000 ac; North Fork Crooked River 5,000 ac; High Desert South Fork Crooked River 5,000 ac; Burnt River 5,000 ac; Powder River - 10,000 acres; Upper Grand Ronde 5,000 ac]
In cooperation with interested landowners and agencies, initiate emergent marsh restoration on private and public land and secure conservation status for emergent marshes	Emergent marshes throughout ecoregion	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended targets: South Fork Crooked River 500 ac; Upper Grande Ronde 2,000 ac]
In cooperation with interested landowners and agencies, initiate riparian restoration on private and public land and secure conservation status for riparian habitats.	Riparian habitats throughout the Blue Mountains ecoregion	OR-WA Partners in Flight – Northern Rocky Mountains Conservation Strategy (Altman 2000) [recommended targets: >more than 30% of historical extent throughout ecoregion]
In cooperation with interested landowners and agencies, initiate riparian forest restoration on private and public land and secure conservation status for riparian forests.	Riparian habitats throughout ecoregion	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended targets: Wallowa Plateau and County 1,000 ac; Upper Grande Ronde - 500 ac; Crooked River National Grasslands 300 ac; Aldrich Mts 500 ac]
In cooperation with interested landowners and agencies, initiate riparian shrubland restoration on private and public land and secure conservation status for riparian shrublands.	Riparian shrubland habitat throughout ecoregion	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended targets: Wallowa Plateau and County 1,000 ac; Upper Grande Ronde 500 ac; Burnt River 500 ac; Malheur Headwaters 200 ac; Aldrich Mts 300 ac]
Improve fish passage. For example, modify barriers or use full spanning structures where appropriate.	Lake Creek and Link Creek Fish Passage Improvement Project; and, all locations (as appropriate)	NWPCC Subbasin Plans, 2004; Oregon Biodiversity Project; Oregon Plan
Focus conservation attention on areas that meet American Fisheries Society requirements for being ecologically outstanding	South Fork John Day River and Joseph-Imnaha Plateau.	Oregon Biodiversity Project, Oregon Plan
Focus conservation attention on biologically unique habitats	Malheur headwaters; Bear Valley; Umatilla-Walla Walla headwaters	Oregon Biodiversity Project, Oregon Plan
Modify practices in forests, agriculture and urban areas to meet large wood levels, reduce sediment, extend fish passage	Trout Creek; Squaw Creek; Middle and Upper Deschutes; Crooked River; And, all locations (as appropriate)	NWPCC Subbasin Plans, 2004; Oregon Plan
Establish integrated framework for wetland restoration assessment, priority setting, and actions at three scales: watersheds, ecoregions and project sites	Wetlands	Recommendations for a nonregulatory wetland restoration program for Oregon. J.W. Good and C.B. Sawyer. 1998. Prepared for Oregon Division of State Lands and U.S. EPA Region X.

(continued on next page)

Actions	Strategy Habitat and General Location	Source Document
Increase incentives for proactive, nonregulatory wetland restoration and enhancement on private land, focusing on a combination of financial assistance, tax benefits, technical assistance, and education	Wetlands	Recommendations for a nonregulatory wetland restoration program for Oregon. J.W. Good and C.B. Sawyer. 1998. Prepared for Oregon Division of State Lands and U.S. EPA Region X.
Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology. - Plant vegetation to stabilize banks; leaving stumps, fallen trees and boulders in waterways - Maintain or enhance off channel or side channel meanders, habitat and pools	Aquatic habitats (streams, pools)	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See guide for specific technical recommendations, sources of information and assistance, and other guidelines.
Maintain riparian and wetlands function: - Manage grazing, riparian vegetation planting and fencing, and livestock water facilities according to best practices, current techniques and with respect to natural hydrological conditions.	Riparian and wetlands habitats	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See guide for specific technical recommendations
Upslope erosion control: - Create water and sediment control basins to contain runoff, wastewater - Use windbreaks (tree and shrub rows using native plants) to reduce erosion and deposition - Upland terracing	Aquatics, riparian and wetland habitats	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See guide for specific technical recommendations

**Note: Strategy monitoring indicators, linked with OSOER Key indicators, targets, and methods, will be identified in a Statewide approach (See Monitoring Chapter for more information).*

Approach: Continue current efforts to provide water for wildlife in arid areas. Continue current design of big game “guzzlers” that accommodate a variety species and retrofit older models where appropriate to make them compatible with newer design standards. Use and maintain escape devices on water developments where animals can become trapped. Remove obstacles that could be hazardous to wildlife from existing developments.

Factor: Invasive species. Invasive plant and animals disrupt and degrade native communities, diminish populations of at-risk native species, and threaten the economic productivity of resource lands. Invasive plants, particularly noxious weeds, have been on the increase during the last 20 years. While not nearly as disruptive, invasive animals have caused problems for native wildlife species and have become a nuisance and impacted people economically.

Approach: Emphasize prevention, risk assessment, early detection and quick control to prevent new invasives from becoming fully established. Use multiple-site appropriate tools (mechanical, chemical and biological) to control the most damaging invasive species. Prioritize efforts to focus on key invasive species in high priority areas, particularly where Strategy Habitats and Species occur. Cooperate with partners through habitat programs to

reduce noxious weeds and other invasive species and to educate people about invasives issues. Promote the use of native “local” stock for restoration and revegetation. At some sites in sagebrush communities, it may be desirable to use “assisted succession” strategies, using low seed rates of non-invasive non-native plants in conjunction with native plant seeds as an intermediate step in rehabilitating disturbances.

Conservation Success Stories

Pine Creek Conservation Area

When evening light paints golden highlights across rocky buttes and casts shadows into steep canyons, the Clarno Basin ranks among Oregon’s most visually dramatic landscapes. A central part of this landscape is the 33,557-acre Pine Creek Conservation Area owned and managed by the Confederated Tribes of Warm Springs. These sagebrush steppes, grasslands, juniper woodlands, and riparian areas connect wildlife habitat across more than 10,000 acres of public lands, including the Spring Basin Wilderness Study Area and the Clarno Unit of the John Day Fossil Beds National Monument.

Western Juniper has encroached into sagebrush steppe and grasslands on the Conservation Area since the late 1800s. Juniper

encroachment eliminates habitat for sagebrush steppe and grassland-dependent wildlife. The Tribes are using prescribed fire and manual cutting to control juniper encroachment and restore open sagebrush steppe and grassland habitats. Native bunchgrasses collect and retain more water than juniper. Juniper management will



Photo © Mark Berry

benefit the watersheds of Pine Creek and the John Day River by improving groundwater recharge and increasing summer stream flow.

The Conservation Area includes almost the entire watershed of Pine Creek, and six miles of John Day River front. Riparian areas on Pine Creek are recovering rapidly from past grazing practices, and removal of passage barriers has

helped steelhead access the stream for spawning.

The Bonneville Power Administration (BPA) is funding acquisition and management of the Conservation Area as partial mitigation for wildlife habitat losses at the John Day Dam on the Columbia River. This project is one of three BPA-funded Conservation Areas owned and managed by the Tribes in the John Day Basin. More than 16 partners, including private individuals, non-profit organizations, and state and federal agencies, are assisting the Tribes with management and monitoring.

In addition to habitat restoration, the Tribes have implemented a successful public access program, creating new opportunities for tribal members and the public to hike, view wildlife, or hunt. The Conservation Area has potential to serve as a model for watershed recovery and wildlife habitat management in the lower John Day Basin.

Longley Meadows Project: creek and meadow habitats restored while maintaining a viable cattle operation

Alta Cunha and Moss Creek ranches, located west of LaGrande, recently worked together and with many partners to restore Longley Meadow and to improve habitat along a one-mile segment of the Grande Ronde River.

Ranch owners Carla Cunha, Shauna Mosgrove and Kelly Stinnett and numerous partners launched the project with planning in 1999 and construction from 2002 to 2004. The purpose of the project was to restore in-stream, streambank and wetland habitat along seven miles of three creeks and the main stem of the Grande Ronde River west of LaGrande. The project included building seven miles of fence to keep livestock away from the creeks and river, planting 40,000 shrubs and trees and developing nine off-channel water sources for livestock.

Partners used state-of-the-art stream restoration techniques to restore one mile of the Bear Creek channel to its historical configurations through Longley Meadow. The new, meandering channel doubled instream habitat and created slow water flow over gravelly streambeds. Crews also placed whole trees with rootwads and woody debris into one mile of Jordan Creek.

To preserve the investment in the project, the ranch owners enrolled 445 acres of land adjacent to the creeks and river in the Conservation Reserve Enhancement Program and the Bonneville Power Administration's Fish Habitat Program. The agreements establish a 15-year streambank conservation easement.

Fourth generation ranch owner Mosgrove said that she, her mother Carla, and ranch co-owner Kelly started the project "with the traditional cattle operation perspective—help the stream, but keep the meadow for grazing." Project planners soon realized this wasn't possible. They toured similar projects. "I had grown up seeing streambank areas looking like putting greens and thought that was normal," she said. "I soon learned that restoration can bring huge benefits to a stream," she said.

Through numerous "stream summits" at the ranch with eight or nine project partners attending, the group found solutions that allowed stream restoration as well as grazing. Staff from the Natural Resources Conservation Service helped develop water sources other than the creeks and assisted with pasture rotation plans to offset the grazing lost from fencing off the ranch's best grazing in the meadow.

"A major surprise came when we found out that existing springs wouldn't be an adequate water source for the livestock," Mosgrove said. The solution: two wells, one of which is powered by a solar pump "that is working wonderfully," she added.

Five years after the start of planning, Mosgrove said it is satisfying to know that “you can do good things for the resource while keeping a viable cattle operation.” Mosgrove said the highlight of the project occurred last spring when one of the Oregon Department of Fish and Wildlife biologists came to tell her that steelhead were building spawning nests in the restored creek bed.

Project partners included several local, state and federal agencies, including the Natural Resources Conservation Service, Oregon Department of Fish and Wildlife, Oregon Department of Transportation, Grande Ronde Model Watershed Program, Oregon Department of Forestry and the Confederated Tribes of the Umatilla Indian Reservation, which managed the project. “The partners worked throughout as a team, bringing technical knowledge, practical experience from similar projects and sources of funding,” Mosgrove said. Individual landowners would not be able to tackle such projects without the good interagency cooperation shown from beginning to end, she noted.

The landowners were awarded the State Land Board’s 2004 Stream Award for the Longley Meadows Project. The State Land Board Awards were created in 2003 to promote and recognize responsible, sustainable stewardship of natural resources.

Deciding Where to Work

Conservation Opportunity Areas Map and Profiles

Landowners and land managers throughout Oregon can contribute to conserving fish and wildlife by maintaining, restoring, and

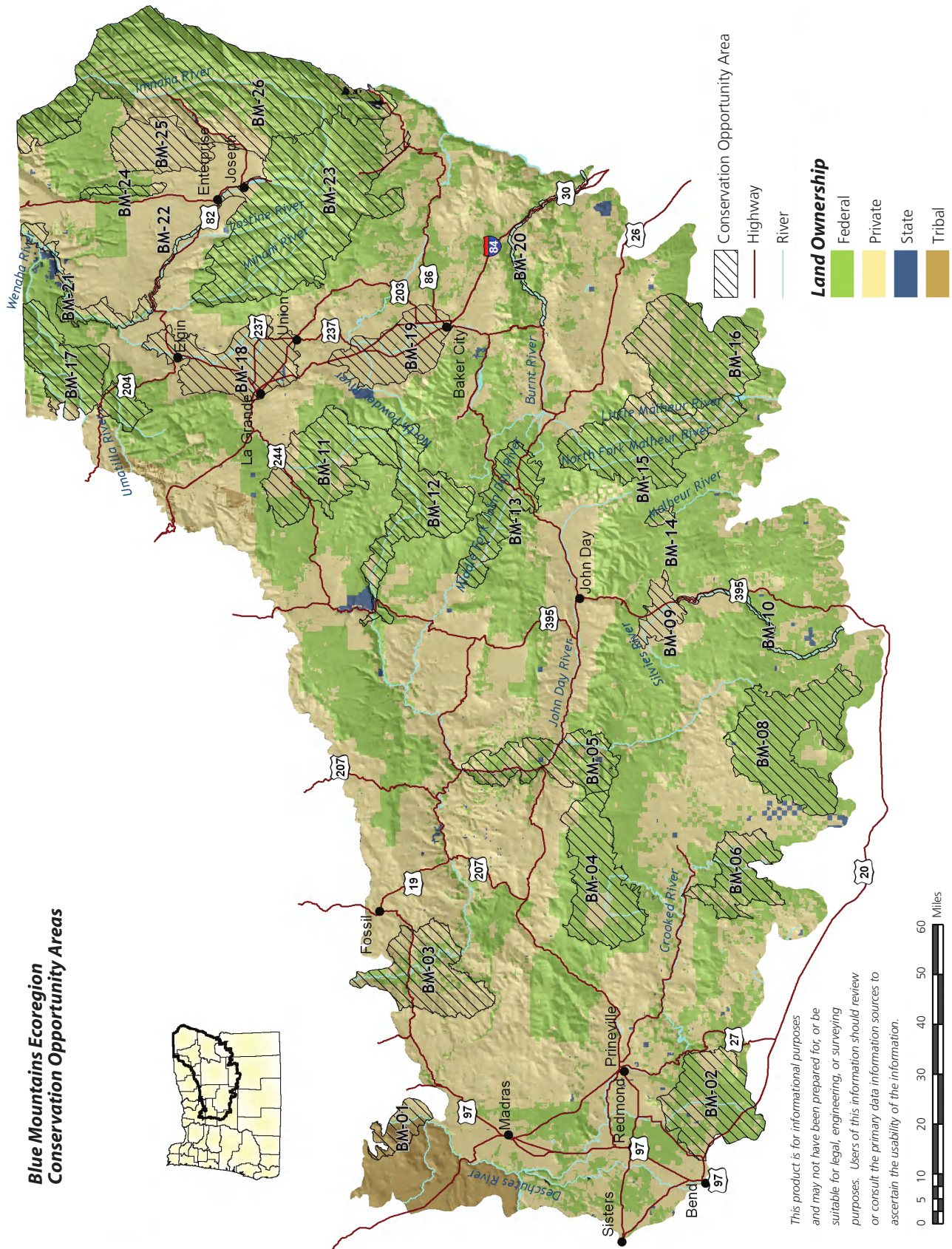
improving habitats. Conservation actions to benefit Strategy Species and Habitats are important regardless of location. However, focusing investments in certain priority areas can increase likelihood of long-term success over larger landscapes, improve funding efficiency, and promote cooperative efforts across ownership boundaries. Conservation Opportunity Areas are landscapes where broad fish and wildlife conservation goals would be best met. Conservation Opportunity Areas were developed to guide voluntary, non-regulatory actions. This map and the associated data should only be used in ways consistent with these intentions. For more information on how Conservation Opportunity Areas were developed, see Appendix IV, “Methods” (beginning on page a:34).

The Conservation Opportunity Area profiles include information on recommended conservation actions, special features, key species, key habitats, and if the area has been identified as a priority by other planning efforts. These profiles highlight some priority actions to implement in individual Conservation Opportunity Areas, which can range from restoration projects to monitoring for invasive species. These recommendations were identified through existing plans, spatial analysis, and expert review. They are not meant to be exhaustive, so other actions also will be appropriate, as influenced by local site characteristics and management goals. Actions need to be compatible with local priorities, local comprehensive plans and land use ordinances, as well as other local, state, or federal laws. Actions on federal lands must undergo federal planning processes prior to implementation to ensure consistency with existing plans and management objectives for the area.

Collaboration between management and research to achieve conservation in the Blue Mountains Ecoregion

Several collaborative initiatives between research and management have contributed greatly to conservation in the Blue Mountains Ecoregion, and many of these efforts are currently continuing. In the 1990s, the Interior Columbia Basin Ecosystem Management Project (ICBEMP) was an interagency collaboration to address Columbia Basin resource issues. The project resulted in several publications and detailed maps of the region. Several natural resource research and management projects are centered in La Grande, Oregon. For 10 years, the Pacific Northwest Research Station maintained the Blue Mountains Institute, to help promote research into fire, forest health and ecosystems in the ecoregion. The Interior Northwest Landscape Analysis System at the La Grande Forestry and Range Sciences Lab is developing spatial data for vegetation

in Blue Mountains watersheds. The Sagebrush Landscape Project at the Pacific Northwest Research Station in La Grande is investigating assessment of the conservation status of multiple species in sagebrush ecosystems, and developing and testing methodologies to accomplish these goals. The USDA-Forest Service Starkey Experimental Forest located near La Grande provides a venue for some of the most comprehensive field research projects ever attempted, with more than 22,000 acres of habitat and associated herds of big game and cattle. This provides an opportunity to investigate and evaluate the response of deer and elk to land management and use. Finally, another notable collaborative effort, the Grande Ronde Watershed Initiative, is discussed in the freshwater aquatic habitats discussion of the Strategy Habitats Chapter.



Conservation Opportunity Area Profiles

BM-01. Deschutes River area

Area is comprised of the Lower Deschutes River and surrounding sage habitat from the ecoregion border south to the confluence with the Warm Springs River.

Special Features:

- *Area includes a section of the Lower Deschutes Wild and Scenic River.*
- *Area extends the Deschutes River conservation opportunity area from the Columbia Plateau ecoregion.*

Key Habitats:

- Aquatic
- Oak Woodlands
- Sagebrush Steppe And Shrublands

Key Species:

- Ferruginous Hawk
- Lewis' Woodpecker
- Bull Trout (Columbia River Population)
- Summer Steelhead
- Pygmy Rabbit

BM-02. Badlands

Special Features:

- This area represents the largest block of old-growth western juniper habitat in Oregon.
- The Badlands Wildlife Study Area, Badlands Area of Critical Environmental Concern, and Horse Ridge area, all managed by the Bureau of Land Management, are within this conservation opportunity area.

Key Habitats:

- Old-growth Western Juniper

Key Species:

- Ferruginous Hawk
- Juniper-associated Songbirds
- Mule Deer

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Oregon Biodiversity Project Conservation Opportunity Areas

Recommended Conservation Actions:

- Manage public access and recreational uses to minimize impacts on ecological values
- Protect old-growth juniper

BM-03. Lower John Day River area

Located on the northern edge of the ecoregion along the lower John Day River West of Fossil.

Special Features:

- *Area includes the John Day Wilderness Study Area, Spring Basin Wilderness Study Area, and the Warm Springs Tribe's Pine Creek Ranch Wildlife Area.*
- *Area extends the John Day River Conservation Opportunity Area in the Columbia Plateau ecoregion.*
- *Ongoing restoration efforts by the Warm Springs Tribe.*
- *Spawning and rearing habitat for native steelhead populations*
- *Important wintering habitat for deer and elk*

Key Habitats:

- Grasslands
- Riparian
- Sagebrush Steppe And Shrublands

Key Species:

- Ferruginous Hawk
- Summer Steelhead
- Pygmy Rabbit

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan (John Day River)
- Oregon Biodiversity Project Conservation Opportunity Areas (Clarno area)

Recommended Conservation Actions:

- Maintain and/or initiate shrub-steppe restoration and management
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Restore and maintain complex, continuous sage habitat
- Restore and maintain grassland habitat

BM-04. Ochoco Mountains area

Special Features:

- *Area includes part of the section of the North Fork Crooked*

River designated as a Wild and Scenic River

- *Scenic River Big Summit Prairie is one of the largest montane wetlands in eastern Oregon.*
- *Streams throughout this area provide habitat for inland Columbia Basin redband trout*
- *High potential for increase in breeding sandhill cranes*

Key Habitats:

- Aquatic
- Ponderosa Pine Woodlands
- Wetlands And Wet Meadows

Key Species:

- Sandhill Crane
- Columbia Basin Redband Trout

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Eastern Oregon Bird Conservation Plan (part of North Fork Crooked area)
- Interior Columbia Basin Ecosystem Management Project (plant biodiversity area)

Recommended Conservation Actions:

- Restore wetland and riparian habitats at Big Summit Prairie
- Use fire and thinning to restore and enhance ponderosa pine forests

BM-05. Picture Gorge-John Day River

This area includes the mainstem John Day River from its intersection with the North Fork to the intersection with the South Fork, and extends down the South Fork John Day River to encompass the Black Canyon Wilderness. The area also includes the upland sage and shrubland habitat.

Special Features:

- *Area includes the Black Canyon Wilderness, Aldrich Mountain Wilderness Study Area, and John Day Fossil Beds National Monument.*
- *This area provides an important migratory corridor for migrating salmonids.*

Key Habitats:

- Aquatic
- Riparian
- Sagebrush Steppe And Shrublands

Key Species:

- Ferruginous Hawk
- Summer Steelhead
- Pygmy Rabbit

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Eastern Oregon Bird Conservation Plan (Aldrich Mountains)
- Oregon Biodiversity Project Conservation Opportunity Areas

Recommended Conservation Actions:

- Maintain and/or initiate shrub-steppe restoration and management
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Restore and maintain complex, continuous sage habitat

BM-06. South Fork Crooked River area

This area, located on the southern edge of the ecoregion primarily in the Prineville District of the BLM, is bisected by the Crooked River.

Special Features:

- *This area includes several areas managed for conservation values including the South Fork, Sand Hollow, and Gerry Mountain Wildlife Study Areas, as well as the South Fork Crooked River Area of Critical Environmental Concern.*

Key Habitats:

- Sagebrush Steppe And Shrublands
- Key Species:
- Sage Grouse
- Pygmy Rabbit

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan (section east of Crooked River)

Recommended Conservation Actions:

- Increase levels of large in-stream wood, reduce sediment, and improve fish passage
- Maintain and/or initiate shrub-steppe restoration and management
- Restore and maintain complex, continuous sage habitat

BM-08. Silver Creek-Emigrant Creek

This area is comprised of the Continental Zone Highlands subregion located west of the Silvies River along the southern edge of the ecoregion.

Special Features:

- *Area contains approximately 16% of the ecoregion's ponderosa pine habitat*

Key Habitats:

- Aquatic
- Ponderosa Pine Woodlands
- Riparian
- Wetlands And Wet Meadows

Key Species:

- Columbia Spotted Frog
- Flammulated Owl
- Malheur Mottled Sculpin
- Oregon Great Basin Redband Trout

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Eastern Oregon Bird Conservation Plan (Emigrant Creek - Silver Creek area)
- The Nature Conservancy Ecoregional Assessment (Silver Creek, Emigrant Creek areas)

Recommended Conservation Actions:

- Initiate or continue wet meadow conservation and restoration efforts
- Restore and maintain riparian habitats
- Use fire and thinning to restore and enhance ponderosa pine forests

BM-09. Bear Valley

Located south of John Day, along the Silvies River. The area encompasses the wetlands and riparian habitat in the valley.

Special Features:

- *Ecosystem management is already being employed here by some private land owners [Oregon Biodiversity Project website].*
- *Large wetland complex is keystone of Silvies River headwaters system, with major influence on downstream flows and water quality.*
- *This area provides significant percentage of the ecoregion's habitat for the upland sandpiper and bobolink.*

- Area contains 26% of the ecoregion's wetlands and wet meadows habitat and a large percentage of its riparian habitat
- There were 23 recorded nesting pairs of sandhill cranes here in 1999-2000.

Key Habitats:

Riparian
Wetlands And Wet Meadows

Key Species:

- Columbia Spotted Frog
- Bobolink
- Sandhill Crane
- Upland Sandpiper
- Inland Columbia Basin Redband Trout
- Malheur Mottled Sculpin
- Oregon Great Basin Redband Trout

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Oregon Biodiversity Project Conservation Opportunity Areas

Recommended Conservation Actions:

- Initiate or continue wet meadow conservation and restoration efforts
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

BM-10. Silvies River

The Silvies River from the ecoregion border to Bear Valley.

Special Features:

- *Extensive opportunities exist in this area for redband trout recovery, primarily related to fish passage and screening. These projects would provide a comprehensive migratory component for redband trout populations.*
- *Area has extensive wet meadows and important riparian habitats.*

Key Habitats:

- Aquatic
- Riparian
- Wetlands And Wet Meadows

Key Species:

- Oregon Great Basin Redband Trout

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

BM-11. Upper Grande Ronde area

Special Features:

- *Contains the section of the Upper Grande Ronde River designated with a Wild and Scenic River designation.*
- *Wetlands Reserve Program project on McCoy Creek is restoring wetlands and natural stream channel on 500 acres; partners include Umatilla tribes, Bonneville Power Administration; USFWS; EPA.*
- *Vey Meadows area has long been considered one of basin's most important salmonid habitats, often referred to as a "natural hatchery", area has high potential for habitat restoration and enhancement.*

Key Habitats:

- Aquatic
- Grasslands
- Ponderosa Pine Woodlands
- Riparian
- Wetlands And Wet Meadows

Key Species:

- Flammulated Owl
- Bull Trout (Columbia River Population)
- Spring Chinook Salmon
- Summer Steelhead
- American Marten

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Maintain and restore wet meadows
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

BM-12. North Fork John Day River

Special Features:

- This area encompasses most of the North Fork John Day Wilder-

ness as well as the Vinegar Hill pending Research Natural Area (prna).

- The North Fork John Day River supports the largest and most important run of anadromous fish within this Basin. [Wallowa-Whitman National Forest website]
- The river provides a major migratory corridor for Rocky Mountain elk and mule deer.
- This area includes the section of the North Fork John Day designated as a Wild and Scenic River.

Key Habitats:

- Aquatic

Key Species:

- Flammulated Owl
- Bull Trout (Columbia River Population)
- Summer Steelhead
- Westslope Cutthroat Trout
- American Marten

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Interior Columbia Basin Ecosystem Management Project (plant biodiversity area)
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

BM-13. Middle Fork John Day River

Special Features:

- *Area includes the Nature Conservancy's Dunstan Homestead Preserve on the Middle Fork John Day River*
- *There has been work here by partners (The Nature Conservancy ODFW, Malheur National Forest, the Umatilla and Warm Springs Confederated Tribes, BPA, Oregon Water Trust, Grant Soil and Water Conservation District) on streamflow restoration and floodplain enhancement.*
- *Area contains strong populations of all three genera of freshwater mussels native to the Pacific Northwest.*

Key Habitats:

- Aquatic
- Aspen

- Ponderosa Pine Woodlands
- Riparian
- Sagebrush Steppe And Shrublands
- Wetlands And Wet Meadows

Key Species:

- Columbia Spotted Frog
- Flammulated Owl
- Upland Sandpiper
- White-headed Woodpecker
- Bull Trout (Columbia River Population)
- Pacific Lamprey
- Spring Chinook Salmon
- Summer Steelhead
- American Marten
- Freshwater Mussels

Identified in other planning efforts:

- NMFS (National Marine Fisheries Service). 2000. Federal Columbia River Power System Biological Opinion. December 21, 2000
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Initiate or continue wet meadow conservation and restoration efforts
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife, including increasing channel length and sinuosity, and decreasing channel gradient
- Restore and maintain ponderosa pine habitats, and upland quaking aspen clones, including appropriate fire management
- Restore river and floodplain interactions

BM-14. Logan Valley

Located south of the Strawberry Mountains, southeast of John Day, OR.

Special Features:

- *Much of this area is currently being managed for wildlife diversity by conservation partners including the Burns Paiute Tribe, The Nature Conservancy, and Malheur National Forest.*
- *Ongoing conservation work here includes maintenance of the wet meadows for nesting birds and riparian restoration to enhance bull trout habitat.*

- *This area is one of four known nesting sites in Oregon for the upland sandpiper. It is also a known nesting site for the long-billed curlew.*

Key Habitats:

- Aquatic
- Riparian
- Sagebrush Steppe And Shrublands
- Wetlands And Wet Meadows

Key Species:

- Long-billed Curlew
- Upland Sandpiper
- Bull Trout (Columbia River Population)

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Eastern Oregon Bird Conservation Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Initiate or continue wet meadow conservation and restoration efforts
- Restore and maintain complex, continuous sage habitat
- Restore and maintain riparian habitats

BM-15. North Fork Malheur-Monument Rock area

This area includes much of the North Fork of the Malheur River as well as the Little Malheur River.

Special Features:

- *Area encompasses the Monument Rock Wilderness and the section of the North Fork Malheur designated as a Wild and Scenic River.*
- *This is an ecologically complex and diverse area including 5 different sub-ecoregions ranging from the Continental Zone Foothills up through the Subalpine Zone.*

Key Habitats:

- Aspen
- Ponderosa Pine Woodlands
- Riparian
- Sagebrush Steppe And Shrublands
- Wetlands And Wet Meadows

Key Species:

- Flammulated Owl
- Lewis' Woodpecker
- Bull Trout (Columbia River Population)
- Inland Columbia Basin Redband Trout
- American Marten
- Pygmy Rabbit

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan (Malheur Headwaters area)
- Oregon Biodiversity Project Conservation Opportunity Areas (Malheur Headwaters area)
- The Nature Conservancy Ecoregional Assessment (Monument Rock area)

Recommended Conservation Actions:

- Initiate or continue wet meadow conservation and restoration efforts
- Maintain and enhance aspen stands
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Restore and maintain complex, continuous sage habitat
- Restore and maintain grassland habitat
- Restore and maintain ponderosa pine habitats

BM-16. Bully Creek area

Located adjacent to the North Fork Malheur-Monument Rock area, this Conservation Opportunity area is focused on the sagebrush habitat.

Special Features:

- *Area includes the Beaver Dam Creek Wilderness Study Area, as well as the Castle Rock and Bully Creek Areas of Critical Environmental Concern.*
- *Area supports significant sage grouse populations.*
- *Area contains 7% of the ecoregion's sage steppe and shrubland habitat*

Key Habitats:

- Aspen
- Ponderosa Pine Woodlands
- Sagebrush Steppe And Shrublands

Key Species:

- Ferruginous Hawk
- Sage Grouse
- Pygmy Rabbit

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Interior Columbia Basin Ecosystem Management Project (plant biodiversity area)
- Oregon Biodiversity Project Conservation Opportunity Areas

Recommended Conservation Actions:

- Maintain and enhance aspen stands
- Restore and maintain complex, continuous sage habitat. Maintain and restore sagebrush-steppe habitats

BM-17. Umatilla-Walla Walla area

This area includes the headwaters of the Umatilla and Walla Walla River, and extends north to the ecoregion border.

Special Features:

- *Area encompasses the North Fork Umatilla Wilderness and the Wenaha-Tucannon Wilderness.*
- *Area provides spawning habitat for Chinook salmon and steel-head*

Key Habitats:

- Aquatic
- Grasslands
- Riparian
- Wetlands And Wet Meadows

Key Species:

- Lewis' Woodpecker
- Bull Trout (Columbia River Population)
- Margined Sculpin
- Spring Chinook Salmon
- Summer Steelhead
- American Marten

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Interior Columbia Basin Ecosystem Management Project (plant biodiversity and plant endemism area)
- Oregon Biodiversity Project Conservation Opportunity Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Initiate or continue wet meadow conservation and restoration efforts
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology

- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Promote early detection and suppression of invasive weeds

BM-18. Grande Ronde Valley

The Grande Ronde River Basin between Elgin and Union.

Special Features:

- *There are ongoing efforts by Joint Venture partners (ODFW, The Nature Conservancy, Natural Resources Conservation Service, and Ducks Unlimited) to restore up to 1000 acres of wetland habitat here. Several Wetlands Reserve Program projects are restoring wetlands on private lands.*
- *Conley Lake, included in this area, provides important habitat for migrating white-fronted geese and other waterfowl.*
- *Area contains a large percentage of the ecoregion's bobolink habitat.*
- *Breeding area for sandhill cranes.*
- *Important habitat for migratory waterfowl and shorebirds.*

Key Habitats:

- Aquatic
- Grasslands
- Riparian
- Wetlands And Wet Meadows

Key Species:

- Bobolink
- Sandhill Crane
- Shorebirds
- Upland Sandpiper
- Waterfowl
- Bull Trout (Columbia River Population)
- Spring Chinook Salmon
- Summer Steelhead

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Manage Ladd Marsh Wildlife Area's wetlands to optimize habitat values for diversity of breeding and migrating birds
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

- Restore seasonal wetlands and semi-permanent marshes

BM-19. Baker Valley

The Powder River Basin north of Baker City.

Special Features:

- *Area contains 12% of the ecoregion's wetlands*
- *High restoration potential for aquatic and riparian systems.*
- *Adjacent area east of this site has high conservation potential for sage grouse.*
- *Wetland Reserve Program project on Baldock Slough has restored more than 700 acres of wetlands and grasslands with high value for migratory birds.*
- *Baker SWCD is undertaking ambitious program to provide off-stream water for livestock and restore riparian habitats.*
- *US Fish and Wildlife Service holds conservation easement on property at North Powder that includes floodplain wetlands and ESA listed plants.*

Key Habitats:

- Aquatic
- Riparian
- Wetlands And Wet Meadows

Key Species:

- Bobolink
- Upland Sandpiper
- Howell's Thelypody
- Oregon Semaphore Grass

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Protect, restore or enhance habitat for ESA-listed plants (Howell's thelopody, Oregon semaphore grass)
- Restore seasonal wetlands

BM-20. Burnt River

The Burnt River from the ecoregion border to where it parallels Highway 245.

Special Features:

- *This area provides good opportunities for riparian restoration.*

Key Habitats:

- Aquatic
- Riparian
- Sagebrush Steppe And Shrublands

Key Species:

- Riparian Birds
- Sage Grouse

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan (Burnt River area from Hwy 245 to Interstate 84)
- The Nature Conservancy Ecoregional Assessment (small area between Hwy 245 and Interstate 84)

Recommended Conservation Actions:

- Maintain and enhance sagebrush habitats
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

BM-21. Lower Grande Ronde

Area follows the Grande Ronde River from the Oregon border to its intersection with the Wallowa River, then up the Wallowa to Highway 82.

Special Features:

- *Area encompasses both the Grande Ronde and the Wallowa Wildlife Study Areas.*
- *Grande Ronde Model Watershed program is working with private landowners to restore floodplain wetlands in several areas to improve irrigation return water quality and habitat for fish and wildlife.*

Key Habitats:

- Aquatic
- Grasslands
- Riparian
- Wetlands And Wet Meadows

Key Species:

- Bobolink
- Bull Trout (Columbia River Population)

- Fall Chinook Salmon
- Spring Chinook Salmon
- Summer Steelhead

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Reestablish floodplain forests
- Restore floodplain wetlands

BM-22. Wallowa River

Special Features:

- *There is a project lead by Wallowa Resources to provide high quality off-channel rearing habitat for juvenile spring chinook and summer steelhead in the Wallowa River.*

Key Habitats:

- Aquatic
- Riparian

Key Species:

- Riparian Birds
- Bull Trout (Columbia River Population)
- Spring Chinook Salmon
- Summer Steelhead

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan (Wallowa Plateau and Canyons area)
- The Nature Conservancy Ecoregional Assessment

BM-23. Eagle Cap-Wallowa Mountains

Located in northeastern Oregon on the Wallowa -Whitman National Forest.

Special Features:

- *Area contains the Eagle Cap Wilderness, several Wild and Scenic Rivers, and a number of research natural areas.*
- *This area has diverse plant communities ranging from low elevation grasslands to alpine meadows.*
- *The Eagle Cap Wilderness has a Prescribed Natural Fire Plan implemented by the Wallowa-Whitman National Forest.*

- Managers monitor several factors in the Eagle Cap Wilderness including water quality and range condition to assess the impacts of recreation.
- Summer range habitat for white-tailed deer, mule deer, and Rocky Mountain elk

Key Habitats:

- Aquatic
- Ponderosa Pine Woodlands
- Wetlands And Wet Meadows

Key Species:

- Columbia Spotted Frog
- Ferruginous Hawk
- Flammulated Owl
- Lewis' Woodpecker
- Bull Trout (Columbia River Population)
- Spring Chinook Salmon
- Summer Steelhead
- American Marten
- Bighorn Sheep
- Mountain Goat

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Interior Columbia Basin Ecosystem Management Project (plant biodiversity and plant endemism area)
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Initiate or continue wet meadow conservation and restoration efforts
- Manage recreational uses to minimize impacts on sensitive habitats

BM-24. Swamp Creek

Area is located north of Enterprise, OR on Forest Service land paralleling Hwy 3.

Special Features:

- Area includes the area of Swamp Creek designated as a Wild and Scenic River.

Key Habitats:

- Aquatic
- Ponderosa Pine Woodlands

- Riparian
- Wetlands And Wet Meadows

Key Species:

- Summer Steelhead

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Eastern Oregon Bird Conservation Plan

Recommended Conservation Actions:

- Initiate or continue wet meadow conservation and restoration efforts
- Restore or enhance riparian habitats and floodplain forests

BM-25. Zumwalt Prairie Plateau

Located on the eastern edge of the ecoregion northeast of Enterprise and Joseph, the area encompasses the grasslands on the plateau.

Special Features:

- One of the largest blocks of native grassland in North America.
- Area builds off of the The Nature Conservancy's Zumwalt Prairie Preserve.
- One of the highest known concentrations of breeding hawks and eagles in North America [The Nature Conservancy website].
- The Nature Conservancy is conducting ongoing research and restoration in the Zumwalt Prairie Preserve.
- 48 species of butterflies have been observed here.

Key Habitats:

- Grasslands
- Riparian

Key Species:

- Ferruginous Hawk
- Grassland Birds
- Swainson's Hawk
- Small Mammals
- Indian Ricegrass
- Spalding's Companion

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- The Nature Conservancy Ecoregional Assessment

BM-26. Hells Canyon

Area follows the Canyons and Dissected Uplands/Highlands subregions along the Snake River from Hwy 86 north to the ecoregion boundary.

Special Features:

- *Area includes the Hells Canyon Wilderness, Imnaha River Wild and Scenic River area, McGraw Creek Wilderness, part of Zumwalt Prairie, and several Areas of Critical Environmental Concern.*
- *Area contains 10% of the ecoregion's grasslands.*

Key Habitats:

- Grasslands
- Ponderosa Pine Woodlands
- Riparian

Key Species:

- Columbia Spotted Frog
- Ferruginous Hawk
- Flammulated Owl
- Lewis' Woodpecker
- Bull Trout (Columbia River Population)
- Fall Chinook Salmon
- Inland Columbia Basin Redband Trout

- Spring Chinook Salmon
- Summer Steelhead
- American Marten
- Bighorn Sheep
- Mountain Goat

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Eastern Oregon Bird Conservation Plan (Wallowa Plateau and Canyons)
- Interior Columbia Basin Ecosystem Management Project (plant biodiversity area)
- Oregon Biodiversity Project Conservation Opportunity Areas (Wallowa Plateau and Canyons, Joseph Imnaha Plateau)
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Maintain and enhance aspen stands
- Maintain and restore riparian habitats
- Promote early detection and suppression of invasive weeds
- Protect and enhance vernal pool wetlands (i.e., Clear Lake, Downy Lake)
- Use fire and thinning to restore and enhance ponderosa pine forests

Invasive weed control in the Blue Mountains Ecoregion requires collaboration among many partners

Invasive weeds are an enormous economic threat to working landscapes, costing millions of dollars of damage each year in Oregon. The threat of weed extends across land ownership boundaries, making collaboration among multiple partners essential. In the Blue Mountains ecoregion, several large-scale collaborative projects are underway to address weed management concerns. The Baker County Weed Board is exploring innovative ways to control the spread of invasive weeds through the creation of a weed cost share program. The program offers reimbursement of up to 50 percent for county residents who apply herbicides or contract out work to eliminate invasive weeds on private land. County agents are currently focusing their efforts on controlling the spread of leafy spurge in the 200,000 acre Alder Creek area. Leafy spurge damages native plant communities by out-competing and displacing native plants, and can result in loss of livestock forage. Additionally, if consumed, leafy spurge causes irritation to the mouth and digestive tract of cattle, which can result in death. Funding for the program comes from a county weed levy and the state weed board. The cost share program is a great example of invasive weeds being addressed in a cooperative manner and is considered a success with more than 80 percent involvement by the public.

Another cost-sharing program that began in 2003 is a partnership between the Bureau of Land Management (BLM)'s Idaho and Oregon/Washington offices and The Nature Conservancy (TNC). The objective of this program is to accelerate weed management through Cooperative Weed Management Areas (CWMAs) and county weed programs. CWMAs appear to be useful tools in achieving a collaborative approach toward managing weeds. A protocol (Guidelines for Cooperative Management of Noxious Weeds: Development of Weed Management Areas) has been very successful in helping direct implementation. Essential components of the management process include program coordination, marketing support for public education, and information management. The next step is to identify long-term goals and estimates of resources required to continue managing the CWMAs. BLM and TNC are now working on several projects to address these and other needs, including work with the Idaho Department of Agriculture on a database for tracking and sharing weed management information, shared training, and public education. For more information about this project, contact Alan Holt at The Nature Conservancy (aholt@tnc.org). Participants in the project also include: Washington State Noxious Weed Control Board; Cooperative Weed Management Areas in the Tri-State (Hell's Canyon), Tri-County (eastern Oregon), and Warner Basin (eastern Oregon).



Photo © Stephen Anderson, The Nature Conservancy

Coast Range Ecoregion

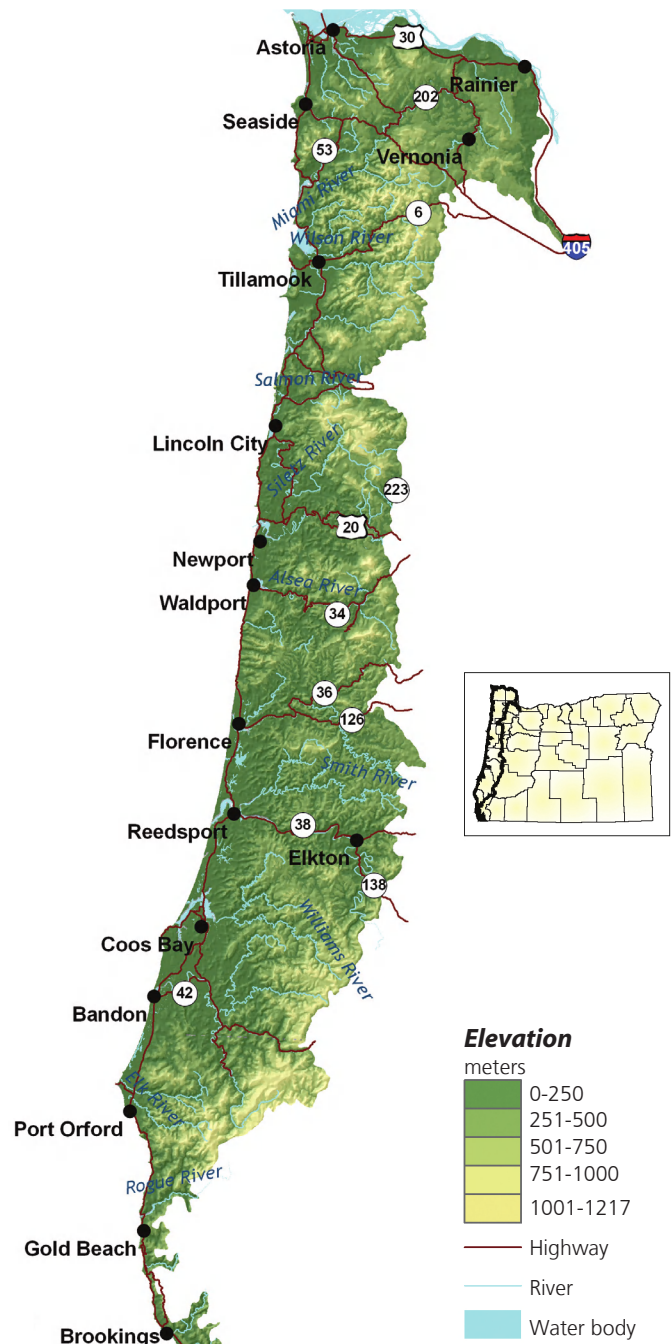
Getting to Know the Coast Range Ecoregion

Characteristics

Oregon's Coast Range is known for its dramatic scenery. It also is extremely diverse, with habitats ranging from open sandy dunes to lush forests and from tidepools to headwater streams. This section of the Conservation Strategy focuses on the Coast Range ecoregion, including the coastline and extending east through coastal forest to border the Willamette Valley and Klamath Mountains ecoregions. In a separate effort, ODFW will address conservation needs for nearshore marine species and habitats (see below).

In general, the topography is characterized by steep mountain slopes and sharp ridges. Elevation varies from the ocean shoreline to Mary's Peak, which is about 4,100 feet; however, main ridge summits are 1400 – 2500 feet. The Coast Range's climate is influenced by cool, moist air from the ocean and is the wettest and mildest in the state. The Coast Range's mild, moist climate creates conditions for highly productive temperate rainforests, which are important ecologically and for local economies. Most of the ecoregion is dominated by coniferous forests. Large forest fires are very infrequent, but are severe when they occur. For example, the Tillamook Burn, which is actually a series of wildfires that occurred from 1939 - 1951, burned approximately 350,000 acres. The Coast Range includes the highest density of streams found in the state, and deciduous riparian vegetation is distinct from surrounding coniferous forests. Along the coastal strip, habitats are influenced by the marine environment and include beaches, estuaries, and headlands.

Some towns in Oregon's Coast Range ecoregion include: Tillamook, Yachats, Astoria, Bandon, Cannon Beach, Elkton, Florence, Gold Beach, Lincoln City, Newport, and Waldport. The largest urban area on the coast is the Coos Bay/North Bend. Because of the bay and the Coos River, this area is a hub for fishing, shellfish, forest products and transportation. Forestry remains the primary industry in the interior portion



“At a Glance”- Characteristics and Statistics**Land use (% of ecoregion):**

Agriculture	0.1%
Forest and woodland	90.7%
Other (lakes, wetlands, cliffs, etc.)	6.1%
Range, pasture, and grassland	2.6%
Towns and rural residential	0.3%
Urban and suburban	0.2%

Land ownership:

Private	60%
Public, federal	28%
Public, state and local	12%
Native American	<1%

Human population, government and transportation statistics:

Estimated population in 2000	245,000
% of Oregon's population in 2000	7.3%
Number of cities	38
Number of counties	13
<i>(includes parts of Benton, Columbia, Coos, Curry, Douglas, Lane, Multnomah, Polk, Washington, Yamhill counties and all of Clatsop, Lincoln, Tillamook counties.)</i>	
Number of watershed councils	40
<i>(A watershed council is considered present if at least 10% of its area is located within the ecoregion.)</i>	
Miles of road	39,500

Economics:

Important industries: timber, agriculture, commercial fishing, fish processing, tourism and recreation (including hunting and recreational fishing), retirement services

Major crops: dairy cattle

Important nature-based recreational areas: Coos Bay; Tillamook Bay; Oregon sand dunes; Siuslaw National Forest; Clatsop, Elliot, and Tillamook State Forests; Mary's Peak; numerous state parks and waysides

Ecology:

Average annual precipitation	60" – 98" (snowfall <1" - 2")
Average July high temperature (1971-2000)	85°F – 102°F
Average January low temperature (1971-2000)	11°F – 25°F
Elevation	from zero to 4,100 feet
Number of regularly occurring vertebrate wildlife species	378
Important rivers	Alsea, Chetco, Coos, Coquille, Illinois, Lewis and Clark, Necanicum, Nehalem, Nestucca, Rogue, Siletz, Siuslaw, Trask, Umpqua, Yaquina, Youngs

Information Sources: Oregon Blue Book (2003-04), Oregon Climate Service data (1971-2000), Oregon State of the Environment Report (2000), Oregon Watershed Enhancement Board (2001), Oregon Wildlife Diversity Plan (1993), U.S. Census Bureau (2000).



Photo © Tupper Ansel Blake

Summary List of Strategy Habitats

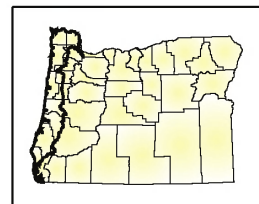
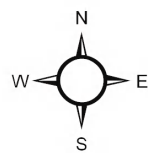
Strategy Habitats in the Coast Range ecoregion include: coastal dunes, estuaries, grasslands (including coastal bluffs and montane grasslands, late successional forests, oak woodlands, riparian, wetlands, and freshwater aquatic habitats.

Change in Strategy Habitats

Historic (1850) Distribution of Strategy Habitats



Current (2004) Distribution of Strategy Habitats



Data Source: Oregon Natural Heritage Information Center, 2004.

Summary List of Strategy Species**Mammals**

American marten
 California myotis (bat)
 Columbian white-tailed deer (Columbia River Distinct Population Segment)
 Fringed myotis (bat)
 Hoary bat
 Long-legged myotis (bat)
 Red tree vole
 Silver-haired bat
 Townsend's big-eared bat

Amphibians and reptiles

Clouded salamander
 Coastal tailed frog
 Columbia torrent salamander
 Cope's giant salamander
 Foothill yellow-legged frog
 Southern torrent salamander
 Western toad
 Northwestern pond turtle

Birds

Aleutian Canada goose
 (Semidi Island population only; note: AOU name is Aleutian cackling goose)
 American bald eagle
 American peregrine falcon
 Band-tailed pigeon
 Black brant
 Black oystercatcher
 California brown pelican
 Caspian tern
 Fork-tailed storm-petrel
 Leach's storm-petrel
 Marbled murrelet
 Northern spotted owl
 Olive-sided flycatcher
 Rock sandpiper
 Tufted puffin
 Western snowy plover

Plants

Cascade Head catchfly
 Coast Range fawn-lily
 Nelson's checker-mallow
 Pink sand-verbena
 Saltmarsh bird's-beak
 Silvery phacelia
 Western lily
 Wolf's evening-primrose

Invertebrates

Haddock's rhyacophilan caddisfly
 Hoary elfin (butterfly)
 Insular blue butterfly (greenish blue)
 Newcomb's littorine snail (Newcomb's periwinkle)
 Oregon silverspot butterfly
 Roth's blind ground beetle
Terrestrial mollusks:
 Sister's Hesperian
 Salamander slug
 Tillamook westernslug
 Green sideband
 Spotted taildropper
 Pacific walker
Aquatic snails:
 Robust walker

Fish

Chinook salmon (Lower Columbia River ESU, spring run)
 Chinook salmon (Lower Columbia River ESU, fall run)
 Chinook salmon (Snake River ESU, spring/summer run)
 Chinook salmon (Snake River ESU, fall run)
 Chinook salmon (Southern Oregon/Northern California Coast ESU, fall run)
 Chinook salmon (Upper Willamette River ESU, spring run)

Fish Cont.

