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East Cascades Ecoregion

Getting to Know the East Cascades Ecoregion

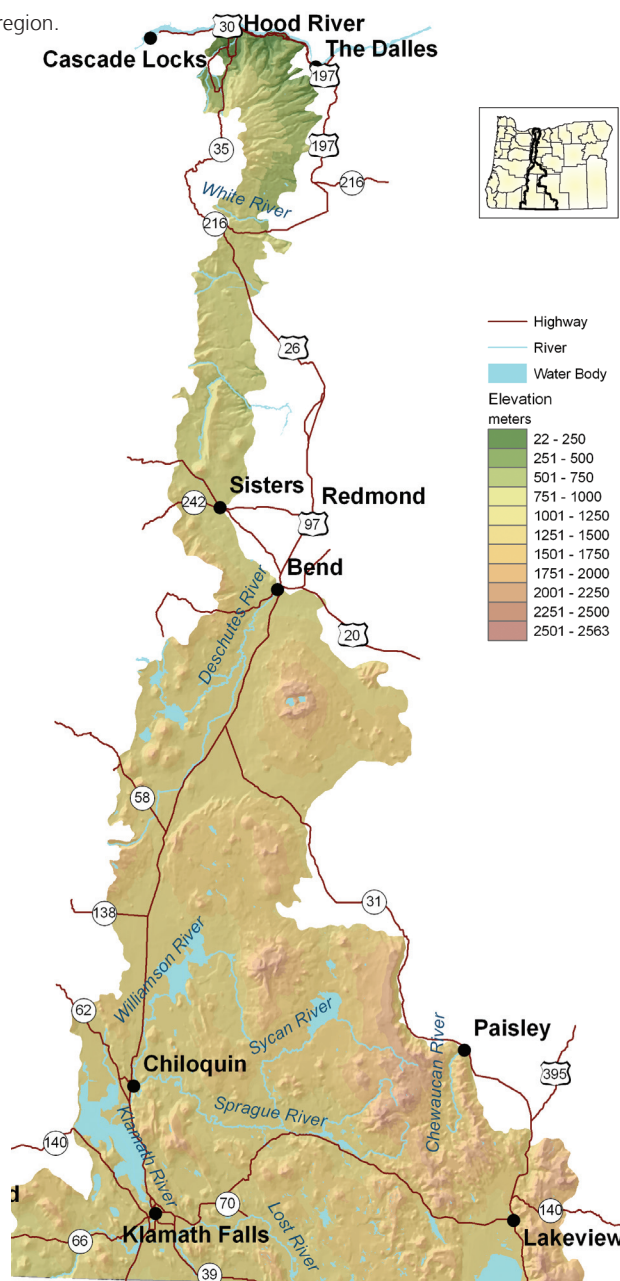
Characteristics

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

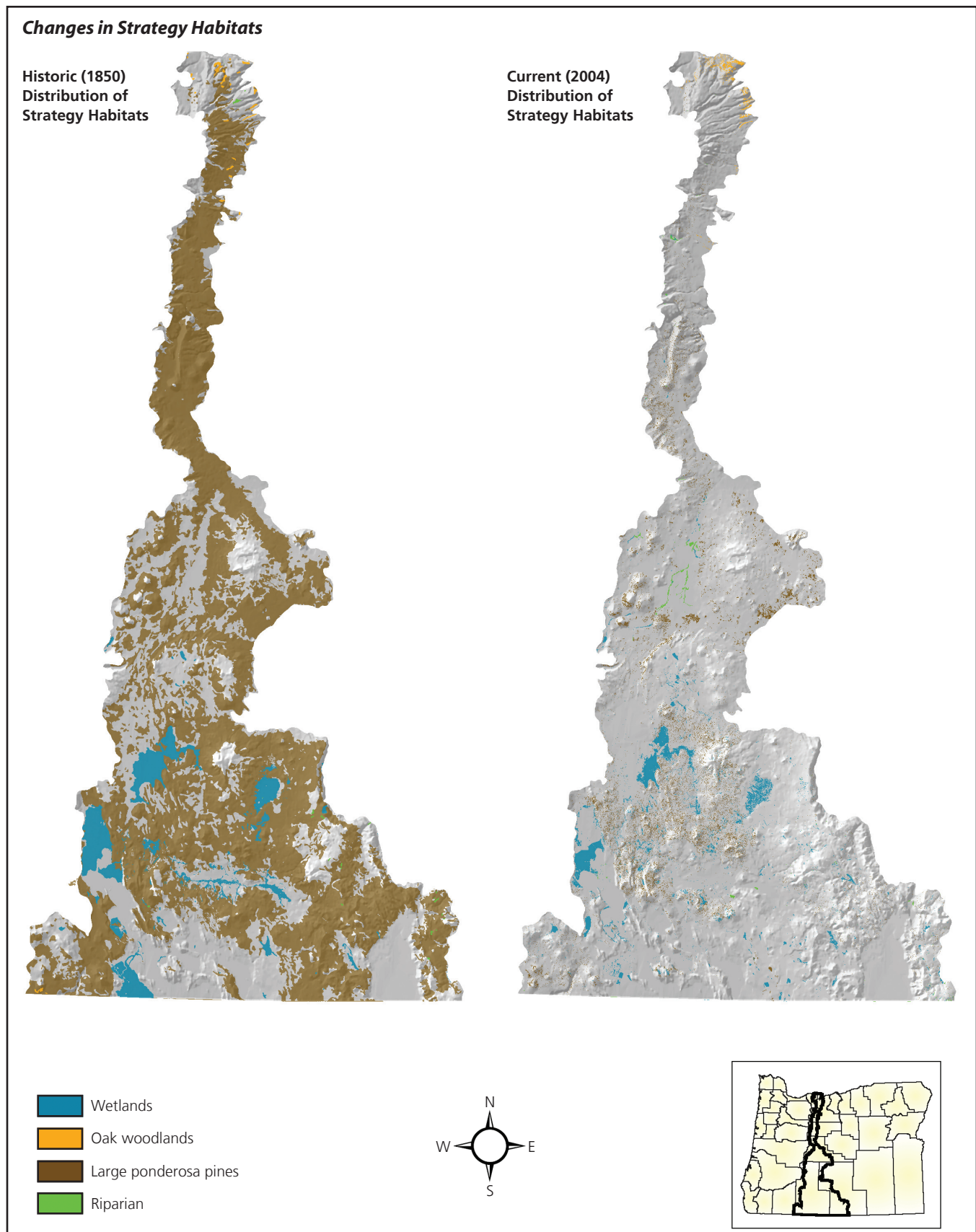
Information Sources: Oregon Blue Book (2003-04), Oregon Climate Service data (1971-2000), Oregon State of the Environment Report (2000), Oregon Watershed Enhancement Board (2001), Oregon Wildlife Diversity Plan (1993), U.S. Census Bureau (2000).