Chum salmon (Pacific Coast ESU)
 Coastal cutthroat trout (Oregon Coast ESU)
 Coastal cutthroat trout (Southern Oregon/California Coasts ESU)
 Coastal cutthroat trout (Southwest Washington/ Columbia River ESU)
 Coastal cutthroat trout (Upper Willamette River ESU)
 Coho salmon (Lower Columbia/Southwest Washington Coast ESU)
 Coho salmon (Oregon Coast ESU)
 Coho salmon (Southern Oregon/Northern California Coasts ESU)
 Green sturgeon
 Millicoma dace
 Pacific lamprey
 Steelhead (Klamath Mountains Province ESU, summer run)
 Steelhead (Klamath Mountains Province ESU, winter run)
 Steelhead (Lower Columbia River ESU, summer run)
 Steelhead (Lower Columbia River ESU, winter run)
 Steelhead (Middle Columbia River ESU, summer run)
 Steelhead (Middle Columbia River ESU, winter run)
 Steelhead (Oregon Coast ESU, summer run)
 Steelhead (Oregon Coast ESU, winter run)
 Steelhead (Snake River Basin ESU)
 Steelhead (Southwest Washington ESU, winter run)
 Steelhead (Upper Willamette, winter ESU)
 Umpqua chub
 Western brook lamprey

opportunities, and tourism is important to local communities. Fishing, both commercial and recreational, and fish processing are significant components of the economy. People are increasingly moving to the coast to retire, so retirement services are growing in importance to coastal communities.

Conservation Issues and Actions

Overview

Demand for waterfront property is increasing, along with numbers of people recreating, relocating and retiring along the coast. Careful resource planning helps to balance these increasing demands with maintaining coastal fish, wildlife and habitats. Coordinated, broad-scale planning is especially important given the diversity of the Coast Range ecoregion, and several efforts are briefly summarized in Appendix II. For example, the Northwest Forest Plan covers much of the region's forests. (See Northwest Forest Plan description in Appendix II a:13). However, the adaptive management component of the Northwest Forest Plan has not been fully implemented. Although many plans currently exist, there is a continuing need to consider the unique needs of transitional zones such as estuaries, and to integrate marine and inland conservation planning.

Much of the ecoregion is publicly owned and managed to balance recreation, tourism and conservation. However, ownership in the northern part of the ecoregion is particularly fragmented. Moreover, steep and variable terrain has resulted in many towns located near estuaries, increasing the demands on these systems. Restoration of watershed processes and functions and restoration of habitat complexity (i.e., woody debris) to stream and riparian areas, are major concerns throughout the entire Coast Range ecoregion. Restoring connected flows to headwater streams maintains ecological connections important for many species.

Oregon Department of Fish and Wildlife's Marine Resources Program is preparing the Oregon Nearshore Strategy to provide a comprehensive, sustainable approach to marine species and habitat management. The Oregon Nearshore Strategy will address fully marine species, including saltwater fish, shellfish, and marine mammals, and their habitats. This Coast Range Ecoregion section addresses anadromous fish, estuaries, and terrestrial habitats such as sand dunes. This chapter also addresses seabird species that nest and/or roost on Oregon coastal terrestrial habitats.

Ecoregion-level limiting factors and recommended approaches

All six of the key conservation issues apply statewide, as do the approaches outlined in the Statewide Perspectives and Approaches

chapter. However, land use changes and invasive species are described further in this section, considering the Coast Range's ecoregional characteristics. In addition to the statewide issues, oil spills, loss of estuarine habitats, and recreational use are of particular concern in this ecoregion.

Factor: Land use conversion and urbanization. Some areas of the Coast Range are developing rapidly, especially along the coastline. Steep slopes limit the amount of land available for development and concentrates it in sensitive areas such as near rivers and estuaries. Residential development contributes to habitat loss, and can threaten traditional land uses such as agriculture and commercial forestlands.

Approach: Work with community leaders and agency partners to encourage planned, efficient growth. Support existing land use regulations to preserve farmland and forestland, open spaces, recreation areas, wildlife refuges, and natural habitats.

Factor: Oil spills. Oil spills along the coast can have devastating effects on coastal habitat, fish and wildlife. Tidal flux can spread oil or other hazardous materials around sensitive habitat very quickly, so rapid response is essential. Additionally, spills of hazardous materials or oil from vehicles traveling on roads along the coast could potentially impact nearby rivers and aquatic species.

Approach: Ensure rapid response and preparedness for spills of hazardous substances. Oregon Department of Environmental Quality's Marine Oil Spill Prevention Program, and the Pacific States/British Columbia Oil Spill Task Force, work with multiple parties and interested partners to address these concerns and quickly identify appropriate actions.

Factor: Alterations to estuarine and wetland habitats. Coastal rivers, wetlands and estuaries were altered long ago when side channels were diked, marshes drained, and channels deepened. These changes impacted fish and wildlife dependent on estuarine habitats.

Approach: Where possible, remove dikes and tide gates to restore estuarine habitats. Where tide gates need to be retained, replace older gates with new innovations such as side-hinged and aluminum gates that improve fish passage and hydrologic functions.

Factor: Increasing recreational use. Recreation contributes positively to the Coast Range's economy and local communities and is managed carefully in many areas. However, increasing numbers of recreationalists can impact sensitive areas such as shorebird nesting areas and tidepool habitats. There are concerns with off-leash dogs and uncontrolled off-highway use in some areas.

Invasive Non-native Species

Invasive species currently are considered to be one of the primary causes of species becoming threatened and endangered, second only to habitat conversion. Many species are as threatening to people's livelihoods as they are to native fish and wildlife and their habitats. This section identifies the species with the greatest current and potential impact in the Coast Range. These species were determined through an analysis of Oregon Department of Agriculture's Noxious Weed List, ODFW's Wildlife Integrity Rules, ODFW's Introduced Fish Management Strategies report, information from Portland State University Center for Lakes and Reservoirs, and local expert review. Although some of these species also cause significant economic damage to farms, ranches, and managed forests, this list is focused on those that cause the most severe ecological damage. Impacts from introduced game fish vary from species to species and within ecoregions. As a result, the impacts need to be evaluated more locally (ODFW Introduced Fish Management Strategies Report).

Known invasive non-native animal and plant species

These species are established or documented in this ecoregion, and are known to impact native fish and wildlife populations and habitats. They may range from small, controllable populations to widespread infestations.

Documented Invasive Animals

Asian clam
Bluegill
Brook trout
Brown bullhead
Bullfrog
Carp
Channel catfish
Crappie
Eastern snapping turtle
European green crab
European starling
Fathead minnow
Feral pig
Goldfish
Grass carp
Green crab
Griffen's isopod
House sparrow
Japanese mitten crab
Largemouth bass
Mosquito fish (*Gambusia*)
New Zealand mudsnail
Norway rat
Nutria
Smallmouth bass
Striped Bass
Virginia opossum
Wiper
Yellow perch
Virginia opossum
Walleye
Yellow perch

Documented Invasive Plants

American beach grass
Armenian (Himalayan) blackberry
Black locust
Bull thistle
Butterfly bush
Canada thistle
Carolina fanwort (aquatic)
Common (or salt meadow) Cordgrass
Common reed (aquatic)
Curly leaf pondweed (aquatic)
Elodea (Brazilian waterweed) (aquatic)
English holly
English ivy
Eurasian milfoil (aquatic)
European beachgrass
Fragrant water lily (aquatic)
False brome
Foxglove
German ivy (Cape ivy)
Gorse
Japanese eelgrass (aquatic)
Knotweeds (Japanese, giant)
Leafy spurge
Matgrass
Meadow hawkweed
Pampas grass
Parrot's feather (aquatic)
Portuguese broom
Purple loosestrife
Reed canarygrass
St. John's wort
Scotch broom
Silver wattle
Spotted knapweed
Tansy ragwort
Watercress (aquatic)
Yellow flag iris (aquatic, riparian)
Yellow starthistle

Non-native animals and plants of potential concern

Preventing the establishment of invasive non-native species is far more cost-effective and practical than trying to eradicate them once they are established. To make the best use of financial and personnel resources, prevention efforts need to be prioritized to address the greatest threats, especially since many non-native species do not pose a significant threat to fish and wildlife populations and habitats. Potentially harmful non-native species can be identified by examining biological factors, potential impacts and invasion patterns in similar climates. The species listed here are included because: 1) they are not known to occur in this ecoregion, but could pose a threat to fish and wildlife populations and habitats if they become established; or 2) they are known to occur in this ecoregion but the extent to which they impact native species and disrupt ecological processes is unclear at this time.

Potentially Invasive Non-native Animals

Asian carp (bighead, silver)
Banded killfish
Black carp
Fishhook waterflea
Chinese mitten crab
Japanese oyster drill
Leidy's comb jelly
Muskellunge, northern pike
Quagga mussel
Rainwater killfish
Round goby
Ruffe
Rusty crayfish
Sea squirt
Shimofuri goby
Snakeheads
Spiny waterflea
Threadfin shad
Veined rapa whelk
Zebra mussel

Potentially Invasive Non-native Plants

Caulerpa seaweed (aquatic)
Coltsfoot (*Tussilago*)
Cordgrasses (smooth, English, dense-flowered)
Dead man's fingers (aquatic)
Dotted duckweed (aquatic)
European water chestnut (aquatic)
Giant hogweed
Giant salvia (aquatic)
Hydrilla (aquatic)
Marsh deflower (aquatic)
Narrow leaf cattail (aquatic)
Orange hawkweed
Pondwater starwort (aquatic)
Purple nutsedge
Rush skeletonweed
Saltmeadow rush (aquatic)
Salt sandspurry (aquatic)
Saragassum algae (aquatic)
Scotch thistle
Squarrose knapweed
Sulfur cinquefoil
Tall oatgrass
Uruguay seedbox (aquatic)
Watermint (aquatic)
Water bentgrass (aquatic)
Water primrose (aquatic)
Yellow floating heart (aquatic)

Approach: Work with local communities to plan recreational use and to increase education and outreach for recreationalists and associated businesses. Where needed, direct activities to particular seasons or away from sensitive areas.

Factor: Invasive species. Non-native plant and animal invasions disrupt native communities, diminish populations of at-risk native species, and threaten the economic productivity of resource lands.

Approach: Emphasize prevention, risk assessment, early detection and quick control to prevent new invasives from becoming fully established. Prioritize management and control efforts to focus on key invasive species in high priority areas, particularly where Strategy Habitats and Species occur. Where needed, use multiple site-appropriate tools (mechanical, chemical and biological) to control the most damaging non-native species. Work with partners to implement measures to prevent unintentional introduction of non-native species (e.g., implement existing ballast water treatment regulations). Provide information to the public about the ecologic and economic damage that invasives cause.

Conservation Success Story: Organic Dairy Farm Cultivates Conservation

Doug and Sharon Sinko believe they have a responsibility to steward the land that supports their livelihood and lifestyle. This philosophy is amply visible on the Sinkos' 360 acre organic dairy farm in Myrtle Point, Oregon.

After Doug bought the land from his father in the 1970s, he and Sharon put their heart and soul into Myrtle Crest farm. They also initiated what would be a multi-year effort to restore severely degraded habitat along the Coquille River, which meanders through their property.

Long before the Sinkos arrived on the scene, the Coquille's banks were rendered unstable following the conversion of surrounding wetlands to pastureland by early farmers. This practice altered the hydrology of the floodplain, contributing to serious bank erosion when the river flooded its banks.

Overcoming initial procedural hurdles to stabilize the bank, the Sinkos have successfully restored 200 acres of wetlands along stretches of the river, which now runs deeper and cooler and supports healthy populations of salmon. With technical assistance from two local organizations – the South Coast Land Conservancy and Ducks Unlimited – the Sinkos voluntarily enrolled their wetlands in the federally administered Wetlands Reserve Program. In return, the Sinkos were compensated for the appraised value of the enrolled land.

The Sinkos' commitment to stewardship also is evident in the way they farm their land. In the early 1990s, Myrtle Crest was the first farm in the Pacific Northwest to be recognized and certified as organic. Today, they are part of Organic Valley Family of Farms, one of the nation's leading organic brands and a cooperative of 689 organic dairy, meat, egg and produce farmers operating in 20 states, including 14 member farms in Oregon. Fueled by growing consumer demand, organic crop, meat and dairy production is one of the fastest growing agricultural sectors in the country. In Oregon alone, the number of organic acres certified by Oregon Tilth, a leading third-party certifier of organic farms, has risen by 39 percent since 2000.

Farms like Myrtle Crest are certified organic because they voluntarily implement "best agricultural practices" approved by the U.S. Department of Agriculture. These practices, or National Organic Program (NOP) Standards, disallow the use of chemical pesticides and fertilizers and genetically modified seed or crops on farms certified as organic. In addition, organic farms must maximize soil quality and minimize soil erosion by practicing low-impact tillage or planting cover crops. USDA authorizes third party organizations like Oregon Tilth to issue certificates and carry out annual audits of organic operations.

The Sinkos have cultivated a path to stewardship by demonstrating a sincere and sustained interest in habitat restoration and natural resource conservation. The stewardship they exhibit also is reflected in their farming practices and rewarded by consumers who pay a premium for organic dairy products.

Deciding Where to Work

Conservation Opportunity Areas Map and Profiles

Landowners and land managers throughout Oregon can contribute to conserving fish and wildlife by maintaining, restoring, and improving habitats. Conservation actions to benefit Strategy Species and Habitats are important regardless of location. However, focusing investments in certain priority areas can increase likelihood of long-term success over larger landscapes, improve funding efficiency, and promote cooperative efforts across ownership boundaries. Conservation Opportunity Areas are landscapes where broad fish and wildlife conservation goals would be best met. Conservation Opportunity Areas were developed to guide voluntary, non-regulatory actions. This map and the associated data should only be used in ways consistent with these intentions. For more information on how Conservation Opportunity Areas were developed, see Appendix IV, "Methods" (beginning on page a:34).

Conservation actions in the Coast Range Ecoregion identified through other planning efforts

Landowners and land managers can benefit a variety of fish and wildlife species by managing and restoring Strategy Habitats. The following recommendations are relevant to Strategy Habitats. They were identified through a review of existing plans.

Actions	Strategy habitat and general location	Source document
Maintain existing late successional habitat and initiate actions to develop or restore late successional forest where appropriate	Coast Range forest	Oregon-Washington Partners in Flight Westside Coniferous Forests Conservation Strategy (Altman 2000) [recommended target: more than 15% of large landscapes in late successional forests]
Maintain connectivity, structural complexity and heterogeneity of landscapes	Coast Range; directed at priority sites based upon species surveys	Northwest Forest Plan (1994; continual updates) [recommended target: Specific recommendations for reserves and other features in light of species surveys]
Consider the impact of recreational activities (e.g., motorized watercraft; shoreline activities; road usage) on water quality and watershed function	All locations (as appropriate)	State of the Environment Report; Oregon Plan (OWEB) Total Maximum Daily Load Planning (ODEQ)
Focus conservation attention on critical aquatic habitats identified (i.e., work in Tillamook State Forest on Salmon Anchor Habitats –Talabere and Jones, ODFW)	Within the Tillamook forest, Nehalem; Kilchis; Wilson and Trask Rivers have been identified as Salmon Anchor Habitats	See: NOAA and NMFS biologists; ODFW; watershed councils; OWEB for further information.
Improve fish passage. For example, modify barriers or use spans where appropriate.	All locations (as appropriate)	Columbia Estuary subbasin plan; State of the Environment Report; ODFW Fish Passage team; Oregon Biodiversity Project; Oregon Plan (OWEB)
Work with forest managers to meet large wood loading benchmarks, reduce sediment, maintain water quality and continue to provide functional riparian habitat	All locations (as appropriate)	Columbia Estuary subbasin plan; Oregon Plan (OWEB); Senate Bill 1010 Plans (ODA); Total Maximum Daily Load Planning (ODEQ)
Work with agricultural landowners to maintain water quality	All locations on agricultural lands (as appropriate)	Senate Bill 1010 Plans (ODA) and Total Maximum Daily Load Planning (ODEQ)
Establish integrated framework for wetland restoration assessment, priority setting, and actions at three scales: watersheds, ecoregions and project sites	Wetlands	Recommendations for a nonregulatory wetland restoration program for Oregon. J.W. Good and C.B. Sawyer. 1998. Prepared for Oregon Division of State Lands and U.S. EPA Region X.
Increase incentives for proactive, nonregulatory wetland restoration and enhancement on private land, focusing on a combination of financial assistance, tax benefits, technical assistance, and education	Wetlands	Recommendations for a nonregulatory wetland restoration program for Oregon. J.W. Good and C.B. Sawyer. 1998. Prepared for Oregon Division of State Lands and U.S. EPA Region X.
Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology. - Plant vegetation to stabilize banks; leaving stumps, fallen trees and boulders in waterways - Maintain or enhance off channel or side channel meanders, habitat and pools	Aquatic habitats (streams, pools)	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See <i>guide for specific technical recommendations, sources of information and assistance, and other guidelines.</i>
Maintain riparian and wetlands function: - Manage grazing, riparian vegetation planting and fencing, and livestock water facilities according to best practices, current techniques and with respect to natural hydrological conditions.	Riparian and wetlands habitats	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See <i>guide for specific technical recommendations</i>
Upslope erosion control: - Create water and sediment control basins to contain runoff, wastewater - Use windbreaks (tree and shrub rows – using native plants) to reduce erosion and deposition Upland terracing	Aquatics, riparian and wetland habitats	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See <i>guide for specific technical recommendations</i>

**Note: Conservation Strategy monitoring indicators, linked with OSOER Key indicators, targets, and methods, will be identified in a statewide approach (See Monitoring chapter for more information).*

The Conservation Opportunity Area profiles include information on recommended conservation actions, special features, key species, key habitats, and if the area has been identified as a priority by other planning efforts. These profiles highlight some priority actions to implement in individual COAs, which can range from restoration projects to monitoring for invasive species. These recommendations were identified through existing plans, spatial analysis, and expert review. They are not

meant to be exhaustive, so other actions also will be appropriate, as influenced by local site characteristics and management goals. Actions need to be compatible with local priorities, local comprehensive plans and land use ordinances, as well as other local, state, or federal laws. Actions on federal lands must undergo federal planning processes prior to implementation to ensure consistency with existing plans and management objectives for the area.

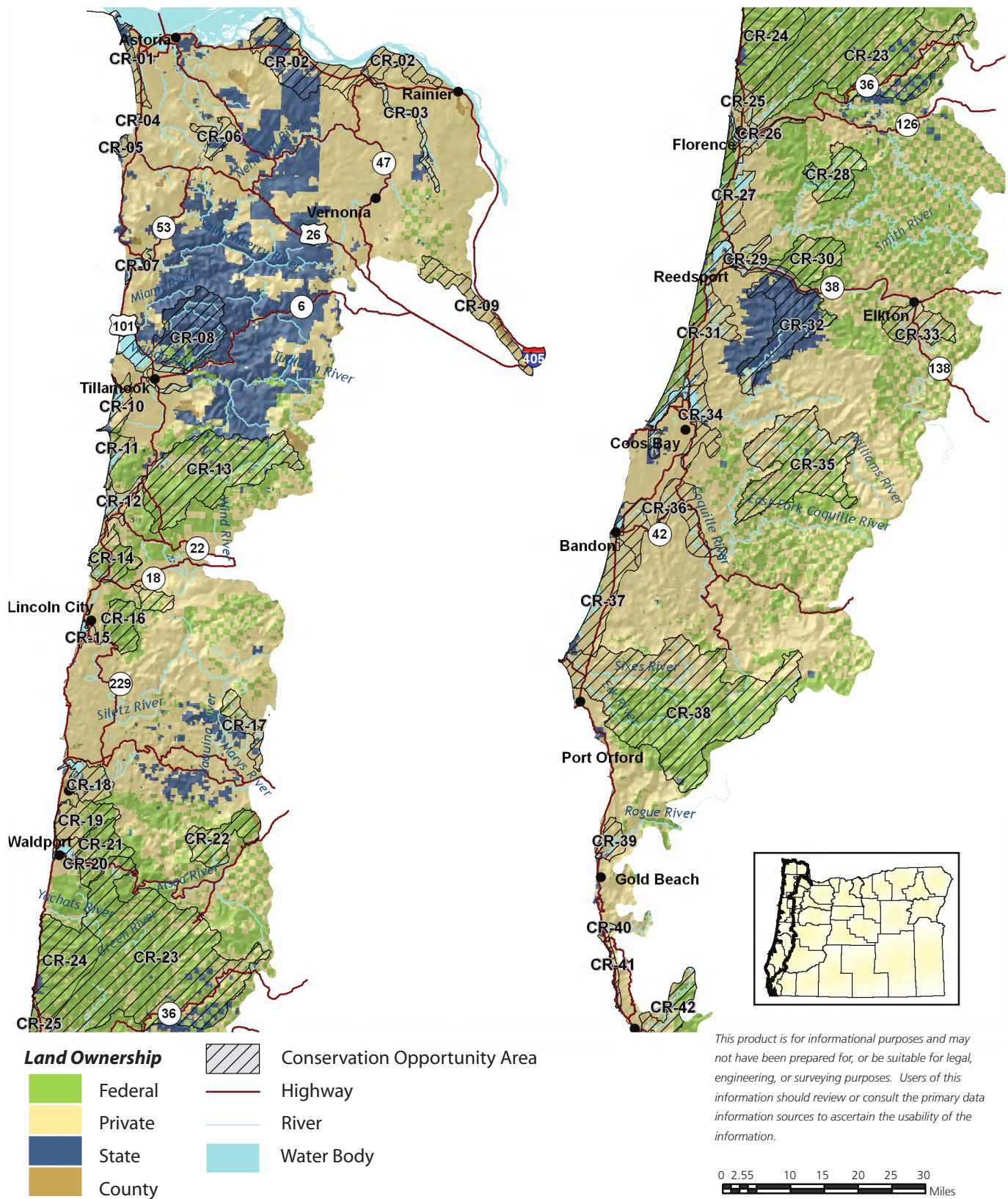
Oregon Beach Clean-up

Oregon has often been at the forefront of innovative approaches to conservation, with first-in-the-nation efforts such as the Oregon Bottle Bill, land use planning, Oregon Plan for Salmon and Watersheds, and the Great Oregon Beach Cleanups. The first beach cleanup was held in 1984 in response to concerns about the effects of beach litter on the environment and local economies. In addition to being unappealing to humans, litter can be dangerous to wildlife. Birds and marine mammals sometime mistake plastic bags, balloons and other trash for food. Or they can become tangled in discarded rope or fishing nets. Also, some garbage contains oil, creosote, or other pollutants. Each year, a spring and fall clean-up is organized by SOLV, a statewide non-profit organization that promotes community building through volunteerism. In 2004, more than 4,800 volunteers removed 39.6 tons of trash during the spring cleanup and 2,700 volunteers removed 21 tons during the Fall. The clean-ups are made possible by a partnership between SOLV, Oregon Parks and Recreation Department, local garbage haulers, business sponsors, and thousands of volunteers. For more information, visit SOLV's website, <http://www.solv.org/>.



Photos © (top) Rod Klein, SOLV; (bottom-left) Rod Klein, SOLV; (bottom-right) SOLV, USFS

Coast Range Ecoregion Conservation Opportunity Areas



Conservation Opportunity Area Profiles

CR-01. Clatsop Plains

Special Features:

- *Area contains Gearhart Fen, the largest contiguous wetland of its kind remaining on the Oregon coast. The bog features several rare plant communities.*
- *The Clatsop beaches provide a concentration point for shorebirds (mostly sanderlings) and gulls.*

Key Habitats:

- Coastal Dunes
- Freshwater Wetlands

Key Species:

- Caspian Tern
- Shorebirds

Identified in other planning efforts:

- Oregon's Important Bird Areas (Clatsop beaches)
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Maintain existing habitat values
- Manage public use to minimize disturbance for shorebirds
- Plan development to maintain key ecological functions and habitats

CR-02. Columbia-Clatskanie area

Special Features:

- *Area encompasses the Julia B. Hanson Refuge for the Columbian white-tailed deer*
- *Area extends to the Blind Slough Swamp Preserve, the best example of a Sitka spruce swamp remaining in Oregon*
- *There are ongoing restoration efforts to eradicate invasive plant species in the Blind Slough Swamp Preserve*
- *Ducks Unlimited has been working with a private landowner to restore large blocks of wetlands on a former cottonwood plantation.*
- *Area is heavily used by migrating and wintering waterfowl.*
- *Area includes critical habitat for Columbian white-tailed deer.*

Key Habitats:

- Freshwater Wetlands
- Oak Woodlands And Savannas
- Riparian

Key Species:

- Olive-sided Flycatcher
- Coho Salmon
- Fall Chinook Salmon
- Winter Steelhead
- Columbian White-tailed Deer

Identified in other planning efforts:

- Joint Venture Plan
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Restore floodplain wetlands, tidal wetlands, and bottomland forests

CR-03. Clatskanie River

Special Features:

- *In 2000, OWEB provided funding for the Lower Columbia River Watershed Council and partners to reconnect the Westport Slough to the Clatskanie River, restoring waterflow and fish passage.*
- *The Lower Columbia River Watershed Council is working with private landowners to reduce water temperatures through streamside planting.*

Key Habitats:

- Aquatic
- Freshwater Wetlands
- Riparian

Key Species:

- Chum Salmon
- Coastal Cutthroat Trout
- Coho Salmon
- Fall Chinook Salmon
- Winter Steelhead
- Columbian White-tailed Deer

CR-04. Necanicum Estuary

Special Features:

- *Necanicum estuary is designated as a Conservation estuary*
- *The city of Seaside and the North Coast Land Conservancy have acquired a network of tidal wetlands along Neawanna Creek estuary that are designated as a natural history park.*
- *The North Coast Land Conservancy purchased (2004) the 365-acre Circle Creek Preserve along Necanicum River that includes one of largest blocks of spruce swamp on the Oregon coast*

Key Habitats:

- Estuary
- Riparian

Key Species:

- Shorebirds
- Waterfowl
- Chum Salmon
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment (Necanicum River)
- Recommended Conservation Actions:
- Restore riparian habitats along Necanicum River

CR-05. Tillamook Head

Special Features:

- Area contains Ecola State Park.
- Offshore rocks provide important nesting habitat for seabirds.

Key Habitats:

- Coastal Dunes
- Late Successional Conifer Forests

Key Species:

- Tufted Puffin

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment (Clatsop Plains-Necanicum River site)

CR-06. Saddle Mountain

Special Features:

- Contains Saddle Mountain State Natural Area, the only significant block of old-growth forest in Clatsop County
- Rare sensitive plants

Key Habitats:

- Aquatic
- Late Successional Conifer Forests

Key Species:

- Peregrine Falcon
- Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas (Lewis and Clarke River portion)
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Maintain existing habitat values

CR-07. Nehalem River Estuary

Special Features:

- Lower Nehalem Community Trust is acquiring former dairy along lower Alder Creek for habitat restoration and public use.
- Nehalem Meadows area has long been considered a hot spot for diversity of migratory birds.
- Nehalem Bay State Park protects undeveloped north spit.
- Area contains a mineral site used by band-tailed pigeons.

Key Habitats:

- Estuary
- Freshwater Wetlands

Key Species:

- Band-tailed Pigeon
- Shorebirds
- Waterfowl
- Chum Salmon
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- Joint Venture Plan
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Restore tidal and freshwater wetlands, riparian habitats along lower Alder Creek

CR-08. Tillamook Bay and tributaries

Special Features:

- Tillamook County has acquired about 400 acres of diked former tidelands in the river delta area at south end of the bay through collaborative effort with Tillamook Estuary Partnership, USFWS, OWEB, Trust for Public Land, and ODFW.
- Tillamook Pioneer Museum acquired key 150-acre property at Kilchis Point with extensive tidal marshes, forested wetlands, undeveloped shoreline
- Opportunities to link lowland conservation efforts with upland forest management

- Important migration stopover for shorebirds and waterfowl
- Heavy use by wintering waterfowl, including brant.
- Undeveloped Bayocean Spit could provide habitat for western snowy plover.
- Large remnant spruce swamp habitats on Hoquarton and Squeedunk sloughs
- Tillamook Bay supports an important mineral site for band-tailed pigeons.

Key Habitats:

- Estuary
- Freshwater Wetlands
- Riparian

Key Species:

- Peregrine Falcon
- Shorebirds
- Waterfowl
- Chum Salmon
- Coastal Cutthroat Trout
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas (N. Fork Wilson River)
- Joint Venture Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas (Tillamook Bay)
- Salmon Anchor Habitat Strategy
- The Nature Conservancy Ecoregional Assessment
- The Oregon Plan Core Salmon Areas

Recommended Conservation Actions:

- Improve water quality
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Maintain undeveloped character of Bayocean Spit
- Reconnect cutoff sloughs in lowlands around bay
- Restore tidal wetlands in river delta at south end of Tillamook Bay

CR-09. Portland's Forest Park

Special Features:

- Area includes Forest Park, the largest forested urban park in the United States.
- There have been ongoing habitat protection and restoration, acquisition, and education projects by Friends of Forest Park. [www.friendsofforestpark.org]
- Area provides an important wildlife corridor between the Coast Range and Willamette Valley ecoregions.

Key Habitats:

- Aquatic
- Late Successional Conifer Forests
- Riparian

Key Species:

- Olive-sided Flycatcher
- Cutthroat Trout

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment

CR-10. Netarts Bay

Special Features:

- Wintering site for significant populations of brant
- Designated Conservation estuary
- Cape Lookout State Park protects the undeveloped south spit

Key Habitats:

- Estuary

Key Species:

- Shorebirds
- Waterfowl
- Chum Salmon
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- Joint Venture Plan
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Manage public use to minimize disturbance of wintering brant

CR-11. Sand Lake area

Special Features:

- *Marine-dominated estuary with little freshwater inflows is one of Oregon's least developed estuaries*
- *State Parks purchased Whalen Island, a large, undeveloped island with extensive high quality tidal marshes, in 2000.*
- *Designated Natural Estuary*
- *Area contains some of the most extensive dunes on the northern coast.*

Key Habitats:

- Coastal Dunes
- Freshwater Wetlands

Key Species:

- Shorebirds
- Waterfowl
- Chum Salmon
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- Joint Venture Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Control key invasive species (European beachgrass)
- Plan development to maintain key ecological functions and habitats
- Restore and maintain tidal marshes and freshwater wetlands on southern spit (Beltz Marsh)

CR-12. Nestucca Bay

Special Features:

- *Nestucca Bay National Wildlife Refuge protects a major wintering area for the bulk of the Semidi Island population of the Aleutian and Dusky Canada Goose and includes extensive tidal marshes.*
- *There are ongoing projects by USFWS and Ducks Unlimited to acquire land on the Little Nestucca River to increase goose and tidal marsh habitat*
- *Neskowin Marsh Unit of the Nestucca Bay NWR protects a large freshwater coastal wetland that includes bogs and other rare plant communities.*
- *Designated Conservation Estuary*

Key Habitats:

- Estuary
- Freshwater Wetlands
- Riparian
- Key Species:
 - Aleutian Canada Goose
 - Dusky Canada Goose
 - Chum Salmon
 - Coho Salmon
 - Winter Steelhead

Identified in other planning efforts:

- Joint Venture Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Improve water quality
- Maintain short-grass pastures to benefit wintering goose populations
- Restore tidal wetlands

CR-13. Nestucca River Watershed

Special Features:

- *Identified by Oregon Plan and American Fisheries Society as an extremely important area for native salmonids*
- *Much of this area designated by Siuslaw National Forest as an Adaptive Management Area, focusing on conservation values*

Key Habitats:

- Freshwater Wetlands
- Late Successional Conifer Forests
- Riparian

Key Species:

- Harlequin Duck
- Marbled Murrelet
- Northern Spotted Owl
- Coho Salmon
- Winter Steelhead
- American Marten

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Oregon Biodiversity Project Conservation Opportunity Areas

- Siuslaw National Forest High Priority Restoration Areas
- The Nature Conservancy Ecoregional Assessment
- The Oregon Plan Core Salmon Areas

Recommended Conservation Actions:

- Improve water quality
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Manage federal lands to enhance development of late successional forests

CR-14. Salmon River Estuary and Cascade Head

Special Features:

- Recent restoration work by USFS on recent acquisitions on the Salmon River Estuary
- USFS restoration work at Cascade Head Scenic Research Area
- Designated Natural estuary
- Rare plants; native prairie grasses
- Ongoing restoration efforts by the Nature Conservancy
- *Camp Westwind owned by YWCA on south side of Salmon River has effectively protected natural values on 600 acres.*
- *Area is a Western Sandpiper migration stopover.*

Key Habitats:

- Coastal Bluffs And Montane Grasslands
- Estuary

Key Species:

- Peregrine Falcon
- Tufted Puffin
- Western Sandpiper
- Chum Salmon
- Coho Salmon
- Winter Steelhead
- Oregon Silverspot Butterfly

Recommended Conservation Actions:

- Enhance meadows to benefit Oregon silverspot butterfly
- Maintain grasslands on Cascade Head to maintain native prairie community
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function
- Maintain undeveloped character of Camp Westwind property

- Manage public access to Cascade Head, Hart Cove to minimize impacts of human disturbance

CR-15. Siletz Bay

Special Features:

- *Many acquisition and restoration projects; partners include USFWS, Ducks Unlimited; Confederated Tribes of the Siletz Indians, US Forest Service*
- *Bay and tidelands are used extensively by shorebirds and waterfowl, and support significant salmonid populations [Oregon Habitat Joint Venture].*
- *Area includes Siletz Bay National Wildlife Refuge*
- *Designated Conservation estuary*

Key Habitats:

- Estuary
- Freshwater Wetlands
- Riparian

Key Species:

- California Brown Pelican
- Caspian Tern
- Chum Salmon
- Coastal Cutthroat Trout
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- Joint Venture Plan
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment
- Recommended Conservation Actions:
- Plan development to maintain key ecological functions and habitats
- Restore tidal wetlands along Drift Creek

CR-16. Drift Creek (Siletz)

Special Features:

- *Ongoing restoration by USFS to thin forests*

Key Habitats:

- Aquatic
- Late Successional Conifer Forests

Key Species:

- Marbled Murrelet

- Northern Spotted Owl
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- Siuslaw National Forest High Priority Restoration Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Manage public lands to enhance development of late-successional forests

CR-17. Luckiamute River

Key Habitats:

- Aquatic
- Riparian

Key Species:

- Riparian Birds
- Winter Steelhead

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

CR-18. Yaquina Bay

Special Features:

- *Restoration work currently underway to restore tidal wetlands in the estuary; partners include The Wetlands Conservancy, the Central Coast Land Conservancy, OWEB, Pacific States Marine Fisheries Commission, the Midcoast Watersheds Council, USFWS*
- *Important migration stopover for shorebirds and waterfowl, including wintering brant.*

Key Habitats:

- Estuary

Key Species:

- Shorebirds
- Waterfowl

- Chum Salmon
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- Joint Venture Plan
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Limit disturbance of wintering brant
- Maintain and restore tidal wetlands

CR-19. Beaver Creek

Special Features:

- *Area includes a small estuary within Ona Beach State Park.*
- *Provides important habitat for wintering and migrating waterfowl and supports native stocks of chinook and coho salmon, steelhead and sea-run cutthroat trout. [Oregon Habitat Joint Venture]*
- *Most of Beaver Marsh was purchased by the Wetlands Conservancy*
- *Restoration work being done by The Wetlands Conservancy, USFWS, Friends of Beaver Creek Marsh, and the US Forest Service*

Key Habitats:

- Coastal Dunes
- Freshwater Wetlands
- Late Successional Conifer Forests
- Riparian

Key Species:

- Waterfowl
- Coastal Cutthroat Trout
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Joint Venture Plan
- The Nature Conservancy Ecoregional Assessment
- Recommended Conservation Actions:
- Maintain and restore freshwater wetlands along lower Beaver Creek

CR-20. Alsea River Estuary**Special Features:**

- Concentration site for shorebirds and waterfowl including Caspian terns and brown pelicans
- Restoration work being done on Lint Slough (south end of estuary) by partnership between Ducks Unlimited, Midcoast Watersheds Council, OWEB, ODFW, USFWS
- MidCoast Watershed Councils and Wetlands Conservancy are developing strategies to implement recommendations of estuarine habitat prioritization funded by OWEB.

Key Habitats:

- Estuary

Key Species:

- California Brown Pelican
- Caspian Tern
- Shorebirds
- Waterfowl
- Chum Salmon
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- Joint Venture Plan
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Restore tidal wetlands

CR-21. Drift Creek (Alsea) area**Special Features:**

- Includes Drift Creek wilderness

Key Habitats:

- Coastal Bluffs And Montane Grasslands
- Late Successional Conifer Forests
- Riparian

Key Species:

- Bald Eagle
- Northern Spotted Owl
- Chinook Salmon
- Coastal Cutthroat Trout
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Siuslaw National Forest High Priority Restoration Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Restore coastal prairie

CR-22. Mary's Peak area**Special Features:**

- Highest point in Oregon's coast range
- Important plant diversity area; over 200 flowering plants have been identified on the summit [Native Plant Society]

Key Habitats:

- Coastal Bluffs And Montane Grasslands
- Late Successional Conifer Forests

Key Species:

- Northern Goshawk
- Northern Spotted Owl
- Coho Salmon

Recommended Conservation Actions:

- Maintain and enhance meadows, late-successional forests

CR-23. Siuslaw River Area**Special Features:**

- Significant for aquatic resources
- One of the highest concentrations of core salmon areas in the state
- Many American Fisheries Society Aquatic Diversity Areas

Key Habitats:

- Late Successional Conifer Forests
- Riparian

Key Species:

- Marbled Murrelet
- Northern Spotted Owl
- Chum Salmon
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Oregon Biodiversity Project Conservation Opportunity Areas
- Siuslaw National Forest High Priority Restoration Areas
- The Nature Conservancy Ecoregional Assessment
- The Oregon Plan Core Salmon Areas

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Manage young forests on public lands to accelerate development of late-successional characteristics

CR-24. Heceta Head

Special Features:

- *Offshore rocks and headlands provide nesting sites for seabirds.*
- *Area encompasses the Cummins Creek Wilderness, a remnant of the giant spruce/hemlock rainforests, and Rock Creek Wilderness. Both have no roads or trails.*

Key Habitats:

- Aquatic
- Late Successional Conifer Forests
- Riparian

Key Species:

- Marbled Murrelet
- Northern Spotted Owl
- Tufted Puffin
- Coastal Cutthroat Trout
- Coho Salmon
- Winter Steelhead
- Oregon Silverspot Butterfly

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Oregon Biodiversity Project Conservation Opportunity Areas (Alsea-Siuslaw conservation opportunity area)
- The Nature Conservancy Ecoregional Assessment (Cummins-Rock Creek)

CR-25. Sutton Lake area

Key Habitats:

- Coastal Dunes

- Estuary
- Freshwater Wetlands

Key Species:

- Black Oystercatcher
- Western Snowy Plover
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Remove European beach grass in targeted areas to enhance habitat for western snowy plover

CR-26. Siuslaw River Estuary

Special Features:

- *Western Sandpiper migration stopover*
- *Includes Nature Conservancy's Cox Island Preserve, large Wetlands Reserve Program easement with restored tidal marshes on Duncan Island, US Forest Service wetland, stream and riparian restoration project at Karnowsky Creek.*
- *Good potential for additional large-scale restoration of tidal marshes.*
- *Key habitat for high-productivity salmon populations*

Key Species:

- Shorebirds
- Waterfowl
- Chum Salmon
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- Joint Venture Plan
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment
- Recommended Conservation Actions:
 - Monitor and control or eliminate spartina at Cox Island
 - Restore tidal marshes

CR-27. Siltcoos/Tahkenitch Basin

Special Features:

- *Contains a complex of seven different lakes*
- *Area encompasses 3 important bird areas including the*

Tahkenitch Creek estuary, the Siltcoos River estuary, and Siltcoos Lake

- *Siltcoos Lake hosted 40-89% of Oregon's coastal winter population of American Coots during 1986-2002 surveys [Important Bird Area website]*
- *Wintering and migrating area for waterfowl.*
- *Area contains approximately 19% of the ecoregion's coastal dunes.*

Key Habitats:

- Coastal Dunes
- Freshwater Wetlands
- Oak Woodlands And Savannas

Key Species:

- Black Oystercatcher
- Waterfowl
- Western Snowy Plover
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas (Siltcoos River/Lake)
- Joint Venture Plan
- Oregon's Important Bird Areas
- Siuslaw National Forest High Priority Restoration Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Manage growth and development in sensitive shoreline areas
- Remove European beach grass in targeted areas to enhance habitat for western snowy plover

CR-28. North Fork Smith River

Special Features:

- *Area contains the Kentucky Falls SIA (see Forest Land Restoration Proposal, April 2002)*
- *Area contains relatively intact terrestrial and aquatic habitat*
- *Willingness by tribes to do watershed and upland restoration work*

Key Habitats:

- Late Successional Conifer Forests

Key Species:

- Marbled Murrelet

- Northern Spotted Owl
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Siuslaw National Forest High Priority Restoration Areas
- The Oregon Plan Core Salmon Areas

Recommended Conservation Actions:

- Consider land exchanges to benefit fish, wildlife, landscape ecological integrity

CR-29. Umpqua River Estuary

Special Features:

- *Leeds Island has long been identified as high potential for estuary restoration. Dean Creek viewing area also has potential for some restoration of tidal wetlands.*
- *Area is an important shorebird and waterfowl site*

Key Habitats:

- Estuary
- Freshwater Wetlands
- Black Oystercatcher
- Shorebirds
- Waterfowl
- Western Snowy Plover
- Coho Salmon
- Summer Steelhead
- Umpqua Dace
- Winter Steelhead

Identified in other planning efforts:

- Joint Venture Plan
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment
- Recommended Conservation Actions:
- Restore tidal wetlands at Leeds Island, portions of Dean Creek Elk Viewing Area

CR-30. Wassen Creek

Special Features:

- *Proposed wilderness area*

Key Habitats:

- Late Successional Conifer Forests

Key Species:

- Northern Spotted Owl
- Coho Salmon
- Winter Steelhead
- American Marten
- Red Tree Vole

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Siuslaw National Forest High Priority Restoration Areas (Lower Smith River)
- The Nature Conservancy Ecoregional Assessment
- The Oregon Plan Core Salmon Areas

CR-31. North Bend dunes

Special Features:

- Includes BLM's Coos Bay Shorelands Area of Critical Environmental Concern, key habitat for western snowy plover.
- Area contains 33% of the ecoregion's coastal dunes.
- Area represents a large percentage of the ecoregion's western snowy plover habitat.

Key Habitats:

- Coastal Dunes
- Freshwater Wetlands

Key Species:

- Black Oystercatcher
- Western Snowy Plover
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- Joint Venture Plan
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Maintain deflation plain wetlands in early seral conditions
- Manage recreational use to limit disturbance to sensitive habitats
- Remove European beach grass in targeted areas to enhance habitat for western snowy plover

CR-32. Elliot State Forest

Key Habitats:

- Late Successional Conifer Forests

Key Species:

- Marbled Murrelet
- Northern Spotted Owl
- Coho Salmon
- Winter Steelhead
- American Marten

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment
- The Oregon Plan Core Salmon Areas

CR-33. Umpqua River area

Key Habitats:

- Late Successional Conifer Forests
- Oak Woodlands And Savannas

Key Species:

- Northern Goshawk
- Northern Spotted Owl
- Coho Salmon
- Summer Steelhead
- Umpqua Dace
- Winter Steelhead
- Columbian White-tailed Deer
- Northwestern Pond Turtle

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment (Umpqua River tributaries site)

Recommended Conservation Actions:

- Consider land exchanges to benefit fish, wildlife, and landscape ecological integrity
- Consider the impact of recreational activities (e.g., motorized watercraft; shoreline activities; road usage) on water quality and watershed function

CR-34. Coos Bay area

Special Features:

- Includes South Slough National Estuarine Research Reserve (5,000+ acres), Shore Acres State Park
- Rare plant species
- Important area for wintering and migrating waterfowl, shorebirds

Key Habitats:

- Coastal Bluffs And Montane Grasslands
- Estuary
- Freshwater Wetlands

Key Species:

- Shorebirds
- Waterfowl
- Coho Salmon
- Winter Steelhead
- Western Lily

Identified in other planning efforts:

- Joint Venture Plan
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Restore freshwater wetlands
- Restore tidal wetlands and reconnect tidal sloughs where feasible and appropriate

CR-35. North Fork Coquille; Cherry Creek area**Key Habitats:**

- Aquatic
- Late Successional Conifer Forests

Key Species:

- Northern Goshawk
- Northern Spotted Owl
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- The Nature Conservancy Ecoregional Assessment (Cherry Creek Area)
- The Oregon Plan Core Salmon Areas

CR-36. Lower Coquille River**Special Features:**

- Includes national wildlife refuges at Coquille Point and Bandon Marsh
- Ni-les-tun Unit of Bandon Marsh NWR has potential for restoration of up to 400 acres of estuarine wetlands.
- Bandon Marsh is key stop for migrating shorebirds

- Large populations of nesting seabirds at Coquille Point
- Coquille Valley attracts large numbers of wintering waterfowl on the Oregon coast, particularly important for dabbling ducks
- Coquille River is one of most productive coastal river systems for coho and other salmon.
- Several properties are enrolled in Wetlands Reserve Program with extensive restored wetlands.
- Wintering site for waterfowl and migratory stopover for shorebirds.

Key Habitats:

- Coastal Bluffs And Montane Grasslands
- Coastal Dunes
- Estuary
- Freshwater Wetlands

Key Species:

- Black Oystercatcher
- Shorebirds
- Waterfowl
- Western Snowy Plover
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- Joint Venture Plan

Recommended Conservation Actions:

- Manage visitor use to minimize impacts of human disturbance on nesting seabirds on offshore rocks
- Restore freshwater wetlands, natural stream channels, riparian habitats along tributary streams within the river floodplain
- Restore tidal wetlands

CR-37. New River area**Special Features:**

- Long stretch of coastal lowlands with diverse habitats, minimal development and limited access
- Staging area for most of recently delisted Aleutian Canada goose population
- Important habitat for western snowy plover
- Rare plant species
- Heavily used by migrating and wintering waterfowl, shorebirds, and migrating songbirds
- Supports significant production of wild chinook, coho salmon, steelhead

- Bogs support ESA-listed western lily and other at-risk and endemic plants
- Includes BLM's New River Area of Critical Environmental Concern
- US Fish and Wildlife Service has proposed establishment of New River National Wildlife Refuge

Key Habitats:

- Aquatic
- Coastal Bluffs And Montane Grasslands
- Coastal Dunes
- Estuary
- Freshwater Wetlands
- Riparian

Key Species:

- Aleutian Canada Goose
- Black Oystercatcher
- Tufted Puffin
- Western Snowy Plover
- Coho Salmon
- Fall Chinook Salmon
- Winter Steelhead
- Western Lily

Identified in other planning efforts:

- Joint Venture Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- The Nature Conservancy Ecoregional Assessment
- The Oregon Plan Core Salmon Areas

Recommended Conservation Actions:

- Limit livestock grazing in seasonal wetlands; manage for diversity of early seral conditions to provide habitat for shorebirds, waterfowl
- Maintain upland pastures in short-grass conditions and accommodate use by staging Aleutian Canada geese
- Minimize human disturbance on beach to benefit western snowy plover
- Re-establish floodplain forests, shrub swamp along estuary; restore and enhance bogs
- Remove European beachgrass in targeted areas to enhance habitat for western snowy plover
- Restore and maintain riparian areas along estuary and tributary streams

- Restore estuary's natural hydrograph (avoid breaching of fore-dune)

CR-38. Cape Blanco area

Special Features:

- Includes the Elk and Sixes Rivers, Grassy Knob Wilderness Area, and Cape Blanco State Park
- High value for both aquatic and terrestrial diversity
- Rare plant species
- Key location on coastal corridor for wide variety of migratory birds
- Several large ranches at the lower end of Elk River have already undertaken significant conservation measures, including livestock exclusion from riparian and wetlands area, enrollment in Conservation Reserve Enhancement Program, and wetland restoration.
- Area contains potential habitat for western snowy plover.
- Area contains 45% of the ecoregion's oak woodland habitat.

Key Habitats:

- Coastal Bluffs And Montane Grasslands
- Freshwater Wetlands
- Oak Woodlands And Savannas

Key Species:

- Marbled Murrelet
- Northern Goshawk
- Peregrine Falcon
- Western Snowy Plover
- Coho Salmon
- Fall Chinook Salmon
- Winter Steelhead
- Pallid Bat
- Western Lily

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Oregon Biodiversity Project Conservation Opportunity Areas
- The Nature Conservancy Ecoregional Assessment
- The Oregon Plan Core Salmon Areas

Recommended Conservation Actions:

- Control gorse
- Manage to maintain grasslands
- Plan development to maintain key ecological functions and habitats
- Restore floodplain wetlands and riparian forests

CR-39. Rogue River Estuary**Key Habitats:**

- Coastal Bluffs And Montane Grasslands
- Estuary
- Riparian

Key Species:

- Tufted Puffin
- Fall Chinook Salmon
- Summer Steelhead
- Winter Steelhead

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Plan development to maintain key ecological functions and habitats
- Restore floodplain habitats and functions

CR-40. Pistol River Estuary**Special Features:**

- *Shorebird and waterfowl habitat*
- *Includes Crook Point, part of Oregon Islands NWR and one of most important seabird nesting sites on the West Coast*
- *Designated Natural Estuary*
- *Offshore rocks provide nesting habitat for seabirds.*

Key Habitats:

- Coastal Bluffs And Montane Grasslands
- Estuary

Key Species:

- Seabirds
- Fall Chinook Salmon
- Winter Steelhead
- Recommended Conservation Actions:
- Limit impacts of human disturbance on nesting seabird sites

CR-41. Cape Ferrelo**Special Features:**

- Adjacent to Oregon Islands, Whalehead Island, and associated Important Bird Areas
- Important shorebird habitat

Key Habitats:

- Coastal Bluffs And Montane Grasslands
- Riparian

Key Species:

- Black Oystercatcher
- Tufted Puffin
- Winter Steelhead

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Manage recreation use to minimize impacts of human disturbance on offshore rocks and intertidal habitats
- Plan development to maintain key ecological functions and habitats
- Remove invading conifers to maintain grasslands

CR-42. Chetco River**Special Features:**

- *Upper reaches of the Chetco designated as having outstanding remarkable values for water quality and fish habitat on a national level.*
- *Designated Natural Estuary*

Key Habitats:

- Estuary

Key Species:

- Northern Goshawk
- Fall Chinook Salmon
- Winter Steelhead

Identified in other planning efforts:

- The Oregon Plan Core Salmon Areas

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology

CR-43. Winchuck River Estuary**Special Features:**

- Ecologically diverse area
- Designated Natural Estuary

Key Habitats:

- Estuary

Key Species:

- Coho Salmon
- Fall Chinook Salmon
- Winter Steelhead



Photo © Bruce Newhouse



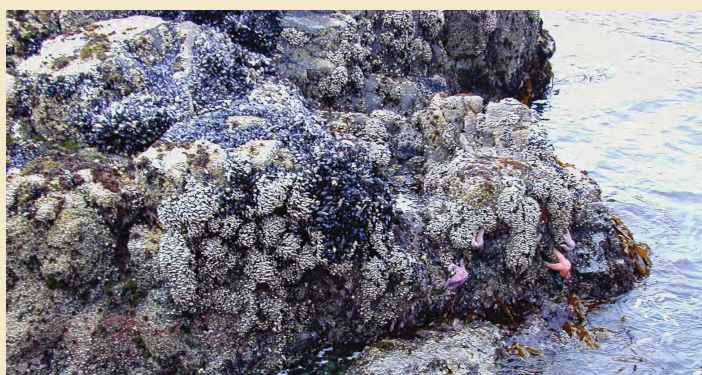
Tidepools and ecology along the rocky Oregon coastline

The ebb and flow of the tides are the daily rhythm of life for animals that live in tidepools along Oregon's rocky coastline. Every day, tidepools experience dramatic changes in water levels, salt levels, light, and other variables. Natural weathering or wave action creates

tions. However, there are usually fewer marine predators in these upper tidepools. In contrast, tidepools lower down on the coastline are more commonly visited by predators, but have less variation in other environmental conditions, such as salt levels. Animals that thrive in tidepools

include rockfish, sculpins, crabs, mussels, whelks, limpets, urchins, seastars, barnacles, anemones, nudibranchs, and sponges. Cornerstone concepts of ecology, such as how animals compete for food or prey upon each other, and how they respond to environmental disturbances, have been explored by studying this diverse community. For more information on tidepools and intertidal species, see ODFW's Nearshore Marine Strategy (in preparation, 2005).

In Oregon, excellent sites for observing tidepools include Strawberry Hill, Boiler Bay, Otter Crest, Canon Beach, Cape Perpetua, and Bandon.



At Yaquina Head, the Bureau of Land Management has created tidepools that are accessible by wheelchair: observers have access to view

tidepools, and they provide habitat for hundreds of species. Tidepools can be small (the size of a coffee mug) or large (the size of a gymnasium). Tidepools located high up on the coastline experience the greatest variations in salt, temperature and other variables. For example, rainwater can create a water layer with relatively low salinity, but this environment is subject to abrupt change with weather condi-

tions. However, there are usually fewer marine predators in these upper tidepools. In contrast, tidepools lower down on the coastline are more commonly visited by predators, but have less variation in other environmental conditions, such as salt levels. Animals that thrive in tidepools include rockfish, sculpins, crabs, mussels, whelks, limpets, urchins, seastars, barnacles, anemones, nudibranchs, and sponges. Cornerstone concepts of ecology, such as how animals compete for food or prey upon each other, and how they respond to environmental disturbances, have been explored by studying this diverse community. For more information on tidepools and intertidal species, see ODFW's Nearshore Marine Strategy (in preparation, 2005).

Oregon silverspot butterfly recovery efforts: Captive breeding, habitat restoration is silver lining for at-risk butterfly

The Oregon silverspot butterfly is named for the shiny metallic spots on the undersides of its wings. Oregon silverspots once ranged from northern California to Washington, but now survive at only 4 sites in Oregon and 1 in California. Oregon silverspots are found in coastal salt spray meadows, stabilized dunes, or montane meadow habitats where they breed, feed and seek shelter from Pacific Ocean wind storms. The butterfly's larvae are dependent on a single food plant, early blue violet. The silverspot's decline is linked to the disappearance of this host plant and general habitat loss. Early blue violets require grassland habitats that are not too overgrown with shrubs or other woody plants. Historically, early blue violets probably benefited from fires set by Native Americans. The fires maintained grassland habitats by reducing competing plants, removing dead vegetation, and stimulating violet seed germination. Early blue violets are outcompeted and outshaded by more aggressive nonnative grasses and other invasive plants. In addition to these impacts, much of the violet's grassland habitat has been lost to development along Oregon's Coast.

One of the Oregon silverspot's strongholds has been The Nature Conservancy's Cascade Head Preserve, north of Lincoln City. However, Cascade Head's silverspot population plummeted from approximately 1,000 butterflies in 1992 to 57 in 1998. In response to the steep decline, The Nature Conservancy partnered with Lewis & Clark College and the Oregon Zoo to experiment with captive rearing and to undertake habitat restoration at Cascade Head. For the captive rearing project, 8 - 26 adult female butterflies were most years since 1999. The females were captured after they had been flying for some time to give them as much opportunity as possible to lay eggs in the wild.

At the Oregon Zoo, researchers cared for the adult females and collected eggs as they were laid. After the eggs hatched, the caterpillars were put in a refrigerator to simulate their normal winter hibernation. The following spring, the caterpillars were fed violet leaves until they formed pupa, an intermediate stage in a butterfly's metamorphosis. The pupae were then returned back to Cascade Head so the adults could emerge and resume their life cycle.

During the same period, researchers have examined effects of mowing and burning on violet populations and have planted early blue violet plants to determine the best methods of restoring the silverspot's natural habitat. Despite these efforts, Cascade Head's silverspot population has yet to fully recover. This may indicate that the size of the violet population is still too small to support the butterflies or may reflect a time lag until young violets mature. Additional habitat work and research is planned for the future.

This use of captive rearing is a short-term, stop-gap measure intended to prevent genetic inbreeding problems that often arise in small populations. It buys time for land managers to restore or otherwise manage habitats essential to a species survival. Captive rearing is usually a last resort and used when a population is at risk of going extinct. Generally, captive-raised individuals are released only at the source population, but occasionally they may be used to bolster other populations considered to be dangerously small and susceptible to inbreeding. However, translocating rare species to new areas raises concerns about genetic



pollution and disease transmission so this practice should be carefully considered before proceeding.

In the long term, only adequate amounts of the right kind of habitat will improve the survival of rare species. In addition to Cascade Head, Oregon silverspot butterfly habitat is being restored at other sites along the Coast, providing hope for the long-term survival of this coastal butterfly.

Ecotourism

Ecotourism is a rapidly growing sector of the hospitality industry. While all of Oregon's ecoregions have excellent ecotourism opportunities, the Coast Range currently has the greatest economic activity directly linked to healthy fish and wildlife populations. Nestled against the Pacific Ocean, the Coast Range has diverse habitats that people enjoy through hiking, camping, bird watching, wildlife viewing, fishing and hunting. Here are just a few of the Coast Range's most popular wildlife-based recreational activities, events and sites.

Whale watching - Twice each year, gray whales migrate through Oregon's waters, traveling between summer feeding grounds near Alaska and winter nursery areas near Mexico. Oregon Park and

can go on whale-watching boat and airplane tours offered by private charter operations (more information is available from ODFW's Marine Resources Program).

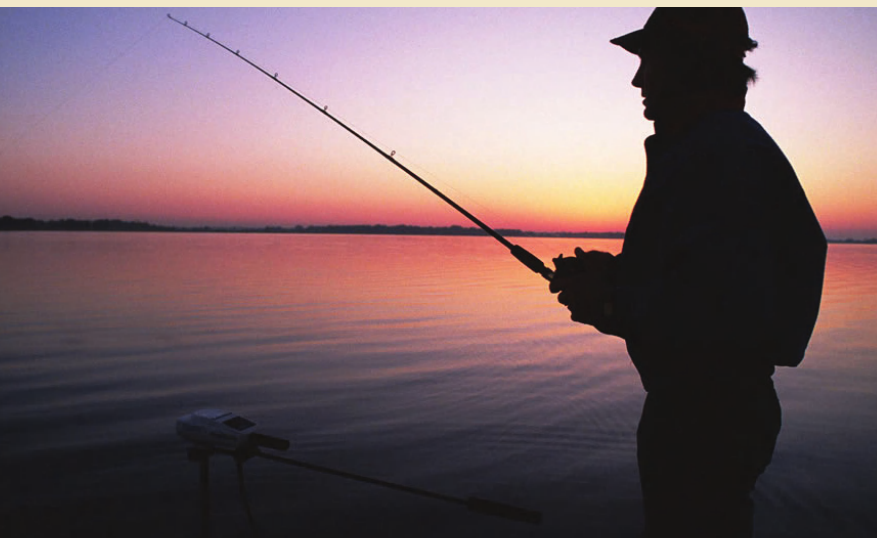
Oregon Shorebird Festival - During late summer, shorebirds gather on Oregon's mudflats and beaches, resting and refueling during their long migrations. The number and variety of birds attract birders from all over the northwest. Each September, the Oregon Shorebird Festival, held in Charleston at the Oregon Institute of Marine Biology, offers lectures, guided field trips, charter boat trips, and family activities. People come to find a rare bird, to sharpen their skills and knowledge, or just to enjoy a bird-themed trip to the Coast.

Exhibits - The Oregon Coast Aquarium and Oregon State University's Mark O. Hatfield Marine Visitor Science Center, both located in Newport, have live animal exhibits, interactive displays, films, guided tours and other educational programs. For more information, visit Oregon

Coast Aquarium's website at www.aquarium.org and OSU Hatfield Marine Science Visitor Center's website at hmsc.oregonstate.edu/visitor.

Tidepool viewing - Along the rocky portion of Oregon's coastline, tidepools harbor fascinating creatures that live in a world of shifting light,

water and salinity. Tidepool viewing is a popular activity, especially for families. Several areas provide educational programs and information



Recreation Department's "Whale Watching Spoken Here" helps coastal visitors spot, enjoy, and learn about the whales. During winter and spring school vacations, more than 200 trained volunteers are stationed at 28 locations along the coast. The program is popular: volunteers talked to more than 16,000 people during the 2004-05 winter whale watching week. In addition to land-based viewing, coastal visitors



on low-impact tidepooling. At the Yaquina Head Outstanding Natural Area, the Quarry Cove Tidepools are the world's first human-made, naturally functioning tidepools that are accessible to everyone. The site's interpretive center, interactive displays, and accessible trails allow people to safely explore and enjoy tidepool life.

Recreational fishing, clamming and crabbing - One of the biggest reasons people visit the coast is to go fishing or to harvest shellfish. Salmon, steelhead, Pacific halibut, surfperch, flatfish, groundfish, albacore tuna, razor clams, bay clams, and Dungeness crabs offer diverse recreational opportunities. In 2002, Oregon Department of Fish and Wildlife estimates 800,000 bay crab and clam user trips, and estimates 990,000 ocean, bay and estuary user trips.

Elk viewing - During the winter months, elk often congregate in large numbers where plentiful forage is available. At ODFW's Jewell Meadows Wildlife Area (located northwest of Portland) and Dean Creek Wildlife Area (located east of Reedsport), visitors are treated to up-close views

of 120-200 elk. Paved parking lots, viewing areas and interpretive signs help make these sites popular tourist stops.

Sea lions and sea lion caves – for example, north of Florence and at Strawberry Hill and numerous other locations. Sea lion viewing is a popular activity with many coastal visitors.

When implemented carefully, with properly managed harvest levels and low-impact viewing practices, ecotourism is allowing local communities to capitalize on their natural resources in a sustainable way. These recreational opportunities and the hospitality jobs they support depend on healthy wildlife populations and habitats, which Oregonians can maintain and restore by working together.

Pink sand-verbena

Pink sand-verbena's genus name, *Abronia*, is derived from the Greek word meaning delicate or graceful. With clusters of small pink, trumpet-like flowers, pink sand-verbena is a graceful resident of Oregon's open, sandy dune habitats. The first plant collected and named west of the Mississippi, pink sand-verbena once occurred along the entire Oregon Coast. But it has declined dramatically since the introduction of European beachgrass caused the loss of open sandy habitats. By the 1970's, there were approximately ten populations left, but only five remained by the late 1990's. It is currently listed as endangered under the Oregon Endangered Species Act.

Sometimes natural resource conflicts can present unanticipated conservation opportunities. In the early 1990's, pink sand-verbena was discovered at Port Orford when the Army Corps of Engineers was negotiating the extension of

their permit to dump dredged sand on the beach. The dredging was necessary to keep navigation lanes open to fishing boats. However, placing the sand on the beach violated the Coastal Zone Management Act, so an alternative solution was needed. Botanists noted that pink sand-verbena might benefit from the dumped sand. State and federal agency partners decided to extend the permit and dump dredge spoils in a pattern to best suit the plant. This solution benefited the plants,

allowed botanists to study the pink sand-verbena in new sandy habitat, and maintained dredging while authorities searched for an alternate location for dumping dredged sand.

Other conservation efforts have benefited pink sand-verbena. Since 1997, the Institute for Applied Ecology, Bureau of Land Management and other partners have conducted seeding and transplantation experiments at 13 sites along the southern Oregon Coast. This research has provided information on the plant's ecology, germination rates, and population trends, and the results will guide management to help recover the species.



Along with pink sand-verbena, other species have declined with the introduction of European beachgrass, including snowy plover, silvery phacelia, and Wolf's evening primrose. A coordinated approach to European beachgrass control and open sand dune habitat restoration will benefit a suite of species.

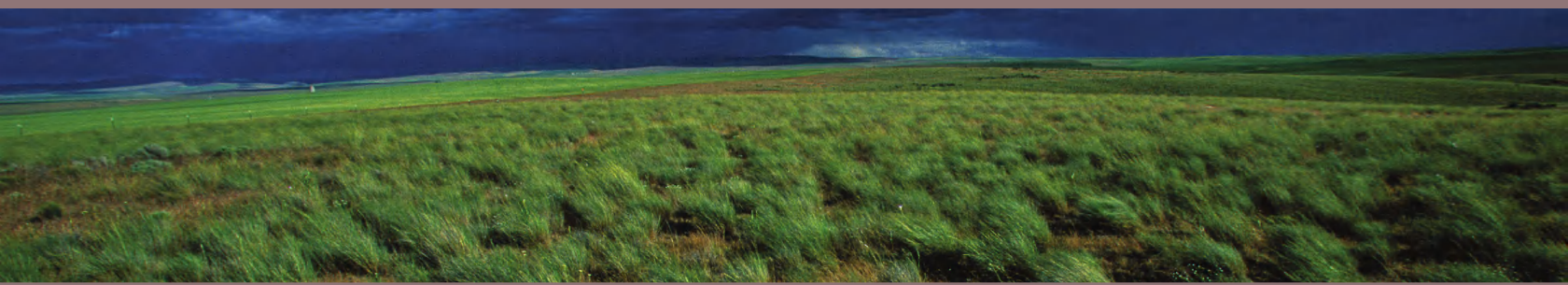


Photo © Ellen Morris Bishop

Columbia Plateau Ecoregion

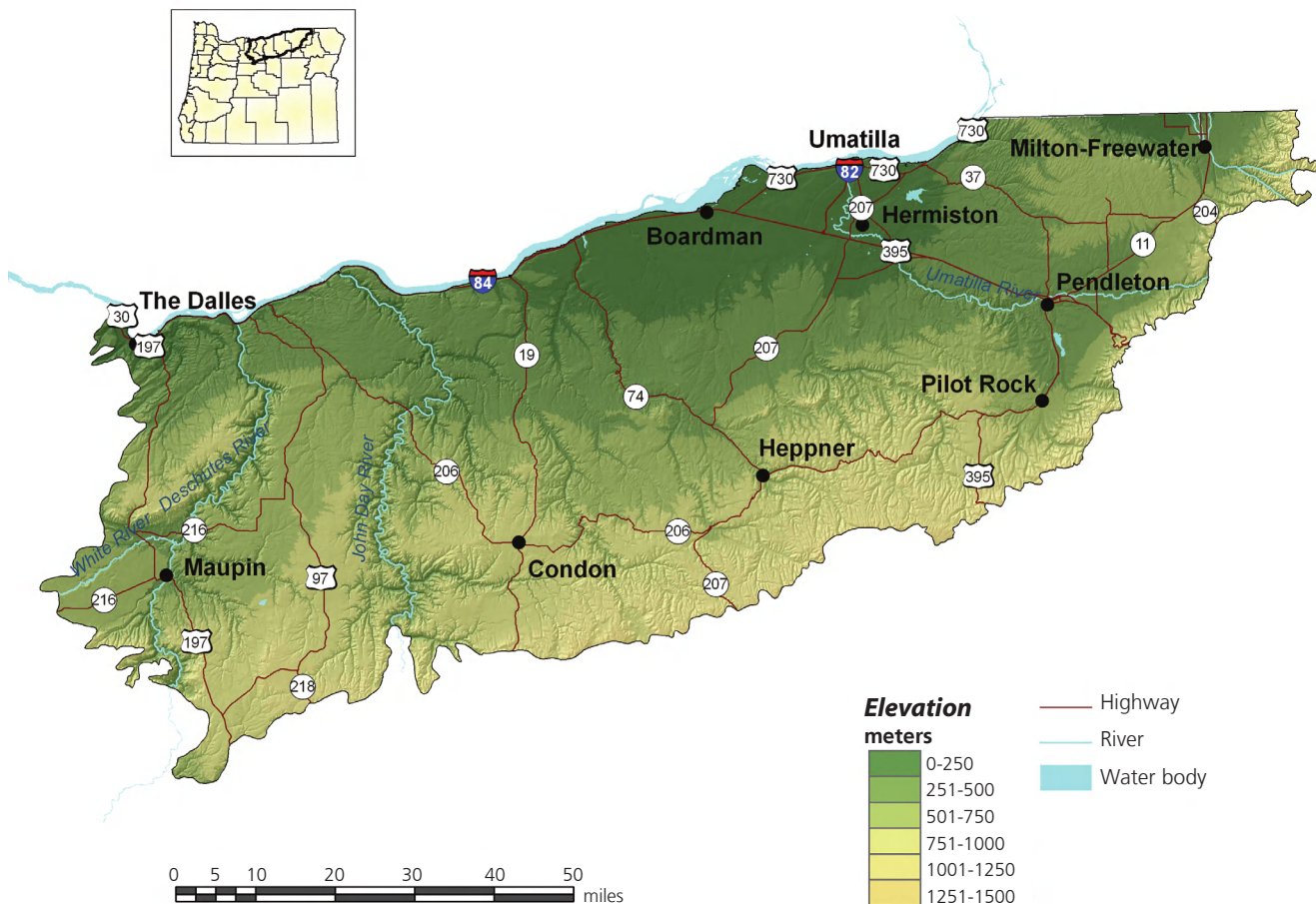
Getting to Know the Columbia Plateau Region

Characteristics

The Columbia Plateau Ecoregion encompasses part of Oregon and most of eastern Washington. The Oregon portion of the ecoregion extends from the eastern slopes of the Cascades Mountains, south and east from the Columbia River to the Blue Mountains. Millions of years ago, the region was covered by lava flows up to two miles deep. The centerpiece of the ecoregion, the Columbia River, has greatly influenced the surrounding area, with cataclysmic floods and large deposits of wind-borne silt and sand. Over time, winds scoured the floodplain, depositing silt and sand across the landscape and creating ideal conditions for

agriculture: rolling lands, deep soil, and plentiful flowing rivers including the lower parts of the Deschutes and John Day Rivers. The ecoregion is made up entirely of lowlands, with an arid climate, cool winters and hot summers.

The Columbia Plateau produces the vast majority of Oregon's grain, and grain production is the heart of the agricultural economy. The Columbia Plateau produces the second-highest agricultural sales per year for any ecoregion in Oregon. More than 80 percent of the ecoregion's population and employment is located in the Umatilla County portion of the ecoregion, which includes Pendleton and Hermiston. Other population centers include The Dalles, Condon, and Heppner.



"At a Glance"- Characteristics and Statistics**Land use (% of ecoregion):**

Agriculture	36.6%
Forest and woodland	0.7%
Other (lakes, wetlands, cliffs, etc.)	4.7%
Range, pasture, and grassland	57.4%
Towns and rural residentia	0.3%
Urban and suburban	0.4%

Land ownership:

Private	85%
Public, federal	11%
Public, state and local	2%
Native American	2%

Human population, government and transportation statistics:

Estimated population in 2000	103,000
% of Oregon's population in 2000	3.1%
Number of cities	21
Number of counties	6
<i>(includes part of Jefferson, Morrow, Umatilla, Wasco counties and all of Gilliam, Sherman counties)</i>	
Number of watershed councils	17
<i>(A watershed council is considered present if at least 10% of its area is located within the ecoregion.)</i>	
Miles of road	8,663

Economics:

Important industries: agriculture; mobile home production; cattle; retail and services; construction

Major crops: Grain; barley; potatoes; onions; fruit

Important natural recreational areas: Cold Springs National Wildlife Refuge (NWR), Umatilla NWR, the canyons of the lower Deschutes and John Day Rivers

Ecology:

Average annual precipitation	12.3 inches per year
Range of average July temperatures (1971-2000)	66°F –76°F
Range of average January low temperature (1971-2000)	30°F –35°F
Elevation	100 feet (The Dalles) to 3,000 feet (Northern slopes)
Number of regularly occurring vertebrate wildlife species	322
Important rivers	Columbia, Deschutes, John Day, Umatilla, Walla Walla.

Information Sources: Oregon Blue Book (2003-04), Oregon Climate Service data (1971-2000), Oregon State of the Environment Report (2000), Oregon Watershed Enhancement Board (2001), Oregon Wildlife Diversity Plan (1993), U.S. Census Bureau (2000).



Photo © Ellen Morris Bishop

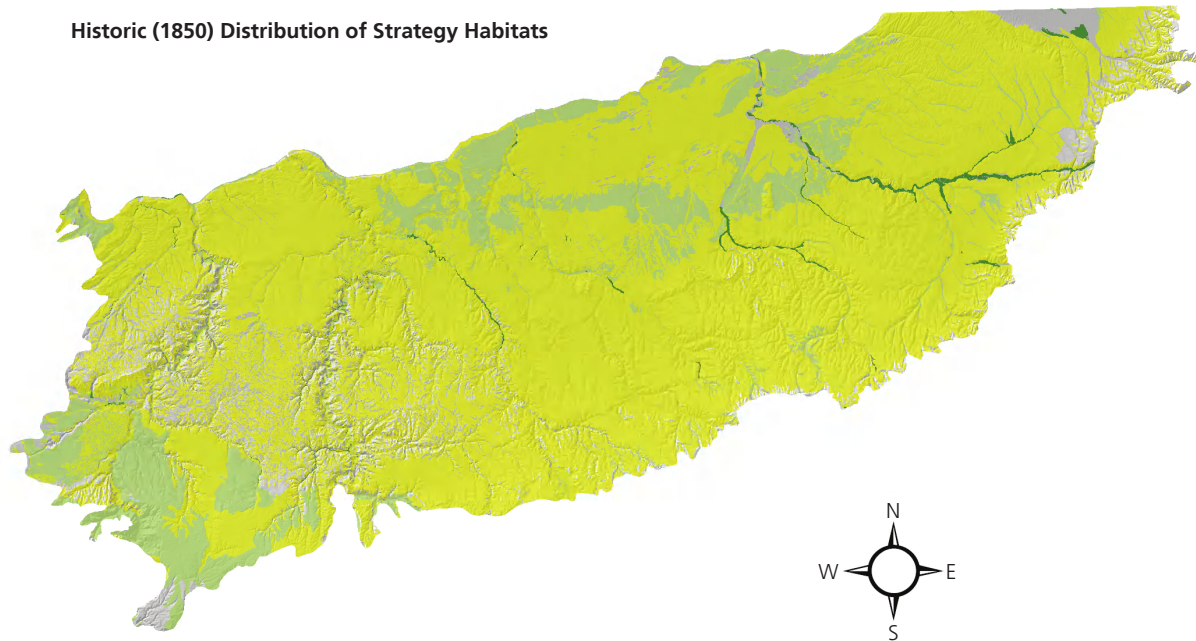


Summary List of Strategy Habitats

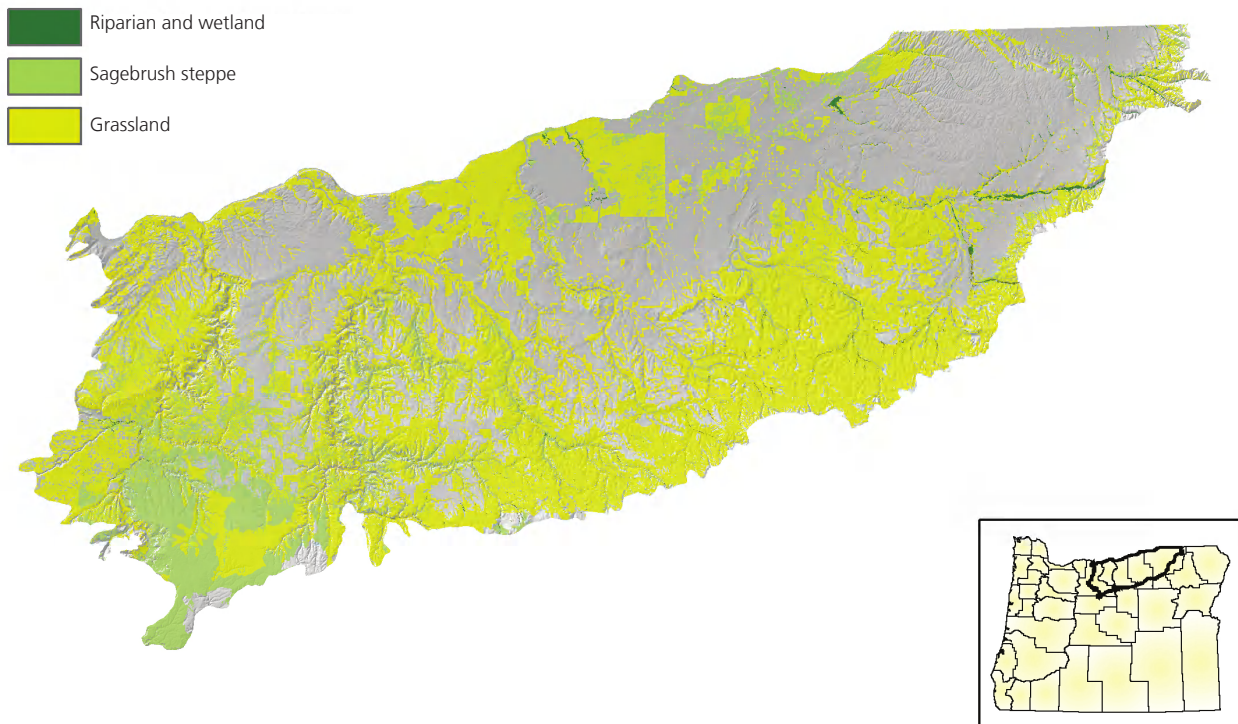
Strategy Habitats in the Columbia Plateau Ecoregion include: grasslands, sagebrush steppe, wetlands, riparian and wetland habitats, and aquatic habitats.

Change in Strategy Habitats

Historic (1850) Distribution of Strategy Habitats



Current (2004) Distribution of Strategy Habitats



Source: Oregon Natural Heritage Information Center (2004)

Conservation Issues and Actions

Overview

Almost all of the Columbia Plateau ecoregion is privately owned. Conservation opportunities for native vegetation are limited because it is difficult to maintain connectivity among high quality habitat patches.

Water availability is a concern in this ecoregion, and demands for water include agricultural, irrigation, and domestic use. Water quality in the Columbia Plateau ecoregion is affected by these demands, particularly in summer months when flows are reduced. Restoring flow with head-water streams is essential to maintain ecological connections. Maintaining aquifers also is critical.

Ecoregion-level limiting factors and recommended approaches

All six of the key conservation issues apply statewide, as do the approaches outlined in the Statewide Perspectives and Approaches chapter. However, water quality and quantity and invasive species are described further in this section, considering the Columbia Plateau's ecoregional characteristics. In addition to the statewide issues, soil erosion and habitat fragmentation are of concern in this ecoregion.

Factor: Water availability. Water quantity is a limiting factor for fish, wildlife, and livestock. In streams, seasonal low flows can limit habitat suitability and reproductive success for many fish and wildlife species. As the demand for water increases, the supply of groundwater is decreasing. Water quality also can limit species and habitats.

Approach: Provide incentives and information about water usage and sharing during low flow conditions (e.g., late summer). Increase awareness and manage timing of applications of potential aquatic contaminants. Improve compliance with water quality standards and pesticide use labels (Oregon Department of Environmental Quality [ODEQ] and U.S. Environmental Protection Agency). Work on implementing Senate Bill 1010 (Oregon Department of Agriculture) and ODEQ Total Maximum Daily Load water quality plans.

Factor: Soil erosion. Soil loss through erosion and decreases in soil quality jeopardize the productivity of habitats and agricultural lands. Water infiltration, which is essential for productive habitats and groundwater recharge, decreases on bare land soils. Sandy soils along the Columbia River are particularly susceptible to erosion from high winds.

Approach: Use incentives to promote no-till farming and agricultural

Summary List of Strategy Species

Mammals

Pallid bat
Townsend's big-eared bat
Washington ground squirrel

Birds

Brewer's sparrow
Ferruginous hawk
Grasshopper sparrow
Lewis' woodpecker
Loggerhead shrike
Long-billed curlew
Sage sparrow
Swainson's hawk
Western burrowing owl

Fish

Bull trout (Columbia Distinct Population Segment [DPS])
Chinook salmon (Snake River ESU, spring/summer run)
Chinook salmon (Snake River ESU, fall run)
Coho salmon (Lower Columbia/Southwest Washington Coast ESU)
Inland Columbia Basin redband trout
Margined sculpin
Pacific lamprey
Steelhead (Middle Columbia River ESU, summer run)
Steelhead (Middle Columbia River ESU, winter run)
Steelhead (Snake River Basin ESU)
Western brook lamprey

Plants

Lawrence milk-vetch
Northern wormwood
Tygh Valley milk-vetch

Amphibians and Reptiles

Northern sagebrush lizard
Western painted turtle

Invertebrates

Snails:

Bulb juga
Columbia Gorge hesperian
Columbia Gorge Oregonian
Dalles mountainsnail
Oregon snail (Dalles sideband)
Purple-lipped juga (Deschutes juga)
Shortface Ianx (giant Columbia River limpet)

practices that do not allow lands to lay bare for long periods of time. Encourage participation and support for programs such as the NRCS Conservation Reserve Program, which promote practices that can offset or minimize soil erosion and degradation.

Factor: Habitat fragmentation. The remaining Strategy Habitats for at-risk native plant and animal species are limited and largely confined to small and often isolated fragments such as roadsides and sloughs. These remaining parcels could be converted to agriculture, and there are few opportunities for large-scale protection or restoration of native landscapes. Existing land use and land ownership patterns present challenges to large-scale ecosystem restoration.

Approach: Provide incentives (e.g., financial assistance, conservation easements) and information about the benefits of maintaining bird and other wildlife habitat. Broad-scale conservation strategies will need to focus on restoring and maintaining more natural ecosystem processes and functions within a landscape that is managed primarily for other values. This may include an emphasis on more “conservation-friendly” management techniques for existing land uses, and restoration of some key ecosystem components

such as riparian function. “Fine-filter” conservation strategies that focus on needs of individual Strategy Species and key sites are particularly important in this ecoregion. Because approximately 84 percent of the Columbia Plateau ecoregion is privately-owned, voluntary cooperative approaches are the key to long-term conservation using tools such as financial incentives, regulatory assurance agreements, and conservation easements. Where appropriate, plan development carefully to maintain existing fish and wildlife habitats.

Factor: Invasive species. Invasive plant and animal species disrupt native communities, diminish populations of at-risk native species, and threaten the economic productivity of resource lands including farmland and rangeland. Differences in county policies and funding availability regarding invasive species have resulted in some inconsistencies in approach.

Approach: Emphasize prevention, risk assessment, early detection and quick control to prevent new invasives from becoming fully established. Use multiple site appropriate tools (mechanical, chemical and biological) to control the most damaging invasive species. Focus on key invasive species in high priority areas, particularly where

Solutions to Environmental and Economic Problems (STEEP)

Cropland soil erosion is one of the most significant problems facing industries in the Columbia Plateau Ecoregion. Cropland soil erosion



can lead to decreased farmland productivity and to degradation of downstream riparian and aquatic habitats. Scientists and educators from the University of Idaho, Oregon State University, Washington State University, and the USDA-Agricultural Research Service are cooperating with growers and agricultural support industries and agencies to develop state-

of-the-art methods to control erosion and to protect environmental quality. The STEEP (Solutions To Environmental and Economic Problems) program combines research and education, focusing on developing profitable cropping systems technologies. Since 1975, Congress has

funded grants for this multi-disciplinary program. Researchers, growers, conservation district associations, and other agricultural interest associations participate in running the programs. The program produces several publications reporting new developments in conservation farming techniques specific to the Columbia Plateau (for example, the Pacific Northwest Conservation Farming Handbook) and organizes a variety of meetings to share information on resources and technologies. The program helps producers implement and evaluate erosion management practices through “On Farm Testing” (OFT), engaging farmers in newly developed technologies and their application. Farmer participation through on-farm testing leads to more appropriate site-specific technology, broader and faster adoption, and increased producer ability to adapt and innovate environmentally sound and profitable conservation farming practices. OFT has the potential to fill a missing link in conservation farming innovation, adaptation, and adoption in the Pacific Northwest. OFT helps producers evaluate and adapt improved erosion management practices to accelerate implementation of their conservation plans and improve profitability. For more information on the program, see: <http://pnwsteep.wsu.edu>.

Invasive Non-native Species

Invasive species currently are considered to be one of the primary causes of species becoming threatened and endangered, second only to habitat conversion. Many species are as threatening to people's livelihoods as they are to fish and wildlife and their habitats. This section identifies the species with the greatest current and potential impact in the Columbia Plateau. These species were determined through an analysis of Oregon Department of Agriculture's Noxious Weed List, ODFW's Wildlife Integrity Rules, ODFW's Introduced Fish Management Strategies report, information from Portland State University Center for Lakes and Reservoirs, and local expert review. Although some of these species also cause significant economic damage to farms, ranches, and managed forests, this list is focused on those that cause the most severe ecological damage. Impacts from introduced game fish vary from species to species and within ecoregions. As a result, the impacts need to be evaluated more locally (ODFW Introduced Fish Management Strategies Report).

Known invasive non-native animal and plant species

These species are established or documented in this ecoregion, and are known to impact native fish and wildlife populations and habitats. They may range from small, controllable populations to widespread infestations.

Documented Invasive Animals

Bluegill
Brook trout
Brown bullhead
Bullfrog
Carp
Channel catfish
Crappie
European starling
House sparrow
Largemouth bass
Mosquito fish (*Gambusia*)
Norway rat
Nutria
Shad
Smallmouth bass
Virginia opossum
Yellow perch

Documented Invasive Plants

Cheatgrass
Curly leaf pondweed (aquatic)
Diffuse knapweed
Eurasian milfoil (aquatic)
Fragrant water lily (aquatic)
Iberian starthistle
Intermediate wheatgrass
Knotweeds (Japanese, giant)
Medusahead rye
Rush skeletonweed
Russian olive
Russian thistle
Scotch thistle
Silverleaf nightshade
Spotted knapweed
Tamarisk
Watercress (aquatic)
Yellow flag iris (aquatic, riparian)
Yellow starthistle

Non-native animals and plants of potential concern

Preventing the establishment of invasive non-native species is far more cost-effective and practical than trying to eradicate them once they are established. To make the best use of financial and personnel resources, prevention efforts need to be prioritized to address the greatest threats, especially since many non-native species do not pose a significant threat to wildlife populations and habitats. Potentially harmful non-native species can be identified by examining biological factors, potential impacts and invasion patterns in similar climates. The species listed here are included because: 1) they are not known to occur in this ecoregion, but could pose a threat to fish and wildlife populations and habitats if they become established; or 2) they are known to occur in this ecoregion but the extent to which they impact native species and disrupt ecological processes is unclear at this time.

Potentially Invasive Non-native Animals

Asian carp (bighead, silver)
Black carp
Feral pigs
Fishhook waterflea
Grass pickerel
Muskellunge, northern pike
Round goby
Ruffe
Rusty crayfish
Snakeheads
Zebra mussels

Potentially Invasive Non-native Plants

Camelthorn
Hydrilla (aquatic)
North Africa grass
Pondwater starwort (aquatic)
Purple knapweed
Skeletonleaf bursage
Syrian bean caper
Texas blueweed
Uruguay seedbox (aquatic)
Water primrose (aquatic)
Yellow hawkweed

Conservation actions identified through other planning efforts

Landowners and land managers can benefit a variety of fish and wildlife species by managing and restoring Strategy Habitats. The following recommendations are relevant to Strategy Habitats. They were identified through a review of existing plans.

Actions	Strategy Habitat and General Location	Source Document
In cooperation with interested landowners and agencies, maintain and/or initiate shrub-steppe restoration and management on private and public land.	Grasslands and shrub-steppe throughout ecoregion	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended targets: Boardman Grasslands 55,000 ac; Lower Umatilla 10,000 ac]
Initiate actions (e.g., restoration, maintenance) in large areas of sagebrush habitat to maintain complex, continuous habitat.	Sagebrush habitat throughout the ecoregion	Partners in Flight Columbia Plateau Conservation Strategy (Altman and Holmes 2000) [recommended targets: maintain more than 50% of landscape in mid to late seral stage with canopy cover more than 15% and at least one contiguous tract more than 1,000 ac]
In cooperation with interested landowners and agencies, maintain and/or initiate grassland restoration and management on private and public land.	Grasslands	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended target: Boardman Grasslands 15,000 ac]
In cooperation with interested landowners and agencies, maintain, manage or restore riparian habitat on private and public land.	Riparian woodland habitat in Lower Umatilla	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended target: 500 ac woodland, 600 ac shrub]
Plan riparian conservation and restoration to maintain conditions that support healthy (i.e., source) populations of Strategy species.	Riparian habitat throughout ecoregion	Partners in Flight Columbia Plateau Conservation Strategy (Altman and Holmes 2000) [recommended target: maintain more than 30% of historical extent of riparian habitat]
Improve fish passage. For example, modify barriers or use spans where appropriate.	Aquatic; All locations (as appropriate)	NWPCC Subbasin Plans, 2004; Oregon Biodiversity Project
Restore instream flows and restore riparian habitat. Partners include: tribes, landowners, state and federal agencies.	Aquatic; Focus on Lower Umatilla River and Wanaket Wildlife Area (Confederated Tribes of the Umatilla Indian Reservation).	Oregon Biodiversity Project
Modify practices in forests, agriculture and urban areas to meet stream large woody debris needs, reduce sediment, and improve fish passage.	Aquatic; All locations (as appropriate)	NWPCC Subbasin Plans, 2004
Establish integrated framework for wetland restoration assessment, priority setting, and actions at three scales: watersheds, ecoregions and project sites.	Wetlands	Recommendations for a nonregulatory wetland restoration program for Oregon. J.W. Good and C.B. Sawyer. 1998. Prepared for Oregon Division of State Lands and U.S. EPA Region X.
Increase incentives for proactive, nonregulatory wetland restoration and enhancement on private land, focusing on a combination of financial assistance, tax benefits, technical assistance, and education.	Wetlands	Recommendations for a nonregulatory wetland restoration program for Oregon. J.W. Good and C.B. Sawyer. 1998. Prepared for Oregon Division of State Lands and U.S. EPA Region X.
Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology. - Plant vegetation to stabilize banks; leaving stumps, fallen trees and boulders in waterways - Maintain or enhance off channel or side channel meanders, habitat and pools	Aquatic habitats (streams, pools)	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See guide for specific technical recommendations, sources of information and assistance, and other guidelines.
Maintain riparian and wetlands function: - Manage grazing, riparian vegetation planting and fencing, and livestock water facilities according to best practices, current techniques and with respect to natural hydrological conditions.	Riparian and wetlands habitats	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See guide for specific technical recommendations
Upslope erosion control: - Create water and sediment control basins to contain runoff, wastewater - Use windbreaks (tree and shrub rows - using native plants) to reduce erosion and deposition - Upland terracing	Aquatics, riparian and wetland habitats	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See guide for specific technical recommendations

**Note: Conservation Strategy monitoring indicators, linked with OSOER Key indicators, targets, and methods, will be identified in a statewide approach (See Monitoring chapter for more information).*

Strategy Habitats and Species occur. Ensure cooperation and collaboration between counties, landowners, land managers, and other entities with invasive species policies and interests. Promote the use of native “local” stock for restoration and revegetation.

Deciding Where to Work

Conservation Opportunity Areas Map and Profiles

Landowners and land managers throughout Oregon can contribute to conserving fish and wildlife by maintaining, restoring, and improving habitats. Conservation actions to benefit Strategy Species and Habitats are important regardless of location. However, focusing investments in certain priority areas can increase likelihood of long-term success over larger landscapes, improve funding efficiency, and promote cooperative efforts across ownership boundaries. Conservation Opportunity Areas are landscapes where broad fish and wildlife conservation goals would be best met. Conservation Opportunity Areas were developed to guide voluntary, non-regulatory actions. This map and the associated data

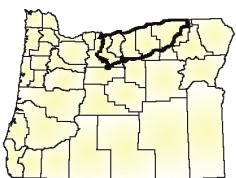
should only be used in ways consistent with these intentions. For more information on how Conservation Opportunity Areas were developed, see Appendix IV, “Methods” (beginning on page a:34).

The Conservation Opportunity Area profiles include information on recommended conservation actions, special features, key species, key habitats, and if the area has been identified as a priority by other planning efforts. These profiles highlight some priority actions to implement in individual COAs, which can range from restoration projects to monitoring for invasive species. These recommendations were identified through existing plans, spatial analysis, and expert review. They are not meant to be exhaustive, so other actions also will be appropriate, as influenced by local site characteristics and management goals. Actions need to be compatible with local priorities, local comprehensive plans and land use ordinances, as well as other local, state, or federal laws. Actions on federal lands must undergo federal planning processes prior to implementation to ensure consistency with existing plans and management objectives for the area.

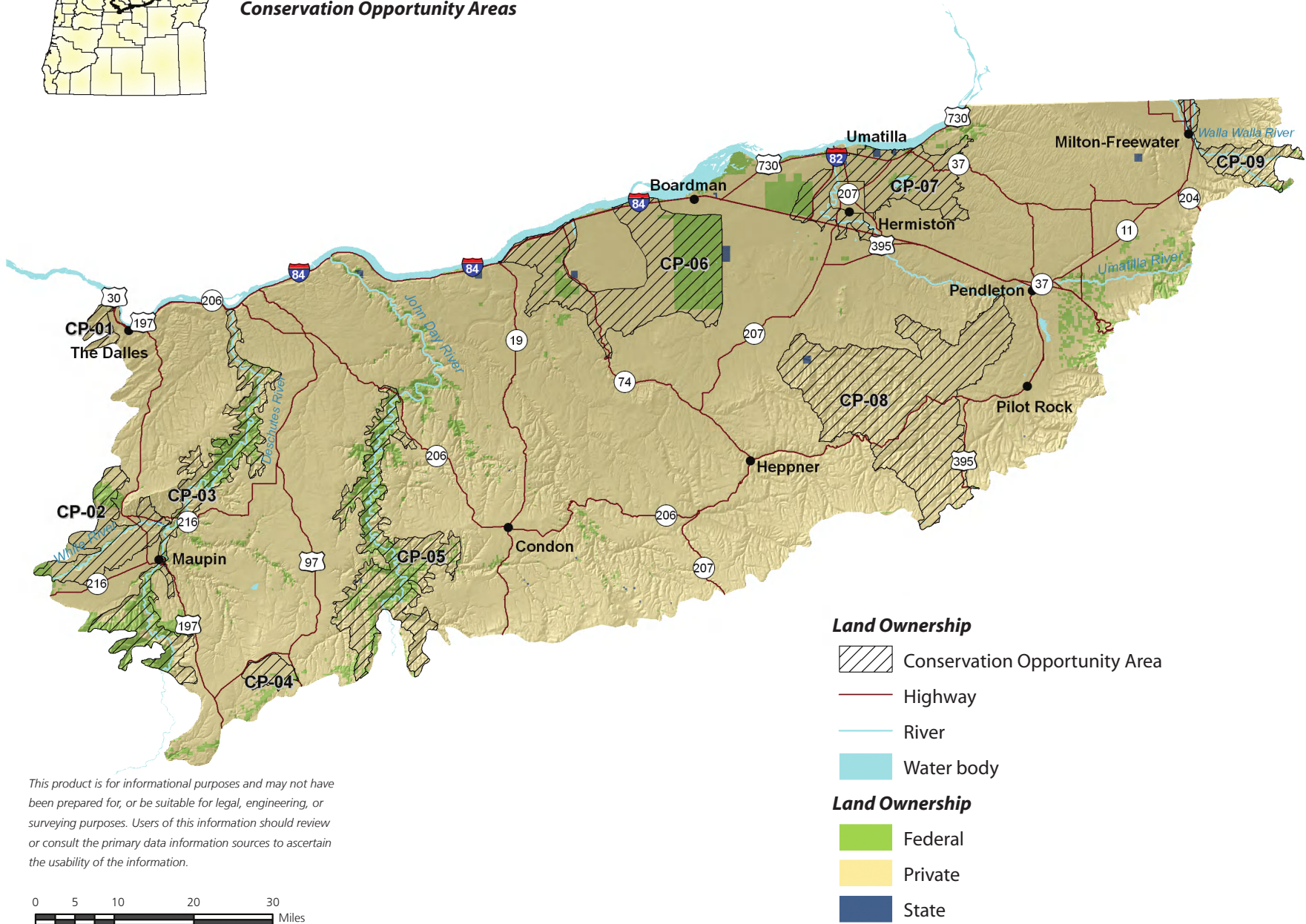


Photo © Tupper Ansel Blake





Columbia Plateau Ecoregion Conservation Opportunity Areas



Conservation Opportunity Area Profiles

CP-01. The Dalles area

Special Features:

- This area extends the Wasco Oaks Conservation Opportunity Area in the East Cascades ecoregion and shares many of the same features with that area.

Key Habitats:

- Aquatic
- Grasslands
- Oak Woodlands

Key Species:

- Lewis' Woodpecker
- Coastal Cutthroat Trout
- Winter Steelhead

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- The Nature Conservancy Ecoregional Assessment

CP-02. White River area

Special Features:

This portion of the White River is a designated Wild and Scenic river Area includes ODFW's White River Wildlife Area

Many sensitive and unique plant species are endemic to this area.

Area contains a diverse mix of fir, pine, and oak forests

Key Habitats:

- Grasslands
- Riparian

Key Species:

- Lewis' Woodpecker
- Western Gray Squirrel

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Manage ODFW Wildlife Area to maintain and enhance priority habitats and species

CP-03. Lower Deschutes River

Special Features:

- Encompasses the Lower Deschutes Wild and Scenic River corridor, designated for scenic and recreation values including its excellent steelhead and trout fisheries.

Key Habitats:

- Aquatic
- Grasslands
- Riparian And Wetland
- Sagebrush Shrub-steppe

Key Species:

- Ferruginous Hawk
- Lewis' Woodpecker
- Bull Trout (Columbia River Population)
- Summer Steelhead
- Sagebrush Lizard

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Promote early detection and suppression of invasive weeds
- Restore and maintain complex, continuous sage habitat
- Restore and maintain riparian habitats

CP-04. Lawrence Grasslands

Located between Hwy 218 and Hwy 97 in the southwest corner of the ecoregion.

Special Features:

- Area includes the Lawrence Memorial Grassland Preserve.

Key Habitats:

- Grasslands

Key Species:

- Burrowing Owl
- Grassland Birds

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment

CP-05. Lower John Day River

Special Features:

- Area encompasses the North Pole Ridge, Thirtymile, and Lower John Day Wilderness Study Areas.

Key Habitats:

- Aquatic
- Grasslands
- Riparian And Wetland
- Sagebrush Shrub-steppe

Key Species:

- Burrowing Owl
- Ferruginous Hawk
- Grasshopper Sparrow
- Loggerhead Shrike
- Summer Steelhead
- Sagebrush Lizard

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan (river corridor)
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Promote early detection and suppression of invasive weeds
- Restore and maintain complex, continuous sage habitat
- Restore and maintain grassland habitat
- Restore and maintain riparian

CP-06. Boardman area

Special Features:

- Area includes the Boardman Conservation Area, the Willow Creek Wildlife Area, the Lindsay Prairie Preserve, and the BLM's Horn Butte Area of Critical Environmental Concern.
- There are ongoing efforts by conservation groups to control noxious weeds in this area.
- The Nature Conservancy, Threemile Canyon Farms, ODFW, Water Watch, and Defenders of Wildlife are partnering to protect and restore the native habitats here.
- Threemile Canyon Farms has adopted a multi-species candidate conservation agreement covering 93,000-acre property.
- Some of the best remaining shrub steppe and grassland habitats in the ecoregion.

- This area represents the largest contiguous Washington ground squirrel habitat in Oregon.
- Some of the highest densities of breeding long-billed curlew in the world.

Key Habitats:

- Grasslands
- Sagebrush Steppe

Key Species:

- Ferruginous Hawk
- Grassland Birds
- Loggerhead Shrike
- Long-billed Curlew
- Sage Sparrow
- Swainson's Hawk
- Washington Ground Squirrel
- Northern Sagebrush Lizard

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Control wildfires to protect native habitats from risk of conversion to cheatgrass
- Maintain and/or initiate shrub-steppe restoration and management
- Promote early detection and suppression of invasive weeds

CP-07. Lower Umatilla area

Special Features:

- Includes the Cold Springs National Wildlife Refuge and Power City Wildlife Area

Key Habitats:

- Aquatic
- Grasslands
- Riparian And Wetland
- Sagebrush Shrub-steppe

Key Species:

- Burrowing Owl
- Grassland Birds

- Sage Sparrow
- Margined Sculpin
- Redband Trout
- Summer Steelhead

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas (Cold Springs NWR)

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Reestablish floodplain forests
- Restore and maintain complex, continuous sage habitat
- Restore wetlands and wet meadows

CP-08. Butter Creek grasslands

Special Features:

- Area contains 9% of the ecoregion's grassland habitat.

Key Habitats:

- Grasslands
- Riparian And Wetland

Key Species:

- Burrowing Owl
- Ferruginous Hawk
- Grasshopper Sparrow
- Loggerhead Shrike
- Pallid Bat

Recommended Conservation Actions:

- Maintain and enhance grassland habitats
- Promote early detection and suppression of invasive weeds
- Restore riparian habitats

CP-09. Walla Walla River

This area encompasses the Walla Walla River in the Columbia Plateau ecoregion, including the surrounding canyon areas near the North and South Forks.