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Summary List of Strategy Habitats

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



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
Muskelluge, 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).



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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.

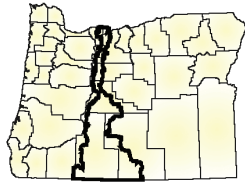


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**East Cascades Ecoregion
Conservation Opportunity Areas**



Legend

Conservation Opportunity Area

Highway

River

Water body

Land Ownership

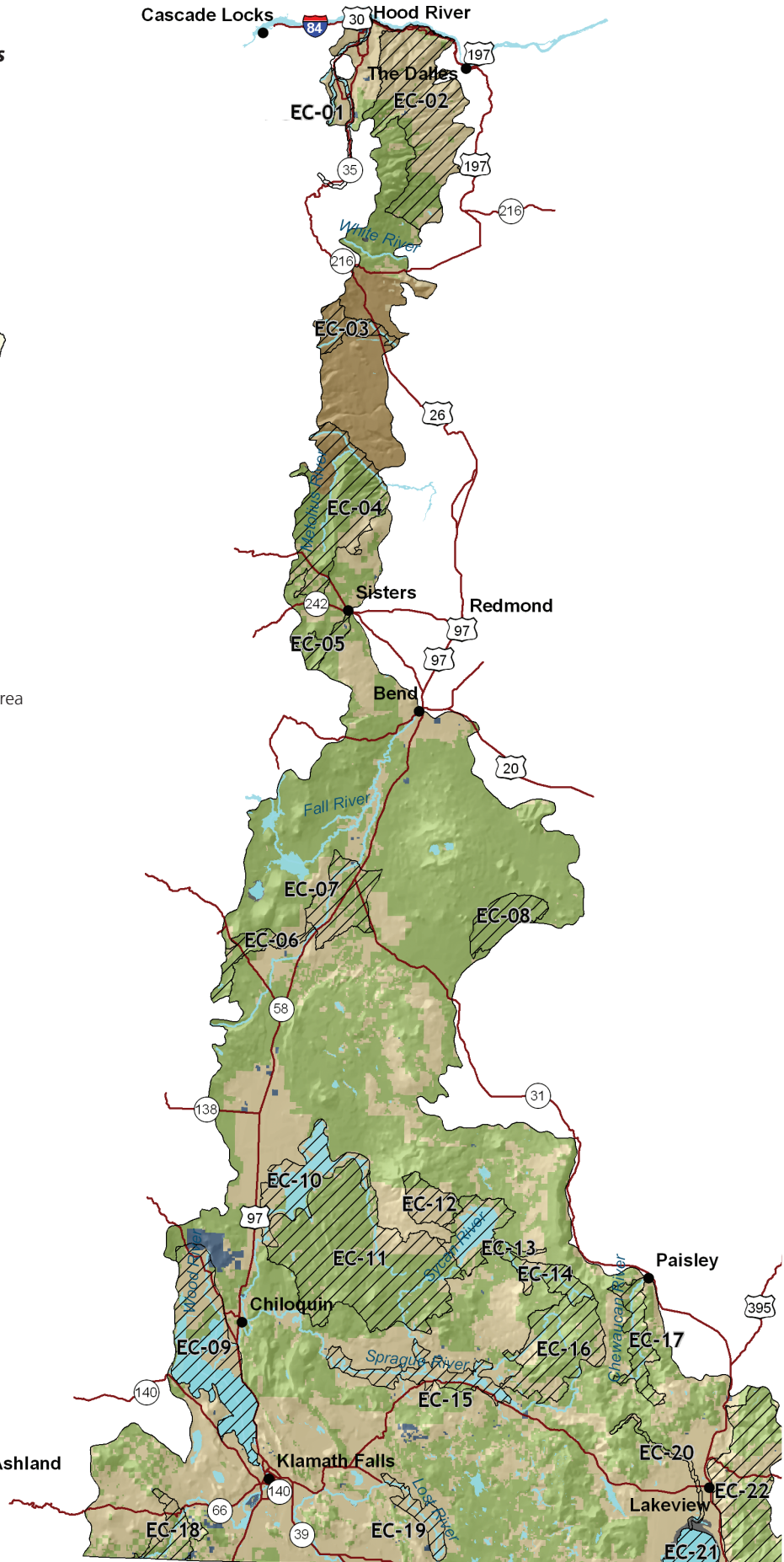
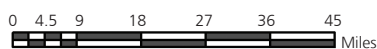
Federal

Private

State

County

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