Special Features:

- *The Walla Walla Basin Watershed Council and its partners are implementing a number of ongoing flow restoration projects to improve water quality and fish habitat in this highly impacted system.*

Key Habitats:

- Aquatic
- Grasslands
- Riparian And Wetland

Key Species:

- Bull Trout (Columbia River Population)
- Inland Columbia Basin Redband Trout
- Margined Sculpin
- Summer Steelhead

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife



Photo © Ellen Morris Bishop

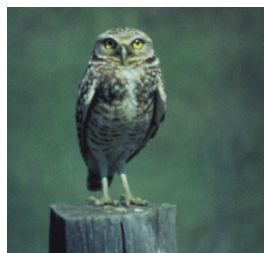




Photo © Ron S. Cole, U.S. Fish and Wildlife Services

East Cascades Ecoregion

Getting to Know the East Cascades Ecoregion

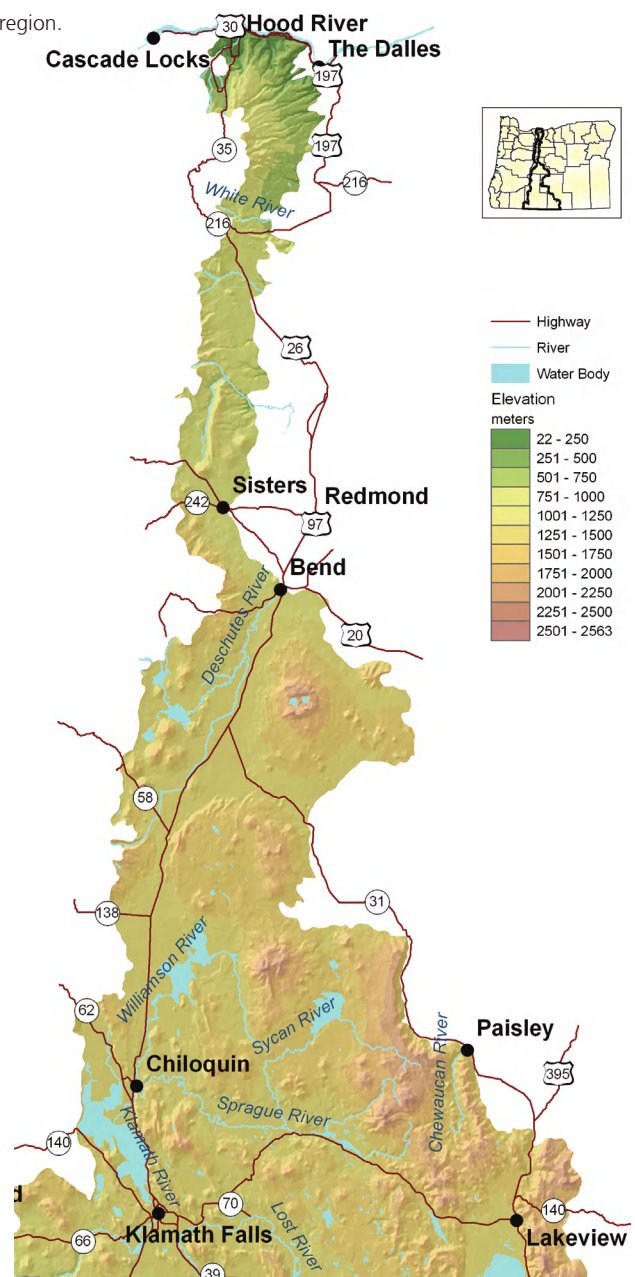
Characteristics

The East Cascades ecoregion extends from just east of the Cascade Mountains summit to the warmer, drier high desert to the east. Stretching the full north-to-south length of the state, the East Cascades is narrow at Columbia River but becomes wider toward the California border. This ecoregion varies dramatically from its cool, moist border with the West Cascades ecoregion to its dry eastern border, where it meets sagebrush country in some regions. The climate is generally dry, with wide variations in temperature. The East Cascades includes several peaks and ridges in the 6,000-7,000 foot range, but, overall, the slopes on the east side of the Cascade Mountain range are less steep and cut by fewer streams than the Western Cascade Ecoregion. The East Cascades' volcanic history is evident through numerous buttes, lava flows, craters, and lava caves, and in the extensive deep ash deposits created by the explosion of historical Mt. Mazama during the creation of Crater Lake.

Terrain ranges from forested uplands to marshes and agricultural fields at lower elevations. The northern two-thirds of the East Cascades ecoregion is drained by the Deschutes River, ultimately flowing into the Columbia. Most of the southern portion of the East Cascades ecoregion is drained by the Klamath River, with a small portion draining into Goose Lake, a closed basin. In general, the East Cascades is drier than the West Cascades, with fewer rivers flowing over the mountain slopes. However, the East Cascades is characterized by many lakes, reservoirs and marshes, providing exceptional habitat for aquatic species and wildlife closely associated with water, including waterbirds, amphibians, fish, aquatic plants and aquatic invertebrates. In fact, the East Cascades ecoregion supports some of the most remarkable aquatic biological diversity in the United States.

When compared to Oregon's other ecoregions, the East Cascades has the second-highest average income (the Willamette ecoregion supports the highest per-capita income). Much of this income is related to tour-

ism and recreation, with forestry and agriculture also important components. Towns include Bend, Klamath Falls, Lakeview, and Hood River; many of these towns are experiencing rapid population growth. Most of the Warm Springs Indian Reservation is found in the East Cascades ecoregion.



"At a Glance"- Characteristics and Statistics**Land use (% of ecoregion):**

Agriculture	3.5%
Forest and woodland	67%
Other (lakes, wetlands, cliffs, etc.)	11.6%
Range, pasture, and grassland	17.1%
Towns and rural residential	0.5%
Urban and suburban	0.2%

Land ownership:

Private	39%
Public, federal	59%
Public, state and local	<1%
Native American	<2%

Human population, government and transportation statistics:

Estimated population in 2000	140,000
% of Oregon's population in 2000	4.1%
Number of cities	11
Number of counties	7
<i>(includes parts of Deschutes, Hood River, Jackson, Jefferson, Klamath, Lake, Wasco counties.)</i>	
Number of watershed councils	18
<i>(A watershed council is considered present if at least 10% of its area is located within the ecoregion.)</i>	
Miles of road (approx.)	36,709

Economics:

Important industries: Recreation (tourism and hospitality); lumber and wood; agriculture

Major crops: Fruit (Hood River valley); wood; potatoes, onions, barley (Klamath basin), alfalfa and cattle (Lake County)

Important nature-based recreational areas: Klamath Marsh; Goose Lake; Newberry Crater National Monument; high Cascade lakes along Century Drive; Pine Mountain; Warner Mountains; Wilderness Areas (Gearhart, Badger Creek); Metolius and Deschutes subbasins

Ecology:

Average annual precipitation (1971-2000)	9.8" -89.6 " (snowfall 19.7" -420 ")
Average July high temperature (1971-2000)	92°F -104°F
Average January low temperature(1971-2000)	-20°F -10°F
Elevation	ranges from 70 feet above sea level (in the Columbia River Gorge area) to over 7,700 feet (peaks in the eastern portion of the ecoregion)
Number of regularly occurring vertebrate wildlife species	390
Important rivers	Deschutes, Hood, Klamath, Metolius, Link, Williamson, Sycan, and Sprague

Information Sources: Oregon Blue Book (2003-04), Oregon Climate Service data (1971-2000), Oregon State of the Environment Report (2000), Oregon Watershed Enhancement Board (2001), Oregon Wildlife Diversity Plan (1993), U.S. Census Bureau (2000).



Photo © Tupper Ansel Blake

Summary List of Strategy Habitats

Strategy Habitats in the East Cascades ecoregion include ponderosa pine woodlands, oak woodlands, riparian, wetlands, and aquatic habitats.


Changes in Strategy Habitats

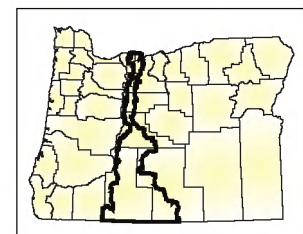
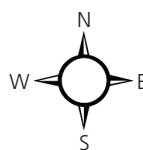
Historic (1850)
Distribution of
Strategy Habitats



Current (2004)
Distribution of
Strategy Habitats



-  Wetlands
-  Oak woodlands
-  Large ponderosa pines
-  Riparian



Source: Oregon Natural Heritage Information Center, 2004.

Conservation Issues and Actions

Overview

Habitats of the East Cascades ecoregion present much variation, from sagebrush flats to alpine fields. The conservation issues are similarly diverse, as well as complex. Timber harvest practices, grazing and fire suppression have altered the distribution and structure of much of the ecoregion's historic ponderosa pine forests and oak woodlands, and many riparian and wetland habitats have been degraded. Rapidly expanding urban and rural residential development is another major emerging conservation issue, resulting in development within ripar-

ian zones, the loss of big game winter range, and water diversions to support development. Along with this development, Highway 97 traffic volume continues to increase, creating a major barrier to wildlife movement. Lastly, a high percentage of wetlands have been converted in the Klamath Basin and water continues to be complex and challenging issue in the area.

Ecoregion-level limiting factors and recommended approaches

All six of the key conservation issues apply statewide, as do the approaches outlined in the Statewide Perspectives and Approaches chap-

Summary List of Strategy Species

Mammals

American marten
California myotis (bat)
Fringed myotis (bat)
Hoary bat
Long-legged myotis (bat)
Pallid bat
Silver-haired bat
Townsend's big-eared bat

Amphibians & Reptiles

Cascades frog
Oregon spotted frog
Western toad
Northwestern pond turtle
Western painted turtle

Birds

American three-toed woodpecker
Barrow's goldeneye
Black-backed woodpecker
Bufflehead
Flammulated owl
Great gray owl
Greater sandhill crane
Lewis' woodpecker
Northern goshawk
Olive-sided flycatcher
Red-necked grebe
White-headed woodpecker
Yellow rail

Plants

Applegate's milk-vetch
Dalles Mountain buttercup
Oregon semaphore grass
Peck's milk-vetch
Pumice grape-fern

Invertebrates

Evening fieldslug
Montane peaclam
Aquatic snails:
Turban pebblesnail
Scalloped juga
Scale lanx
Archimedes springsnail
Dall's ramshorn
Lined ramshorn
Klamath ramshorn
Sinitsin ramshorn
Siskiyou Hesperian
Crater Lake tightcoil
Great Basin ramshorn
Highcap lanx

Fish

Bull trout (Columbia Distinct Population Segment [DPS])
Bull trout (Klamath population)
Chinook salmon (Lower Columbia River ESU, spring run)
Chinook salmon (Lower Columbia River ESU, fall run)
Chinook salmon (Snake ESU, spring/summer run)

Fish Cont.

Chinook salmon (Snake ESU, fall run)
Coastal cutthroat trout (Southwest Washington Columbia River ESU)
Coho salmon (Lower Columbia /Southwest Washington Coast ESU)
Goose Lake lamprey
Goose Lake sucker
Goose Lake tui chub
Inland Columbia Basin redband trout
Jenny Creek sucker (= Jenny Creek population of Klamath smallscale sucker)
Lost River sucker
Miller Lake lamprey
Modoc sucker
Oregon Basin redband trout (Goose Lake SMU)
Oregon Basins redband trout (Jenny Creek redband trout)
Pacific lamprey
Pit-Klamath brook lamprey
Shortnose sucker
Slender sculpin
Steelhead (Lower Columbia River ESU, summer run)
Steelhead (Lower Columbia River ESU, winter run)
Steelhead (Middle Columbia River ESU, summer run)
Steelhead (Middle Columbia River ESU, winter run)
Steelhead (Snake River Basin ESU)
Upper Klamath Lake lamprey
Western brook lamprey

ter. However, invasive species, altered disturbance regimes and land use changes are described further in this section, considering the East Cascades ecoregional characteristics. In addition to the statewide issues, habitat fragmentation and increasing recreational use is of concern in this ecoregion.

Factor: Altered fire regimes. Past forest practices and fire suppression have resulted in young, dense mixed-species stands where open, park-like stands of ponderosa pine once dominated. These mixed conifer forests are at increased risk of forest-destroying crown fires, disease, and damage by insects. Shading from encroaching trees and fire suppression has reduced the vigor of shrubs, particularly bitterbrush, an important forage plant for mule deer. Efforts to reduce fire danger and improve forest health may help restore habitats but require careful planning to provide sufficient habitat features that are important to wildlife (e.g., snags, down logs, hiding cover for big game.) Similarly, wildfire reforestation efforts should be carefully planned to create stands with tree diversity, understory vegetation and natural forest openings.

Increasing home and resort development in forested habitats makes prescribed fire difficult in some areas and increases risk of high-cost wildfires. Although many urban-interface “fire proofing” measures can be implemented with minimal effects to wildlife habitat, some poorly-planned efforts have unintentionally and unnecessarily harmed habitat.

Approach: Use an integrated approach to forest health issues that considers historic conditions, wildlife conservation, natural fire intervals, and silvicultural techniques. Evaluate individual stands to determine site appropriate actions, such as monitoring in healthy stands or thinning, mowing, and prescribed fire in at-risk stands. Where appropriate, thin smaller trees in the understory and develop markets for small-diameter trees.

Implement fuel reduction projects to reduce the risk of forest-destroying wildfires, considering site-specific conditions and goals. Fuel reduction strategies need to consider the habitat structures that are needed by wildlife, such as snags and down logs, and make an effort to maintain them at a level to sustain wood-dependent species. For example, design frequency and scale of prescribed fire to maintain and allow establishment of native shrubs. However, lower log and shrub densities may be desirable in priority white-headed woodpecker areas, so sites need to be evaluated for appropriate understory vegetation management. Maintain areas of multi-species, dense woody plant hiding cover in patches.

Monitor forest health initiatives efforts and use adaptive management techniques to ensure efforts are meeting habitat restoration and forest-destroying fire prevention objectives with minimal impacts on wildlife.

Work with homeowners and resort operators to reduce vulnerability of properties to wildfires while maintaining habitat quality. Highlight successful, environmentally sensitive fuel management programs.

In the case of wildfires, maintain high snag densities and replant with native tree, shrub, grass, and forb species. Manage reforestation after wildfire to create species and structural diversity, based on local management goals.

Factor: Land use conversion and urbanization. The East Cascades ecoregion includes some of the fastest growing areas of the state (e.g., Bend, Klamath Falls, Hood River). Rapid urban and rural residential development contributes to habitat loss, and can threaten traditional land uses such as agriculture and forestry. Urban and rural residential development also can fragment habitat into small patches, isolating wildlife populations. Increasing traffic volumes and road density associated with development creates barriers to animal movements, especially along Highway 97. Residential development is increasing in sensitive habitats such as wetlands, riparian areas, and close to cliffs and rims where raptors nest.

Approach: Cooperative approaches with both large and small private landowners are critical. Work with community leaders and agency partners to encourage planned, efficient growth. Support existing land use regulations to preserve forestland, farmland and rangeland; open spaces; recreation areas; wildlife refuges; and natural habitats. Work with community leaders and agency partners to identify wildlife movement corridors and to fund and implement site-appropriate mitigation measures such as drift fences to overpasses or underpasses. In forested habitats, maintain vegetation to provide screening along open roads, prioritize roads for closure based on transportation needs and wildlife goals, and/or manage road use during critical periods.

Factor: Habitat fragmentation. In non-forested areas, habitats for at-risk native plants and some animal species are largely confined to small and often isolated fragments such as roadsides and sloughs. Opportunities for large-scale protection or restoration of native landscapes are limited, particularly in the Klamath Basin. Existing land use and land ownership patterns presents challenges to large-scale ecosystem restoration.

Invasive Non-native Species

Invasive species currently are considered to be one of the primary causes of species becoming threatened and endangered, second only to habitat conversion. Many species are as threatening to people's livelihoods as they are to fish and wildlife and their habitats. This section identifies the species with the greatest current and potential impact in the East Cascades Ecoregion. They were determined through an analysis of Oregon Department of Agriculture's Noxious Weed List, ODFW's Wildlife Integrity Rules, ODFW's Introduced Fish Management Strategies report, information from Portland State University Center for Lakes and Reservoirs, and local expert review. Although some of these species also cause significant economic damage to farms, ranches, and managed forests, this list is focused on those that cause the most severe ecological damage. Impacts from introduced game fish vary from species to species and within ecoregions. As a result, the impacts need to be evaluated more locally (ODFW Introduced Fish Management Strategies Report).

Known invasive non-native animal and plant species

These species are established or documented in this ecoregion, and are known to impact native fish and wildlife populations and habitats. They may range from small, controllable populations to widespread infestations.

Documented Invasive Animals

Alligator gar
Atlantic salmon
Bluegill
Brook trout
Brown bullhead
Brown trout
Bullfrog
Carp
Channel catfish
Crappie
Crayfish (eastern)
European starling
Fathead minnow
Feral pig
Golden shiner
Goldfish
House sparrow
Hybrid bass
Lake trout
Largemouth bass
Mosquito fish (*Gambusia*)
Mute swan
Norway rat
Nutria
Red eared slider
Virginia opossum
Walleye
Yellow perch

Documented Invasive Plants

Armenian (Himalayan) blackberry
Canada thistle
Cheatgrass
Curly leaf pondweed (aquatic)
Dalmation toadflax
Diffuse knapweed
Dyers woad
False brome
Leafy spurge
Matgrass
Musk thistle
Orange hawkweed
Perennial pepperweed
Purple knapweed
Quackgrass
Reed canarygrass
Rush skeletonweed
Scotch thistle
Spotted knapweed
Squarrose knapweed
St. John's wort
Tansy ragwort
Whitetop
Yellow flag iris (aquatic)
Yellow starthistle

Non-native animals and plants of potential concern

Preventing the establishment of invasive non-native species is far more cost-effective and practical than trying to eradicate them once they are established. To make the best use of financial and personnel resources, prevention efforts need to be prioritized to address the greatest threats, especially since many non-native species do not pose a significant threat to wildlife populations and habitats. Potentially harmful non-native species can be identified by examining biological factors, potential impacts and invasion patterns in similar climates. The species listed here are included because: 1) they are not known to occur in this ecoregion, but could pose a threat to fish and wildlife populations and habitats if they become established; or 2) they are known to occur in this ecoregion but the extent to which they impact native species and disrupt ecological processes is unclear at this time.

Potentially Invasive Non-native Animals

Asian carp (bighead, silver)
Black carp
Feral goat
Muskellunge, northern pike
New Zealand mud snail
Round goby
Ruffe
Rusty crayfish
Sacramento perch
Smallmouth bass
Snakeheads
Zebra mussel

Potentially Invasive Non-native Plants

Common toadflax
Knotweeds (Japanese, giant)
Ovate goatgrass
Patterson's curse
Puncture vine
Purple loosestrife
Russian knapweed
Syrian bean caper
Tansy ragwort
Texas blueweed
Tree of Heaven

Approach: Broad-scale conservation strategies will need to focus on restoring and maintaining natural ecosystem processes and functions within landscapes that are often managed for other values. This may include an emphasis on more “conservation-friendly” management techniques for existing land uses and restoration of some key ecosystem components such as riparian function.

Factor: Invasive species. Non-native plant and animal invasions disrupt native communities, diminish populations of at-risk native species, and threaten the economic productivity of resource lands.

Approach: Emphasize prevention, risk assessment, early detection and quick control to prevent new invasives from becoming fully established. Use multiple-site appropriate tools (mechanical, chemical and biological) to control the most damaging invasive species. Prioritize efforts to focus on key invasive species in high priority areas, particularly where Strategy Habitats and Species occur. Promote the use of native “local” stock for restoration and revegetation.

Factor: Increasing recreational use. Increasing recreational use can impact wildlife directly (e.g., mortality from off-highway vehicles) or indirectly (e.g., new road construction interferes with migration pathways). Increasing numbers of recreationalists, including mountain bicyclists and rock climbers, can impact sensitive areas.

Approach: Increase education and outreach for recreationalists and associated businesses. Where needed, direct activities to particular seasons or away from sensitive habitat.

Factor: Water distribution in arid areas and wildlife entrapment in water developments. In arid areas, water availability can limit animal distribution. Water developments established for cattle, deer, and elk can significantly benefit birds, bats, and small mammals as well. However, some types of these facilities, particularly water developments for livestock, can have unintentional hazards. These hazards include over-hanging wires that act as trip lines for bats, steep side walls that act as entrapments under low water conditions, or unstable perches that cause animals to fall into the water. If an escape ramp is not provided, small animals cannot escape and will drown.

Approach: Continue current efforts to provide water for wildlife in arid areas. Continue current design of big game “guzzlers” that accommodate a variety species and retrofit older models where appropriate to make them compatible with newer design standards. Use and maintain escape devices on water developments where animals can become trapped. Remove obstacles that could be hazardous to wildlife from existing developments.

Collaborative Conservation Story: Klamath water crisis and the Klamath Basin Rangeland Trust

Conflict over water brought national attention to the Klamath Basin in 2001, when the U.S. Bureau of Reclamation discontinued irrigation water to more than 1300 farms and ranches to protect endangered fish. OSU researchers estimate the lost revenue at approximately \$157 million in agricultural sales, and more than \$79 million in additional reduced employment, income, and property value. The climate of economic uncertainty affected communities, including social service agencies, schools, and local businesses. Following the conflict, multiple conservation and community partners have been working to implement mutually beneficial solutions to the water crisis. One example is the Klamath Basin Rangeland Trust.

Created in response to the water crisis, the KBRT works to provide more water for both farmers and fish by conserving irrigation water in the Upper Klamath Basin and Wood River Valley. Examples of how the KBRT achieves these objectives are by pursuing methods to manage cattle grazing in a manner that improves water quality and also requires less water for irrigation. The KBRT also pioneered a market-based approach to conserve water that could otherwise be directed toward irrigation, to instead go to fish habitat.

In 2002, KBRT started a project to evaluate the Wood River Valley, which provides much of the water flowing into Upper Klamath Lake. Ecological assessments using state-of-the-art Geographic Information Systems technology identified specific locations for stream flows and irrigation diversions. Results emphasized a need to improve water quality and provide fish and wildlife habitat, recognizing that water quality and quantity are interrelated.

To address these goals, the KBRT works in collaboration with many additional partners and planning efforts, including the USDA-NRCS, Klamath River Basin fisheries task force, Upper Klamath working group, USFWS recovery planning for listed species, groundwater management plans, and water quality plans (i.e., ODEQ's Total Maximum Daily Load planning for temperature and nutrient loads in the Upper Klamath Lake and its tributaries).

Continuing the momentum, the federal budget for 2005 provides increased funding for the Klamath, emphasizing the need for collaborative on-the-ground partnerships. In fact, James Connaughton, chairman of the White House Council on Environmental Quality, stated that the budget commitment to the Klamath Basin reflects a federal commitment for agencies to “...encourage stakeholders to take voluntary measures that benefit the fish.”

Conservation actions in the East Cascade ecoregion identified through other planning efforts

Landowners and land managers can benefit a variety of fish and wildlife species by managing and restoring Strategy Habitats. The following recommendations are relevant to Strategy habitats. They were identified through a review of existing plans.

Actions	Strategy Habitat and General Location	Source Document
In partnership with private and public landowners, restore/maintain at least 30% of the potential vegetation of large landscape units (e.g., watersheds or greater) in late-successional habitat suitable for white-headed woodpecker	East-slope Cascades ecoregion	OR-WA Partners in Flight – East-slope Cascades Conservation Strategy (Altman 2000) [recommended target: more than 30% late-successional forest, with a minimum of three patches more than 5,000 acres]
In partnership with private and public landowners, maintain “high-quality old-growth” ponderosa pine woodlands in conservation status	Metolius	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended target: 25,000 acres]
Use plantings and restoration to enhance patch size and connectivity and to reduce fragmentation of oak and oak-pine woodlands	East Cascades ecoregion	OR-WA Partners in Flight – East-slope Cascades Conservation Strategy (Altman 2000)
Maintain high quality oak and oak-pine woodlands in tracts more than 100 ac in a mosaic of habitat conditions	East Cascades ecoregion	OR-WA Partners in Flight – East-slope Cascades Conservation Strategy (Altman 2000) [recommended target: tracts more than 100 ac]
Work in partnership with private landowners to maintain oak woodlands in conservation status	Wasco Oaks Klamath River Canyon	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended targets: Wasco Oaks 30,000 ac; Klamath River Canyon 5,000 ac]
In partnership with landowners, maintain emergent wetland habitats in conservation status	Upper Klamath Lower Klamath Sprague/Sycan Goose Lake	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended targets: Wasco Oaks 30,000 ac; Klamath River Canyon 5,000 ac]
In partnership with landowners, maintain wet meadow habitats in conservation status	Upper Deschutes Upper Klamath Lower Klamath Sprague/Sycan Goose Lake	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended targets: Upper Klamath 50,000 ac; Lower Klamath 20,000 ac; Sprague/Sycan 15,000 ac; Goose Lake 5,000 ac]
In partnership with private and public landowners, manage and restore riparian shrub habitats	Deschutes River Upper Deschutes River Upper Klamath River Lower Klamath River Sprague/Sycan Rivers Goose Lake	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended targets: Upper Deschutes 15,000 ac; Upper Klamath 40,000 ac; Lower Klamath 10,000 ac; Sprague/Sycan 25,000 ac; Goose Lake 10,000 ac]
In partnership with private and public landowners, manage and restore riparian woodland habitats	Goose Lake	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended target: 500 ac]
Consider the impact of recreational activities (e.g., motorized watercraft; shoreline activities; road usage) on watersheds and water quality	All locations (as appropriate); particular concern in Hood River and Deschutes River areas	State of the Environment Report; Oregon Plan (OWEB)
Focus conservation attention on critical aquatic habitats identified via American Fisheries Society and other standards	Upper Klamath and Agency Lakes; Wood River valley; Williamson River; Metolius River; Sprague and Chewaucan rivers; other locations as identified.	Oregon Biodiversity Plan
Improve fish passage. For example, modify barriers or use spans where appropriate. Providing passage around dams might benefit other wildlife (frogs, salamanders, reptiles, mammals)	All locations (as appropriate); particular concern for Klamath River and its tributaries (Scott, Shasta and Trinity River sub-basins); Chewaucan River	NWPCC Subbasin Plans, 2004; State of the Environment Report; Oregon Biodiversity Project; Oregon Plan (OWEB)
Habitat restoration and habitat likely to benefit several species (including redband trout, Modoc sucker, Pit-Klamath lamprey, Goose Lake lamprey, California pit roach, Goose Lake tui chub)	Thomas Creek (tributary of Klamath River)	ODFW; USFWS
Improve monitoring for irrigation projects; Continue work on basin-wide water conservation plan	Klamath basin. Innovative GIS methodologies developed to assist in locating areas of concern for water flow and monitoring.	Klamath Basin Rangeland Trust

Actions	Strategy Habitat and General Location	Source Document
Modify practices in forests and agriculture to meet large wood levels, reduce sediment, and continue to prevent warming.	All locations (as appropriate)	NWPCC Subbasin Plans; Oregon Plan (OWEB)
Establish integrated framework for wetland restoration assessment, priority setting, and actions at three scales: watersheds, ecoregions and project sites	Wetlands	Recommendations for a nonregulatory wetland restoration program for Oregon. J.W. Good and C.B. Sawyer. 1998. Prepared for Oregon Division of State Lands and U.S. EPA Region X.
Increase incentives for proactive, nonregulatory wetland restoration and enhancement on private land, focusing on a combination of financial assistance, tax benefits, technical assistance, and education	Wetlands	Recommendations for a nonregulatory wetland restoration program for Oregon. J.W. Good and C.B. Sawyer. 1998. Prepared for Oregon Division of State Lands and U.S. EPA Region X.
Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology. <ul style="list-style-type: none"> - Plant vegetation to stabilize banks; leaving stumps, fallen trees and boulders in waterways - Maintain or enhance off channel or side channel meanders, habitat and pools 	Aquatic habitats (streams, pools)	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See <i>guide for specific technical recommendations, sources of information and assistance, and other guidelines.</i>
Maintain riparian and wetlands function: <ul style="list-style-type: none"> - Manage grazing, riparian vegetation planting and fencing, and livestock water facilities according to best practices, current techniques and with respect to natural hydrological conditions. \ 	Riparian and wetlands habitats	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See <i>guide for specific technical recommendations</i>
Upslope erosion control: <ul style="list-style-type: none"> - Create water and sediment control basins to contain runoff, wastewater - Use windbreaks (tree and shrub rows – using native plants) to reduce erosion and deposition - Upland terracing 	Aquatics, riparian and wetland habitats	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See <i>guide for specific technical recommendations</i>

**Note: Conservation Strategy monitoring indicators, linked with OSOER Key indicators, targets, and methods, will be identified in a statewide approach (See Monitoring chapter for more information).*

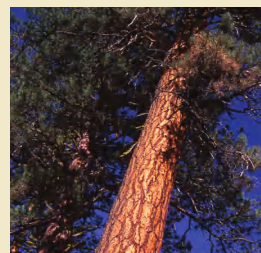


Photo © Stephen Anderson, The Nature Conservancy



Photo © Jim Ward

To implement these goals, organizations like the NRCS and the KBRT work to identify landowner needs and provide essential assistance in planning and implementation. In the Klamath Basin, NRCS has held workshops on conservation and the Farm Bill with more than 250 attendees, provided newsletters and brochures to answer common questions, and provided technical assistance to numerous individuals interested in improving watershed management and enhancing conservation buffers.

The KBRT is continuing restoration work with several ongoing projects that restore habitat to benefit many species. For example, a project to restore hydrological function to Crane Creek will provide critical habitat for bull trout, and support shortnose sucker, Lost River, yellow rail and Oregon spotted frog. Guiding all of this work is the continuing goal of ensuring reliable water supply for both agriculture and the environment.

Deciding Where to Work

Conservation Opportunity Areas Map and Profiles

Landowners and land managers throughout Oregon can contribute to conserving wildlife by maintaining, restoring, and improving habitats. Conservation actions to benefit Strategy Species and Habitats are important regardless of location. However, focusing investments in

certain priority areas can increase likelihood of long-term success over larger landscapes, improve funding efficiency, and promote cooperative efforts across ownership boundaries. Conservation Opportunity Areas (COAs) are landscapes where broad wildlife conservation goals would be best met. COAs were developed to guide voluntary, non-regulatory actions. This map and the associated data should only be used in ways consistent with these intentions. For more information on how COAs were developed, see the Appendix IV, "Methods" (beginning on page a:34).

The COA Profiles include information on recommended conservation actions, special features, key species, key habitats, and if the area has been identified as a priority by other planning efforts. These profiles highlight some priority actions to implement in individual COAs, which can range from restoration projects to monitoring for invasive species. These recommendations were identified through existing plans, spatial analysis, and expert review. They are not meant to be exhaustive, so other actions will also be appropriate, as influenced by local site characteristics and management goals. Actions need to be compatible with local comprehensive plan and ordinance requirements and other state, federal and local laws. Actions on federal lands must go through the federal planning process and be consistent with the requirements of federal land management plans.

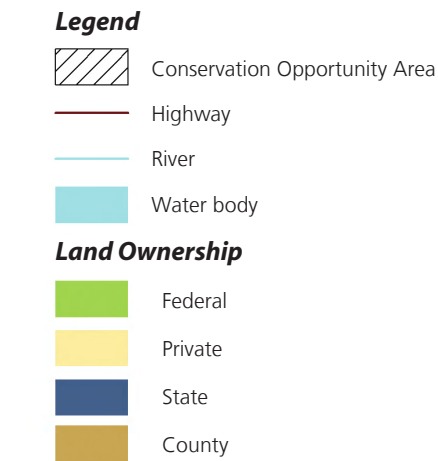


Photo © Tupper Ansel Blake

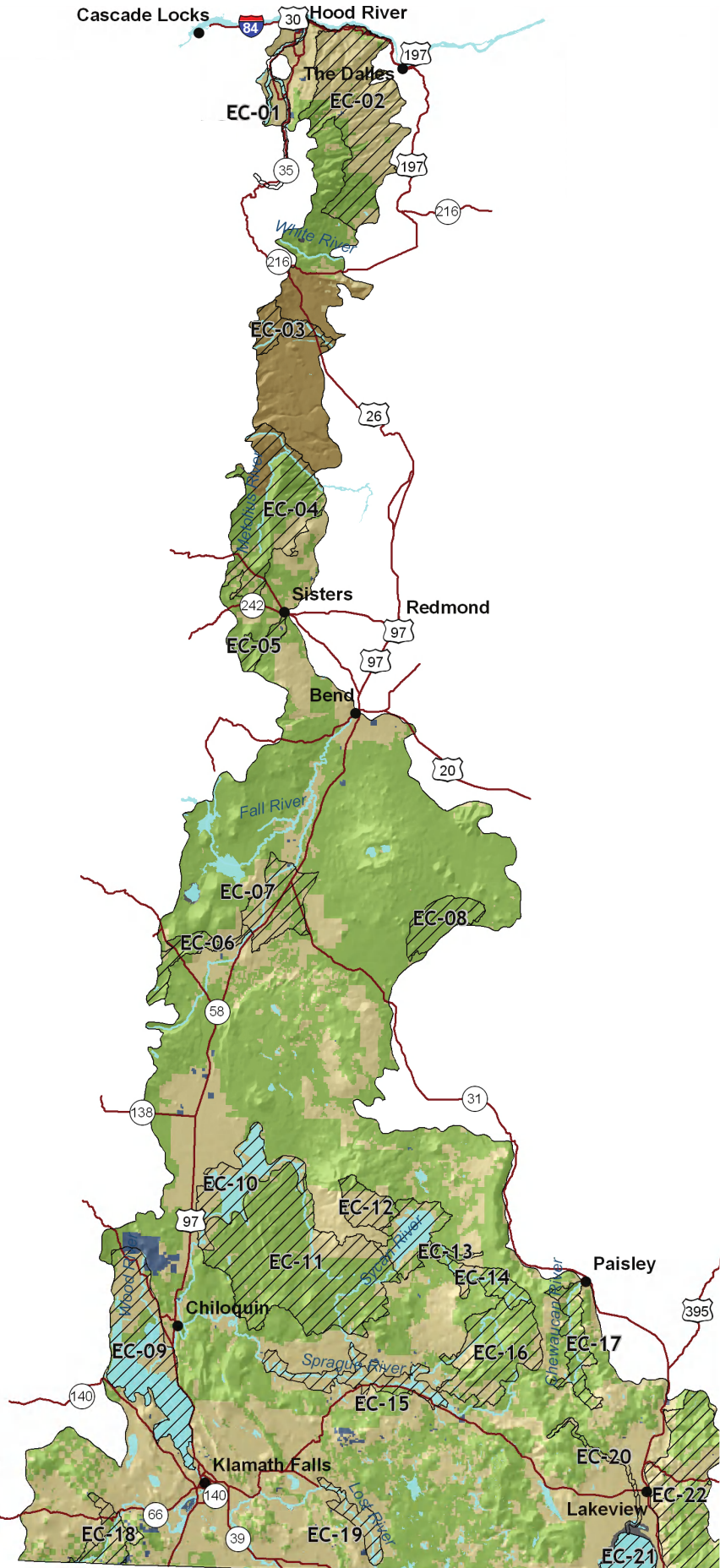


Photo © Tupper Ansel Blake

East Cascades Ecoregion **Conservation Opportunity Areas**



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data information sources to ascertain the usability of the information.



Conservation Opportunity Area Profiles

EC-01. Hood River

Special Features:

- *The Hood River Watershed Action group has completed conservation projects throughout the Hood River Watershed. Additionally, they have developed a prioritized list of proposed projects for fish passage, water quality enhancement, stream flow restoration, habitat restoration and protection, and education.*

Key Habitats:

- Aquatic
- Riparian

Key Species:

- Riparian Birds
- Bull Trout
- Coastal Cutthroat Trout
- Coho Salmon
- Fall Chinook Salmon
- Summer Steelhead
- Winter Steelhead

Identified in other planning efforts:

- Interior Columbia Basin Ecosystem Management Project (plant endemism area)

EC-02. Wasco Oaks

Extends from the Columbia River up through the Mt. Hood National Forest

Special Features:

- *Area contains the ODFW White River Wildlife Management Area.*
- *Area provides winter range for mule deer.*
- *This area contains over 80% of the ecoregion's limited oak habitat*

Key Habitats:

- Oak Woodlands

Key Species:

- Lewis' Woodpecker
- Coastal Cutthroat Trout
- Winter Steelhead

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Eastern Oregon Bird Conservation Plan

- Oregon Biodiversity Project Conservation Opportunity Areas (North Wasco County)

Recommended Conservation Actions:

- Limit development in oak habitats
- Maintain and restore oak woodlands

EC-03. Warm Springs River

Special Features:

- *Naturally spawning spring chinook*

Key Habitats:

- Aquatic
- Oak Woodlands
- Riparian
- Wetlands

Key Species:

- Olive-sided Flycatcher
- Bull Trout
- Summer Steelhead

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas

EC-04. Metolius River area

Area includes the Metolius River basin, Green Ridge, and the valley east of Green Ridge; it extends north to encompass the Whitewater River and south into the Mount Washington Wilderness.

Special Features:

- *The Metolius is a designated Wild and Scenic River with outstanding natural resource values*
- *Green Ridge is an important corridor for migrating raptors*
- *Various butterfly species located in the Prairie Farm Creek area*
- *Includes some of region's highest quality ponderosa pine forests*
- *Deschutes Basin Land Trust purchased 1,200+ acres (2004) to protect largest private landholding in the Metolius basin from development.*
- *Winter range habitat for mule deer.*

Key Habitats:

- Ponderosa Pine Woodlands
- Riparian

Key Species:

- Raptors
- White-headed Woodpecker
- Bull Trout
- Wolverine

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Eastern Oregon Bird Conservation Plan
- Oregon Biodiversity Project Conservation Opportunity Areas

Recommended Conservation Actions:

- Maintain high-quality old-growth ponderosa pine woodlands
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

EC-05. Squaw Creek

The three forks of Squaw Creek headwater in the Three Sisters Wilderness on the east slope of the Cascade Range.

Special Features:

- *Designated Wild and Scenic River*

Key Habitats:

- Aquatic
- Riparian

Key Species:

- Bull Trout
- Mountain Whitefish
- Redband Trout

Recommended Conservation Actions:

- Increase levels of large in-stream wood, reduce sediment, and improve fish passage
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

EC-06. Big Marsh Creek/Crescent Creek

Special Features:

- *Includes Big Marsh, large high-quality wetland in headwaters of Crescent Creek drainage, where Forest Service has ongoing enhancement efforts. Big Marsh supports one of largest remaining populations of Oregon spotted frog as well as breeding yellow rails*

Key Habitats:

- Aquatic
- Riparian
- Wetlands

Key Species:

- Oregon Spotted Frog
- Olive-sided Flycatcher
- Riparian Birds
- Three-toed Woodpecker
- Yellow Rail
- Redband Trout

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan (riparian habitat)

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

EC-07. Little Deschutes River Basin

Special Features:

- *Extensive wet meadow systems and some high-quality riparian shrub habitats*
- *Area includes a large percentage of the ecoregion's black swift habitat*

Key Habitats:

- Aquatic
- Riparian

Key Species:

- Oregon Spotted Frog
- Black Swift
- Sandhill Crane
- Bull Trout
- Redband Trout

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Oregon's Important Bird Areas

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Manage livestock grazing to promote recovery and maintenance of riparian habitats
- Restore wetlands and wet meadows

EC-08. Sixteen Butte

This area is located in the Deschutes National Forest approximately 10 miles southeast of Newberry Crater National Monument.

Special Features:

- *Winter range for deer and elk*
- *This area has some of the largest tracts of older-aged ponderosa pine forest in the ecoregion.*

Key Habitats:

- Ponderosa Pine Woodlands

Key Species:

- Lewis' Woodpecker
- White-headed Woodpecker

Recommended Conservation Actions:

Use fire and thinning to restore and enhance ponderosa pine forests

EC-09. Upper Klamath Lake area**Special Features:**

- *Area is one of the most important wetland complexes in the Pacific Flyway*
- *Recent and currently planned restoration efforts could double the amount of marshes around Upper Klamath Lake to 30,000 acres by 2010.*
- *Area includes Upper Klamath National Wildlife Refuge and the Klamath Wildlife Management Area*
- *Includes critical habitat for two ESA-listed fish, the Lost River sucker and shortnose sucker.*
- *Wetlands along the west side of Agency Lake were acquired by the Bureau of Reclamation and are now being managed for water storage, which creates extensive seasonal wetlands.*
- *The Nature Conservancy acquired virtually all of the Williamson River delta in the 1990s and is currently working to restore more than 5,000 acres of wetland habitat in partnership with Natural Resources Conservation Service, PacifiCorp, Cell Tech International, US Fish and Wildlife Service, US Bureau of Reclamation, Klamath Tribes, and the National Fish and Wildlife Foundation.*
- *The Bureau of Land Management has restored 3,000 acres of seasonal wetlands at the Wood River Wetlands with assistance from Ducks Unlimited, Oregon Trout, USFWS, Oregon DEQ, Bureau of Reclamation, ODOT, ODFW, and Klamath tribes.*
- *BLM and Oregon Trout have restored lower three miles of Wood River to historic channel.*
- *Area provides important migratory and nesting habitat for shorebirds and waterfowl.*
- *Area contains rare and endemic molluscs.*

Key Habitats:

- Aquatic
- Riparian
- Wetlands

Key Species:

- Oregon Spotted Frog
- Sandhill Crane
- Shorebirds
- Waterfowl
- Yellow Rail
- Klamath Basin Redband Trout
- Lost River Sucker
- Pit-klamath Brook Lamprey
- Shortnose Sucker
- Molluscs

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Interior Columbia Basin Ecosystem Management Project (animal endemism area)
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas

Recommended Conservation Actions:

- Maintain and restore emergent wetland habitats
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Manage and restore riparian shrub habitats
- Reconnect lakeside wetlands and Upper Klamath Lake where feasible and appropriate
- Restore lake connections and more natural hydrology within Williamson River Delta

EC-10. Klamath Marsh**Special Features:**

- *This area includes Klamath Marsh National Wildlife Refuge, which is managed for the conservation and recovery of endangered, threatened, and sensitive species and the habitats on which they depend. [Klamath Marsh NWR website]*
- *Ongoing conservation actions by the refuge include aquisition projects, grazing management, and prescribed burning. Forest management next to the wetlands is key for hydrological and ecological function as well as habitat.*
- *Important habitat for nesting sandhill cranes (60 pair in 1999-2000)*
- *Supports nesting trumpeter swans (translocated)*
- *Heavy use by migrating waterfowl*
- *Area contains approximately 21% of the ecoregion's wetlands.*

Key Habitats:

- Aquatic
- Wetlands

Key Species:

- Oregon Spotted Frog
- Bald Eagle
- Peregrine Falcon
- Sandhill Crane
- Waterfowl
- Yellow Rail
- Klamath Largescale Sucker

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas

Recommended Conservation Actions:

- Maintain wetland habitat values

EC-11. Williamson River area

This area, located primarily on the Winema National Forest, spans the distance between Klamath Marsh National Wildlife Refuge and Sycan Marsh.

Special Features:

- *Area includes the Sycan River Wild and Scenic River corridor.*
- *Area encompasses a large American Fisheries Society Aquatic Diversity Areas.*
- *Extensive wet meadow systems exist along the upper Williamson River*
- *Ponderosa pine forests are located throughout this area, making up approximately 20% of the ecoregion's ponderosa pines.*

Key Habitats:

- Ponderosa Pine Woodlands
- Wetlands

Key Species:

- Lewis' Woodpecker
- Northern Goshawk
- Sandhill Crane
- White-headed Woodpecker
- Yellow Rail
- Klamath Basin Redband Trout
- Klamath Largescale Sucker
- Miller Lake Lamprey
- Pit-klamath Brook Lamprey

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Interior Columbia Basin Ecosystem Management Project (plant biodiversity area)

- Oregon Biodiversity Project Conservation Opportunity Areas (Upper Klamath Basin Wetlands area extends into this area along the Williamson River)

Recommended Conservation Actions:

- Maintain corridors for wildlife movements and connectivity
- Maintain emergent wetland habitats
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Manage and restore riparian shrub habitats
- Manage livestock grazing to promote recovery and maintenance of wet meadow and riparian habitats
- Restore mature forest structure and composition
- Use fire and thinning to restore and enhance ponderosa pine forests

EC-12. Long Creek-Coyote Creek

This area is comprised of two subwatersheds adjacent to Sycan Marsh

Key Habitats:

- Aquatic
- Ponderosa Pine Woodlands

Key Species:

- Bull Trout (Klamath River Population)
- Klamath Basin Redband Trout
- Miller Lake Lamprey
- Pearlshell Mussel

Recommended Conservation Actions:

- Enhance connectivity for salmonid habitat
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology

EC-13. Sycan Marsh

Special Features:

- *One of largest montane wetlands (35,000 acres) in Oregon*
- *Area includes Sycan Marsh Preserve, which is owned by The Nature Conservancy.*
- *More than 206 species of migrating and breeding birds use marsh*
- *Heavy use by migrating waterfowl and other waterbirds*
- *More than 6,000 acres of wetland habitat has been restored here through partnerships with the US Fish and Wildlife Service, Murdock Foundation, CH2M Hill, National Fish and Wildlife Foundation, Oregon Department of Fish and Wildlife, Weyerhaeuser Company, and ZX Ranch.*
- *Important nesting site for both yellow rail and great blue heron.*

Key Habitats:

- Wetlands

Key Species:

- American White Pelican
- Great Blue Heron
- Horned Grebe
- Sandhill Crane
- White-faced Ibis
- Yellow Rail
- Bull Trout (Klamath River Population)

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas
- Recommended Conservation Actions:
- Continue work to restore more natural hydrology within marsh

EC-14. Sycan River

The Sycan River and surrounding area east of Sycan Marsh.

Special Features:

- *Area includes the Sycan River Wild and Scenic River Corridor.*

Key Habitats:

- Aquatic
- Riparian
- Wetlands

Key Species:

- Three-toed Woodpecker
- Bull Trout (Klamath River Population)
- Pit-klamath Brook Lamprey
- American Marten

Identified in other planning efforts:

- Interior Columbia Basin Ecosystem Management Project (plant endemism area)

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Restore connectivity of aquatic habitats

EC-15. Sprague River**Special Features:**

- *Area provides important habitat for the Lost River sucker and short-nose sucker.*
- *Area receives heavy use by migrating and wintering waterfowl.*
- *The Sprague River has high potential for restoration of wetlands, wet meadows, riparian habitats.*

Key Habitats:

- Aquatic
- Riparian
- Wetlands

Key Species:

- Sandhill Crane
- Waterfowl
- Yellow Rail
- Klamath Basin Redband Trout
- Klamath Largescale Sucker
- Lost River Sucker
- Pit-klamath Brook Lamprey
- Shortnose Sucker

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan

Recommended Conservation Actions:

- Maintain emergent wetland habitats
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Manage livestock grazing to promote recovery and maintenance of wet meadow and riparian habitats

EC-16. Gearhart Mountain-North Fork Sprague**Special Features:**

- *Area includes the North Fork Sprague River Wild and Scenic River Corridor*
- *Area includes Gearhart Mountain Wilderness.*

Key Habitats:

- Aquatic
- Riparian
- Key Species:
- Oregon Spotted Frog
- Olive-sided Flycatcher
- Three-toed Woodpecker
- Bull Trout (Klamath River Population)

- Klamath Basin Redband Trout
- Oregon Great Basin Redband Trout
- American Marten
- Fisher
- Wolverine

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Oregon Biodiversity Project Conservation Opportunity Areas

EC-17. Chewaucan River

Special Features:

- *A partnership between local leaders and Sustainable Northwest led to a forest restoration project on 50,000 acres of forested habitat in the Chewaucan River drainage.*
[\[www.biodiversitypartners.org\]](http://www.biodiversitypartners.org)

Key Habitats:

- Aquatic
- Riparian

Key Species:

- Oregon Great Basin Redband Trout

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Oregon Biodiversity Project Conservation Opportunity Areas (Gearhart Mountain)

EC-18. Klamath River Canyon

Area follows the Klamath River from Hwy 66 to the California border.

Special Features:

- *Area has unique value for plants and wildlife.*
- *This portion of the Klamath is a designated Wild and Scenic River*
- *Area includes the Upper Klamath River Area of Environmental Concern*

Key Habitats:

- Aquatic
- Oak Woodlands

Key Species:

- Klamath Basin Redband Trout
- Lost River Sucker
- Shortnose Sucker

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Oregon's Important Bird Areas

Recommended Conservation Actions:

- Maintain and restore oak woodlands
- Maintain emergent wetland habitats
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Manage and restore riparian shrub habitats

EC-19. Lost River

Area follows Lost River basin from the town of Bonanza to the California border.

Special Features:

- *Area includes more than 1,000 acres of restored wetlands enrolled in the Wetlands Reserve Program.*
- *Area receives heavy use by migrating and wintering waterfowl.*
- *Lost River provides habitat for the Lost River sucker and short-nose sucker.*

Key Habitats:

- Aquatic
- Riparian
- Wetlands

Key Species:

- Sandhill Crane
- Waterfowl
- Yellow Rail
- Lost River Sucker
- Shortnose Sucker

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan

Recommended Conservation Actions:

- Manage livestock grazing to promote recovery and maintenance of wetland and riparian habitats
- Restore floodplain wetlands

EC-20. Thomas Creek

Special Features:

- *Thomas Creek is the largest tributary of Goose Lake.*

Key Habitats:

- Aquatic
- Riparian

Key Species:

- Goose Lake Lamprey
- Goose Lake Redband Trout
- Goose Lake Sucker
- Goose Lake Tui Chub
- Modoc Sucker
- Pit Roach
- Pit Sculpin
- Pit-klamath Brook Lamprey

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas

EC-21. Goose Lake**Special Features:**

- *Several fish species here are endemic to Goose Lake.*
- *Ducks Unlimited has been working with private landowners to restore or enhance nine miles of stream and 3,000 acres of wetland, riparian and grassland habitats.*
- *The lake provides breeding habitat for more than a dozen waterbirds, and receives heavy use by migrating waterfowl.*

Key Habitats:

- Aquatic
- Riparian
- Wetlands

Key Species:

- Waterfowl
- Goose Lake Lamprey
- Goose Lake Redband Trout
- Goose Lake Sucker

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan

Recommended Conservation Actions:

- Maintain riparian, wet meadow habitats and emergent wetlands

EC-22. Warner Mountains

Located east of Lakeview along the eastern border of the ecoregion.

Special Features:

- *Diverse landscape includes extensive Ponderosa pine forests, montane meadows, wetlands, sagebrush, and aspen.*

Key Habitats:

- Aquatic
- Aspen
- Ponderosa Pine Woodlands
- Riparian

Key Species:

- Great Gray Owl
- Olive-sided Flycatcher
- Sandhill Crane
- Goose Lake Redband Trout
- Warner Valley Redband Trout

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Interior Columbia Basin Ecosystem Management Project (plant biodiversity area)

Recommended Conservation Actions:

- Maintain aspen and sagebrush-steppe habitats
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Use fire and thinning to restore and enhance ponderosa pine forests

Photo © Bruce Newhouse

Getting to Know the Klamath Mountains Ecoregion

Partly because of this unique geology, the Klamath Mountains ecoregion boasts a high rate of species diversity, including many species found only locally. In fact, the Klamath-Siskiyou region was included in the World Wildlife Fund's assessment of the 200 locations most important for species diversity world-wide. The region is particularly rich in plant species, including many pockets of endemic communities and some of the most diverse plant communities in the world. For

Elevation meters

0 - 250
251 - 500
501 - 750
751 - 1000
1001 - 1250
1251 - 1500
1501 - 1750
1751 - 2000
2001 - 2250
2251 - 2270

— Highways
— Rivers

0 5 10 20 30 40 miles

"At a Glance"- Characteristics and Statistics**Land use (% of ecoregion):**

Agriculture	0.3%
Forest and woodland	77.1%
Other (lakes, wetlands, cliffs, etc.)	12.6%
Range, pasture, and grassland	8.8%
Towns and rural residential	0.7%
Urban and suburban	0.6%

Land ownership:

Private	47.5%
Public, federal	52%
Public, state and local	0.6%

Human population, government and transportation statistics:

Estimated population in 2000	340,000
% of Oregon's population in 2000	10.1%
Number of incorporated cities	22
Number of counties	4
<i>(includes parts of Curry, Douglas, Jackson counties and all of Josephine county.)</i>	
Number of watershed councils	13
<i>(A watershed council is considered present if at least 10% of its area is located within the ecoregion.)</i>	
Miles of road (approx. miles)	23,400

Economics:

Important industries: lumber and woods manufacturing, service, tourism, trade, new electronics and transportation equipment manufacturers

Major crops: Fruit; vegetables; livestock; dairy farms; nursery products; forest products

Important nature-based recreational areas: Siskiyou Mountains/Siskiyou National Forest; Applegate Lake; Rogue River National Forest; Emigrant Lake; Howard Prairie Lake; Umpqua National Forest.

Ecology:

Average annual precipitation (1971-2000)	18.4" – 62.7"
Average July high temperature (1971-2000)	79.2 °F – 91.9 °F
Average January low temperature(1971-2000)	29.1 °F – 32.5 °F
Elevation	ranges from ~2,070 feet to ~7,500 feet (Mt. Ashland)
Number of regularly occurring vertebrate wildlife species	392
Important rivers	Applegate; Rogue; Chetco; Coquille; Umpqua; Illinois

Information Sources: Oregon Blue Book (2003-04), Oregon Climate Service data (1971-2000), Oregon State of the Environment Report (2000), Oregon Watershed Enhancement Board (2001), Oregon Wildlife Diversity Plan (1993), U.S. Census Bureau (2000).



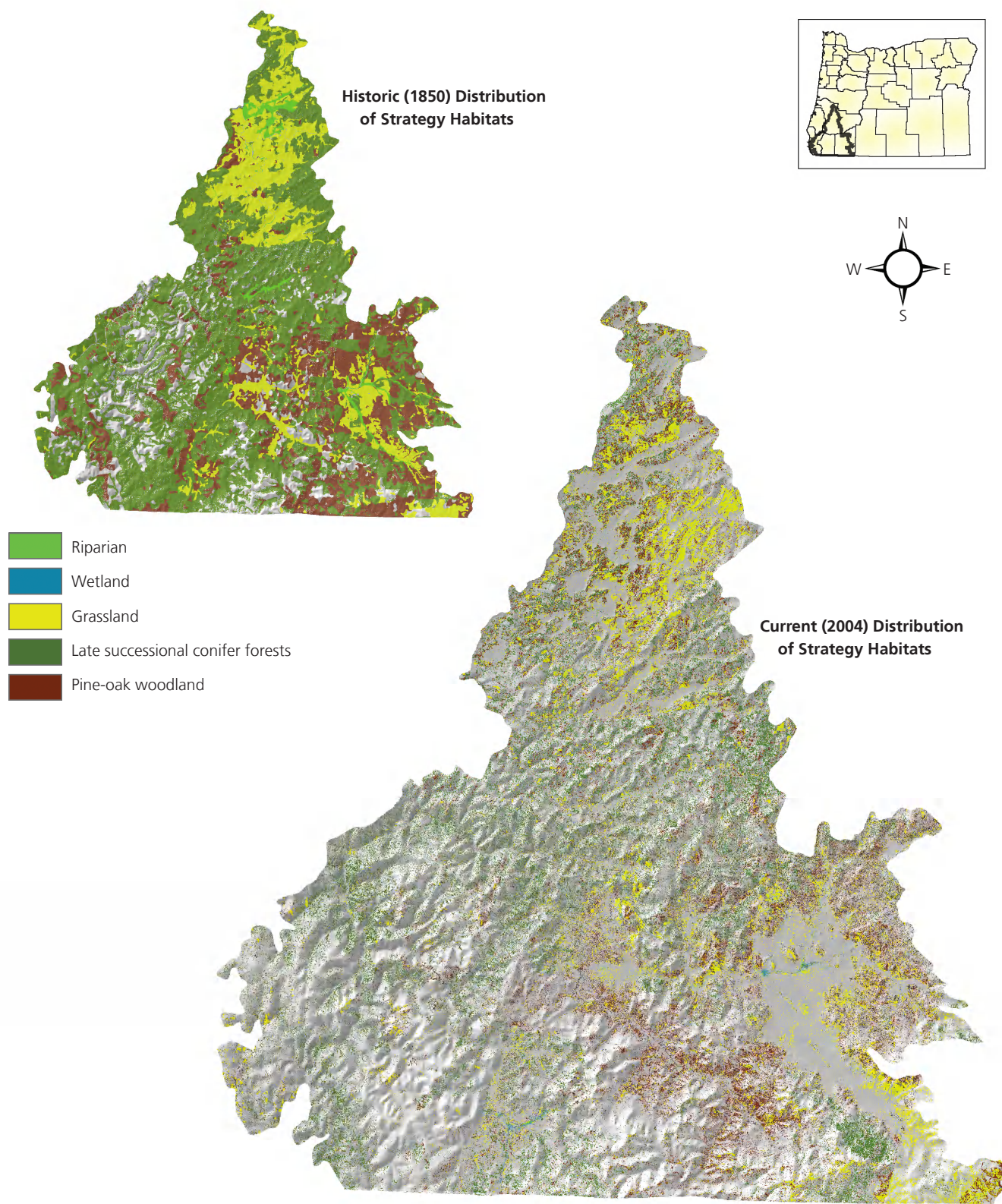
Photo © Bruce Newhouse



Summary List of Strategy Habitats

Strategy Habitats identified in the Klamath Mountains ecoregion include: ponderosa pine, pine-oak, and oak woodlands; late successional conifer forests; grasslands (including oak savannas); riparian; wetlands; and aquatic habitats.

Change in the Klamath Mountains Ecoregion Strategy Habitats



Data Source: Oregon Natural Heritage Information Center, 2004.

While panning for gold first drew European settlers to the Klamath Mountains ecoregion, today's communities have a wide range of industries and economies including agriculture, manufacturing, and tourism. Many retirement communities are rapidly growing in the Medford and Roseburg areas.

Conservation Issues and Actions

Overview

While the Klamath Mountains ecoregion is ecologically unique, it embodies many of the conservation issues facing other parts of Oregon. For example, increasing population growth and development in rural residential and urban communities strain resources, particularly in the southern and eastern portions of the ecoregion. The Klamath Moun-

tains is the second fastest-growing ecoregion in Oregon (the Willamette Valley is experiencing the fastest rate of expansion). Much of the population growth is concentrated in valleys along the Interstate 5 corridor. Demands for choice building sites often coincide with good quality habitat.

The Northwest Forest Plan covers many of the forests found in the western part of the ecoregion. (See Northwest Forest Plan description in Appendix II). However, the adaptive management component of the Northwest Forest Plan has not been fully implemented. Overall, these habitats are challenged by decades of fire suppression, a need to reduce excessive fuel loadings that have accumulated in the dry interior, and by checkerboard ownership patterns that can make resource planning particularly challenging. Grasslands in the Klamath Mountains

Summary List of Strategy Species

Mammals

California myotis (bat)
Columbian white-tailed deer
(Umpqua population)
Fisher
Fringed myotis (bat)
Hoary bat
Long-legged myotis (bat)
Pallid bat
Red tree vole
Ringtail
Silver-haired bat
Townsend's big-eared bat

Invertebrates

Johnson's hairstreak (butterfly)
Mardon skipper (butterfly)
Oregon cave amphipod
Rotund lanx (aquatic snail)
Siskiyou short-horned grasshopper
Vernal pool fairy shrimp
Terrestrial snails:
Traveling sideband
Green sideband
Siskiyou hesperian
Oregon shoulderband

Fish

Chinook (Southern Oregon/Northern California Coast ESU, fall run)
Coastal cutthroat trout
(Oregon Coast ESU)
Coastal cutthroat trout (Southern Oregon/Northern California Coasts ESU)
Coho (Oregon Coast ESU)
Coho (Southern Oregon/Northern California Coasts ESU)
Pacific lamprey
Steelhead (Klamath Mountains Province ESU, summer run)
Steelhead (Klamath Mountains Province ESU, winter run)
Steelhead (Oregon Coast ESU, summer run)
Steelhead (Oregon Coast ESU, winter run)
Umpqua chub
Western brook lamprey

Birds

Blue-gray gnatcatcher
Grasshopper sparrow
Lewis' woodpecker
Marbled murrelet
Northern spotted owl
Oregon vesper sparrow
Western purple martin
White-headed woodpecker

Plants

Big-flowered wooly meadowfoam
Cook's desert parsley
Crinite mariposa-lily
Dwarf meadowfoam
Gentner's fritillaria
Howell's mariposa-lily
Howell's microseris
Kincaid's lupine
Large-flowered rushlily
Red Mountain rockcress
Rough allocarya
(Rough popcorn flower)
Sexton Mountain mariposa-lily
Shiny-fruited allocarya
(Shiny-fruited popcorn flower)
Umpqua mariposa-lily
Wayside aster

Amphibians & Reptiles

Clouded salamander
Coastal tailed frog
Foothill yellow-legged frog
Northern red-legged frog
Siskiyou Mountain salamander
Southern torrent salamander
Western toad
Common kingsnake
Northwestern pond turtle

ecoregion are home to many endemic and at-risk plant communities, but are potentially impacted by invasive grasses and by conversion to development. Recent indicators suggest that water quality and riparian condition in the ecoregion may be increasing. Much of this change could be attributed to local collaborative conservation efforts via watershed councils and other groups.

Ecoregion-level limiting factors and recommended approaches

All six of the key conservation issues apply statewide, as do the approaches outlined in the Statewide Perspectives and Approaches chapter. However, land use changes, altered fire regimes, and invasive species are described further in this section, considering the Klamath Mountains' ecoregional characteristics. In addition to the statewide issues, loss of habitat connectivity and mineral extraction is of concern in this ecoregion.

Factor: Land use conversion and urbanization. The Klamath Mountains ecoregion has the second fastest growth rate in the State (the Willamette Valley ecoregion experiences the highest level of population growth). For example, Medford and Roseburg are two communities that are rapidly expanding. Rapid urbanization can strain the ability of sensitive habitat such as valleys and wetlands to continue to provide valued ecological functions and services. Rapid development increases the potential for perceived conflict between people and wildlife. For example, increasing road traffic increases the potential for collisions with migrating species, creating a hazard to both motorists and wildlife.

Approach: Cooperative approaches with private landowners are the key to long-term conservation. Essential tools include financial incentives, Candidate Species Conservation Agreements, and conservation easements. Work with community leaders and agency partners to ensure planned, efficient growth. Support and implement existing land use regulations to preserve farm and range land, open spaces, recreation areas, and natural habitats including essential home range for wildlife.

Factor: Altered fire regimes. Historically, the ecoregion was dominated by fire-adapted vegetation and experienced widely variable fire regimes, ranging from areas with relatively short fire return intervals to areas with 50 or 60 year return intervals. Fire suppression has damaged forest health, resulting in undesirable changes in vegetation and increased intensity of wildfires as fuel loads increase. Efforts to reduce fire danger can help to restore wildlife habitat, but require careful planning to provide sufficient habitat features that are important to wildlife (e.g., snags, down logs, hiding cover for big game). Reintroducing fire can be challeng-

ing in the Klamath Mountains because of high volatility of fuels, "checkerboard" land ownership patterns, and scattered rural residential developments.

Approach: Use an integrated approach to fuels management and forest health issues that considers historic conditions, wildlife conservation, natural fire intervals, and silvicultural techniques. Encourage forest management at a broad scale to address limiting factors. Reintroduce fire where feasible; prioritize sites and applications. Maintain important wildlife habitat features such as snags and logs at a level to sustain wood-dependent species. In areas where prescribed fire is undesirable or difficult to implement, use mechanical treatment methods (e.g., chipping, cutting for firewood) that minimize soil disturbance. Monitor these efforts and use adaptive management techniques to ensure efforts are meeting habitat restoration and wildfire prevention objectives with minimal impacts on wildlife.

Factor: Loss of habitat connectivity. The Klamath Mountains ecoregion is naturally diverse and heterogeneous. However, some habitat types have been particularly disrupted by fragmentation and loss of connectivity, including late successional forests and valley-bottom habitats. Opportunities for large-scale protection or restoration of native landscapes are limited, particularly in the interior valleys. Existing development, growth pressures, high land costs, and the fragmented nature of ownerships and remaining native vegetation types all present barriers to large-scale ecosystem restoration.

Approach: In the valleys, broad-scale conservation strategies will need to focus on restoring and maintaining more natural ecosystem processes and functions within a landscape that is managed primarily for other values. This may include an emphasis on conservation-oriented management techniques for existing land uses and restoration of some key ecosystem components such as river-floodplain connections and riparian function.

Factor: Invasive species. Invasive plants are of particular concern in the Klamath Mountains ecoregion. Invasive plants disrupt native communities, diminish populations of at-risk native species, and threaten the economic productivity of resource lands. Invasive plants have been on the increase during the last 20 years. While not nearly as extensive as invasive plants, non-native animals also have impacted native fish and wildlife populations.

Approach: Emphasize prevention, risk assessment, early detection and quick control to prevent new invasives from becoming fully established. Use multiple-site appropriate tools (mechanical, chemical and biological) to control the most damaging invasive species. Prioritize efforts to focus on key invasives in high priority areas,

Invasive Non-native Species

Invasive species currently are considered to be one of the primary causes of species becoming threatened and endangered, second only to habitat conversion. Many species are as threatening to people's livelihoods as they are to fish, wildlife and their habitats. This section identifies the species with the greatest current and potential impact in the Klamath Mountains. They were determined through an analysis of Oregon Department of Agriculture's Noxious Weed List, ODFW's Wildlife Integrity Rules, ODFW's Introduced Fish Management Strategies report, information from Portland State University Center for Lakes and Reservoirs, and local expert review. Although some of these species also cause significant economic damage to farms, ranches, and managed forests, this list is focused on those that cause the most severe ecological damage. Impacts from introduced game fish vary from species to species and within ecoregions. As a result, the impacts need to be evaluated more locally (ODFW Introduced Fish Management Strategies Report).

Known invasive non-native animal and plant species

These species are established or documented in this ecoregion, and are known to impact native fish and wildlife populations and habitats. They may range from small, controllable populations to widespread infestations.

Documented Invasive Animals

Bluegill
Brook trout
Brown bullhead
Brown trout
Bullfrog
Carp
Crappie
Eastern snapping turtle
European starling
Fathead minnow
Golden shiner
House sparrow
Mosquito fish (*Gambusia*)
Norway rat
Nutria
Pikeminnow
Red eared slider
Shad
Yellow perch

Documented Invasive Plants

Armenian (Himalayan) blackberry
Canada thistle
Dalmation toadflax
Diffuse knapweed
Dogtail
Dyers woad
False brome
Fennel
Iberian starthistle
Leafy spurge
Meadow knapweed
Mediterranean sage
Medusahead rye
Puncture vine
Quackgrass
Rush skeletonweed
Scotch broom
Spanish broom
Spotted knapweed
Woolly distaff thistle
Yellow toadflax
Yellow star thistle

Non-native animals and plants of potential concern

Preventing the establishment of invasive non-native species is far more cost-effective and practical than trying to eradicate them once they are established. To make the best use of financial and personnel resources, prevention efforts need to be prioritized to address the greatest threats, especially since many non-native species do not pose a significant threat to fish and wildlife populations and habitats. Potentially harmful non-native species can be identified by examining biological factors, potential impacts and invasion patterns in similar climates. The species listed here are included because: 1) they are not known to occur in this ecoregion, but could pose a threat to fish and wildlife populations and habitats if they become established; or 2) they are known to occur in this ecoregion but the extent to which they impact native species and disrupt ecological processes is unclear at this time.

Potentially Invasive Non-native Animals

Asian carp (bighead, silver)
Black carp
Feral pig
Muskellunge, northern pike
New Zealand mud snail
Round goby
Ruffe
Rusty crayfish
Sacramento perch
Snakeheads
Striped bass
Zebra mussel

Potentially Invasive Non-native Plants

Butterfly bush
Camelthorn
Coltsfoot (*Tussilago*)
Ovate goatgrass
Pampas grass
Scotch thistle
Squarrose knapweed



Photo © Dave Menke



Photo © Bruce Newhouse

Conservation actions in the Klamath Mountains Ecoregion identified through other planning efforts

Landowners and land managers can benefit a variety of wildlife species by managing and restoring strategy habitats. The following recommendations are relevant to Strategy Habitats. They were identified through a review of existing plans.

Actions	Strategy Habitat and General Location	Source Document
Maintain existing late successional habitat and initiate actions to develop or restore late successional forest where appropriate	Klamath Mountains forest	Oregon-Washington Partners in Flight Westside Coniferous Forests Conservation Strategy (Altman 2000) [recommended target: more than 15% of large landscapes in late successional forests]
Maintain connectivity, structural complexity and heterogeneity of landscapes	Klamath Mountains late successional forest; directed at priority sites based upon species surveys	Northwest Forest Plan (1994; continual updates) [recommended target: Specific recommendations for reserves and other features in light of species surveys]
Maintain all large oak trees (more than 22in. dbh) and all oak woodland patches more than 100 ac (40 ha)	Klamath Mountains oak habitats	OR-WA Partners in Flight Landbird Conservation Strategy (Altman 2000)
Maintain or restore more than 30% of the historical extent of riparian habitat in each major watershed	Klamath Mountains riparian habitats	Partners In Flight Landbird Conservation Plan (Altman 2000)
Focus conservation attention on critical aquatic habitats identified by American Fisheries Society surveys	North Umpqua River; Upper Illinois River; East Fork Illinois River	Oregon Biodiversity Project. See: NOAA and NMFS biologists; ODFW; watershed councils; OWEB for further information.
Improve fish passage. For example, modify barriers or use spans where appropriate.	All locations (as appropriate)	State of the Environment Report; ODFW Fish Passage team; Oregon Biodiversity Project; Oregon Plan (OWEB)
Work with forest managers to meet large wood loading benchmarks, reduce sediment, maintain water quality and continue to provide functional riparian habitat	All locations (as appropriate)	Oregon Plan (OWEB); Senate Bill 1010 Plans (ODA); Total Maximum Daily Load Planning (ODEQ)
Work with agricultural and residential landowners to maintain water quality	All locations on agricultural lands (as appropriate)	Senate Bill 1010 Plans (ODA) and Total Maximum Daily Load Planning (ODEQ)
Establish integrated framework for wetland restoration assessment, priority setting, and actions at three scales: watersheds, ecoregions and project sites	Wetlands	Recommendations for a nonregulatory wetland restoration program for Oregon. J.W. Good and C.B. Sawyer. 1998. Prepared for Oregon Division of State Lands and U.S. EPA Region X.
Increase incentives for proactive, nonregulatory wetland restoration and enhancement on private land, focusing on a combination of financial assistance, tax benefits, technical assistance, and education	Wetlands	Recommendations for a nonregulatory wetland restoration program for Oregon. J.W. Good and C.B. Sawyer. 1998. Prepared for Oregon Division of State Lands and U.S. EPA Region X.
Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology. - Plant vegetation to stabilize banks; leaving stumps, fallen trees and boulders in waterways - Maintain or enhance off channel or side channel meanders, habitat and pools	Aquatic habitats (streams, pools)	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See <i>guide for specific technical recommendations, sources of information and assistance, and other guidelines</i> .
Maintain riparian and wetlands function: - Manage grazing, riparian vegetation planting and fencing, and livestock water facilities according to best practices, current techniques and with respect to natural hydrological conditions.	Riparian and wetlands habitats	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See <i>guide for specific technical recommendations</i>
Upslope erosion control: - Create water and sediment control basins to contain runoff, wastewater - Use windbreaks (tree and shrub rows - using native plants) to reduce erosion & deposition - Upland terracing	Aquatics, riparian and wetland habitats	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See <i>guide for specific technical recommendations</i>

**Note: Conservation Strategy monitoring indicators, linked with OSOER Key indicators, targets, and methods, will be identified in a statewide approach (See Monitoring chapter for more information).*

particularly where Strategy Habitats and Species occur. Cooperate with partners through habitat programs and county weed boards to address invasive species problems. Promote the use of native “local” stock for restoration and revegetation.

Factor: Mineral extraction. Long-term effects of historic mining include damage to stream beds and toxic runoff. Currently, mining for nickel and chromium associated with the region’s serpentine soils has the potential to impact fish and wildlife by disturbing habitat. Mineral extraction is a particular concern in the Siskiyou Mountains. Gold mining also potentially impacts habitat for fish, wildlife and at-risk plants along many streams. In-stream placer mining and recreational placer mining are prevalent in this ecoregion.

Approach: Plan mineral extraction activities to minimize potential impact on species and habitat. Minimize disturbance by focusing extraction efforts in areas with existing roads, rather than creating new roads and increasing the potential for habitat disturbance. Follow existing recommendations to avoid impacting water quality and riparian function.

Conservation Success Story: a partnership born out of frustration, thrives today

After years of slinging accusations over the fate of natural resources in southwestern Oregon, two former, battle-scarred adversaries agreed to put aside their differences and find common ground. Jack Shipley, a passionate environmentalist, and Jim Neal, a fixture in the logging community, founded the Applegate Partnership, a community-based forum in which resource management issues are openly discussed in the hopes they can be resolved without going to court. The Partnership was established to facilitate and encourage the adoption of natural resource principles that promote ecosystem health, economic vitality and community stability in the 500,000-acre Applegate watershed. Industry, conservation groups, natural resource agencies and residents, which make up the Partnership’s membership, work together to tackle complex resource management issues.

The Partnership’s inclusive, cooperative approach to divisive natural resource issues has produced on-the-ground success. A recent example of this success has been working with more than 40 private landowners to reconnect 37 miles of aquatic habitat for anadromous salmonids on the Little Applegate River. Two 100-year old irrigation dams have hindered fish passage to upstream spawning beds so the Partnership decided to pursue dam removal. The Partnership recognized the importance of the water behind the dams to local irrigators and realized that without their support the project would fail. In characteristic manner, the Partnership opened a dialogue with local farmers and proposed an innovative

solution: reroute their supply of water from the smaller Little Applegate River to the main stem of the Applegate. Nearly all landowners have agreed to this plan and so far one of the dams has been breached.

The technical aspects of the dam removal project fall to the Applegate River Watershed Council, which the Partnership formed to administer and implement site-specific restoration projects. Several organizations have contributed about \$2.5 million to fund project-related activities, including public outreach and installation of water pumps. So far one dam has been removed. After the second dam comes out the watershed council expects the amount of in-stream water in the Little Applegate to increase by 12 cubic feet per second. The enhanced stream flow will benefit migrating salmon, particularly during parched summer months, and help reestablish a healthy fishery.

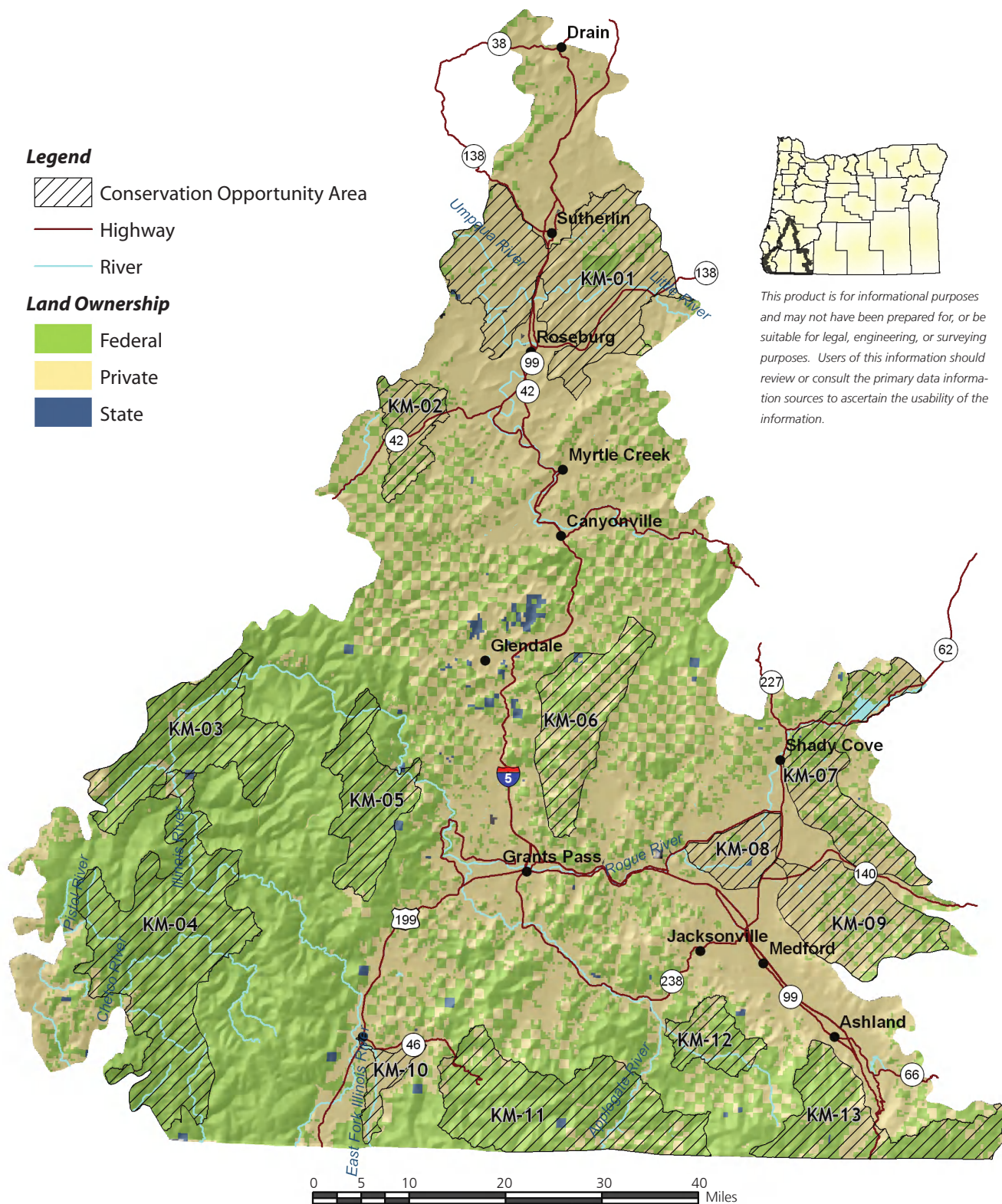
Deciding Where to Work

Conservation Opportunity Areas Map and Profiles

Landowners and land managers throughout Oregon can contribute to conserving fish and wildlife by maintaining, restoring, and improving habitats. Conservation actions to benefit Strategy Species and Habitats are important regardless of location. However, focusing investments in certain priority areas can increase likelihood of long-term success over larger landscapes, improve funding efficiency, and promote cooperative efforts across ownership boundaries. Conservation Opportunity Areas are landscapes where broad fish and wildlife conservation goals would be best met. Conservation Opportunity Areas were developed to guide voluntary, non-regulatory actions. This map and the associated data should only be used in ways consistent with these intentions. For more information on how Conservation Opportunity Areas were developed, see Appendix IV, “Methods” (beginning on page a:34).

The Conservation Opportunity Area profiles include information on recommended conservation actions, special features, key species, key habitats, and if the area has been identified as a priority by other planning efforts. These profiles highlight some priority actions to implement in individual Conservation Opportunity Areas, which can range from restoration projects to monitoring for invasive species. These recommendations were identified through existing plans, spatial analysis, and expert review. They are not meant to be exhaustive, so other actions also will be appropriate, as influenced by local site characteristics and management goals. Actions need to be compatible with local priorities, local comprehensive plans and land use ordinances, as well as other local, state, or federal laws. Actions on federal lands must undergo federal planning processes prior to implementation to ensure consistency with existing plans and management objectives for the area.

Klamath Mountains Ecoregion Conservation Opportunity Areas



Conservation Opportunity Area Profiles

KM-01. Umpqua River area

Special Features:

- Includes the North Bank Habitat Management Area
- Core area for key population of Columbian white-tailed deer
- Area includes several important river confluences.
- Northwestern pond turtles are in relative abundance here, including populations in all the rivers, Cooper Creek Reservoir (Sutherlin area), and Stewart Park Wildlife Pond in Roseburg.
- Area contains a large percentage of the ecoregion's purple martin habitat.
- Area contains approximately 14% of the ecoregion's grassland and oak savanna habitat.

Key Habitats:

- Aquatic
- Grasslands And Oak Savanna
- Pine-oak Woodlands
- Riparian

Key Species:

- Horned Lark
- Purple Martin
- Coho Salmon
- Pacific Lamprey
- Summer Steelhead
- Umpqua Oregon Chub
- Winter Steelhead
- Columbian White-tailed Deer
- Common Kingsnake
- Northwestern Pond Turtle

Identified in other planning efforts:

- Oregon Biodiversity Project Conservation Opportunity Areas
- The Nature Conservancy Ecoregional Assessment
- The Oregon Plan Core Salmon Areas

Recommended Conservation Actions:

- Consider land exchanges to benefit fish, wildlife, and landscape ecological integrity
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

KM-02. Tenmile area

Located west of Winston, OR in the hills along either side of Highway 42.

Special Features:

- Area includes the Bushnell-Irvin Rocks Area of Environmental Concern.
- Much of the forest land in this area is designated Late Successional Reserve.
- High diversity of Strategy habitats exists in this area.

Key Habitats:

- Grasslands And Oak Savanna
- Late Successional Mixed Conifer Forests
- Pine-oak Woodlands

Key Species:

- Northern Spotted Owl
- Coho Salmon
- Winter Steelhead
- Red Tree Vole

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment (Camas Valley site)

Recommended Conservation Actions:

- Consider land exchanges to benefit fish, wildlife, and landscape ecological integrity

KM-03. Rogue area

Special Features:

- This Conservation Opportunity Area includes much of the Wild Rogue Wilderness. The remaining area is almost entirely encompassed within a Rogue River-Siskiyou National Forest Late Successional Reserve.
- The wilderness here was originally designated to protect the Wild section of the Rogue River.
- Many endemic rare plants found in the Rogue drainage in serpentine habitats.
- High percentage of the ecoregion's marbled murrelet habitat.

Key Habitats:

- Aquatic
- Late Successional Mixed Conifer Forests

Key Species:

- Coastal Tailed Frog
- Southern Torrent Salamander
- Marbled Murrelet
- Northern Spotted Owl
- Coho Salmon
- Fall Chinook Salmon
- Summer Steelhead
- Winter Steelhead
- Red Tree Vole
- Ringtail

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas (southeastern side)
- The Nature Conservancy Ecoregional Assessment
- The Oregon Plan Core Salmon Areas

KM-04. Kalmiopsis area

Special Features:

- *Area contains much of the Kalmiopsis Wilderness*
- *This area is known for its plant diversity due to unique geologic conditions and serpentine habitats.*
- *Contains sections of several rivers including the Illinois River, Chetco River, East Fork Winchuck, and the Pistol River.*
- *Globally significant site for endemic plants and diverse salamander populations*
- *Area contains a significant amount of the ecoregion's marbled murrelet habitat*

Key Habitats:

- Aquatic
- Late Successional Mixed Conifer Forests

Key Species:

- Southern Torrent Salamander
- Marbled Murrelet
- Northern Spotted Owl
- White-headed Woodpecker
- Coho Salmon
- Fall Chinook Salmon
- Winter Steelhead
- Fringed Bat
- Red Tree Vole
- Ringtail

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- The Nature Conservancy Ecoregional Assessment
- The Oregon Plan Core Salmon Areas

Recommended Conservation Actions:

- Continue to improve the conservation practices of forestry and land management
- Reduce the threat of disease (phytophthora) to forests
- Work to resolve conflicts between incompatible mining practices and wildlife conservation

KM-05. Taylor Creek area

Located in the mountains west of Grants Pass, this area extends north to the Rogue River and south to Serpentine Point. The majority of this area is in the Chrome Ridge and Mount Peavine quads.

Special Features:

- *Area is located almost entirely in a Late Successional Reserve.*
- *Area contains a high percentage of the ecoregion's gnatcatcher habitat*
- *Serpentine habitats here host a number of endemic plant species.*

Key Habitats:

- Late Successional Mixed Conifer Forests
- Pine-oak Woodlands

Key Species:

- Blue-gray Gnatcatcher
- Lewis' Woodpecker
- Northern Spotted Owl
- White-headed Woodpecker
- Coho Salmon
- Summer Steelhead
- Winter Steelhead
- Red Tree Vole

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment

KM-06. King Mountain area

Area includes the mountains extending from Glendale to Grants pass, on the east side of the interstate highway.

Special Features:

- *The majority of the federal land in this area is managed by the Bureau of Land Management and includes the King Mountain Rock Garden area of critical environmental concern.*
- *Area contains many rare plant species.*

Key Habitats:

- Grasslands And Oak Savanna
- Late Successional Mixed Conifer Forests
- Pine-oak Woodlands

Key Species:

- Southern Torrent Salamander
- Blue-gray Gnatcatcher
- Lewis' Woodpecker
- White-headed Woodpecker
- Coho Salmon
- Summer Steelhead
- Winter Steelhead

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment
- Recommended Conservation Actions:
- Consider land exchanges to benefit fish, wildlife, and landscape ecological integrity

KM-07. Shady Cove foothills

Area is comprised of the foothills east of Shady Cove which parallel the ecoregion boundary.

Special Features:

- *Area contains over 5% of the ecoregion's pine-oak woodland habitat.*

Key Habitats:

- Grasslands And Oak Savanna
- Pine-oak Woodlands

Key Species:

- Blue-gray Gnatcatcher
- Lewis' Woodpecker
- White-headed Woodpecker
- Coastal Cutthroat Trout
- Summer Steelhead
- Common Kingsnake

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment (Cascade foothills site, Little Butte Creek site)
- Recommended Conservation Actions:
- Address invasive species threat
- Protect, maintain, or enhance pine-oak woodlands, grasslands, and oak savanna

KM-08. North Medford area**Special Features:**

- *This unique area provides important low elevation habitat for and includes the Denman Wildlife Area, Upper and Lower Table Rocks, Agate Desert Preserve, and the Whetstone Savannah Preserve.*
- *Area contains many endemic, rare plants*
- *Important site for migrating and nesting waterfowl.*

Key Habitats:

- Aquatic
- Grasslands And Oak Savanna
- Riparian
- Wetlands

Key Species:

- Horned Lark
- Purple Martin
- Upland Birds
- Waterfowl
- Coho Salmon
- Fall Chinook Salmon
- Summer Steelhead
- Winter Steelhead
- Fairy Shrimp

Identified in other planning efforts:

- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas (Denman WA, Table Rocks, Whetstone Savanna)
- The Nature Conservancy Ecoregional Assessment

KM-09. Antelope Creek area

This area encompasses the foothills east of Medford.

Special Features:

- *This low elevation site provides a diversity of habitats for both terrestrial and aquatic species.*

Key Habitats:

- Aquatic
- Grasslands And Oak Savanna
- Pine-oak Woodlands
- Riparian
- Wetlands

Key Species:

- Blue-gray Gnatcatcher
- Lewis' Woodpecker
- White-headed Woodpecker
- Coho Salmon
- Summer Steelhead

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment
- The Oregon Plan Core Salmon Areas (Antelope Creek, Little Butte Creek)

Recommended Conservation Actions:

- Address invasive species threat
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Protect, maintain, or enhance pine-oak woodlands, grasslands, and oak savanna

KM-10. East Fork Illinois River

Special Features:

- *This area is noted for its abundance of rare and endemic plant species.*
- *This area includes approximately 30% of the ecoregion's wetland habitat.*
- *Area contains diverse low and mid elevation forests and unique grassland habitats.*

Key Habitats:

- Aquatic
- Grasslands And Oak Savanna
- Riparian
- Wetlands

Key Species:

- Lewis' Woodpecker
- Coho Salmon

- Fall Chinook Salmon
- Winter Steelhead
- Common Kingsnake

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Oregon Biodiversity Project Conservation Opportunity Areas
- The Nature Conservancy Ecoregional Assessment
- The Oregon Plan Core Salmon Areas

KM-11. Oregon Caves-Applegate area

Special Features:

- *Area provides an important stopover for migrating songbirds.*

Key Habitats:

- Aquatic
- Grasslands And Oak Savanna
- Late Successional Mixed Conifer Forests
- Pine-oak Woodlands
- Wetlands

Key Species:

- Siskiyou Mountains Salamander
- Lewis' Woodpecker
- Northern Spotted Owl
- Coho Salmon
- Summer Steelhead
- Winter Steelhead
- Fisher
- Red Tree Vole

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Oregon Biodiversity Project Conservation Opportunity Areas (Upper Illinois River)
- Oregon's Important Bird Areas (Bigelow Lakes / Mount Elijah)
- The Nature Conservancy Ecoregional Assessment (Oregon Caves site, Applegate site)
- The Oregon Plan Core Salmon Areas

Recommended Conservation Actions:

- Reduce the threat of disease (phytophthora) to forests
- Work to restore fire regime to historical and natural range of variation

KM-12. Anderson Butte

This area includes both the Little and Middle Little Applegate River subwatersheds, which encompass both Anderson Butte and the Sterline Mine Ditch.

Special Features:

- *This area received an Important Bird Area designation for the ceanothus-manzanita brushfields and scrub oak habitat, which is important for a bird community that includes Blue-gray Gnatcatcher, Wrentit, Oak Titmouse, and California Towhee. Ceanothus-manzanita brushfield habitat has declined in many areas due to forest succession from fire suppression. It is often eradicated to reduce fire danger.*

Key Habitats:

- Grasslands And Oak Savanna
- Pine-oak Woodlands
- Key Species:
- Blue-gray Gnatcatcher
- California Towhee
- Oak Titmouse
- Wrentit

Identified in other planning efforts:

- Oregon Biodiversity Project Conservation Opportunity Areas (Upper Applegate River)
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment
- Recommended Conservation Actions:
- Prioritize infestations of invasive species for treatment
- Protect, maintain, or enhance ceanothus-manzanita brushfields and scrub oak habitat
- Work to restore fire regime to historical and natural range of variation

KM-13. Siskiyou Crest-Soda Mountain**Special Features:**

- *Located on the edge of three ecoregions, The Cascade-Siskiyou National Monument within this opportunity area was established for its "spectacular biological diversity."*
- *This area provides habitat for a large number of species on the edge of their range, forming rare communities and species interactions.*

Key Habitats:

- Aquatic
- Grasslands And Oak Savanna
- Late Successional Mixed Conifer Forests
- Pine-oak Woodlands
- Wetlands

Key Species:

- Siskiyou Mountains Salamander
- Blue-gray Gnatcatcher
- Great Gray Owl
- Northern Spotted Owl
- Willow Flycatcher
- Jenny Creek Sucker
- Fisher

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Oregon's Important Bird Areas (Siskiyou Peak, Cascade-Siskiyou National Monument)
- The Nature Conservancy Ecoregional Assessment (Siskiyou Crest site, Soda Mountain site)

Recommended Conservation Actions:

- Work to restore fire regime to historical and natural range of variation



Photo © Matthew Lawhead



Photo © Bruce Taylor

Northern Basin and Range Ecoregion

Getting to Know the Northern Basin & Range Ecoregion

Description

The Northern Basin and Range ecoregion is sagebrush country. It is Oregon's slice of the Old West, with rich ranching and farming traditions.

The Northern Basin and Range ecoregion covers the southeastern portion of the state, from Burns south to the Nevada border and from Christmas Valley east to Idaho. The name describes the landscape:

numerous flat basins separated by isolated mountain ranges. Several important mountains are fault blocks, with gradual slopes on one side and steep basalt rims and cliffs on the other side. The Owyhee Uplands consists of a broad plateau cut by deep river canyons. Elevations range from 2,070 feet near the Snake River to more than 9,700 feet on Steens Mountain.

In the rain shadow of the Cascades Mountains, the Northern Basin and Range is Oregon's driest ecoregion and marked by extreme ranges of



"At a Glance"- Characteristics and Statistics**Land use (% of ecoregion):**

Agriculture	2.5%
Forest and woodland	0.1%
Other (lakes, wetlands, cliffs, etc.)	8.9%
Range, pasture, and grassland	87.9%
Towns and rural residential	0.2%
Urban and suburban	0.5%

Land ownership:

Private	20%
Public, federal	75%
Public, state and local	4%

Human population, government and transportation statistics:

Estimated population in 2000	40,000
% of Oregon's population in 2000	1.4%
Number of incorporated cities	9
Number of counties	6
<i>(includes parts of Baker, Crook, Deschutes, Lake, Harney and Malheur counties.)</i>	
Number of watershed councils	5
<i>(A watershed council is considered present if at least 10% of its area is located within the ecoregion.)</i>	
Miles of road (approx. miles)	28,700

Economics:

Important industries: Livestock, forest products, agriculture, food processing, recreation.

Major crops: alfalfa, wheat, hay, corn, oats, onions, sugar beets, potatoes.

Important nature-based recreational areas: Alvord Desert, Dunes, and Lake; Diamond Craters Natural Area; Hart Mountain National Antelope Refuge; Lake Abert; Malheur National Wildlife Refuge; Owyhee Lake and River; Steens Mountain Wilderness Area and Steens Mountain Cooperative Management and Protection Area; Summer Lake and Summer Lake Wildlife Area; Silvies River.

Ecology:

Average annual precipitation (1961-2000)	7.6" (Rome) - more than 40" (Steens Mountain), most areas average <15"
Average July high temperature (1961-2000)	86.4°F (Ironsides) - 95.7°F (Ontario)
Average January low temperature (1961-2000)	14.7°F (Danner) – 21.8°F (Owyhee Dam)
Elevation	ranges from 2,070 feet (Snake River) to 9,733 (Steens Mountain)
Number of regularly occurring vertebrate wildlife species	345
Important rivers	Donner und Blitzen, Malheur, Owyhee, Silvies

Information Sources: Oregon Blue Book (2003-04), Oregon Climate Service data (1971-2000), Oregon State of the Environment Report (2000), Oregon Watershed Enhancement Board (2001), Oregon Wildlife Diversity Plan (1993), U.S. Census Bureau (2000).



Photo © Bruce Newhouse

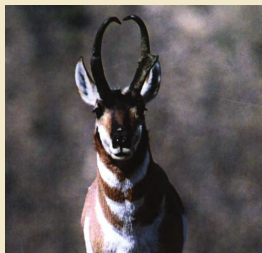


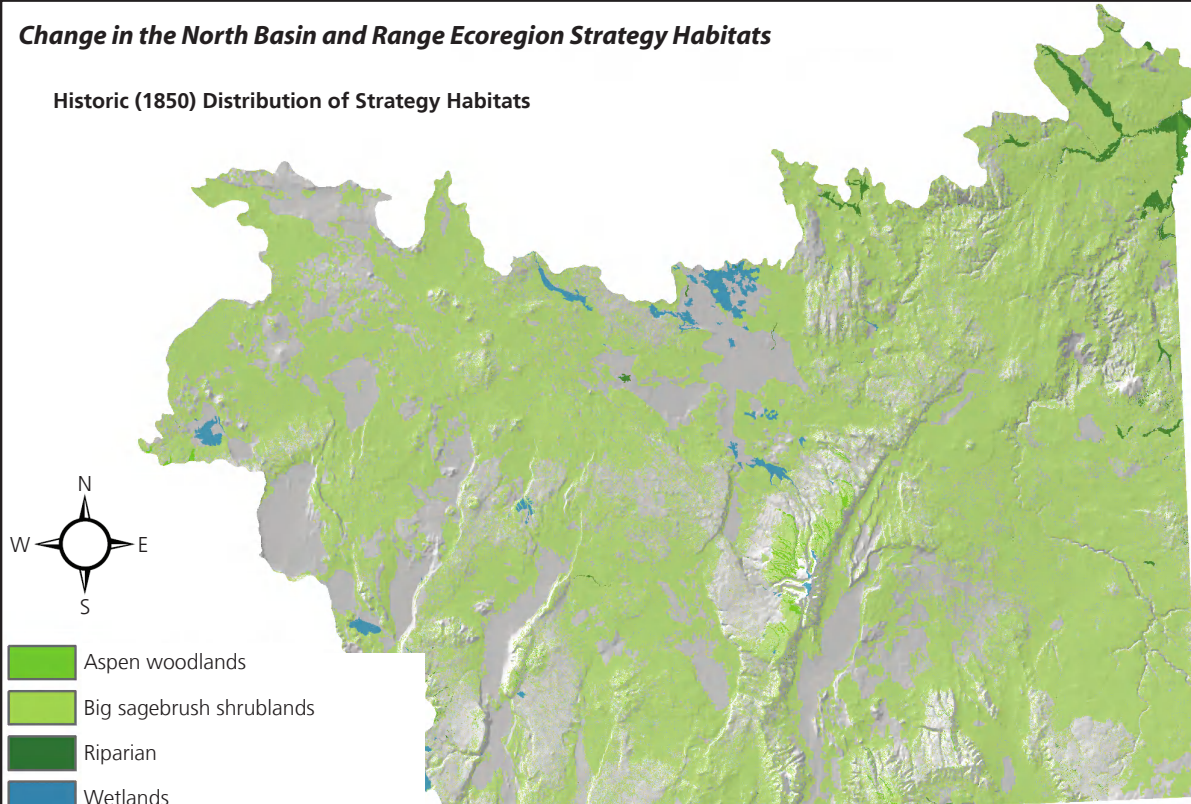
Photo © Jim Ward

Summary List of Strategy Habitats

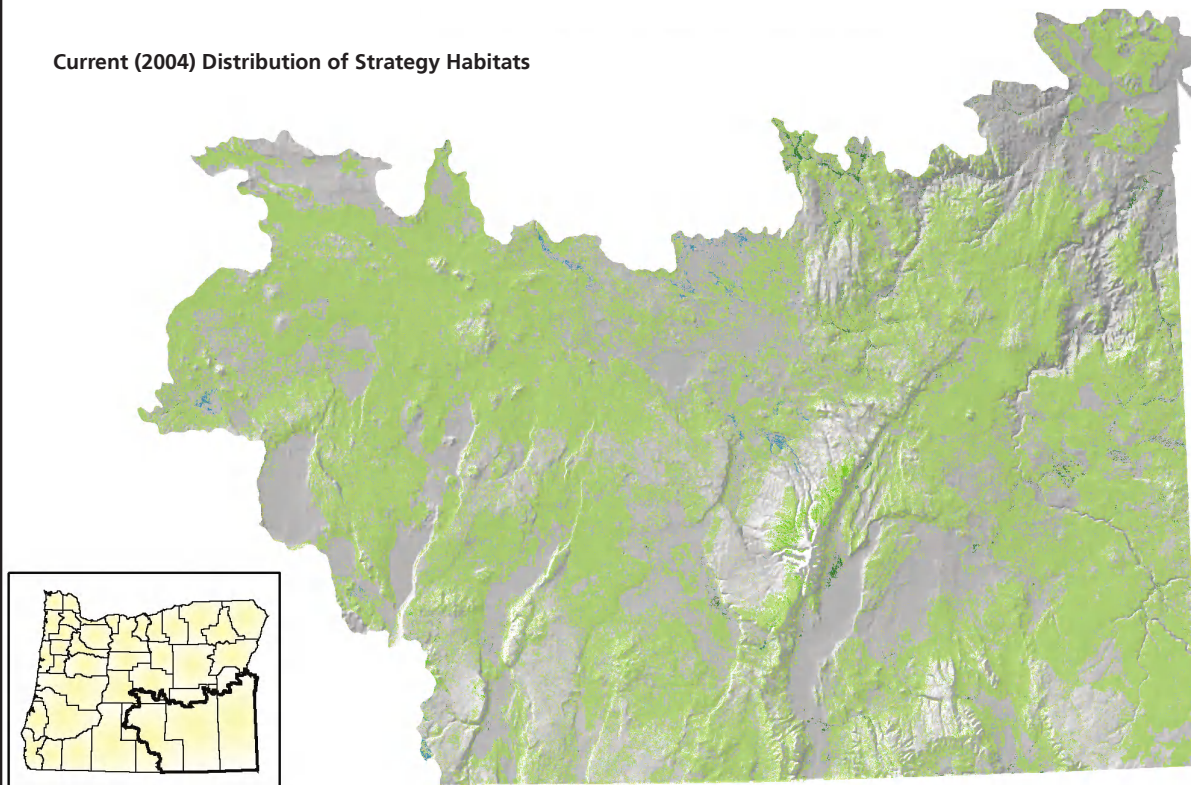
Strategy Habitats in the Northern Basin and Range Ecoregion include: sagebrush shrublands (particularly big sagebrush habitats), aspen woodlands, riparian, wetlands, and aquatic habitats.

Change in the North Basin and Range Ecoregion Strategy Habitats

Historic (1850) Distribution of Strategy Habitats



Current (2004) Distribution of Strategy Habitats



Data Source: Oregon Natural Heritage Information Center, 2004.

daily and seasonal temperatures. Much of the ecoregion receives less than 15 inches of precipitation per year, although mountain peaks receive higher amounts, 30-40 inches per year. The extreme southeastern corner of the state has desert-like conditions, with an annual precipitation of only 8-12 inches. Runoff from precipitation and mountain snowpack often flows into low, flat playas where it forms seasonal shallow lakes and marshes. Most of these basins contained large deep lakes during the late Pleistocene, between 40,000 and 10,000 years ago. As these lakes, which don't drain to the ocean, dried through evaporation, they left salt and mineral deposits that formed alkali flats. They are extremely important stopover sites for migratory shorebirds due to the rich source of invertebrate prey.

Sagebrush communities dominate the landscape. Due to the limited availability of water, sagebrush is usually widely spaced and associated with an understory of forbs and perennial bunchgrasses such as bluebunch wheatgrass and Idaho fescue. Isolated mountain ranges have few forests or woodlands, with rare white fir stands in Steens Mountain and Hart Mountain. However, aspen and mountain mahogany are more widespread. For example, the Trout Creeks, Steens Mountain, Pueblo Mountains, Oregon Canyon Mountain, and Mahogany Mountains are excellent sites for finding both mahogany and aspen. In the southern portion of the ecoregion, there are vast areas of desert shrubland, called salt-desert scrub, dominated by spiny, salt tolerant shrubs. Throughout the ecoregion, soils are typically rocky and thin, low in organic matter, and high in minerals.

Northern Basin and Range is sparsely inhabited, but the local communities have vibrant cultural traditions. The largest community is Ontario with more than 11,000 people. Other communities include Nyssa, Vale, Burns and Lakeview, with 2,400 to 3,100 people each. Land ownership is mostly federal primarily administered by the Bureau of Land Management. Livestock and agriculture are the foundations of the regional economy. Food processing is important in Malheur County. Recreation is a seasonal component of local economies, particularly Harney County. Hunting is particularly important, but wildlife viewing, white-water rafting, and camping are popular. Historically, lumber processing and harvesting from the nearby Blue Mountains was an economic basis of some local communities, particularly for Burns. However, these industries have declined with lower harvests from neighboring federal forests.

Conservation Issues and Actions

Overview

Uncontrolled livestock grazing in the decades before enactment of the Taylor Grazing Act of 1934 caused serious long-term ecological damage throughout the ecoregion. Rangeland conditions have substantially improved since then in most areas, and grazing is managed sustainably in many parts of the ecoregion. However, some areas are still impacted. In addition, sensitive areas, such as riparian habitats and arid areas of sagebrush and salt desert, have been slow to recover.

Greater sage-grouse and comprehensive planning efforts

In Oregon, the greater sage-grouse has brought together an extraordinary range of people, organizations and species to focus on how to maintain sagebrush habitat. Perhaps the best example of a species that might help protect other species associated with the same habitat, the greater sage-grouse is considered a good indicator of sagebrush habitats and of many other species – including the sagebrush lizard, sage sparrow, sage thrasher, Brewer's sparrow, pygmy rabbit, and many plants and invertebrates. The greater sage-grouse possesses many of the traits that biologists look for in an "umbrella" species: it is easily observed, has well-understood biology (including requirements for breeding, nesting, and wintering), and requires a large and diverse home range covering many native grasses and forbs. Recent comprehensive efforts to assess the conservation status of the greater sage-grouse in Oregon, and other states, have contributed to federal decisions not to list the species under the provisions of the Endangered Species Act. Partners involved in the conservation assessment include federal (USFWS – Partners for Fish and Wildlife; BLM; NRCS), state (e.g., ODFW; ODSL) and private groups (e.g., TNC; OHA; landowners). The conservation assessment has support from the Western Governor's Association and the Western Association of Fish and Wildlife Agencies, and

integrates analyses across the greater sage-grouse's entire distribution. Oregon's assessment synthesizes decades of information on population trends. In Oregon, vital information about populations is obtained from three independent measures of population trend. Each spring, counts of males at breeding grounds (leks) provide a basis for population size. Also, brood routes are driven each summer to evaluate productivity of nesting females. Lastly, every year, successful hunters submit wings that are measured and evaluated at "wing-bees," providing vital information on individual attributes and populations. Overall, results of the conservation assessment suggest that habitat loss, cheatgrass invasion, disease, predation, herbicides, and drought could be factors in the greater sage-grouse population declines. Addressing these issues will facilitate recovery of this important species and, ultimately, associated species and habitats. Because Oregon is a stronghold for this species, conservation actions here are critical. For more information see: ODFW website; Western Association of Fish and Wildlife Agencies; USGS – SAGEMAP website (<http://sagemap.wr.usgs.gov>) (a web-based forum for making datasets available and to provide information for research and management).

Some areas are still recovering from intensive management in the past. For example, the Bureau of Land Management began a massive effort in 1962 to rehabilitate degraded rangelands by establishing a non-native pasture grass, crested wheatgrass, and by removing the native sagebrush. Over the course of 10 years, the Vale Rehabilitation Project seeded 250,000 acres to crested wheatgrass and used plowing, chaining, and herbicides to reduce sagebrush on as much as 506,000 acres. Currently the Bureau of Land Management maintains extensive wilderness areas in this ecoregion (e.g., Malheur Refuge, Hart Mountain, Steens Cooperative Management and Protection Area, Bureau of Land Management areas of critical environmental concern at Lake Abert, Warner Valley, Owyhee canyons).

Historic overgrazing and fire suppression, followed by invasion of weedy annual grasses such as cheatgrass, have greatly altered natural fire cycles in many sagebrush steppe habitats. Landscapes formerly comprised of mosaics dominated by bunchgrasses and forbs are now heavily and disproportionately dominated by shrubs (mostly sagebrush),

and exotic grasses and forbs. Invasive species and altered fire regimes are the greatest terrestrial conservation issues in this ecoregion. As a result of altered fire regime, encroachment of juniper has displaced grasses and sagebrush, especially in the northern portions of the ecoregion. However, old-growth juniper occurs in some areas, especially in rock outcrops where grasses and sagebrush are uncommon and where fire is less of a factor, and is extremely beneficial to wildlife.

Popular with sportsmen and biologists, greater sage-grouse also are considered excellent indicators of sagebrush habitat quality. Current efforts to improve conditions for greater sage-grouse include comprehensive range-wide assessments of both species and habitat.

Stream water quality in the Northern Basin and Range ecoregion is poor when compared to other ecoregions. Throughout the Northern Basin and Range ecoregion, water quality is impacted by high temperatures and in some areas by bacteria, pollutants, and aquatic weeds. Water is limited in the ecoregion, fully allocated in storage and other uses.

Summary List of Strategy Species

Mammals

California myotis (bat)
Hoary bat
Kit fox
Long-legged myotis (bat)
Pallid bat
Pygmy rabbit
Spotted bat
Townsend's big-eared bat
White-tailed jackrabbit

Plants

Boggs Lake hedge-hyssop
Cronquist's stickseed
Crosby's buckwheat
Davis' peppergrass
Golden buckwheat
Grimy ivesia
Malheur Valley fiddleneck
Malheur wire-lettuce
Mulford's milk-vetch
Oregon semaphore grass
Owyhee clover
Packard's mentzelia
Smooth mentzelia
Snake River goldenweed
Sterile milk-vetch

Fish

Abert Lake tui chub (Oregon Lakes tui chub)
Alvord chub
Borax Lake chub
Catlow tui chub
Foskett spring speckled dace
Hutton tui chub
Inland Columbia Basin Redband Trout
Lahontan cutthroat trout
Malheur mottled sculpin
Oregon Basins Redband Trout (Foster Creek redband trout)
Oregon Basins Redband Trout (Catlow Valley redband trout SMU)
Oregon Basins Redband Trout (Warner Valley redband trout SMU)
Sheldon tui chub
Summer Basin tui chub
Warner Basin tui chub
Warner sucker

Amphibians & Reptiles

Columbia spotted frog
Northern leopard frog
Western toad

Birds

American peregrine falcon
American white pelican
Black-necked stilt
Bobolink
Ferruginous hawk
Franklin's gull
Greater sage-grouse
Greater sandhill crane
Juniper titmouse
Long-billed curlew
Mountain quail
Snowy egret
Swainson's hawk
Western snowy plover
Willow flycatcher

Invertebrates

Borax Lake ramshorn
Crooked Creek springsnail
Harney Lake springsnail
Malheur Cave endemics:
Malheur Cave amphipod
Malheur Cave flatworm
Malheur isopod
Malheur pseudoscorpian
Malheur Cave springtail

Aquatic habitats are affected by altered channel and flow conditions, obstructions, and poor riparian condition. Efforts to assess the quality of aquatic habitats are ongoing and obtaining an understanding of natural temperature and water quality dynamics in the ecoregion is a research priority.

Ecoregion-level limiting factors and recommended approaches

All six of the key conservation issues apply statewide, as do the approaches outlined in the Statewide Perspectives and Approaches chapter. However, invasive species and altered disturbance regimes are described further in this section, considering the Northern Basin and Range's ecoregional characteristics. In addition to the statewide issues, on-going recovery from historic overgrazing and uncontrolled off-highway vehicle use are issues in this ecoregion. Other forms of recreational use are currently compatible with conservation goals, but may become an issue in the future.

Factor: Invasive species: Invasive plants, especially those classified as noxious weeds, are of particular concern in the Northern Basin and Range ecoregion. They disrupt native communities, diminish populations of at-risk native species, and threaten the economic productivity of resource lands. Invasive plants have been on the increase during the last 20 years. The spread of cheatgrass and medusahead can increase the frequency, intensity, and spread of fires, replacing sagebrush and native bunchgrasses which are adapted to infrequent, patchy fires. While not nearly as disruptive as invasive plants, non-native animals also have impacted native fish and wildlife populations.

Approach: Emphasize prevention, risk assessment, early detection and quick control to prevent new invasives from becoming fully established. Use multiple-site appropriate tools (mechanical, chemical and biological) to control the most damaging invasive species. Prioritize efforts to focus on key invasives in high priority areas, particularly where Strategy Habitats and Species occur. Cooperate with partners through habitat programs and county weed boards address invasive species problems. Carefully manage wildfires in cheatgrass-dominated areas. Promote the use of native "local" stock for restoration and revegetation. In some cases, it may be desirable to use "assisted succession" strategies, using low seed rates of non-invasive non-native plants in conjunction with native plant seeds as an intermediate step in rehabilitating disturbances in sagebrush communities.

Factor: Altered fire regimes. Fire suppression has resulted in undesirable changes in vegetation in some habitats, contributing to the

build up of woody plants that increase the intensity of fires when burned. Most big sagebrush-dominated areas were once a mosaic of successional stages, from recently burned areas dominated by grasses and forbs to old sagebrush-dominated stands that have not burned for 80 to 100 years. However, altered fire regimes has reduced this mosaic and resulted in large areas dominated by older big sagebrush with an understory of invasive annual plants.

As a result of fire suppression and other factors, western junipers encroach into and degrade sagebrush, riparian, large-diameter juniper, and aspen habitats. Dense juniper stands are not suitable for species that require open sagebrush, but old growth juniper, often found in rocky outcrops, are beneficial to wildlife.

While a useful tool, prescribed fire might not be suitable for all habitats. Some sagebrush habitats, such as low sagebrush communities, are extremely slow to recover from disturbance such as prescribed fire.

Approach: Carefully evaluate sites to determine if prescribed fire is appropriate and be particularly cautious in low productivity low sagebrush sites where recovery times are prolonged. If determined to be ecologically beneficial, reintroduce natural fire regimes using site-appropriate prescriptions (accounting for the historic fire regime, as well as area size and vegetation characteristics that affect resiliency and resistance to disturbance). Use prescribed fire to create a mosaic of successional stages and avoid large prescribed fires. Avoid fires in areas of high sensitivity and with slow recovery times. In areas where prescribed fire is undesirable or difficult to implement, use mechanical treatment methods (e.g., chipping, cutting for firewood) that minimize soil disturbance. Develop markets for small juniper trees as a special forest product to reduce restoration costs. Maintain large-diameter juniper trees, which are important nesting habitat for songbirds and raptors. Consider landscape context and landscape diversity when planning conservation actions.

Factor: On-going recovery from historic overgrazing. Prior to limitations that were initiated on public lands in the mid-1930s, live-stock grazing had a profound influence on landscapes throughout the Northern Basin and Range ecoregion. Many areas experienced serious ecological damage. Conditions on rangelands in general have improved substantially over the past half-century as a result of improvements in livestock management, and most ecosystems are recovering. However, some habitats have been slow to recover (e.g., some riparian areas and sagebrush communities, especially where cheatgrass has invaded).

Invasive Non-native Species

Invasive species currently are considered to be one of the primary causes of species becoming threatened and endangered, second only to habitat conversion. Many species are as threatening to people's livelihoods as they are to fish and wildlife and their habitats. This section identifies the species with the greatest current and potential impact in the Northern Basin and Range. They were determined through an analysis of Oregon Department of Agriculture's Noxious Weed List, ODFW's Wildlife Integrity Rules, ODFW's Introduced Fish Management Strategies report, information from Portland State University Center for Lakes and Reservoirs, and local expert review. Although some of these species also cause significant economic damage to farms, ranches, and managed forests, this list is focused on those that cause the most severe ecological damage. Impacts from introduced game fish vary from species to species and within ecoregions. As a result, the impacts need to be evaluated more locally (ODFW Introduced Fish Management Strategies Report).

Known invasive non-native animal and plant species

These species are established or documented in this ecoregion, and are known to impact native fish and wildlife populations and habitats. They may range from small, controllable populations to widespread infestations.

Documented Invasive Animals

Bluegill
Brook trout
Brown bullhead
Brown trout
Bullfrog
Carp
Channel catfish
Crappie
Eastern gray squirrel
European starling
Fathead minnow
Golden shiner
Goldfish
House sparrow
Hybrid bass
Largemouth bass
Mosquito fish (*Gambusia*)
New Zealand mud snail
Norway rat
Pikeminnow
Smallmouth bass
Utah chub
White and black crappie
Wiper
Yellow perch

Documented Invasive Plants

Cheatgrass
Dalmatian toadflax
Diffuse knapweed
Dyers woad
Halogeton
Hounds tongue
Leafy spurge
Medusahead rye
Perennial pepperweed
Purple loosestrife
Reed canarygrass
Rush skeletonweed
Scotch thistle
Spotted knapweed
Squarrose knapweed
Sulfur cinquefoil
Tamarisk (salt cedar)
Tansy ragwort
Whitetop
Yellow starthistle
Yellow toadflax

Non-native animals and plants of potential concern

Preventing the establishment of invasive non-native species is far more cost-effective and practical than trying to eradicate them once they are established. To make the best use of financial and personnel resources, prevention efforts need to be prioritized to address the greatest threats, especially since many non-native species do not pose a significant threat to fish and wildlife populations and habitats. Potentially harmful non-native species can be identified by examining biological factors, potential impacts and invasion patterns in similar climates. The species listed here are included because: 1) they are not known to occur in this ecoregion, but could pose a threat to fish and wildlife populations and habitats if they become established; or 2) they are known to occur in this ecoregion but the extent to which they impact native species and disrupt ecological processes is unclear at this time.

Potentially Invasive Non-native Animals

Asian carp (bighead, silver)
Black carp
Feral pig
Oriental weatherfish
Rainwater killfish
Round goby
Ruffe
Rusty crayfish
Sacramento perch
Snakeheads
Zebra mussel

Potentially Invasive Non-native Plants

Barbed goatgrass
Camelthorn
King devil hawkweed
Narrow-leaf cattail
Ovate goatgrass
Paterson's curse
Purple starthistle
Skeletonleaf bursage
Syrian bean caper
Texas blueweed
Yellow hawkweed

Approach: Continue to proactively manage livestock grazing and restore degraded habitats. Minimize grazing during restoration of highly sensitive areas, such as wetlands and riparian areas.

Factor: Uncontrolled off-highway vehicle use. Use by off-highway vehicles (OHVs) has increased dramatically, with permits doubling statewide during 1999-2004. While limited and controlled OHV use can be compatible with wildlife conservation; unlimited and uncontrolled use can impact riparian, aquatic, and upland habitats; spread invasive plant seeds; affect wildlife behavior and distribution, especially during critical breeding and wintering periods; damage soils; and increase risk of wildfires. Although OHV use is limited to designated roads in some sensitive landscapes, there is little to no enforcement due to lack of funds and law enforcement personnel.

Approach: Work cooperatively with land managers and OHV groups to direct use to maintained trails in low-impact areas and improve enforcement of existing rules. Support educational efforts to promote low-impact recreational use, such as the "Tread Lightly!" program. Monitor OHV impacts at priority areas. Support efforts to effectively manage OHV use on public lands, particularly in highly sensitive habitats, and restore damaged areas.

Factor: Other unmanaged recreational use. In addition to OHV use, other recreational use such as camping, rock climbing and parasailing is increasing and contributing to some associated development. Although recreational use is still light in comparison to other ecoregions, new uses such as parasailing could impact wildlife behavior and populations by making previously remote areas more accessible to people.

Approach: Proactively consider potential impacts to wildlife and habitats when developing or promoting recreational opportunities to encourage compatible uses. Monitor recreational patterns and trends.

Factor: Water distribution in arid areas and wildlife entrapment in water developments. In arid areas, water availability can limit animal distribution. Water developments established for cattle, deer, and elk can significantly benefit birds, bats, and small mammals as well. However, some types of these facilities, particularly water developments for livestock, can have unintentional hazards. These hazards include over-hanging wires that act as trip lines for bats, steep side walls that act as entrapments under low water conditions, or unstable perches that cause animals to fall into the water. If an escape ramp is not provided, small animals cannot escape and will drown.

Approach: Continue current efforts to provide water for wildlife in arid areas. Continue current design of big game "guzzlers" that accommodate a variety species and retrofit older models where appropriate to make them compatible with newer design standards. Use and maintain escape devices on water developments where animals can become trapped. Remove obstacles that could be hazardous to wildlife from existing developments.

Conservation Success Story: Local ranching cooperative promotes stewardship on the range

A cooperative of 90 family ranches operating under the label 'Country Natural Beef' (CNB, formally Oregon Country Beef) is revolutionizing the ranching business. Founded in the mid 1980s by a handful of Oregon ranchers, Country Natural Beef personifies a business philosophy based on the principles of economic, social and environmental sustainability. Together, member ranches graze cattle on four million acres of privately owned or publicly managed pastures, meadows and open range land. The cooperative recognizes that their rural ranching lifestyle, consumer trust and resource conservation are all interconnected and that one cannot exist without the other.

CNB member ranches adhere to a form of holistic, sustainable range management that minimizes their environmental 'footprint.' This stewardship ethic is reflected in a set of low-impact grazing practices and a belief that a biologically healthy rangeland is more resilient and productive. Ranchers strive to limit the duration and intensity of cattle grazing in an effort to give native grasses a rest and the time they need to recover before grazing resumes. CNB encourages a diversity of native wildlife such as rodents, insects, birds and predators on the range and prides itself on adapting "our individual environments rather than fitting the environment to our management."

Located to the east of majestic Steens Mountain in the Catlow Valley is Roaring Springs Ranch, which has been a member of Natural Country Beef for more than 10 years. The 250,000-acres ranch fulfills the cooperative's stewardship ethic by frequently rotating cattle to keep grazing pressure to a minimum on the sagebrush-dominated high desert ecosystem. Ranch manager Stacy Davies says "our aim is to graze an area on the range one day a year and then we rest that area for the remainder of the year." Stacy manages cattle on land owned by the ranch and has leasing rights to another 250,000 acres managed by the Bureau of Land Management.

Roaring Springs Ranch also has been actively involved in voluntary conservation activities aimed at improving habitat for at-risk fish and wildlife. In 1997, the ranch entered voluntarily into a Candidate Conser-

Conservation actions in the North Basin and Range Ecoregion identified through other planning efforts

Landowners and land managers can benefit a variety of fish and wildlife species by managing and restoring Strategy Habitats. The following recommendations are relevant to Strategy Habitats. They were identified through a review of existing plans.

Actions	Strategy Habitat and General Location	Source Document
Initiate actions to maintain aspen habitats in conservation status at the following locations: 750 acres Hart Mountain; 20,000 acres – Steens/Alvord; 300 acres – Trout Creek Mountains; 400 acres Bully Creek	Aspen habitat in Northern Basin and Range ecoregion	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended target: 21,750 acres in conservation status]
Initiate actions to maintain sagebrush-steppe habitats in conservation status at the following locations: 25,000 acres – Warner Basin; 400,000 acres – Hart Mountain; 650,000 acres – Steens/Alvord; 230,000 acres – Trout Creek Mountains; 480,000 acres – West Little Owyhee; 200,000 Bully Creek	Sagebrush habitat in Northern Basin and Range ecoregion	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended target: 1,985,000 acres in conservation status]
Initiate actions to maintain alkaline wetland habitats in conservation status at the following locations: 35,000 acres – Lake Abert; 10,000 acres – Hart Mountain; 10,000 acres – Steens/Alvord; 20,000 acres – Harney Basin; 20,000 acres – Summer Lake	Alkaline wetland habitat in Northern Basin and Range ecoregion	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended target: 95,000 acres in conservation status]
Initiate actions to maintain emergent wetland habitats in conservation status at the following locations: 500 acres – Warner Basin; 5,000 acres – Cheuwacan Marsh; 15,000 acres – Hart Mountain; 10,000 acres – Steens/Alvord; 40,000 acres – Harney Basin; 7,000 acres – Summer Lake; 3,000 acres Paulina Marsh	Wetland habitat in Northern Basin and Range ecoregion	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended target: 80,500 acres in conservation status]
Initiate actions to maintain wet meadow habitats in conservation status at the following locations: 3,000 acres – Warner Basin; 10,000 acres – Cheuwacan Marsh; 1,000 Lake Abert; 20,000 acres – Hart Mountain; 20,000 acres – Steens/Alvord; 50,000 acres – Harney Basin; 10,000 acres Silvies/Bear Valley; 20,000 acres Malheur Headquarters; 5,000 acres – Summer Lake; 5,000 acres Paulina Marsh	Wet meadow habitat in Northern Basin and Range ecoregion	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended target: 144,000 acres in conservation status]
Initiate actions to maintain riparian shrub habitats in conservation status at the following locations: 1,000 acres – Warner Basin; 500 acres – Hart Mountain; 1,000 acres – Steens/Alvord; 100 acres Trout Creek Mountains; 2,000 acres – Harney Basin; 300 acres – Aldrich Mountains; 200 acres – Malheur Headquarters	Riparian shrub habitat in Northern Basin and Range ecoregion	Eastside All-Bird Implementation Plan (Ivey 2000) [recommended target: 5,100 acres in conservation status]
Initiate actions (e.g., restoration, protection) at the landscape level to maintain more than 30% of the historical extent of each riparian system to conditions that support healthy (i.e., source) populations of priority species	Riparian habitat in Northern Basin and Range ecoregion	Partners in Flight Columbia Plateau Conservation Strategy (Altman and Holmes 2000)
Initiate actions (e.g., restoration, protection) in large areas of sagebrush habitat to maintain more than 50% of the landscape in mid-late seral stage with canopy cover more than 15% and at least one contiguous tract more than 1,000 acres	Sagebrush habitat in Northern Basin and Range ecoregion	Partners in Flight Columbia Plateau Conservation Strategy (Altman and Holmes 2000)
Restore drainage. Improve water management facilities. Use fishways, traps, and screens to limit carp migration to enhance productivity of wetlands and other aquatic habitats	Malheur Lake, Harney Basin	Joint Venture Implementation Plans for Eastern Oregon - Oregon Closed Basin (Ivey 2000)
Consider the impact of recreational activities (e.g., motorized watercraft; road usage) on water quality and watershed function	Aquatic habitat in Northern Basin and Range ecoregion	State of the Environment Report; Oregon Plan (OWEB); Total Maximum Daily Load Planning (ODEQ)
Focus conservation attention on critical aquatic habitats identified in American Fisheries Society survey work	Trout Creek Mountains area	Oregon Biodiversity Project. See: NOAA and NMFS biologists; ODFW; watershed councils; OWEB for further information.
Improve fish passage. For example, modify barriers or use spans where appropriate.	Stream habitat in Northern Basin and Range ecoregion	NWPCC Subbasin plans 2004 (Owyhee, Malheur); State of the Environment Report; ODFW Fish Passage team; Oregon Biodiversity Project; Oregon Plan (OWEB)

Actions	Strategy Habitat and General Location	Source Document
Work with forest managers to meet large wood loading benchmarks, reduce sediment, maintain water quality and continue to provide functional riparian habitat	Riparian habitat in Northern Basin and Range ecoregion	NWPCC Subbasin plans 2004 (Owyhee, Malheur); Oregon Plan (OWEB); Senate Bill 1010 Plans (ODA); Total Maximum Daily Load Planning (ODEQ)
Work with agricultural landowners to maintain water quality	All locations on agricultural lands (as appropriate) in Northern Basin and Range ecoregion	Senate Bill 1010 Plans (ODA) and Total Maximum Daily Load Planning (ODEQ)
Establish integrated framework for wetland restoration assessment, priority setting, and actions at three scales: watersheds, ecoregions and project sites	Wetlands	Recommendations for a nonregulatory wetland restoration program for Oregon. J.W. Good and C.B. Sawyer. 1998. Prepared for Oregon Division of State Lands and U.S. EPA Region X.
Increase incentives for proactive, nonregulatory wetland restoration and enhancement on private land, focusing on a combination of financial assistance, tax benefits, technical assistance, and education	Wetlands	Recommendations for a nonregulatory wetland restoration program for Oregon. J.W. Good and C.B. Sawyer. 1998. Prepared for Oregon Division of State Lands and U.S. EPA Region X.
Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology. - Plant vegetation to stabilize banks; leaving stumps, fallen trees and boulders in waterways - Maintain or enhance off channel or side channel meanders, habitat and pools	Aquatic habitats (streams, pools)	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. <i>See guide for specific technical recommendations, sources of information and assistance, and other guidelines.</i>
Maintain riparian and wetlands function: - Manage grazing, riparian vegetation planting and fencing, and livestock water facilities according to best practices, current techniques and with respect to natural hydrological conditions.	Riparian and wetlands habitats	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. <i>See guide for specific technical recommendations</i>
Upslope erosion control: - Create water and sediment control basins to contain runoff, wastewater - Use windbreaks (tree and shrub rows—using native plants) to reduce erosion and deposition - Upland terracing	Aquatics, riparian and wetland habitats	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. <i>See guide for specific technical recommendations</i>

**Note: Conservation Strategy monitoring indicators, linked with OSOER Key indicators, targets, and methods, will be identified in a statewide approach (See Monitoring chapter for more information).*

vation Agreement with three government agencies to repair freshwater habitat for redband trout, a candidate for federal protection at the time. Under this agreement, the ranch modified its grazing practices in riparian areas, restored streamside vegetation and screened off irrigation canals to prevent fish from entering. These efforts, as well as those taken by other ranches in the area that signed similar agreements, led the government to decide that federal protection for redband trout was not necessary.

Country Natural Beef is growing a successful, sustainable business that is balancing the needs of rangeland ecosystems with those of ranching families that depend on the resource base for a living.

Conservation Success Story: Fast food chain supports rangeland conservation

Fish and wildlife have an ally in Oregon-based Burgerville. In 2004, the Northwest fast food restaurant chain made a corporate decision to buy beef produced in a way that is more sensitive to rangeland habitat and species. This decision reinforces Burgerville's commitment to sustainable

business practices and to using the highest quality ingredients from Northwest producers.

Founded in Oregon, Country Natural Beef (also known as Oregon Country Beef) supplies Burgerville with more than 1.75 million pounds of naturally raised beef each year. Central to the philosophy of Country Natural Beef is the belief that rangeland stewardship is in the best, long-term interest of the resource base and the families whose livelihoods depend on it. Member ranches are certified by a third-party organization for following best grazing practices, which reduce the intensity and duration of cattle grazing on native grasses and shrubs like sagebrush. Country Natural Beef cattle also are raised without the use of growth hormones, antibiotics or animal-based feed – attributes that strongly appeal to health-conscious consumers.

Burgerville's customers have responded enthusiastically to the fast food burger chain's transition to Country Natural Beef. In the first two months following Burgerville's announcement in February 2004, sales increased 11 percent. For the rest of 2004 the trend continued with sales increases hovering about eight percent.

As Tara Wafers, Burgerville's Vice President for Marketing, says "Our sales data strongly suggest that our decision to carry exclusively Oregon Country Beef patties resonates with customers." She adds, "customers take comfort in the fact that their purchase helps local ranchers, Oregon's environment and is the best their money can buy."

Deciding Where to Work

Conservation Opportunity Areas Map and Profiles

Landowners and land managers throughout Oregon can contribute to conserving fish and wildlife by maintaining, restoring, and improving habitats. Conservation actions to benefit Strategy Species and Habitats are important regardless of location. However, focusing investments in certain priority areas can increase likelihood of long-term success over larger landscapes, improve funding efficiency, and promote cooperative efforts across ownership boundaries. Conservation Opportunity Areas are landscapes where broad fish and wildlife conservation goals would be best met. Conservation Opportunity Areas were developed to guide voluntary, non-regulatory actions. This map and the associated data

should only be used in ways consistent with these intentions. For more information on how Conservation Opportunity Areas were developed, see Appendix IV, "Methods" (beginning on page a:34).

The Conservation Opportunity Area profiles include information on recommended conservation actions, special features, key species, key habitats, and if the area has been identified as a priority by other planning efforts. These profiles highlight some priority actions to implement in individual Conservation Opportunity Areas, which can range from restoration projects to monitoring for invasive species. These recommendations were identified through existing plans, spatial analysis, and expert review. They are not meant to be exhaustive, so other actions also will be appropriate, as influenced by local site characteristics and management goals. Actions need to be compatible with local priorities, local comprehensive plans and land use ordinances, as well as other local, state, or federal laws. Actions on federal lands must undergo federal planning processes prior to implementation to ensure consistency with existing plans and management objectives for the area.

Lakeview Biomass Project

Approximately 84 percent of Oregon's forestlands currently are either moderately or highly departed from their historic fire regimes (Fire Condition Class II or III; see altered fire regime discussion in the State-wide Perspectives and Approaches chapter beginning on page 47). As a result, these forests are at risk of severe drought stress, insect and disease outbreaks, and uncharacteristically severe wildfires due to dense vegetation (including large volumes of biomass) and continuous fuels from the forest floor to the forest canopy. Addressing these issues will require removal of excess biomass in small to medium size trees, retention of large trees, and return of natural forest processes. Significant fish and wildlife benefits would come from restoring habitats, forest resilience, and water flows.

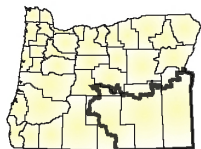
However, restoring wildlife habitats and ecological function presents technical, ecological, and economic challenges. Lake County exemplifies these challenges. The local forest sector industry, that could be mobilized to address the forest biomass issue, is dwindling. Additionally, the absence of economically viable utilization options for small diameter trees makes their removal prohibitively costly.

Innovative approaches are needed. An integrated solution will require a different forest management model that entails creation and application of new governance models, new forest management techniques and tools, new processes for utilizing forest products, and new

methods to contain costs and account for the full array of benefits derived from forest restoration. A proposed biomass energy facility in Lakeview potentially could contribute to such an integrated approach by reducing costs of habitat restoration activities and reducing wildfire risks, while increasing job opportunities. An efficient biomass energy facility would add a means for processing biomass and for making wood products from small-diameter trees.

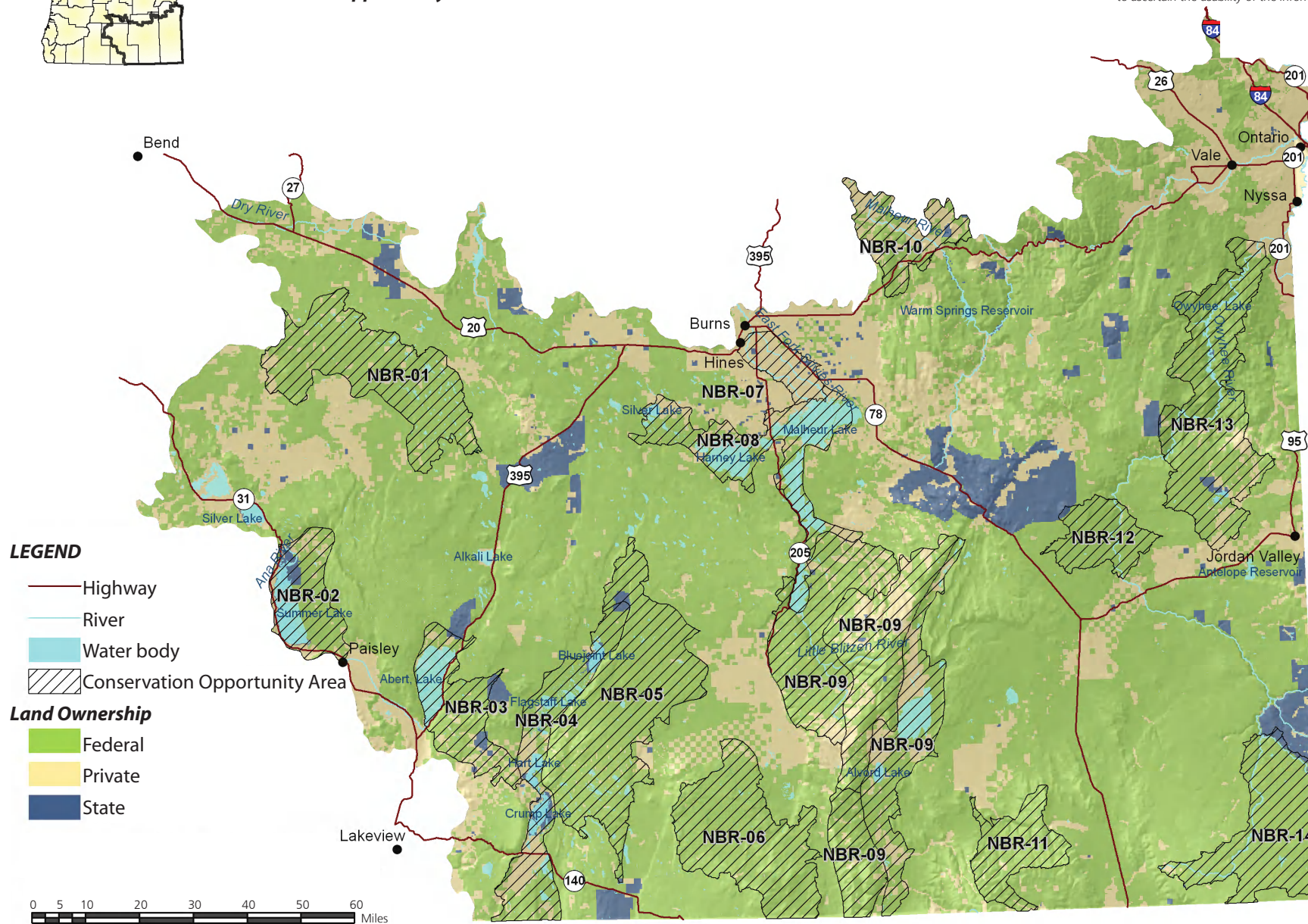
Project success will depend on overcoming several economic and policy challenges through the collaborative efforts of a diverse group of stakeholders. To facilitate this collaboration, Governor Theodore Kulongoski designated the Lakeview Biomass Project an Oregon Solutions project in January 2005, assuring participation of his staff and appropriate state agencies in a Community Governance process. Through a series of multi-stakeholder meetings, issues, challenges, and opportunities will be fully explored by local governments, state and federal agencies, businesses, non-profits and other interested parties. As an important first step in this project, partners will create a Declaration of Cooperation that will include implementation plans, guideposts, and benchmarks for success.

For more information, visit www.orsolutions.org/central/lakeviewbiomass.htm.



Northern Basin and Range Ecoregion Conservation Opportunity Areas

This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data information sources to ascertain the usability of the information.



Conservation Opportunity Area Profiles

NBR-01. Squaw Ridge area playas and sagebrush

This area is located along the western part of the ecoregion, following the high lava plains subregion from the Squaw Ridge Wilderness Study Area to just southeast of the Lost Forest Area of Critical Environmental Concern.

Special Features:

- *This area includes a large percentage of the ecoregion's playas, or ephemeral wetlands, which may provide important habitat for wildlife. The role of playas in ecosystem function is a data gap.*
- *Area includes important areas for sage grouse.*

Key Habitats:

- Big Sagebrush Shrublands
- Wetlands

Key Species:

- Ferruginous Hawk
- Sage Grouse
- Swainson's Hawk
- Pygmy Rabbit

Recommended Conservation Actions:

- Control spread of western juniper to maintain habitat values in sagebrush habitats
- Manage livestock grazing to promote recovery and maintenance of vernal pool (playa) wetlands
- Restore and maintain complex, continuous sage habitat

NBR-02. Summer Lake area

This area is comprised of Summer Lake and the surrounding high desert wetlands subregion, including much of the Diablo Mountain Wilderness Study Area.

Special Features:

- *Area includes the Summer Lake Wildlife Area, which encompasses more than 18,000 acres dominated by diverse freshwater and alkaline wetlands.*
- *Summer Lake provides some of the most important migratory habitat for birds along the Pacific Flyway. Total use by migratory waterfowl has exceeded 5 million use-days for ducks and 4 million use-days for white geese. Shorebird uses is estimated at 1 million use-days.*

- *Summer Lake supports high diversity of nesting waterbird and significant numbers of nesting waterfowl.*
- *Diablo Mountain Wildlife Study Area includes large blocks of salt desert scrub habitats.*

Key Habitats:

- Aquatic
- Salt Desert Scrub
- Wetlands

Key Species:

- Black-necked Stilt
- Long-billed Curlew
- Snowy Egret
- Western Snowy Plover
- Summer Basin Tui Chub

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Interior Columbia Basin Ecosystem Management Project (plant endemism area)
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Improve water delivery system at Summer Lake Wildlife Area to improve effectiveness of wetland management
- Maintain diverse wetland habitats

NBR-03. Lake Abert-Honey Creek area

This area encompasses Lake Abert and most of the Honey Creek drainage, including the Lake Abert Area of Critical Environmental Concern and the Abert Rim Wilderness Study Area.

Special Features:

- *Lake Abert is largest saline lake in Pacific Northwest and one of most important shorebird habitats in the Intermountain West. Bureau of Land Management has designated 50,000-acre area of critical environmental concern.*
- *Total waterbird use is estimated at more than 3.25 million bird use-days.*
- *Abert Rim supports significant numbers of nesting raptors.*
- *Honey Creek area has high diversity of high-quality habitats*

Key Habitats:

- Aquatic
- Aspen Woodland
- Big Sagebrush Shrublands
- Riparian
- Wetlands

Key Species:

- Black-necked Stilt
- Juniper Titmouse
- Western Snowy Plover
- Oregon Great Basin Redband Trout
- Oregon Lakes Tui Chub
- Warner Sucker

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Interior Columbia Basin Ecosystem Management Project (plant biodiversity area)
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Manage livestock grazing to promote recovery and maintenance of wet meadow, riparian, and aspen habitats
- Promote early detection and suppression of invasive weeds
- Restore and maintain complex, continuous sage habitat

NBR-04. Warner Basin

Adjacent to the Hart Mountain Refuge, this area includes the High Desert Wetlands from the Warner Wetlands south to the California border.

Special Features:

- *Area includes 90,000 acres of shallow lakes, marshes, and playa wetlands.*
- *The wetland complex here provides some of the most important habitat in the region for migratory birds.*
- *Bureau of Land Management designation provides special management for 51,000-acre Warner Wetlands Area of Critical Environmental Concern.*
- *This area provides habitat for large breeding populations of colonial nesting waterbirds and several species of endemic fish.*

Key Habitats:

- Aquatic

- Riparian
- Wetlands

Key Species:

- American White Pelican
- Black-necked Stilt
- Snowy Egret
- Western Snowy Plover
- Fosskett Spring Speckled Dace
- Warner Sucker
- Warner Valley Redband Trout

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Interior Columbia Basin Ecosystem Management Project (plant biodiversity and plant endemism area)
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Improve water management system to enhance wetlands at Warner Wetlands
- Initiate or continue wet meadow conservation and restoration efforts
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Manage livestock grazing to promote recovery and maintenance of wetland and riparian habitats
- Promote early detection and suppression of invasive weeds
- Protect springs as breeding sites for Warner sucker

NBR-05. Hart Mountain area

This area encompasses the Hart Mountain National Wildlife Refuge. It extends north to include the Orejana Canyon Wilderness Study Area and south just past the Guano Creek Wilderness Study Area.

Special Features:

- *Hart Mountain Refuge provides summer range habitat for a herd of migratory pronghorn, which winters in Nevada's adjacent Sheldon National Wildlife Refuge.*
- *There are many ongoing wildlife studies conducted on the refuge including those on pygmy rabbits, sagegrouse, bighorn sheep, coyote predation, and riparian conditions.*
- *The 278,000-acre refuge is one of the most expansive wildlife habitats in the arid West free of domestic livestock. [Hart Mtn Refuge website]*

- Seasonal wetlands provide important habitat for migrating waterfowl.

Key Habitats:

- Aquatic
- Aspen Woodland
- Big Sagebrush Shrublands
- Riparian
- Wetlands

Key Species:

- Ferruginous Hawk
- Sage Grouse
- Swainson's Hawk
- Catlow Tui Chub
- Catlow Valley Redband Trout
- Sheldon Tui Chub
- Pronghorn Antelope
- Pygmy Rabbit

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Interior Columbia Basin Ecosystem Management Project (plant biodiversity and plant endemism area)
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Initiate or continue wet meadow conservation and restoration efforts
- Maintain alkaline wetland habitats
- Maintain and restore aspen habitats
- Maintain and restore sagebrush-steppe habitats
- Promote early detection and suppression of invasive weeds
- Restore and maintain complex, continuous sage habitat

NBR-06. Basque Hills-Hawk Mountain area plains

This area encompasses most of Basque Hills and Rincon Wilderness Study Areas, and parts of two others (Spalding, Hawk Mountain), focusing on the greatest concentrations of sagebrush habitat.

Special Features:

- Area contains extensive, high-quality sagebrush habitats.

Key Habitats:

- Aspen Woodland

- Big Sagebrush Shrublands
- Wetlands

Key Species:

- Ferruginous Hawk
- Sage Grouse
- Swainson's Hawk
- Pygmy Rabbit

Recommended Conservation Actions:

- Control invasive weeds in unique high-quality grasslands
- Initiate or continue wet meadow conservation and restoration efforts
- Restore and maintain complex, continuous sage habitat

NBR-07. Silvies River Floodplain

Special Features:

- Seasonal wetlands maintained by flood irrigation and managed for hay production and livestock grazing provide high quality habitats for migrating waterfowl and other waterbirds, especially in spring.
- Floodplain habitats support significant numbers of nesting sandhill cranes and other waterbirds.
- Floodplain wetland restoration work undertaken by Ducks Unlimited, Harney Soil and Water Conservation District, Natural Resources Conservation Service, and other partners is restoring more than 2,000 acres of wetland and floodplain habitats along lower Silvies River.

Key Habitats:

- Aquatic
- Riparian
- Wetlands

Key Species:

- Black-necked Stilt
- Franklin's Gull
- Sandhill Crane
- Oregon Great Basin Redband Trout

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan

Recommended Conservation Actions:

- Initiate or continue wet meadow conservation and restoration efforts
- Maintain or enhance in-channel watershed function, connection

to riparian habitat, flow and hydrology

- Maintain traditional agricultural practices that enhance habitat for migratory birds
- Manage fish passage to control carp
- Manage livestock grazing to promote recovery and maintenance of wetland and riparian habitats
- Promote delayed haying to protect nesting birds
- Restore floodplain wetlands

NBR-08. Harney-Malheur area

This area includes Harney Lake and Malheur Lake, extending south to include the Donner and Blitzen River floodplain, and west to Silver Lake.

Special Features:

- *Area encompasses the Malheur National Wildlife Refuge.*
- *Includes some of most important wetland habitats in the west.*
- *Area receives heavy use by migrating waterfowl and other waterbirds.*
- *Area has a high diversity of breeding waterbirds, including the largest population of nesting sandhill cranes in Oregon.*
- *There is potential for significant increase in nesting waterfowl with effective carp control.*

Key Habitats:

- Riparian
- Wetlands

Key Species:

- American White Pelican
- Black-necked Stilt
- Ferruginous Hawk
- Franklin's Gull
- Sandhill Crane
- Snowy Egret
- Swainson's Hawk
- Western Snowy Plover

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Interior Columbia Basin Ecosystem Management Project (plant endemism area)
- Oregon Biodiversity Project Conservation Opportunity Areas (Steens Mountain)
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Control invasive carp and restore natural flows and channels in Blitzen River
- Maintain alkaline wetland habitats
- Manage wetlands to control, and where possible, eliminate carp
- Promote early detection and suppression of invasive weeds
- Restore drainage and manage water flows to maintain or enhance wetland habitats. Use fishways, traps, and screens to limit carp migration to enhance productivity of wetlands and other aquatic habitats
- Work with private lands to conserve wetlands and waterfowl/shorebird habitat

NBR-09. Steens Mountain-Alvord Basin

This area is divided into several parts including the Alvord Lake Basin, the Steens Mountain Uplands, the Pueblo Mountains, and the Steens Mountain High Lava Plains.

Special Features:

- *The unique habitat in this area is widely recognized as having significant biological value for plants and animals, resulting in many rare and endemic species.*
- *This area has exceptional diversity of high-quality habitats with high value for a wide variety of wildlife.*
- *Most of area receives some degree of protection under the Steens Mountain Cooperative Management and Protection Act.*
- *Area contains approximately 70% of the ecoregion's aspen and mountain mahogany woodlands*
- *This is an important area for migratory birds.*

Key Habitats:

- Aquatic
- Aspen Woodland
- Big Sagebrush Shrublands
- Riparian
- Wetlands

Key Species:

- Long-billed Curlew
- Sandhill Crane
- Alvord Cutthroat Trout
- Borax Lake Chub
- Catlow Tui Chub
- Catlow Valley Redband Trout
- Lahonton Cutthroat Trout
- Malheur Mottled Sculpin
- Sage-associated Species

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Interior Columbia Basin Ecosystem Management Project (plant biodiversity and plant endemism area)
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas (Steens Mountain)
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Control spread of western juniper to maintain habitat values in sagebrush, aspen, and riparian habitats
- Initiate or continue wet meadow conservation and restoration efforts
- Maintain alkaline wetland habitats
- Manage livestock grazing to promote recovery and maintenance of riparian habitats
- Promote early detection and suppression of invasive weeds
- Restore and maintain complex, continuous sage habitat
- Restore aspen woodlands and forests

NBR-10. Malheur River area

Key Habitats:

- Aquatic
- Big Sagebrush Shrublands
- Riparian

Key Species:

- Sage Grouse
- Willow Flycatcher
- Bull Trout (Columbia River Population)
- Inland Columbia Basin Redband Trout

Identified in other planning efforts:

- Interior Columbia Basin Ecosystem Management Project (plant biodiversity area)

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Manage sagebrush habitats to achieve and maintain habitat goals of Oregon Sage Grouse Strategy
- Restore drainage and manage water flows to maintain or enhance wetland habitats. Use fishways, traps, and screens to

limit carp migration to enhance productivity of wetlands and other aquatic habitats

- Restore ponderosa pine and aspen in riparian zone and in surrounding uplands

NBR-11. Trout Creek Mountains

Special Features:

- *Aspen and mountain mahogany woodlands provide important breeding habitat for many rare songbirds in Oregon including probable or confirmed nesting of the Gray-headed Junco and Virginia's warbler. [Important Bird Areas website]*
- *Area includes several Wildlife Study Areas and an Area of Critical Environmental Concern.*
- *Trout Creek and Oregon Canyon Mountains contain several rare fish species.*

Key Habitats:

- Aquatic
- Aspen Woodland
- Big Sagebrush Shrublands
- Riparian

Key Species:

- Gray-headed Junco
- Sage Grouse
- Songbirds
- Virginia's Warbler
- Lahonton Cutthroat Trout

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas

Recommended Conservation Actions:

- Manage livestock grazing to promote recovery and maintenance of wet meadow and riparian habitats
- Restore and maintain complex, continuous sage habitat
- Restore riparian zones and protect rare fish habitats

NBR-12. Saddle Butte

Located along the Owyhee River, this area encompasses most of the Saddle Butte Wilderness Study Area, including the Saddle Butte Area of Critical Environmental Concern (ACEC).

Key Habitats:

- Big Sagebrush Shrublands

Key Species:

- Ferruginous Hawk
- Sage Grouse
- Swainson's Hawk
- Pygmy Rabbit

Identified in other planning efforts:

- Oregon Biodiversity Project Conservation Opportunity Areas (Middle Owyhee River)
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Restore and maintain complex, continuous sage habitat

NBR-13. Middle Owyhee River Area**Special Features:**

- High quality mountain-mahogany-sagebrush communities in the Mahogany Ridge ACEC provide important habitat for many landbird species.
- Canyon areas provide habitat for a number of rare endemic plant species.
- Unique volcanic ashbeds provide habitat for endemic plants.

Key Habitats:

- Aspen Woodland
- Big Sagebrush Shrublands
- Riparian

Key Species:

- Columbia Spotted Frog
- Ferruginous Hawk
- Sage Grouse
- Swainson's Hawk

Identified in other planning efforts:

- Interior Columbia Basin Ecosystem Management Project (plant biodiversity area)
- Oregon Biodiversity Project Conservation Opportunity Areas
- The Nature Conservancy Ecoregional Assessment (Succor Creek)

Recommended Conservation Actions:

- Restore and maintain complex, continuous sage habitat

NBR-14. Upper Owyhee

Located in the southeast corner of the state, this area encompasses several Wilderness Study Areas including Owyhee Canyon, Lookout Butte, and Upper West Little Owyhee.

Special Features:

- Encompasses one of the largest remaining blocks of high quality sagebrush habitat in the west.
- Toppin Creek Butte ACEC / RNA (3,996 acres) was established here in 2002 by the BLM to protect high-quality sagebrush steppe communities and habitat for sage grouse and other landbirds. [Oregon Biodiversity Project website]
- The BLM recently (2003) adopted a new management strategy for the Louse Canyon wildlife area which emphasizes sagebrush-associated wildlife and at-risk species. [Oregon Biodiversity Project website]

Key Habitats:

- Big Sagebrush Shrublands
- Riverine Canyons

Key Species:

- Ferruginous Hawk
- Sage Grouse
- Swainson's Hawk
- Pygmy Rabbit

Identified in other planning efforts:

- Eastern Oregon Bird Conservation Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- Sage Grouse Plan
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Protect playas in SE corner of the state for newly discovered fairy shrimp population and other rare species/habitats
- Protect riverine canyons and riparian zones within them
- Restore and maintain complex, continuous sage habitat



Photo © Peg Boulay

West Cascades Ecoregion: Getting to Know the West Cascades Ecoregion

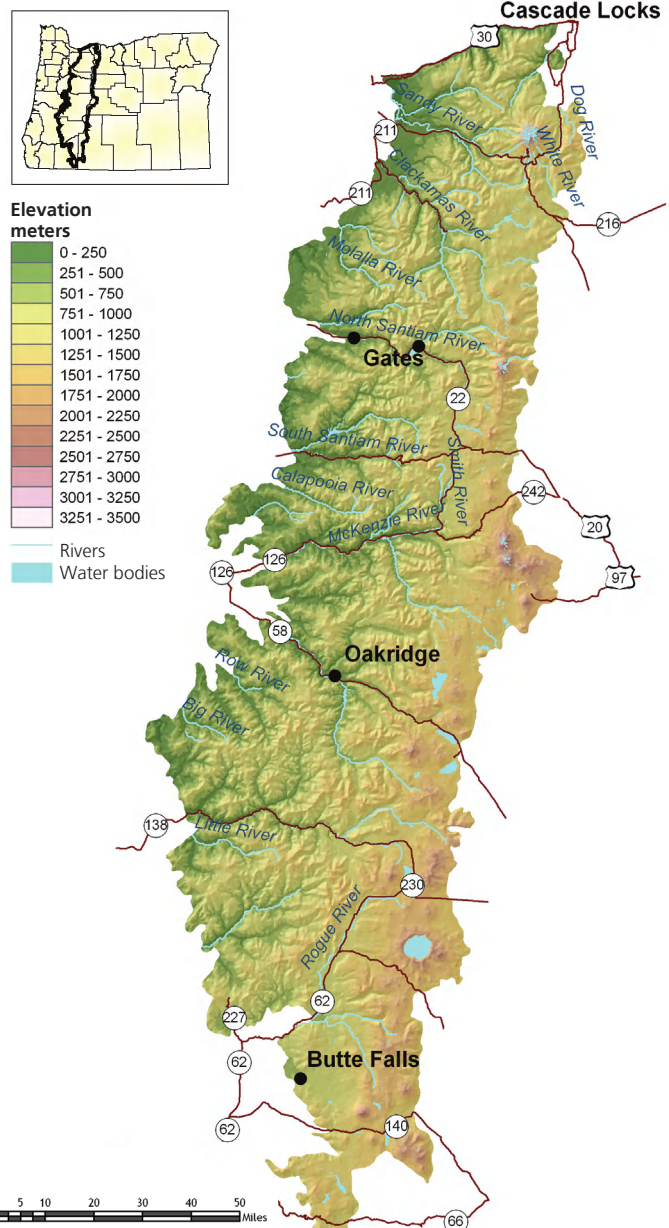
Getting to Know the West Cascades Ecoregion

Description

The West Cascades ecoregion extends from just east of the Cascade Mountains summit to the foothills of the Willamette, Umpqua and Rogue Valleys, and spans the entire length of the state of Oregon, from the Columbia River to the California border. The topography and soils of the West Cascades ecoregion has been shaped dramatically by its volcanic past. Geologically, the West Cascades has two distinct areas: the younger volcanic crest (approximately three million years old) and the “old Cascades” to the west of the crest (at least 30 million years old). The volcanic crest includes the highest peaks in Oregon: Mt. Hood, Mt. Jefferson, and North, Middle, and South Sisters, all more than 10,000 feet. The older western Cascade Mountain Range is characterized by long, steep ridges and wide, glaciated valleys.

This ecoregion is almost entirely forested by conifers, although the dominant tree species vary by elevation, site characteristics, and stand history. Douglas-fir is the most common tree below 4,000 feet, often with western hemlock as a co-dominant. At higher elevations, dominant tree species include Pacific silver fir, mountain hemlock, or subalpine fir. Other common conifers include western redcedar, grand fir, and noble fir. Above approximately 7000 feet, the conditions are too severe for tree growth, and alpine parklands and dwarf shrubs predominate, including some wetlands and barren expanses of rock and ice. The climate and resulting fire regime varies with latitude and elevation. Fire regimes in the forests vary across the ecoregion, with the northern portion of the ecoregion seeing less frequent but more severe fires, whereas the southern portion is typically drier with frequent, lightning-caused fires. In the southern areas with higher fire frequency, Ponderosa pine, sugar pine, and incense cedar often are found with Douglas-fir at the lower elevations. The climate varies with elevation. At the lower elevations, winter conditions are mild with high rainfall. Above 4,000 feet, much of the precipitation occurs as snowfall.

The West Cascades ecoregion houses just over one percent of Oregon's population, mostly in towns including Cascade Locks, Butte Falls, Detroit, Gates, Idanha, McKenzie Bridge, Blue River, Oakridge, Westfir, and part of Sweet Home (the remainder of which lies in the Willamette Valley ecoregion). Local economies were once entirely dependent on



"At a Glance"- Characteristics and Statistics**Land use (% of ecoregion):**

Agriculture	0%
Forest and woodland	96%
Other (lakes, wetlands, cliffs, etc.)	3.3%
Range, pasture, and grassland	0.5%
Towns and rural residential	0.1%
Urban and suburban	0%

Land ownership:

Private	23 %
Public, federal	76 %
Public, state and local	1 %
Native American	<1 %

Human population, government and transportation statistics:

Estimated population in 2000	48,000
% of Oregon's population in 2000	1.4%
Number of towns	11
Number of counties	12
<i>(includes parts of Clackamas, Deschutes, Douglas, Jackson Jefferson, Hood River, Klamath, Lane, Linn, Marion, Multnomah, Wasco counties)</i>	
Number of watershed councils	21
<i>(A watershed council is considered present if at least 10% of its area is located within the ecoregion.)</i>	
Miles of road	37,215

Economics:

Important industries: timber, recreation

Major crops: some fruits; mint

Important nature-based recreational areas: Mt Hood, Willamette, Umpqua, and Rogue River national forests; Waldo Lake; Odell Lake; Detroit and Hills Creek Reservoirs; includes about half of Crater Lake National Park

Ecology:

Average annual precipitation	42" – 89 " (snowfall 7" - 233")
Average July high temperature (1971-2000)	75.6°F –86°F
Average January low temperature (1971-2000)	21.7°F –33.5°F
Elevation	98 feet (along the western border of the ecoregion) to 11,040 feet (along the Cascades)
Number of regularly occurring vertebrate wildlife species	322
Important rivers	Clackamas (Oak Grove Fork); McKenzie; Rogue; Umpqua; Breitenbush; Middle Santiam; North and Middle Fork of the Willamette

Information Sources: Oregon Blue Book (2003-04), Oregon Climate Service data (1971-2000), Oregon State of the Environment Report (2000), Oregon Watershed Enhancement Board (2001), Oregon Wildlife Diversity Plan (1993), U.S. Census Bureau (2000).



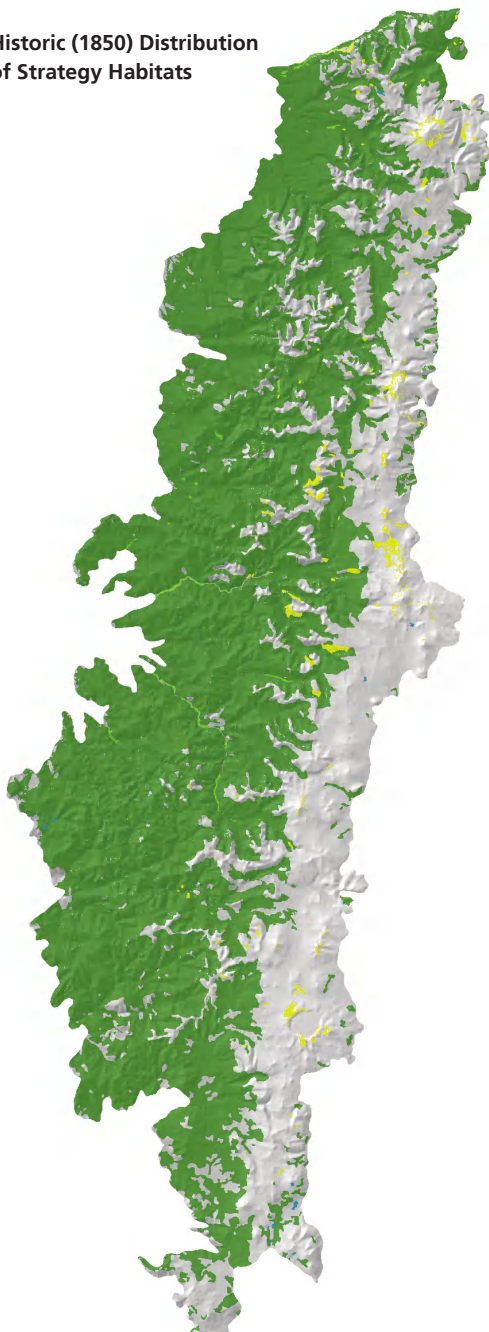
Photo © Bruce Newhouse

Summary List of Strategy Habitats

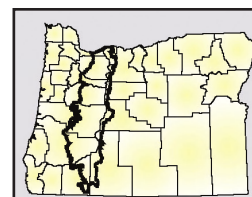
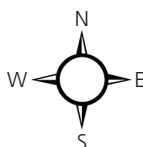
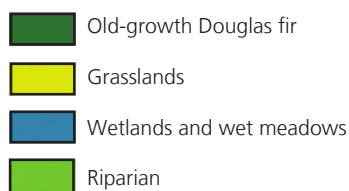
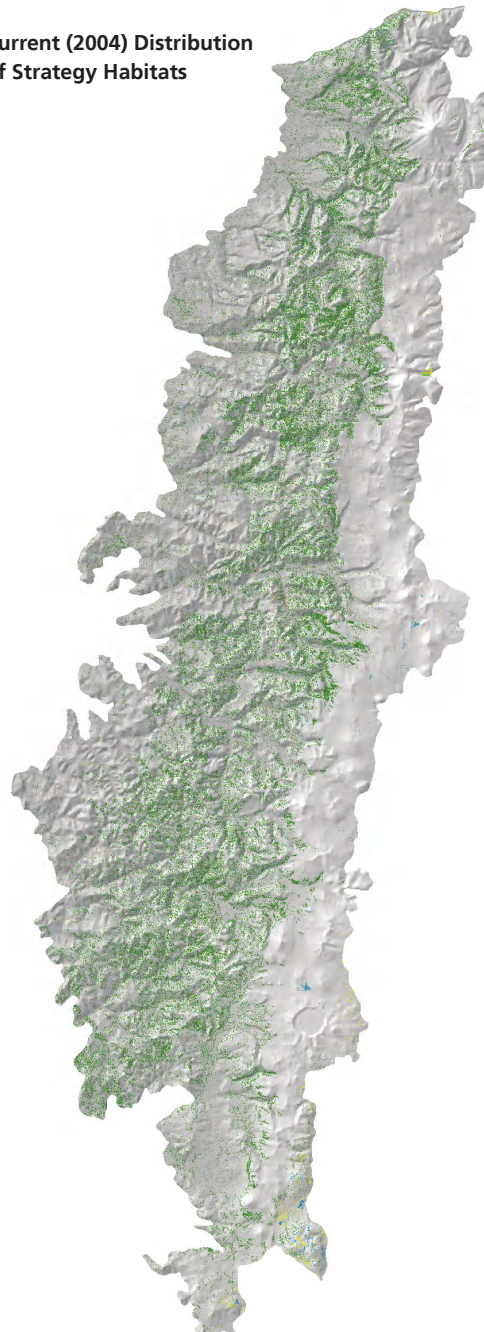
Strategy Habitats in the West Cascades ecoregion include: late successional conifer (especially Douglas-fir) forests, oak woodlands, grasslands (including montane grasslands and oak savannas), wetlands, riparian, and aquatic habitats.

Change in West Cascades Strategy Habitats

Historic (1850) Distribution of Strategy Habitats



Current (2004) Distribution of Strategy Habitats



Data Source: Oregon Natural Heritage Information Center, 2004.

timber harvest, but have been greatly affected as market conditions, long-term and broad-scale changes in the forest products marketplace, and shifts in public forest management priorities have shaped Oregon's timber industry. Many towns are increasingly promoting recreational opportunities - including hiking, camping, fishing, hunting, birding, mountain biking and skiing - to supplement timber harvest revenue. However, timber harvest is expected to remain important to local West Cascades economies in the future.

Conservation Issues and Actions

Overview

Of all of Oregon's ecoregions, the West Cascades is considered the healthiest by several indicators. For example, this ecoregion has the highest water quality in the state, and the fewest problems with water allocation and quantity. Very few species have been extirpated from this ecoregion, and there has been considerable effort toward recovering

Summary List of Strategy Species

Mammals

American marten
California myotis (bat)
Fisher
Fringed myotis (bat)
Hoary bat
Long-legged myotis (bat)
Red tree vole
Ringtail
Silver-haired bat
Townsend's big-eared bat

Plants

Northern wormwood
Umpqua mariposa-lily
Wayside aster
White Rock larkspur

Amphibians & Reptiles

Cascades frog
Cascade torrent salamander
Clouded salamander
Coastal tailed frog
Cope's giant salamander
Foothill yellow-legged frog
Larch Mountain salamander
Oregon slender salamander
Oregon spotted frog
Western toad
Northwestern pond turtle
Western painted turtle

Fish

Bull trout (Columbia Distinct Population Segment [DPS])

Fish Cont.

Bull Trout (Klamath River population)
Chinook salmon (Lower Columbia River ESU, spring run)
Chinook salmon (Lower Columbia River ESU, fall run)
Chinook salmon (Snake River ESU, spring/summer run)
Chinook salmon (Snake River ESU, fall run)
Chinook salmon (Southern Oregon/Northern California Coast ESU, fall run)
Chinook salmon (Upper Willamette River ESU, spring run)
Coastal cutthroat trout (Oregon Coast ESU)
Coastal cutthroat trout (Southern Oregon/California Coasts ESU)
Coastal cutthroat trout (Southwestern Washington/ Columbia River ESU)
Coastal cutthroat trout (Upper Willamette River ESU)
Coho salmon (Lower Columbia River/SW Washington Coast ESU)
Coho salmon (Oregon Coast ESU)
Coho salmon (Southern Oregon/Northern California Coasts ESU)
Oregon chub
Pacific lamprey
Steelhead (Klamath Mountains Province ESU, summer run)
Steelhead (Klamath Mountains Province ESU, winter run)
Steelhead (Lower Columbia River ESU, summer run)

Fish Cont.

Steelhead (Lower Columbia River ESU, winter run)
Steelhead (Middle Columbia River ESU, summer run)
Steelhead (Middle Columbia River ESU, winter run)
Steelhead (Oregon Coast ESU, summer run)
Steelhead (Oregon Coast ESU, winter run)
Steelhead (Snake River Basin ESU)
Steelhead Upper Willamette River ESU, winter run)
Umpqua chub
Western brook lamprey

Birds

Band-tailed pigeon
Barrow's goldeneye
Black swift
Bufflehead
Greater sandhill crane
Northern goshawk
Northern spotted owl
Olive-sided flycatcher

Invertebrates

Columbia Gorge caddisfly
"Constricted" caddisfly (no common name)
Johnson's hairstreak
Scott's apatanian caddisfly
Wahkeena Falls flightless stonefly
Terrestrial snails:
Chace sideband
Traveling sideband

threatened and endangered species. Much of the remnant classic late successional forests on public land are managed with an emphasis on biodiversity under the Northwest Forest Plan. Although focused on the spotted owl, the plan was intended to address the needs of a wide array of species affected by loss and fragmentation of late successional forests, and covers more than 1,000 species of plants, animals, and fungi. (See Northwest Forest Plan description in Appendix II). However, the adaptive management component of the Northwest Forest Plan has not been fully implemented. Also, many forests in the West Cascades ecoregion are in Fire Regime Condition Class II, with moderate risk of losing one or more ecosystem components.

Ecoregion-level limiting factors and recommended approaches

All six of the key conservation issues apply statewide, as do the approaches outlined in the Statewide Perspectives and Approaches chapter. However, altered fire regimes and invasive species are described further in this section, considering the West Cascades' ecoregional characteristics.

Factor: Altered fire regimes: Many forests in the West Cascades ecoregion are in Fire Regime Condition Class II, with moderate risk of losing one or more ecosystem components. Efforts to reduce

risks of uncharacteristically severe fires can help to restore habitat, but require careful planning to provide sufficient habitat features that are important to wildlife (e.g., snags, down logs, hiding cover for big game).

Approach: Use an integrated approach to wildfire issues that considers historic conditions, wildlife conservation, natural fire intervals, and silvicultural techniques. Encourage forest management at a broad scale to address limiting factors. Reintroduce fire where feasible; prioritize sites and applications. Maintain important wildlife habitat features such as snags and logs at a level to sustain wood-dependent species. Monitor these efforts and use adaptive management techniques to ensure efforts are meeting habitat restoration and wildfire prevention objectives with minimal impacts on wildlife.

Factor: Invasive species: Non-native plant and animal invasions disrupt native communities, diminish populations of at-risk native species, and threaten the economic productivity of resource lands. Although the West Cascades has fewer invasives than other ecoregions, invasives are a problem at lower elevations, in disturbed areas, and some sensitive habitats. False brome threatens to dramatically alter forest understories.

Approach: Emphasize prevention, risk assessment, early detection and quick control to prevent new invasives from becoming fully estab-

Dragonflies and Damselflies: Citizen-based monitoring in action

With an amazing array of colors and patterns, acrobatic flying skills, and an appetite for mosquitoes, dragonflies have become almost as popular as butterflies. Dragonflies and their damselfly "cousins" are probably "older", in an evolutionary sense, than dinosaurs and ancient birds. All dragonflies develop in water, but some have very specific habitat requirements while others will tolerate a wide range of conditions. Some dragonflies prefer still water, others prefer fast-flowing water, and still others prefer brackish water. In general, conservation actions that preserve high quality water bodies and wetlands benefit dragonflies. Because dragonflies are quickly attracted to suitable habitat, creating or maintaining pond and wetland habitat is one easy way to help dragonflies. Planting native plants and maintaining hedgerows and other brushy areas also will help dragonflies. Local conservation groups are even promoting "dragonfly watching" for recreation, education and monitoring populations. For example, variegated meadowhawk dragonfly migrations can be observed in late summer in Oregon. Some of these meadowhawks fly hundreds of miles along the northwest coast to spend the winter in warmer climates. Sometimes, dozens to

hundreds of dragonflies may be seen flying overhead each minute. There is still a great deal that people don't understand about this migration, including exactly where the dragonflies breed, where they are coming from, where they are going, why they are going there, or how often they also migrate inland. By observing dragonfly migration, people can help scientists answer some of these questions. Finding out this information will help in determining specific habitat requirements and, ultimately, conservation actions that will help to keep these common, but beautiful, species remain common. For more information see:

- Dragonfly Society of the Americas:
<http://www.afn.org/~jori/dsaintro.html>
- Oregon Dragonfly Migration project:
http://www.ent.orst.edu/ore_dfly/migrate.htm#top

Invasive Non-native Species

Invasive species currently are considered to be one of the primary causes of species becoming threatened and endangered, second only to habitat conversion. Many species are as threatening to people's livelihoods as they are to fish, wildlife and their habitats. This section identifies the species with the greatest current and potential impact in the West Cascades. They were determined through an analysis of Oregon Department of Agriculture's Noxious Weed List, ODFW's Wildlife Integrity Rules, ODFW's Introduced Fish Management Strategies report, information from Portland State University Center for Lakes and Reservoirs, and local expert review. Although some of these species also cause significant economic damage to farms, ranches, and managed forests, this list is focused on those that cause the most severe ecological damage. Impacts from introduced game fish vary from species to species and within ecoregions. As a result, the impacts need to be evaluated more locally (ODFW Introduced Fish Management Strategies Report).

Known invasive non-native animal and plant species

These species are established or documented in this ecoregion, and are known to impact native fish and wildlife populations and habitats. They may range from small, controllable populations to widespread infestations.

Documented Invasive Animals

Bluegill
Brook trout
Brown bullhead
Brown trout
Bullfrog
Carp
Catfish
Crappie
Eastern snapping turtle
European starling
Feral pig
Golden shiner
House sparrow
Lake trout
Largemouth bass
Mosquito fish (*Gambusia*)
Norway rat
Nutria
Smallmouth bass
Striped bass
Virginia opossum
Walleye

Documented Invasive Plants

Armenian (Himalayan) blackberry
Butterfly bush
Canada thistle
Curly leaf pondweed (aquatic)
Dalmation toadflax
Diffuse knapweed
Dyers woad
False brome
Giant hogweed
Japanese knotweed
Leafy spurge
Meadow hawkweed
Meadow knapweed
Mouse ear hawkweed
Orange hawkweed
Portuguese broom
Puncture vine
Purple loosestrife
Reed canarygrass
Rush skeletonweed
Scotch broom
Spanish broom
Spotted knapweed
St. Johnswort
Tansy ragwort
Tree of heaven
Woolly distaff thistle
Yellow flag iris (aquatic, riparian)
Yellow star-thistle

Non-native animals and plants of potential concern

Preventing the establishment of invasive non-native species is far more cost-effective and practical than trying to eradicate them once they are established. To make the best use of financial and personnel resources, prevention efforts need to be prioritized to address the greatest threats, especially since many non-native species do not pose a significant threat to fish and wildlife populations and habitats. Potentially harmful non-native species can be identified by examining biological factors, potential impacts and invasion patterns in similar climates. The species listed here are included because: 1) they are not known to occur in this ecoregion, but could pose a threat to fish and wildlife populations and habitats if they become established; or 2) they are known to occur in this ecoregion but the extent to which they impact native species and disrupt ecological processes is unclear at this time.

Potentially Invasive Non-native Animals

Asian carp (bighead, silver)
Banded killfish
New Zealand mudsnail
Oriental weatherfish
Round goby
Ruffe
Rusty crayfish
Snakeheads
Zebra mussel

Potentially Invasive Non-native Plants

Coltsfoot (*Tussilago*)
Gorse
Ovate goatgrass
Pondwater starwort (aquatic)
Purple star-thistle
Squarrose knapweed
Syrian beancaper
Texas blueweed

Conservation actions in the West Cascade Ecoregion identified through other planning efforts

Landowners and land managers can benefit a variety of fish and wildlife species by managing and restoring Strategy Habitats. The following recommendations are relevant to Strategy Habitats. They were identified through a review of existing plans.

Actions	Strategy Habitat and General Location	Source document
Maintain existing late successional habitat and initiate actions to develop or restore late successional forest where appropriate	Late successional forests throughout ecoregion	Oregon-Washington Partners in Flight Westside Coniferous Forests Conservation Strategy (Altman 2000) [recommended target: more than 15% of large landscapes in late successional forests throughout ecoregion]
Maintain connectivity, structural complexity and heterogeneity of landscapes	West Cascades; directed at priority sites based upon species surveys; specific recommendations for reserves and other features in light of species surveys	Northwest Forest Plan (1994; continual updates)
Consider the impact of recreational activities (e.g., motorized watercraft; shoreline activities; road usage) on water quality and watershed function	All locations (as appropriate)	State of the Environment Report; Oregon Plan (OWEB) As appropriate, see Senate Bill 1010 Plans (ODA) and Total Maximum Daily Load Planning (ODEQ)
Focus conservation attention on critical aquatic habitats identified via American Fisheries Society and other standards	Umpqua headwaters area; lower McKenzie watershed around Vida	Oregon Biodiversity Plan See: NOAA and NMFS biologists; ODFW; watershed councils; OWEB for further information.
Improve fish passage. For example, modify barriers or use spans where appropriate.	All locations (as appropriate)	NWPCC Subbasin Plans 2004; State of the Environment Report; Oregon Biodiversity Project; Oregon Plan (OWEB)
Modify practices in forests to meet large wood levels, reduce sediment, maintain water quality and continue to prevent warming and provide riparian habitat	All locations (as appropriate)	NWPCC Subbasin Plans 2004; Oregon Plan (OWEB); Senate Bill 1010 Plans (ODA); Total Maximum Daily Load Planning (ODEQ)
Establish integrated framework for wetland restoration assessment, priority setting, and actions at three scales: watersheds, ecoregions and project sites	Wetlands	Recommendations for a nonregulatory wetland restoration program for Oregon. J.W. Good and C.B. Sawyer. 1998. Prepared for Oregon Division of State Lands and U.S. EPA Region X.
Increase incentives for proactive, nonregulatory wetland restoration and enhancement on private land, focusing on a combination of financial assistance, tax benefits, technical assistance, and education	Wetlands	Recommendations for a nonregulatory wetland restoration program for Oregon. J.W. Good and C.B. Sawyer. 1998. Prepared for Oregon Division of State Lands and U.S. EPA Region X.
Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology. - Plant vegetation to stabilize banks; leaving stumps, fallen trees and boulders in waterways - Maintain or enhance off channel or side channel meanders, habitat and pools	Aquatic habitats (lakes, ponds, streams, pools)	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. <i>See guide for specific technical recommendations, sources of information and assistance, and other guidelines.</i>
Maintain riparian and wetlands function: - Manage grazing, riparian vegetation planting and fencing, and livestock water facilities according to best practices, current techniques and with respect to natural hydrological conditions.	Riparian and wetlands habitats	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. <i>See guide for specific technical recommendations</i>
Upslope erosion control: - Create water and sediment control basins to contain runoff, wastewater - Use windbreaks (tree and shrub rows – using native plants) to reduce erosion and deposition - Upland terracing	Aquatics, riparian and wetland habitats	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. <i>See guide for specific technical recommendations</i>

**Note: Conservation Strategy monitoring indicators, linked with OSOER Key indicators, targets, and methods, will be identified in a statewide approach (See Monitoring chapter for more information).*

lished. Prioritize efforts to focus on key invasive species in high priority areas, particularly where Strategy Habitats and Species occur. Where needed, use multiple site-appropriate tools (mechanical, chemical and biological) to control the most damaging invasive species. Promote the use of native “local” stock for restoration and revegetation.

Conservation Success Story – Jim’s Creek

The West Cascades foothills once had extensive woodlands and savannas of widely-spaced large Oregon white oak, ponderosa pine and Douglas-fir trees with a grass and wildflower understory. Native Americans are thought to have maintained these habitats through the use of fire, which produced forage for big game, improved traveling conditions, and selected for important subsistence plants such as camas, tarweed, and desert-parsleys. As a result of changes in fire frequency and intensity after European settlement, Douglas-fir now dominates in many of these areas, and many of the open woodlands and savannas converted to forests. Almost 95 percent of open oak and pine habitats have been lost in this ecoregion. Currently, remnant patches of oak-pine woodlands and savannas are found on the margins of the Willamette, Umpqua, and Rogue valleys and some dry, south-facing mid-elevation slopes.

One site with a remnant oak-pine woodland and evidence of Native American use is the area around Jim’s Creek, on the Willamette National Forest near Oakridge. The site’s important ecological and cultural value has inspired a comprehensive planning effort to restore some of the oak-pine habitat. Once a savanna with large, scattered oak, pine, and Douglas-fir trees, the area is dominated by a relatively dense Douglas-fir forest. Several of the large ponderosa pines have scars characteristic of bark removal. Native Americans removed the inner bark (cambium) for medicine, so these large trees are considered “medicine trees.” However, the large pines are declining in health, and oaks are now restricted to the margins of small, rocky openings. With no pine or oak regeneration occurring, the site will convert to a Douglas-fir forest if no actions are taken. The large heritage ponderosa pine trees will be lost.

In response, the Willamette National Forest began an extensive outreach effort to the communities of Oakridge and Eugene, including political leaders, Native American leaders, the timber industry, and environmental groups to discuss the issues and ask people how they thought the landscape should be managed. Ecological studies on current and historic vegetation, small mammal populations, and fish populations have been initiated to determine restoration opportunities and to guide management in an adaptive management approach.

These ecological studies also will provide valuable lessons that could be applied to other sites. So far, competing conifers have been removed from around several large oak and ponderosa pine trees in three test treatment plots. The plots are being used to demonstrate potential techniques and results. The plots also will test the effects of treatment on the individual oak and pine trees. The extensive planning process will be completed in 2005, with potential treatments being implemented in 2006. The Jim’s Creek project is a comprehensive approach to building partnerships and planning science-based restoration that will hopefully restore an important cultural and ecological landscape for future generations to enjoy.

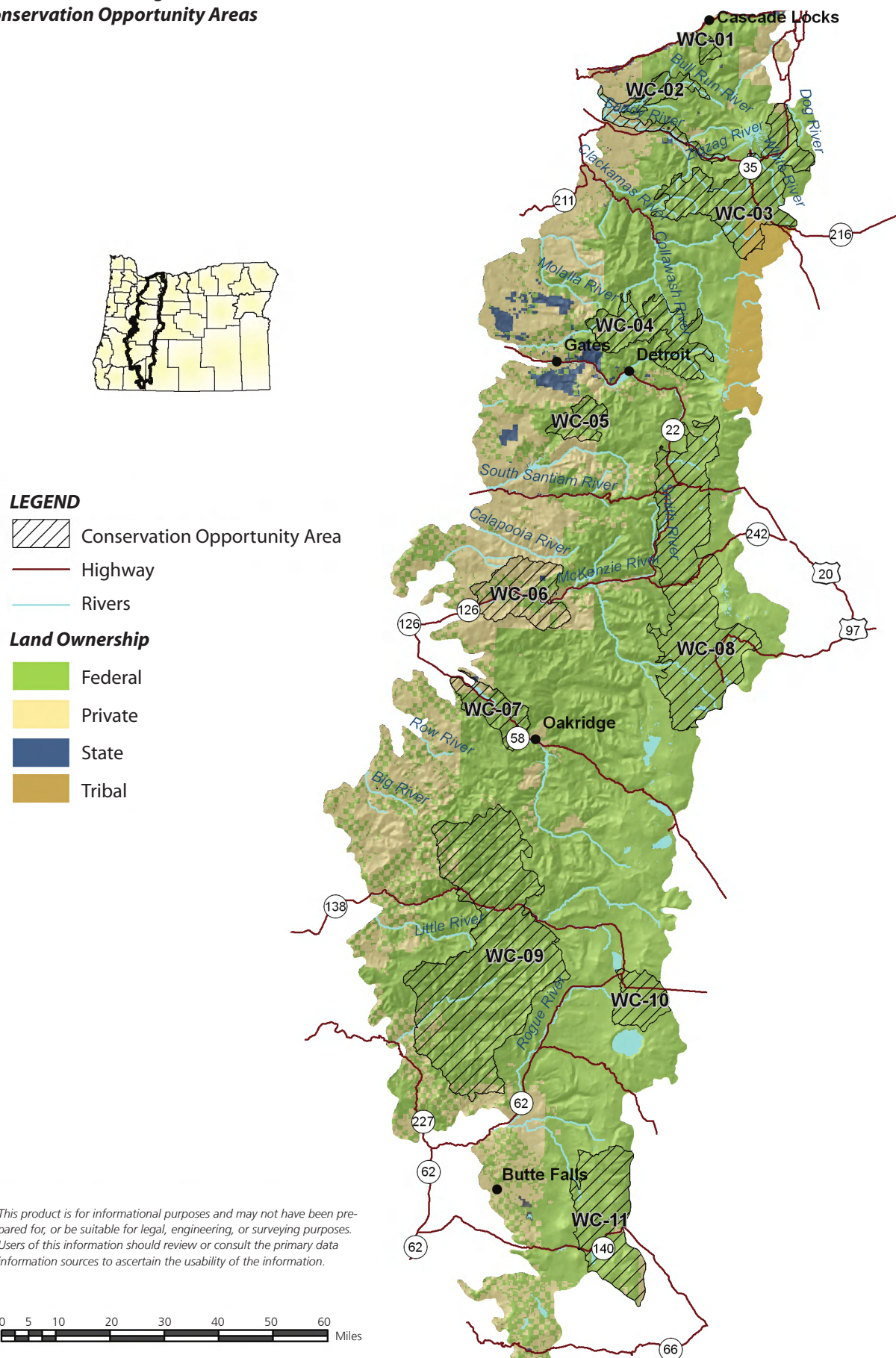
Deciding Where to Work

Conservation Opportunity Areas Map and Profiles

Landowners and land managers throughout Oregon can contribute to conserving fish and wildlife by maintaining, restoring, and improving habitats. Conservation actions to benefit Strategy Species and Habitats are important regardless of location. However, focusing investments in certain priority areas can increase likelihood of long-term success over larger landscapes, improve funding efficiency, and promote cooperative efforts across ownership boundaries. Conservation Opportunity Areas are landscapes where broad fish and wildlife conservation goals would be best met. Conservation Opportunity Areas were developed to guide voluntary, non-regulatory actions. This map and the associated data should only be used in ways consistent with these intentions. For more information on how Conservation Opportunity Areas were developed, see Appendix IV, “Methods” (beginning on page a:34).

The Conservation Opportunity Area profiles include information on recommended conservation actions, special features, key species, key habitats, and if the area has been identified as a priority by other planning efforts. These profiles highlight some priority actions to implement in individual Conservation Opportunity Areas, which can range from restoration projects to monitoring for invasive species. These recommendations were identified through existing plans, spatial analysis, and expert review. They are not meant to be exhaustive, so other actions also will be appropriate, as influenced by local site characteristics and management goals. Actions need to be compatible with local priorities, local comprehensive plans and land use ordinances, as well as other local, state, or federal laws. Actions on federal lands must undergo federal planning processes prior to implementation to ensure consistency with existing plans and management objectives for the area.

West Cascades Ecoregion Conservation Opportunity Areas



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data information sources to ascertain the usability of the information.

Conservation Opportunity Area Profiles

WC-01. Eagle Creek

Located at the northern edge of the ecoregion in the Hatfield Wilderness, this area is comprised of the Eagle Creek drainage which flows into the Columbia River.

Key Habitats:

- Aquatic
- Late Successional Douglas-fir Forests
- Riparian
- Wetlands And Wet Meadows

Key Species:

- Cascade Torrent Salamander
- Cope's Giant Salamander
- Larch Mountain Salamander
- Oregon Slender Salamander
- Northern Goshawk
- Coastal Cutthroat Trout

Recommended Conservation Actions:

- Initiate or continue wet meadow conservation and restoration efforts
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

WC-02. Bull Run-Sandy Rivers

Special Features:

- *Area contains the Sandy River Gorge Preserve and a portion of the Sandy designated as a Wild and Scenic River.*
- *Much of the Bull Run River area is within a Forest Service designated Late Successional Reserve.*
- *Important area for winter steelhead, fall Chinook salmon and spring Chinook salmon*

Key Habitats:

- Aquatic
- Late Successional Douglas-fir Forests
- Riparian

Key Species:

- Cascade Torrent Salamander
- Cope's Giant Salamander
- Oregon Slender Salamander
- Oregon Spotted Frog
- Northern Goshawk
- Coho Salmon

- Fall Chinook Salmon
- Winter Steelhead

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

WC-03. Mt. Hood area

Special Features:

- *Area includes Bonney Butte, an important funnel for migratory raptors, which has been a Hawkwatch International monitoring site since 1994. Up to 18 species of raptors have been observed in a single season.*
- *This area represents a large percentage of the ecoregion's habitat for several amphibian species.*

Key Habitats:

- Late Successional Douglas-fir Forests

Key Species:

- Cascade Torrent Salamander
- Cascades Frog
- Coastal Tailed Frog
- Cope's Giant Salamander
- Larch Mountain Salamander
- Oregon Slender Salamander
- Bufflehead
- Northern Goshawk
- Coastal Cutthroat Trout

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas (along the Salmon, White, and Roaring Rivers)
- Oregon's Important Bird Areas

WC-04. Bull of the Woods area

Special Features:

- *Area includes the Bull of the Woods Wilderness.*

Key Habitats:

- Aquatic
- Late Successional Douglas-fir Forests

Key Species:

- Cascade Torrent Salamander
- Great Gray Owl
- Northern Goshawk

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Area

WC-05. Quartzville Creek area

Special Features:

- *BLM is negotiating to acquire the remaining parcels of private land that are adjacent to the creek within the Wild and Scenic corridor. [Oregon Important Bird Areas website]*
- *The Quartzville Creek Basin represents a significant percentage of breeding habitat for the harlequin duck.*

Key Habitats:

- Aquatic
- Late Successional Douglas-fir Forests

Key Species:

- Cascade Torrent Salamander
- Larch Mountain Salamander
- Oregon Slender Salamander
- Harlequin Duck

Identified in other planning efforts:

- Oregon's Important Bird Areas

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology

WC-06. McKenzie River area

Special Features:

- *Federal land in this area is designated as an adaptive management area, designed to emphasize research on ecosystem function in forested landscapes.*
- *Area encompasses two aquatic diversity areas.*
- *Habitat for several amphibian species.*

Key Habitats:

- Aquatic
- Late Successional Douglas-fir Forests
- Riparian

Key Species:

- Coastal Tailed Frog
- Harlequin Duck
- Bull Trout (Columbia River Population)

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Oregon Biodiversity Project Conservation Opportunity Areas

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

WC-07. Middle Fork Willamette River

Special Features:

- *Area contains the North Fork Willamette Wild and Scenic River.*

Key Habitats:

- Aquatic
- Late Successional Douglas-fir Forests

Key Species:

- Oregon Slender Salamander
- Bull Trout (Columbia River Population)
- Oregon Chub
- American Marten
- Fisher
- Fringed Bat

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology

WC-08. Central Cascades Crest

Special Features:

- *Containing parts of several wilderness areas, this large area is almost entirely managed for conservation values.*

Key Habitats:

- Late Successional Douglas-fir Forests
- Montane Grasslands
- Wetlands And Wet Meadows

Key Species:

- Cascade Torrent Salamander
- Cascades Frog
- Coastal Tailed Frog
- Oregon Slender Salamander
- Oregon Spotted Frog
- Black Swift
- Bufflehead
- Northern Goshawk
- Sandhill Crane
- American Marten
- Fisher

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas

Recommended Conservation Actions:

- Initiate or continue wet meadow conservation and restoration efforts

WC-09. Umpqua Headwaters

Area includes the headwaters of the North and South Umpqua Rivers.

Special Features:

- *This area encompasses some of the ecoregion's most important salmonid habitat, including 11 American Fisheries Society aquatic diversity areas.*
- *Much of this area has been designated by the US Forest Service as a Late Successional Reserve.*
- *The northwestern pond turtle can be observed in low elevation lakes and streams throughout this area, particularly in the South Umpqua area. There are documented nesting sites and observed hatchlings here.*

Key Habitats:

- Aquatic
- Late Successional Douglas-fir Forests

Key Species:

- Cascades Frog
- Foothill Yellow-legged Frog
- Larch Mountain Salamander
- Great Gray Owl
- Northern Goshawk
- Coastal Cutthroat Trout
- Coho Salmon
- Summer Steelhead
- Umpqua Oregon Chub
- Winter Steelhead
- American Marten
- Fisher
- Fringed Bat
- Townsend's Big-eared Bat
- Northwestern Pond Turtle

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Oregon Biodiversity Project Conservation Opportunity Areas
- The Oregon Plan Core Salmon Areas

Recommended Conservation Actions:

- Consider the impact of recreational activities (e.g., motorized watercraft; shoreline activities; road usage) on water quality and watershed function

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology

WC-10. Crater Lake**Special Features:**

- *Most of this area is within Crater Lake National Park, 90% of which is managed as a wilderness.*
- *Area contains 8% of the ecoregion's wetlands and wet meadows.*

Key Habitats:

- Wetlands And Wet Meadows

Key Species:

- Cascades Frog
- Bufflehead
- Olive-sided Flycatcher
- American Marten
- Canada Lynx

WC-11. Pelican Butte-Sky Lakes area**Special Features:**

- Most of this area is managed for conservation values, including the Sky Lakes Wilderness, Mountain Lakes Wilderness, and land designated as Late Successional Reserve.
- Area contains 87% of the ecoregion's grasslands and 48% of the ecoregion's wetlands and wet meadows.

Key Habitats:

- Montane Grasslands
- Wetlands And Wet Meadows

Key Species:

- Oregon Spotted Frog
- Sandhill Crane
- Bull Trout (Klamath River Population)
- Klamath Basin Redband Trout
- Lost River Sucker

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas

Getting to Know the Willamette Valley Ecoregion

Bounded on the west by the Coast Range and on the east by the Cascade Mountains, this ecoregion encompasses 5,308 square miles and includes the Willamette Valley and adjacent foothills. Twenty to 40 miles wide and 120 miles long, the valley is a long, level alluvial plain with scattered groups of low basalt hills. Elevations on the valley floor are about 400 feet at the southern end near Eugene, dropping gently to near sea-level at Portland. The climate is characterized by mild wet winters and warm dry summers. Fertile soil and abundant rainfall make the valley the most important agricultural region in the state.



"At a Glance"- Characteristics and Statistics**Land use (% of ecoregion):**

Agriculture	41 %
Forest and woodland	34.8%
Other (lakes, wetlands, cliffs, etc.)	3%
Range, pasture, and grassland	9.2%
Towns and rural residential	1.7%
Urban and suburban	10.3%

Land ownership:

Private	96%
Public, federal	3%
Public, state and local	1%

Human population, government and transportation statistics:

Estimated population in 2000	2,300,000
% of Oregon's population in 2000	68.1%
Number of cities	91
Number of counties	10
<i>(includes parts of Benton, Clackamas, Douglas, Lane, Linn, Marion, Multnomah, Polk, Washington, Yamhill counties)</i>	
Number of watershed councils	36
<i>(A watershed council is considered present if at least 10% of its area is located within the ecoregion.)</i>	
Miles of road	20,746

Economics:

Important industries: agriculture, manufacturing, high technology, forest products, construction, retail, services, government, health care, and tourism.

Major crops: nursery and greenhouse plants, grass seed, wine grapes, Christmas trees, poultry, dairy, vegetables, small fruits and berries, nuts, grains, and hops.

Important nature-based recreational areas: Forest Park; Bybee and Smith Lakes; Willamette River; Willamette Valley National Wildlife Refuge Complex; Fern Ridge Reservoir.

Ecology:

Average annual precipitation	37" - 59" (snowfall 1.7" – 6.0")
Average July high temperature	75°F - 83 °F
Average January low temperature	31°F - 35 °F
Elevation	4 feet (Columbia River) – 780 feet (near Lowell)
Number of regularly occurring vertebrate wildlife species	approx. 250
Important rivers	Willamette, McKenzie, Santiam, Sandy, Mollala, Clackamas, Tualatin, Yamhill, Luckiamute, Long Tom

Information Sources: Oregon Blue Book (2003-04), Oregon Climate Service data (1971-2000), Oregon State of the Environment Report (2000), Oregon Watershed Enhancement Board (2001), Oregon Wildlife Diversity Plan (1993), U.S. Census Bureau (2000).



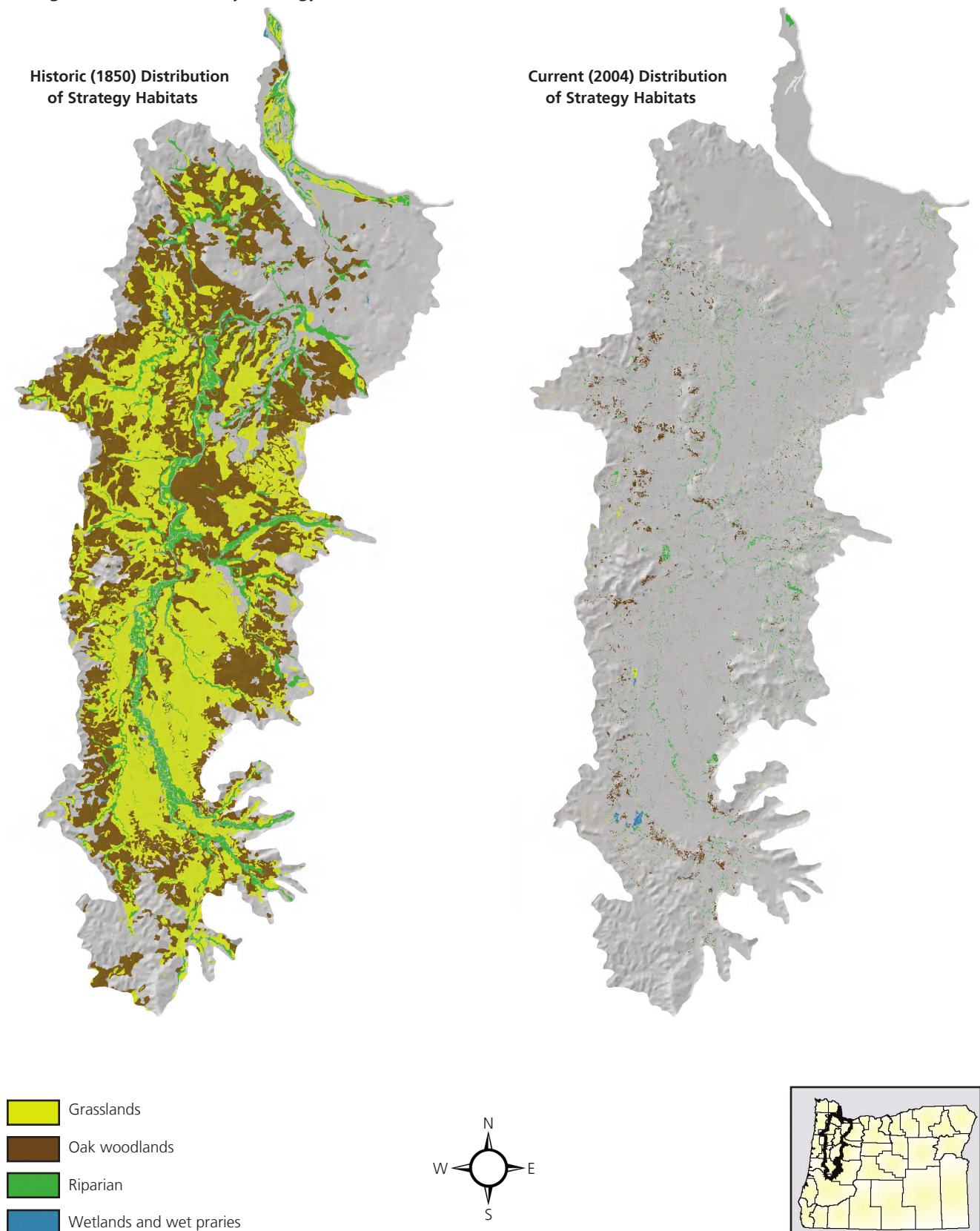
Photo © Bruce Newhouse



Summary List of Strategy Habitats

Strategy Habitats in the Willamette Valley ecoregion include: oak woodlands, grasslands (including oak savanna), wetlands (including wet prairies), riparian, and aquatic habitats.

Change in Willamette Valley Strategy Habitats



Conservation Issues and Actions

Overview

The Willamette Valley ecoregion is both the fastest growing ecoregion in Oregon and the most densely populated, containing the states' three largest urban centers (Portland, Salem, Eugene). The population projected for 2050 is approximately four million, nearly double today's population. The ecoregion also provides about half of the state's agricultural sales and includes six of the top 10 agricultural-producing counties. Also, 16 of top 17 private sector employers (manufacturing, high technology, forest products, agriculture, and services) are located in this ecoregion.

Historical accounts indicate that prior to European settlement, much of the Willamette Valley was covered by native grasses and forbs. The Calapoopia people regularly set fires to improve hunting and travel. The fires helped maintain the valley's mosaic of grasslands, oak savannas, wet prairies and other open habitats.

Since the 1850's, much of the Willamette Valley ecoregion has been altered by development (agricultural or urban), particularly affecting oak woodlands, oak savanna, grassland, riverine, and wetland habitats. The Willamette River has been disconnected from its floodplain, and much of the historic habitats have been fragmented. About 96 percent of the Willamette Valley ecoregion is privately owned, presenting challenges to conservation management. "Fine-filter" conservation strategies that focus on needs of individual at-risk species and key sites are particularly critical in this ecoregion.

Ecoregion-level limiting factors and recommended approaches

All six of the key conservation issues apply statewide, as do the approaches outlined in the Statewide Perspectives and Approaches chapter. However, land use changes, altered disturbance regimes (both fire and floodplain function) and invasive species are described further in this section, considering the Willamette Valley's ecoregional characteristics. In addition to the statewide factors, habitat fragmentation is of concern.

Summary List of Strategy Species

Mammals

California myotis (bat)
Townsend's big-eared bat
Western gray squirrel

Plants

Bradshaw's desert parsley
Golden paintbrush
Howellia
Kincaid's lupine
Nelson's checker-mallow
Peacock larkspur
Wayside aster
White rock larkspur
White-topped aster
Willamette daisy

Amphibians & Reptiles

Northern red-legged frog
Foothill yellow-legged frog
Northwestern pond turtle
Western painted turtle
Western rattlesnake

Invertebrates

American grass bug
Fender's blue butterfly
Taylor's checkerspot (butterfly)
Willamette floater (freshwater mussel)

Fish

Bull trout (Columbia Distinct Population Segment [DPS])
Chinook salmon (Lower Columbia River ESU, spring run)
Chinook salmon (Lower Columbia River ESU, fall run)
Chinook salmon (Snake River ESU, spring/summer run)
Chinook salmon (Snake River ESU, fall run)
Chinook salmon (Upper Willamette River ESU, spring run)
Coastal cutthroat trout (Oregon coast ESU)
Coastal cutthroat trout (Southwestern Washington/Columbia River ESU)
Coastal cutthroat trout (Upper Willamette River ESU)
Coho salmon (Oregon Coast ESU)
Coho salmon (Lower Columbia River/SW Washington Coast ESU)
Oregon chub
Pacific lamprey
Steelhead (Lower Columbia River ESU, summer run)
Steelhead (Lower Columbia River ESU, winter run)
Steelhead (Middle Columbia River ESU, summer run)
Steelhead (Middle Columbia River ESU, winter run)

Fish Cont.

Steelhead (Oregon Coast ESU, summer run)
Steelhead (Oregon Coast ESU winter run)
Steelhead (Snake River Basin ESU)
Steelhead (Southwest Washington ESU, winter run)
Steelhead (Upper -Willamette River ESU, winter run)
Western brook lamprey

Birds

Acorn woodpecker
Chipping sparrow
Common nighthawk
Dusky Canada Goose
Grasshopper sparrow
Little willow flycatcher
Oregon vesper sparrow
Short-eared owl
Slender-billed nuthatch
Streaked horned lark
Western bluebird
Western meadowlark
Western purple martin
Yellow-breasted chat

Factor: Land use conversion and urbanization. Habitat continues to be lost through conversion to other uses.

Approach: Because 96 percent of the Willamette Valley ecoregion is privately-owned, voluntary cooperative approaches are the key to long-term conservation using tools such as financial incentives, Candidate Conservation Agreements with Assurances, and conservation easements. Careful land use planning also is essential. Work with agency partners to support and implement existing land use regulations to preserve farmland, open spaces, recreation areas, and natural habitats. Monitor changes in land uses across the landscape and in land use plans and policies.

Factor: Altered fire regimes. Maintenance of open-structured Strategy Habitats such as grasslands, oak savannas and wet prairies, are dependent in part on periodic burning. Fire exclusion has allowed succession to more forested habitats. Reintroduction of fire poses significant management problems in many areas of the Willamette Valley. These problems include conflicts with surrounding land use, smoke management and air quality, and safety.

Approach: Use multiple tools, including mowing and controlled grazing, to maintain open-structured habitats. Ensure that tools are site-appropriate and implemented to minimize impacts to native species. Re-introduce fire at locations where conflicts such as smoke and safety concerns can be minimized. Work with local communities to ensure that local concerns such as air quality are addressed.

Factor: Altered floodplain. The floodplain dynamics of the Willamette River have been significantly altered. Multiple braided channels dispersed floodwaters, deposited fertile soil, moderated water flow and temperatures, and provided a variety of slow-water habitats such as sloughs and oxbow lakes. The Willamette River has largely been confined to a single channel and disconnected from its floodplain.

Approach: While restoration of multiple channels may be neither practical nor desirable, cooperative efforts are needed to restore floodplain function and critical off-channel habitats. Approaches are discussed in *Restoring a River of Life*, Willamette Restoration Initiative (2001).

The Willamette River

With a watershed of more than 11,200 square miles, the Willamette River is the longest river in Oregon and the primary waterway in the valley. From the junction of the Coast Fork and Middle Fork near Springfield, the Willamette meanders more than 185 miles north to its

confluence with the Columbia. Along the way, the river swells with the waters of numerous tributaries flowing out of the Cascades and the Coast Range. Prior to European settlement, the Willamette River system

dominated the landscape, occupying braided, shallow channels that moved constantly across a broad floodplain with numerous sloughs and extensive marshlands. The river's flows varied with the seasons, rising slowly from late August through the winter, peaking during spring snowmelt in the Cascades, then falling sharply until the rains returned. During times of peak flow, the river frequently flooded large portions of the valley, at times attaining widths of two to six miles. Over the past 150 years, the river has been transformed into a deeper, straighter, and narrower channel, and flows have been regulated by a number of dams in the upper watersheds of the Willamette's tributaries. These modifications resulted in a complex web of unintended secondary changes that have fundamentally altered the river system's natural ecological processes and functions. Recently, there have been coordinated efforts to address concerns such as clean water, water quantity, and habitat loss.



confluence with the Columbia. Along the way, the river swells with the waters of numerous tributaries flowing out of the Cascades and the Coast Range. Prior to European settlement, the Willamette River system

Invasive Non-native Species

Invasive species currently are considered to be one of the primary causes of species becoming threatened and endangered, second only to habitat conversion. Many species are as threatening to people's livelihoods as they are to fish, wildlife and their habitats. This section identifies the species with the greatest current and potential impact in the Willamette Valley. They were determined through an analysis of Oregon Department of Agriculture's Noxious Weed List, ODFW's Wildlife Integrity Rules, ODFW's Introduced Fish Management Strategies report, information from Portland State University Center for Lakes and Reservoirs, and local expert review. Although some of these species also cause significant economic damage to farms, ranches, and managed forests, this list is focused on those that cause the most severe ecological damage. Impacts from introduced game fish vary from species to species and within ecoregions. As a result, the impacts need to be evaluated more locally (ODFW Introduced Fish Management Strategies Report).

Known invasive non-native animal and plant species

These species are established or documented in this ecoregion, and are known to impact native fish and wildlife populations and habitats. They may range from small, controllable populations to widespread infestations.

Documented Invasive Animals

Bluegill
Brook trout
Brown bullhead
Brown trout
Bullfrog
Carp
Catfish
Crappie
Eastern fox squirrel
Eastern gray squirrel
Eastern snapping turtle
European starling
Fathead minnow
Feral pig
Fox squirrel
Goldfish
Grass carp
House sparrow
Largemouth bass
Mosquito fish (*Gambusia*)
Norway rat
Nutria
Red eared slider
Shad
Smallmouth bass
Sunfish
Tench
Virginia opossum
Walleye
Yellow bullhead

Documented Invasive Plants

Armenian (Himalayan) blackberry
Butterfly bush
Curly leaf pondweed (aquatic)
Elodea (Brazilian waterweed) (aquatic)
English ivy
Eurasian milfoil (aquatic)
False brome
Fragrant water lily (aquatic)
Garlic mustard
Giant hogweed
Herb Robert
Knotweeds (Japanese, giant)
Kudzu
Meadow knapweed
Mouse ear hawkweed
Parrot's feather (aquatic)
Portuguese broom
Purple loosestrife
Purple starthistle
Reed canarygrass
Rush skeletonreed
Scotch broom
Shining crane's-bill
Spotted knapweed
Tall oat grass
Tansy ragwort
Traveler's joy
Watercress (aquatic)
Yellow flag iris (aquatic, riparian)
Yellow starthistle

Non-native animals and plants of potential concern

Preventing the establishment of invasive non-native species is far more cost-effective and practical than trying to eradicate them once they are established. To make the best use of financial and personnel resources, prevention efforts need to be prioritized to address the greatest threats, especially since many non-native species do not pose a significant threat to fish and wildlife populations and habitats. Potentially harmful non-native species can be identified by examining biological factors, potential impacts and invasion patterns in similar climates. The species listed here are included because: 1) they are not known to occur in this ecoregion, but could pose a threat to fish and wildlife populations and habitats if they become established; or 2) they are known to occur in this ecoregion but the extent to which they impact native species and disrupt ecological processes is unclear at this time.

Potentially Invasive Non-native Animals

Asian carp (bighead, silver)
Banded killfish
Black carp
Mute swan
New Zealand mudsnail
Oriental weatherfish
Round goby
Ruffe
Rusty crayfish
Shimofuri goby
Snakeheads
Spiny waterflea
Threadfin shad
Zebra mussel

Potentially Invasive Non-native Plants

African waterweed
Awl-leaf arrowhead
Brass buttons
Camelthorn
Coltsfoot (Tussilago)
European water chestnut
Giant salvinia
Hydrilla
Marsh dewflower
Pondwater starwort
Puncture vine
Purple nutsedge
Uruguay seedbox
Water mint

Factor: Habitat fragmentation. Habitats for at-risk native plant and animal species are largely confined to small and often isolated fragments such as roadsides and sloughs. Opportunities for large-scale protection or restoration of native landscapes are limited. Barriers to large-scale ecosystem restoration include: existing development, growth pressures, high land costs, and the fragmented nature of ownerships and remaining native vegetation types.

Approach: Broad-scale conservation strategies will need to focus on restoring and maintaining more natural ecosystem processes and functions within a landscape that is managed primarily for other values. This may include an emphasis on more “conservation-friendly” management techniques for existing land uses and restoration of some key ecosystem components such as river-floodplain connections and wetland and riparian habitats. “Fine-filter” conservation strategies that focus on needs of individual Strategy Species and key sites are particularly critical in this ecoregion.

Factor: Invasive species. Invasive plants and animals disrupt native plant and animal communities and impact populations of at-risk native species.

Approach: Emphasize prevention, risk assessment, early detection and quick control to prevent new invasives from becoming fully established. Use multiple-site appropriate tools (mechanical, chemical and biological) to control the most damaging non-native species. Prioritize efforts that focus on key invasive species in high priority areas, particularly where Strategy Habitats and Species occur. Work with the Oregon Invasive Species Council and other partners to educate people about invasive species issues and to prevent introductions of potentially high-impact species such as zebra mussel. Provide technical and financial assistance to landowners interested in controlling invasive species on their properties. Promote the use of native “local” stock for restoration and revegetation.

Conservation Success Story: Fescue farm supports wetlands restoration in the Willamette Valley

Located several miles west of Salem off Route 22 are 400 acres of restored wetlands owned by landowners Mark and Debora Knaupp, second generation Oregonians whose voluntary decision to convert a portion of his farmland to wetland is producing ecological, recreational and financial benefits.

The Knaupps are commercial grass seed growers who, with technical assistance from ODFW and others, have nurtured back to life a mosaic of shallow seasonal marshes and wet prairies. As a result, wildlife, waterfowl and rare plants along Mud Slough in Polk County have returned

in full splendor. Knaupps’ wetlands also help purify local drinking water by removing pollutants that might otherwise percolate into the local watershed of Rickreall.

In 1996, the Knaupps retired 320 acres of grass seed production by enrolling this land in U.S. Department of Agriculture Department’s Wetlands Reserve Program (WRP). Under this program, private landowners agree to take agricultural land out of production and place those acres into a conservation easement. In exchange they are paid the agricultural value of their land, which in the Willamette Valley has increased to \$2,500 per acre since 1999. Landowners maintain complete ownership of the land enrolled in WRP and the right to pursue undeveloped recreational uses such as hunting and fishing. Indeed, the Knaupps operates a duck-hunting club to take advantage of plentiful waterfowl drawn to their wetland.

The Knaupps have found another way for the wetland to pay for itself and diversify his business. They created a 57-acre mitigation bank that offers wetland credits to area landowners who develop their property but must offset any loss of wetlands under federal law. Purchasing credits from the Knaupps’ Mud Slough Mitigation Bank enables landowners to meet wetland regulatory requirements without developing a detailed mitigation plan or paying for new wetlands construction.

For Mark and Debora Knaupp, restoring marginal farmland to a healthy, fully functional wetland was as much a personal desire as it was a business decision. After all, Mark Knaupp says “supporting wild-life conservation by participating in USDA’s Wetland Reserve Program and selling mitigation credits has resulted in economic benefits for our business and brought our family tremendous personal satisfaction.”

Deciding Where to Work

Conservation Opportunity Areas Map and Profiles

Landowners and land managers throughout Oregon can contribute to conserving fish and wildlife by maintaining, restoring, and improving habitats. Conservation actions to benefit Strategy Species and Habitats are important regardless of location. However, focusing investments in certain priority areas can increase likelihood of long-term success over larger landscapes, improve funding efficiency, and promote cooperative efforts across ownership boundaries. Conservation Opportunity Areas are landscapes where broad fish and wildlife conservation goals would be best met. Conservation Opportunity Areas were developed to guide voluntary, non-regulatory actions. This map and the associated data should only be used in ways consistent with these intentions. For more information on how Conservation Opportunity Areas were developed, see Appendix IV, “Methods” (beginning on page a:34).

Conservation actions in the Willamette Valley Ecoregion identified through other planning efforts

Landowners and land managers can benefit a variety of fish and wildlife species by managing and restoring Strategy Habitats. The following recommendations are relevant to Strategy Habitats. They were identified through a review of existing plans.

Actions	Strategy Habitat and General Location	Source Document
Maintain and restore oak habitat	Oak woodlands and savannas	OR-WA Partners in Flight Landbird Conservation Strategy (Altman 2000) [recommended target: maintain all large oak trees (more than 22in. dbh) and all oak woodland patches more than 100 ac (40 ha)]
Initiate restoration private lands in partnership with willing landowners	All Strategy Habitats throughout ecoregion	Oregon Biodiversity Project; NWPCC Subbasin Plans 2004
Secure conservation status through willing partnerships	Oak woodlands, grasslands and savannas; wetlands and wet prairies; floodplain habitats throughout ecoregion	Pacific Coast Joint Venture Willamette Valley Implementation Plan (Roth et al. 2002); Willamette Restoration Initiative
Maintain or restore riparian habitat in each major watershed. Ensure sufficient habitat complexity for wildlife (basking structures, nesting areas, snags near water, large expanses of wetlands and wet prairies, etc)	Riparian habitat throughout ecoregion	PIF Landbird Conservation Plan (Altman 2000)
Improve fish passage. Modify barriers or use spans where appropriate.	All locations (as appropriate)	Willamette Restoration Initiative; NWPCC Subbasin Plans 2004
Restore and enhance stream channel complexity in lowlands throughout the Willamette Basin	All locations (as appropriate)	Willamette Restoration Initiative; Willamette Subbasin Plan (2004)
Restore river and floodplain interactions	All locations (as appropriate)	Willamette Restoration Initiative; Willamette Subbasin Plan (2004)
Work with forestry, agricultural, and urban interests to provide large woody debris, reduce sedimentation and reduce point and nonpoint source pollution, improve water flows, and extend fish passage by removing barriers	All locations (as appropriate)	Willamette Restoration Initiative; Willamette Subbasin Plan (2004)
Establish integrated framework for wetland restoration assessment, priority setting, and actions at three scales: watersheds, ecoregions and project sites	Wetlands	Recommendations for a nonregulatory wetland restoration program for Oregon. J.W. Good and C.B. Sawyer. 1998. Prepared for Oregon Division of State Lands and U.S. EPA Region X.
Increase incentives for proactive, nonregulatory wetland restoration and enhancement on private land, focusing on a combination of financial assistance, tax benefits, technical assistance, and education	Wetlands	Recommendations for a nonregulatory wetland restoration program for Oregon. J.W. Good and C.B. Sawyer. 1998. Prepared for Oregon Division of State Lands and U.S. EPA Region X.
Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology. - Plant vegetation to stabilize banks; leaving stumps, fallen trees and boulders in waterways - Maintain or enhance off channel or side channel meanders, habitat and pools	Aquatic habitats (streams, pools)	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See <i>guide for specific technical recommendations, sources of information and assistance, and other guidelines.</i>
Maintain riparian and wetlands function: - Manage grazing, riparian vegetation planting and fencing, and livestock water facilities according to best practices, current techniques and with respect to natural hydrological conditions.	Riparian and wetlands habitats	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See <i>guide for specific technical recommendations</i>
Upslope erosion control: - Create water and sediment control basins to contain runoff, wastewater - Use windbreaks (tree and shrub rows—using native plants) to reduce erosion and deposition - Upland terracing	Aquatics, riparian and wetland habitats	Oregon Aquatic habitat restoration and enhancement guide. The Oregon Plan for Salmon and Watersheds May 1999. See <i>guide for specific technical recommendations</i>

**Note: Conservation Strategy monitoring indicators, linked with OSOER Key indicators, targets, and methods, will be identified in a statewide approach (See Monitoring chapter for more information).*

The Conservation Opportunity Area profiles include information on recommended conservation actions, special features, key species, key habitats, and if the area has been identified as a priority by other planning efforts. These profiles highlight some priority actions to implement in individual Conservation Opportunity Areas, which can range from restoration projects to monitoring for invasive species. These recommendations were identified through existing plans, spatial analysis, and expert review. They are not meant to be exhaustive, so other actions also will be appropriate, as influenced by local site characteristics and management goals. Actions need to be compatible with local priorities, local comprehensive plans and land use ordinances, as well as other

local, state, or federal laws. Actions on federal lands must undergo federal planning processes prior to implementation to ensure consistency with existing plans and management objectives for the area.



Photo © Bruce Newhouse



Photo © Bruce Newhouse

Comprehensive, Collaborative Assessments of Willamette Valley Economies and Environmental Issues

The Willamette Valley of Oregon is a lush, productive landscape that supports diverse wildlife habitats and highly productive agriculture, with expanding urban areas as residents are attracted by the outstanding quality of life. The resulting potential for conflict between economic and environmental interests has been addressed by several collaborative, comprehensive planning efforts: the Willamette Valley Livability Forum; the Pacific Northwest Ecosystem Research Consortium and Willamette Futures Analysis; the Willamette Restoration Initiative and subbasin planning efforts.

The Willamette Valley Livability Forum is a citizen-focused group comprised of individuals from business, citizen interest groups, and government programs. The Forum was initiated by former Governor John Kitzhaber in 1996 and includes both an Advisory Board to guide the group and a Resource Group of individuals to provide research and other insights. The Forum helps residents to understand important issues facing the Valley so that wise decisions can be made that will maintain and enhance livability. More information about the Willamette Valley Livability Forum can be found at: www.lcog.org/wvlf. Working from a more scholarly perspective, The Pacific Northwest Ecosystem Research Consortium is a group of researchers working to scientifically assess ecosystem condition and change and to evaluate the potential outcomes, ecological consequences, and associated uncertainty of various societal decisions. Quantitative models have been developed to identify and analyze the results of ecological and socio-economic influences on ecosystem structure and function in the Willamette Valley, resulting in detailed maps and assessments of the results of different policy decisions. The results from this Willamette Futures Analysis have been presented in a variety of media, including scholarly articles, video, technical and public work groups. More information and several maps

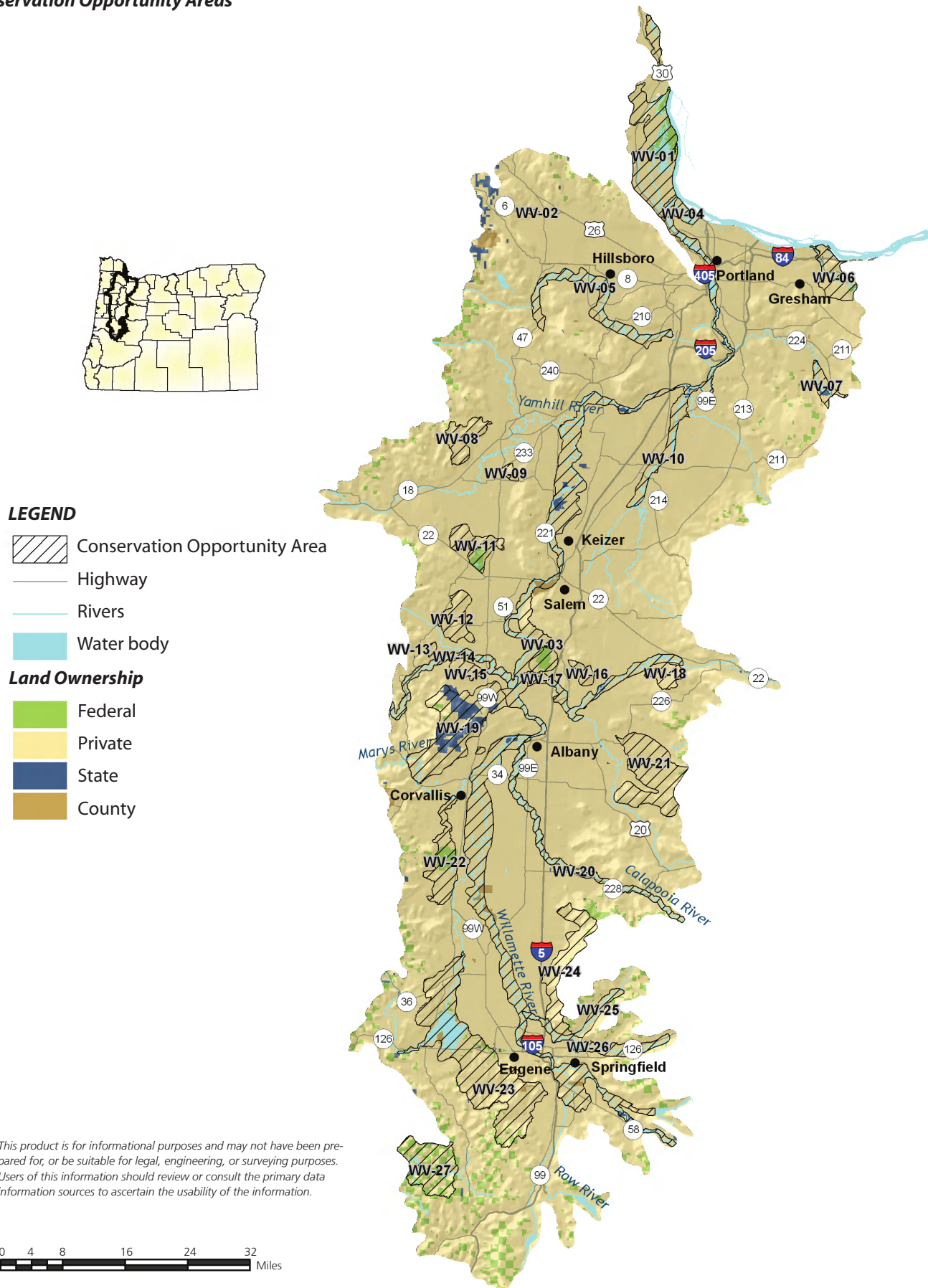
depicting future scenarios for the Willamette Valley can be found at:

<http://oregonstate.edu/Dept/pnw-erc/>.

Finally, the Willamette Restoration Initiative brought together many diverse organizations, jurisdictions, and interests and has developed strategies to protect and restore fish and wildlife habitat, increase populations of declining species, enhance water quality, and properly manage floodplain areas, including a comprehensive document published in 2001. Willamette Restoration Initiative was closely involved in the development of the Willamette Subbasin Plan, as part of efforts initiated by the Northwest Power and Conservation Council. This document presents extensive background and expertise of the status of fish and wildlife populations in the Willamette, and the factors that limit those populations. Based on the need to be able to receive private, tax deductible donations, the Willamette Restoration Initiative disbanded in early 2005 and was replaced with a new organization called the Willamette Partnership. Although there are some overlapping board members, the Partnership has a new, more focused mission: to increase the pace, scope, and effectiveness of conservation in the basin. An early emphasis is on the creation of a “marketplace” to facilitate strategic investments in high priority areas to produce multiple ecological benefits, while streamlining development in appropriate areas. The organization is looking at water quality trading (for temperature) as a pilot test of the market-based approach.

Although there are several different initiatives addressing economic and environmental issues in the Willamette, extensive coordination and mutual sharing of information ensures that the goals and objectives of each effort can best be addressed. Taken together, these efforts are an example of outstanding collaboration and cooperation among many diverse groups.

**Willamette Valley Ecoregion
Conservation Opportunity Areas**



Conservation Opportunity Area Profiles

WV-01. Columbia River Bottomlands

Special Features:

- Includes 12,000-acre Sauvie Island Wildlife Area managed by ODFW and almost 1,000 acres along Multnomah Channel owned by Metro and Bonneville Power Administration.
- One of the most important habitat complexes in the Pacific Flyway for migrating and wintering waterfowl. The mixture of sloughs, lakes, ponds, marshes, woodlands, and cropland attract peak concentrations of more than 150,000 ducks and geese in the fall, and more than 250 bird species use the area.
- There are ongoing projects by partners (ODFW, Ducks Unlimited, Natural Resources Conservation Service, USFWS, and Oregon Duck Hunters Association) to restore and enhance wetlands in this area.
- Area used by significant numbers of waterfowl and shorebirds.

Key Habitats:

- Oak Woodlands
- Riparian
- Wetlands And Wet Prairie

Key Species:

- Bald Eagle
- Peregrine Falcon
- Shorebirds
- Waterfowl
- Coho Salmon
- Fall Chinook Salmon
- Winter Steelhead
- Northwestern Pond Turtle
- Western Painted Turtle

Identified in other planning efforts:

- Joint Venture Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Improve water delivery system on Sauvie Island Wildlife Area to enhance effectiveness of wetlands management
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Restore or enhance seasonal wetlands

WV-02. Banks Swamp

This area is comprised of a willow/ash wetland located along the Highway 6 west of Banks, OR.

Key Habitats:

- Willow/ash Wetland

Key Species:

- Riparian Birds
- Willow Flycatcher
- Winter Steelhead

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

WV-03. Willamette River floodplain

This area spans almost the entire length of the ecoregion encompassing the floodplain of the Willamette River from south of Springfield to the confluence with the Columbia River.

Special Features:

- Restoration of the Willamette floodplain has important implications not only for wildlife habitats, but also for the social and economic factors resulting from restoring ecological function such as flood control and improvement of water quality.
- This broadly defined area includes a number of important sites for wildlife including many river confluences, Ankeny Wildlife Refuge, and Willamette Mission State Park.
- There are many restoration opportunities in this area, and many willing partners including the Willamette Conservation Network (formerly Willamette Restoration Initiative), ODFW, Defenders of Wildlife, The Nature Conservancy, USFWS, and others.
- The McKenzie River Trust purchased most of 1,300-acre Green Island, a key floodplain site at the confluence of the McKenzie and Willamette rivers in 2003 and is planning for large-scale habitat restoration involving multiple public and private partners.
- Oregon Parks and Recreation Department owns and manages significant portions of the floodplain as part of its Willamette Greenway network of properties.
- Floodplain wetlands provide valuable habitat for large numbers of wintering waterfowl
- The section from the McKenzie River north to the Calapooia River has the greatest potential to return natural river functions along the mainstem Willamette. This extensive reach supports the greatest aquatic biodiversity, with actively moving channels and extensive floodplain and forests. This reach has the largest acreage of hydric soils that could be potentially restored to high

quality wetland and riparian habitats. It also holds significant value for numerous rare and endangered species including nesting bald eagles, western pond turtles, and red-legged frogs, and provides important seasonal habitat for salmon and steel-head. Ninety percent of the remaining rearing habitat for native spring chinook salmon is found between the McKenzie River confluence and Harrisburg.

Key Habitats:

- Aquatic
- Bottomland Hardwoods
- Riparian

Key Species:

- Foothill Yellow-legged Frog
- Northern Red-legged Frog
- Riparian Birds
- Coho Salmon
- Fall Chinook Salmon
- Oregon Chub
- Winter Steelhead
- Northwestern Pond Turtle

Identified in other planning efforts:

- Oregon Biodiversity Project Conservation Opportunity Areas (Willamette River floodplain)
- The Nature Conservancy Ecoregional Assessment (many sections of the floodplain)
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Ensure sufficient habitat complexity for wildlife
- Maintain or restore riparian habitat and ecological function
- Promote early detection and suppression of invasive weeds
- Restore or enhance wetlands
- Restore river and floodplain interactions

WV-03A. Mt. Pisgah area

A section of the Willamette River floodplain COA south of Springfield near the Coast Fork - Middle Fork confluence.

Special Features:

- This area supports a number of at-risk species.
- The land on and around Mt. Pisgah represents some of the area's largest tracts of native habitats.
- Mt. Pisgah is a designated Oregon Important Bird Area
- The floodplain here contains some of the largest northwestern pond turtle populations in the ecoregion
- Area contains a great blue heron rookery.

Key Habitats:

- Aquatic
- Grasslands and Oak Savanna
- Oak Woodlands
- Riparian

Key Species:

- Great Blue Heron
- Northwestern Pond Turtle

Recommended Conservation Actions:

- Actively manage uplands to promote and maintain oak savanna and prairie habitats
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Promote early detection and suppression of invasive weeds

WV-04. Smith-Bybee Lakes

Located north of Portland, adjacent to the confluence of the Willamette and Columbia Rivers.

Special Features:

- Includes 2,000-acre wildlife area managed by Metro.
- New water control structure installed in 2004 allows active management of water levels in wetlands.
- Seasonally dry lakes provide emergent wetland and mudflat habitats.
- The Columbia sedge meadows here are listed by Oregon Natural Heritage Program as "critically imperiled" in Oregon.
- Area provides a wintering site for significant numbers of waterfowl.

Key Habitats:

- Grasslands And Oak Savanna
- Riparian
- Wetlands And Wet Prairie

Key Species:

- Bald Eagle
- Peregrine Falcon
- Waterfowl
- Western Meadowlark
- Willow Flycatcher
- Coho Salmon
- Fall Chinook Salmon
- Winter Steelhead
- Northwestern Pond Turtle
- Western Painted Turtle

Identified in other planning efforts:

- Joint Venture Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Actively manage wetlands to optimize habitat values for diversity of species
- Restore floodplain forest habitats

WV-05. Tualatin River

Area includes the Tualatin River and floodplain from the Tualatin National Wildlife Refuge to Wapato Lake, east of Gaston.

Special Features:

- *Area includes the Tualatin National Wildlife Refuge, Jackson Bottoms Preserve, and Wapato Lake.*
- *Ongoing land acquisition and restoration efforts by the Wildlife Refuge, Tualatin River Watershed Council, USFWS, Ducks Unlimited, Bureau of Reclamation, Metro, Friends of the Refuge, Tualatin Riverkeepers, Friends of Trees, and Portland Bureau of Environmental Services.*
- *Wapato Lake was historically one of the most important waterfowl sites in the Willamette Valley and is still used extensively in the winter by dabbling ducks, Canada geese, and swans. The U.S. Fish and Wildlife Service manages 150 acres of land in the ancient lake bed. The entire lake bed, approximately 1,000 acres, has high potential for wetland restoration.*
- *Jackson Bottom Wetlands Preserve has restored 650 acres of the Tualatin floodplain. The master plan for Jackson Bottoms sets a goal of 3,000 acres of restored habitat containing six river miles.*
- *The Tualatin River National Wildlife Refuge, with an authorized boundary encompassing 3,058 acres along 10 miles of the meandering river, currently includes almost 1,100 acres. More than 500 acres of seasonal, permanent, and forested wetlands and riparian habitat have been restored.*
- *This is a significant breeding area for migratory songbirds, as well as a great blue heron nesting site.*
- *Overwinter site for waterfowl.*

Key Habitats:

- Aquatic
- Riparian
- Wetlands And Wet Prairie

Key Species:

- Northern Red-legged Frog

- Bald Eagle
- Great Blue Heron
- Peregrine Falcon
- Waterfowl
- Winter Steelhead
- Northwestern Pond Turtle

Identified in other planning efforts:

- Joint Venture Plan
- Oregon's Important Bird Areas (Tualatin NWR, Jackson Bottoms Preserve)
- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Restore floodplain wetlands and riparian forests

WV-06. Sandy River area

Special Features:

- *Area encompasses the Sandy River Gorge Preserve.*
- *Forested upland terraces provide a corridor for wildlife coming out of the West Cascades ecoregion.*
- *There are ongoing activities on the Preserve by The Nature Conservancy and volunteers which include monitoring, invasive plant removal, and educational outreach.*
- *The Sandy River Basin Watershed Council is actively involved in watershed enhancement, restoration, and planning projects.*
- *Includes Sandy River Delta, a 1,400-acre area at the mouth of the Sandy River managed by the Columbia River Gorge National Scenic Area that contains extensive seasonal wetlands, grasslands and floodplain forest.*
- *Area provides spawning habitat for several species of salmonids.*

Key Habitats:

- Aquatic
- Floodplain Forests
- Riparian
- Wetlands And Wet Prairie

Key Species:

- Oregon Slender Salamander
- Coho Salmon
- Fall Chinook Salmon
- Winter Steelhead

Identified in other planning efforts:

- Joint Venture Plan
- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore floodplain wetlands and forests
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

WV-07. Clackamas River area**Special Features:**

- There are ongoing restoration and planning efforts by the Clackamas River Basin Council in this area.

Key Habitats:

- Aquatic
- Grasslands And Oak Savanna
- Riparian

Key Species:

- Coho Salmon
- Fall Chinook Salmon
- Pacific Lamprey
- Winter Steelhead

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

WV-08. Yamhill Oaks

Located east of McMinnville in the foothills paralleling Hwy 18.

Special Features:

Area contains large tracts of oak woodland habitat.

Key Habitats:

- Oak Woodlands

Key Species:

- Associated Oak Species

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Remove invading conifers and non-native vegetation from oak woodlands

WV-09. Amity Oaks**Special Features:**

- Area contains large tracts of oak woodland habitat.

Key Habitats:

- Oak Woodlands

Key Species:

- Associated Oak Species

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Remove invading conifers and non-native vegetation from oak woodlands

WV-10. Lower Little Pudding River

Area extends from Mt. Angel to the confluence with the Willamette River.

Special Features:

- *Ongoing conservation actions by the Pudding River Watershed Council include water quality monitoring, river cleanup events, riparian enhancement, invasive species removal, and the development of a watershed assessment.*
- *Once an important breeding area for wood ducks, the restoration of forested wetlands, seasonal wetlands and riparian areas along the Pudding River would once again create habitat for waterfowl and improve water quality in the river.*

Key Habitats:

- Aquatic
- Riparian
- Wetlands And Wet Prairie

Key Species:

- Cutthroat Trout
- Spring Chinook Salmon
- Winter Steelhead

Identified in other planning efforts:

- Joint Venture Plan
- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Restore floodplain wetlands and riparian forests

WV-11. Basket Butte

Located north of Dallas along Highways 22 and 99. Area includes Basket Slough National Wildlife Refuge and the upland oak-dominated foothills.

Special Features:

- *This area supports a rare community of upland prairie and Oregon white oak woodland/oak savanna. [Oregon Important Bird Areas website]*
- *Wetland restoration at Baskett Slough National Wildlife Refuge (2,500 acres) has increased the refuge's seasonal wetland habitat, resulting in dramatically increased waterfowl and shorebird use. Nearly 2,400 acres of land adjacent to the refuge has been identified as providing exceptional wetland restoration values. The refuge also provides valuable habitat for Fender's blue butterfly and Willamette daisy.*
- *One private landowner has already restored more than 400 acres of farmland to seasonal wetlands. The only known site of nesting black neck stilts in the Willamette Valley is found in the private restoration area.*
- *The refuge is currently managing woody vegetation on the prairie through repeated burning and prescribed fire.*
- *Conifer encroachment threatens the oak habitats here.*
- *One of the ecoregion's largest concentrations of streaked-horned lark.*
- *Area provides migratory habitat for waterfowl and shorebirds, as well as wintering habitat for waterfowl.*
- *High quality prairie in the upland portions of Basket Slough Refuge*

Key Habitats:

- Grasslands And Oak Savanna
- Oak Woodlands
- Wetlands And Wet Prairie

Key Species:

- Dusky Canada Goose
- Shorebirds
- Streaked-horned Lark
- Waterfowl
- Fender's Blue Butterfly
- Kincaid's Lupine
- Willamette Daisy

Identified in other planning efforts:

- Joint Venture Plan
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Maintain and enhance remnant native wet prairie and upland prairie
- Promote early detection and suppression of invasive weeds
- Remove invading conifers and non-native vegetation from oak woodlands
- Restore seasonal wetlands

WV-12. Habeck Oaks

Located north of the Little Luckiamute River along Hwy 223.

Special Features:

- Area contains large tracts of oak woodland habitat.

Key Habitats:

- Oak Woodlands

Key Species:

- Associated Oak Species

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment

Recommended Conservation Actions:

- Remove invading conifers and non-native vegetation from oak woodlands

WV-13. Airlie Savanna

Key Habitats:

- Grasslands And Oak Savanna

Key Species:

- Oak And Grassland Associates

Recommended Conservation Actions:

- Remove invasive and non-native vegetation

WV-14. Luckiamute River

Special Features:

- *A finalized watershed assessment was completed by the Luckiamute Watershed Council in June 2004.*

Key Habitats:

- Aquatic
- Riparian

Key Species:

- Riparian Birds
- Winter Steelhead

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

WV-15. Airlie Oaks

Located south of the Luckiamute River just west of Hwy 99.

Special Features:

- *Area contains large tracts of oak woodland habitat.*

Key Habitats:

- Oak Woodlands

Key Species:

- Associated Oak Species

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Remove invading conifers and non-native vegetation from oak woodlands

WV-16. Salem Hills-Ankeny NWR

This area is comprised of the Ankeny National Wildlife Refuge, located south of Salem, and the surrounding foothills.

Special Features:

- *Ankeny NWR contains extensive restored shallow-water seasonal wetlands that are heavily used by migrating and wintering waterfowl and shorebirds.*
- *Just east of the refuge, a private landowner began work in 2003 to restore a large block of oak savanna and woodland and riparian habitats.*
- *Wintering site for waterfowl and shorebirds.*

Key Habitats:

- Grasslands And Oak Savanna
- Oak Woodlands
- Riparian
- Wetlands And Wet Prairie

Key Species:

- Dusky Canada Goose
- Riparian Birds
- Shorebirds
- Waterfowl
- Willow Flycatcher

Identified in other planning efforts:

- Joint Venture Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas (Ankeny NWR)
- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Maintain and enhance remnant native wet prairie and upland prairie
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Promote early detection and suppression of invasive weeds
- Remove invading conifers and non-native vegetation from oak woodlands
- Restore seasonal wetlands

WV-17. Lower and North Santiam Rivers**Special Features:**

- *Ongoing conservation actions by the North Santiam Watershed Council include water quality monitoring, the development of a watershed assessment, culvert replacement projects, riparian enhancement, and education and outreach.*
- *Along the North Santiam, the City of Stayton is restoring riparian forest and wetland braided channels and acquired a key 55-acre property in 2003.*
- *At the lower end of the North Santiam River, Wiseman Island represents one of the largest blocks of relatively intact floodplain habitat in the valley. The Oregon Department of Fish and Wildlife and Marion County own the bulk of this area, which encompasses about five miles of river.*

Key Habitats:

- Aquatic
- Floodplain Forests
- Riparian
- Wetlands And Wet Prairie

Key Species:

- Riparian Birds
- Oregon Chub
- Winter Steelhead

Identified in other planning efforts:

- Joint Venture Plan
- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

WV-18. Kingston Prairie area

Located south of the North Santiam River.

Special Features:

- Area contains The Nature Conservancy's Kingston Prairie Preserve, where there are ongoing efforts to maintain the native prairie vegetation.
- Biologists use the preserve to study the habitat needs for the Western meadowlark and other songbirds.
- Area contains several rare plant species including Bradshaw's lomatium, Willamette daisy, Oregon larkspur and white-topped aster.

Key Habitats:

- Grasslands And Oak Savanna
- Oak Woodlands
- Riparian
- Wetlands And Wet Prairie

Key Species:

- Western Meadowlark
- Bradshaw's Lomatium
- Oregon Larkspur
- White-topped Aster
- Willamette Daisy

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Initiate or continue wet meadow conservation and restoration efforts

WV-19. Corvallis area

Special Features:

- Area includes several important places for wildlife including McDonald Forest, Soap Creek, Dunn Forest, Maxfield Creek, Jackson-Frazier wetland, and EE Wilson Wildlife Refuge.
- There are ongoing habitat restoration and protection efforts for wetland, oak, and prairie habitats by the City of Corvallis, Benton County, and the Greenbelt Land Trust, including the recent purchase of Owens Farm north of Corvallis.
- The Newton Creek watershed on the north side of Philomath, includes more than 400 acres of wetland with good restoration potential. The Greenbelt Land Trust has been working to protect and restore this large wetland complex, including a 65-acre private parcel to the northwest containing wet prairie, ash swales and riparian corridor along Newton Creek.
- Area contains some of the best yellow-breasted chat habitat in the ecoregion (EE Wilson).
- Area provides migratory stopover areas for waterfowl and shorebirds (EE Wilson; ephemeral wetlands).
- Area contains several locations of upland prairie including Bald Hill Park, Carson Prairie (within Dunn Forest), and Butterfly meadows

Key Habitats:

- Aquatic
- Grasslands And Oak Savanna
- Oak Woodlands
- Riparian
- Wetlands And Wet Prairie

Key Species:

- Shorebirds
- Waterfowl
- Yellow-breasted Chat
- Winter Steelhead
- Nelson's Checkermallow
- Willamette Daisy

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas
- Joint Venture Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas (EE Wilson)
- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Maintain and enhance remnant native wet prairie and upland prairie

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Remove invading conifers and non-native vegetation from oak woodlands
- Restore floodplain wetlands. Promote early detection and suppression of invasive weeds

WV-20. Calapooia River

Special Features:

- *The corridor along the Calapooia River contains some of the best riparian forests remaining in the valley, and the river supports small populations of native spring chinook salmon and summer steelhead. Studies of wintering shorebird use in the Willamette Valley found the Calapooia drainage to be extremely valuable habitat for killdeer and dunlin.*

Key Habitats:

- Aquatic
- Riparian

Key Species:

- Riparian Birds
- Winter Steelhead

Identified in other planning efforts:

- Joint Venture Plan
- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Work with farmers to maintain winter ponding and soil saturation on farmed fields to protect wintering shorebird habitat

WV-21. One Horse Slough - Beaver Creek

Area is located along the ecoregion boundary east of Albany adjacent to South Santiam River. The majority of the area is located in the One-horse Slough quad.

Special Features:

- *This area may serve as an important transition zone between the West Cascades and Willamette Valley ecoregions. Historically, it contained a diverse mixture of habitats including ponderosa pine, deciduous swamp, and wet prairie. It currently has a number of Strategy habitats.*
- *This area, adjacent to the South Santiam River, provides habitat to some of the last known populations foothill yellow-legged frog in the Willamette Valley.*

Key Habitats:

- Aquatic
- Grasslands And Oak Savanna
- Oak Woodlands
- Riparian
- Wetlands And Wet Prairie

Key Species:

- Foothill Yellow-legged Frog
- Northern Red-legged Frog
- Chipping Sparrow
- Slender-billed Nuthatch
- Willow Flycatcher

Identified in other planning efforts:

- The Nature Conservancy Ecoregional Assessment (Golden Valley site, Crabtree Wetlands site)

Recommended Conservation Actions:

- Control key non-native species
- Maintain large oaks with open understories
- Maintain natural water flow patterns and streamside vegetation for yellow-legged frogs; protect from other impacts at priority breeding sites
- Maintain wetland habitat and adjacent woodlands for red-legged frogs

WV-22. Finley-Muddy Creek area

Located around Finley Wildlife Refuge south of Corvallis along the west side of Hwy 99. Area extends up Muddy Creek to its confluence with Mary's River.

Special Features:

- *Area contains Finley National Wildlife Refuge.*
- *There are ongoing efforts to eventually provide a connection corridor of restored and protected habitats along Muddy Creek between Finley Refuge and Mary's River. Partners include Greenbelt Land Trust, USFWS, ODFW, City of Corvallis, Natural Resources Conservation Service, and private landowners.*
- *Area includes high-quality remnants of native wet prairie, oak, and riparian habitats.*
- *Habitat for migratory waterfowl*
- *Area contains several threatened and endangered plants including Nelson's checkermallow, Bradshaw's lomatium, and peacock larkspur*

Key Habitats:

- Grasslands And Oak Savanna
- Riparian
- Wetlands And Wet Prairie

Key Species:

- Band-tailed Pigeon
- Dusky Canada Goose
- Short-eared Owl
- Waterfowl
- Western Bluebird
- Western Meadowlark
- Oregon Chub
- Bradshaw's Lomatium
- Nelson's Checkermallow
- Peacock Larkspur

Identified in other planning efforts:

- Joint Venture Plan
- Oregon Biodiversity Project Conservation Opportunity Areas
- Oregon's Important Bird Areas
- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Restore or maintain floodplain wetlands and wet prairie

WV-23. West Eugene

This site extends from Camas Swale north along the foothills to Cox Butte, including the West Eugene wetlands.

Special Features:

- *This area contains many important sites including Camas Swale, Fern Ridge Reservoir, and the West Eugene Wetlands.*
- *There is ongoing acquisition and restoration in the West Eugene wetlands by the following partners: BLM, City of Eugene, Lane Council of Governments, The Nature Conservancy, Corps of Engineers, Natural Resources Conservation Service.*
- *Area contains some of the largest remaining fragments of the Willamette Valley's native wet prairies (West Eugene wetlands)*
- *Area provides an important habitat for migratory birds.*

Key Habitats:

- Aquatic
- Grasslands And Oak Savanna
- Oak Woodlands
- Wetlands And Wet Prairie

Key Species:

- Waterfowl
- Fender's Blue Butterfly
- Northwestern Pond Turtle

Identified in other planning efforts:

- American Fisheries Society Aquatic Diversity Areas (Camas Swale Watershed)
- Oregon Biodiversity Project Conservation Opportunity Areas (West Eugene Wetlands)
- Oregon's Important Bird Areas (Fern Ridge Reservoir)
- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Continue active management of restored habitats to conserve ecological values
- Minimize impacts of development on oak woodlands
- Restore and maintain wetland and riparian habitats along Long Tom and Coyote creek corridors

WV-24. Coburg Ridge area

Ridgeline and foothills bordering the east side of the ecoregion from Coburg Ridge to Indian Head.

Special Features:

- *This area provides important transition habitat from the West Cascades into the Willamette Valley lowlands.*
- *Lower portions of the Coburg Hills include remnant grasslands, oak savanna and woodlands that provide important habitat for a variety of landbirds. This area has been designated as a Grassland Bird Conservation Area and supports the highest concentrations of several grassland bird species in the Willamette Valley. The lower slopes of the Coburg Hills also contain some of the best remnant oak habitats on the east side of the valley.*
- *The valley floor has high potential for restoration of seasonal wetlands. A 600-acre property enrolled in the Wetlands Reserve Program in 2005 is the largest in the Willamette Valley.*

Key Habitats:

- Grasslands And Oak Savanna
- Oak Woodlands
- Riparian
- Wetlands And Wet Prairie

Key Species:

- Acorn Woodpecker
- Vesper Sparrow
- Western Bluebird
- Western Meadowlark
- Fender's Blue Butterfly

Identified in other planning efforts:

- Joint Venture Plan
- The Nature Conservancy Ecoregional Assessment
- Willamette Basin Alternative Futures

Recommended Conservation Actions:

- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

WV-25. Mohawk River**Special Features:**

- *The Mohawk Watershed Partnership, part of the McKenzie Watershed Council, is an active organization here that participates in ongoing conservation activities including habitat restoration and enhancement, water quality monitoring, and education and outreach.*
- *Primary spawning area for one of the strongest populations of cutthroat trout in the Willamette Basin*

Key Habitats:

- Aquatic
- Oak Woodlands
- Riparian

Key Species:

- Cutthroat Trout

Identified in other planning efforts:

- Oregon Biodiversity Project Conservation Opportunity Areas

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Restore river and floodplain interactions

WV-26. McKenzie River**Special Features:**

- *There are ongoing conservation actions in this area by the McKenzie Watershed Council.*
- *McKenzie River Trust holds conservation easements on several floodplain properties with high value for fish and wildlife.*

Key Habitats:

- Aquatic
- Grasslands And Oak Savanna

- Riparian
- Wetlands And Wet Prairie

Key Species:

- Western Meadowlark
- Bull Trout
- Oregon Chub
- Northwestern Pond Turtle

Identified in other planning efforts:

- Oregon Biodiversity Project Conservation Opportunity Areas

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife
- Restore river and floodplain interactions

WV-27. Upper Siuslaw area

Located at the southern end of the ecoregion, this area is a mixture of public and private land, comprised largely of BLM late successional reserves.

Special Features:

- *This area contains the only streams in this ecoregion that were identified in the Coastal Salmon Restoration Initiative.*

Key Habitats:

- Aquatic

Key Species:

- Chipping Sparrow
- Slender-billed Nuthatch
- Western Bluebird
- Willow Flycatcher
- Coho Salmon
- Winter Steelhead

Identified in other planning efforts:

- Coastal Salmon Restoration Initiative (CSRI)
- The Nature Conservancy Ecoregional Assessment
- The Oregon Plan Core Salmon Areas

Recommended Conservation Actions:

- Maintain or enhance in-channel watershed function, connection

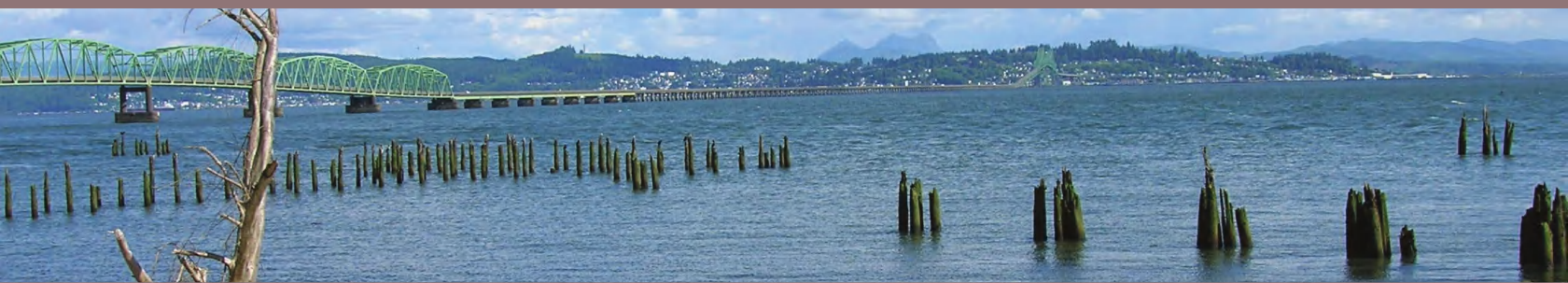


Photo © Martin Nugent

Connected by Water: the Columbia River

One river connects many of Oregon's ecoregions. Its immense size, and the unique geographic and geologic characteristics, make the Columbia River a special place that requires a coordinated conservation approach.

Beginning in the Canadian Rockies of British Columbia and the Clark Fork in Montana, the Columbia River is the largest river by volume flowing into the Pacific Ocean from North America. During its long journey, it flows through 63 cities. It is the 15th-longest river in North America and has the sixth largest flow.

The Columbia Basin is the 258,000-square-mile area drained by the Columbia River. The Basin extends roughly from the crest of the Cascade Mountains of Oregon and Washington east through Idaho to the Continental Divide in the Rocky Mountains of Montana and Wyoming, and from the headwaters of the Columbia River in Canada to the high desert of northern Nevada and northwestern Utah. The Columbia Basin includes two countries, Canada and the United States, including parts of Washington, Oregon, Idaho, Montana, Wyoming, Nevada, and Utah. Within Oregon, the Columbia collects water from five ecoregions (part or all of the Coast Range, Willamette Valley, West Cascades, East Cascades, and Columbia Plateau ecoregions).

Cultural and Economic Significance

The Columbia has played a significant role in human activities for at least 12,000 years. In addition to being home to native people, the Columbia River Gorge provided a portal through the mountains that served as a major trade route between tribes. Objects found in the gorge originate from as far away as Alaska, Minnesota and Mexico. The salmon fishery at Celilo Falls drew people to multilingual fishing settlements. The Columbia River gorge served as an important passage through the mountains for trappers, the Lewis and Clark Corps of Discovery, and Oregon Trail emigrants. It has been designated as a National Scenic Area to protect its natural and cultural features by concentrating human enterprises within established cities.

Nearly half of all hydroelectricity produced in the United States comes from the Columbia and its tributaries via 150 hydroelectric projects. The Grand Coulee Dam and the Chief Joseph Dam are the largest dams in the United States and Grand Coulee is the third largest hydroelectric dam in the world. The dams also provide water for the Columbia Basin Irrigation Project, one of the most extensive irrigation projects in the western United States. Watering more than 500,000 acres of fertile but arid farmland central Washington has turned the area into a major agricultural center that produces apples, potatoes, alfalfa, wheat, corn, barley, hops, beans, and sugar beets.

The Columbia River is valued for recreation and recreational use is increasing. Fishing, windsurfing, hiking, wildflower viewing, camping, waterfall viewing, and scenic touring are all popular activities.

Significant Ecological Features

Just as it provides a means for people to travel, the Columbia River is the link between habitats and landscapes for other species. It is a primary migration route for anadromous fish from the entire basin. Historically the Columbia produced more chinook and coho salmon and steelhead trout than any other river in the world. Ten to 16 million adult salmon once entered the river each year. These mighty runs have been impacted by historic overfishing, habitat degradation, and passage barriers, including a series of dams.

Because of its unique geology and dramatic range in elevation, temperature, precipitation, habitat, the Columbia Gorge has diverse plant life. The gorge's dazzling array of approximately 800 flowering plants draws many visitors each spring and summer. It is home to several endemic plants and invertebrates. For example, 14 wildflowers occur in the gorge and nowhere else. Because of their limited range, endemic species are particularly vulnerable to habitat alteration and other changes.

Some Strategy Species, such as salmon, western painted turtles, and several invertebrates primarily occur or move through the Columbia Gorge. For example, the river is a critical migratory path for many populations of declining salmonids, linking their habitat across hundreds of miles. These species associated with the Columbia are listed in the separate ecoregional chapters; however, their conservation requires a more holistic approach, one that looks at the Columbia as a system.

An Altered System

The Columbia River has been dramatically altered by development and hydropower dams. Riparian, wetland and estuarine habitat has been converted into railroads, highways, and urban areas. Large dams have turned the free-flowing river into a series of lakes, taming its seasonal temperament. Uniform flow has further altered riparian and wetland habitats. Large and small dams throughout the system have blocked migration routes and disrupted seasonal water temperature regimes.

Because the Columbia River drains such a large area of varying land uses, it collects and concentrates pollutants from urban areas and agricultural areas alike. Some of these nonpoint inputs include fertilizers and pesticides. Two particular challenges regarding point pollution sources are the Portland Harbor and the Hanford Nuclear Reservation, both Environmental Protection Agency Superfund Sites. Because of its importance to commerce, the Portland Harbor is one of the most highly industrialized systems in Oregon. For more than 100 years, many businesses, including manufacturing and ship building businesses, have

operated at the harbor. Consequently, the aquatic system has been contaminated with heavy metals, polychlorinated biphenyls (PCB's)



and other chemicals from industrial processes. Contaminants also have seeped into the Columbia River from the Hanford Nuclear Reservation, which once served as a plutonium production complex with nine nuclear reactors and related facilities. Also, assessments of the effects of dams on water quality are needed.

Other issues affect the Columbia Gorge and River. Just as it collects and drains water over a wide area, the Columbia Gorge funnels air pollution from as far as Eugene, Oregon and Tacoma, Washington. Winter inversions trap pollutants, affecting air quality. Also, residential and other development is increasing. Lastly, because the Columbia River is home to large ports and is a route of transportation, invasive species are a concern.

Management Entities Specific to the Columbia River

This Conservation Strategy addresses species and habitat issues and actions for the Columbia River within the ecoregional sections. However, due to the complexity of issues within the Columbia and the numerous entities with a stake in its management, a high level of coordination is necessary. Actions within this Conservation Strategy should be implemented within the existing multi-party management efforts.



Many agencies, tribes and groups have jurisdiction and interest in management of the Columbia River and its many resources. Several cooperative efforts have created management plans and identified priority conservation issues and actions for the Columbia River. These entities and plans are listed in the Appendix, "Existing Planning and Regulatory Framework for Conservation."

Photos © (top) Stephen Anderson, The Nature Conservancy; (bottom-left) Bruce Newhouse; (bottom-right) Jennifer Thompson, U.S. Fish and Wildlife Service

