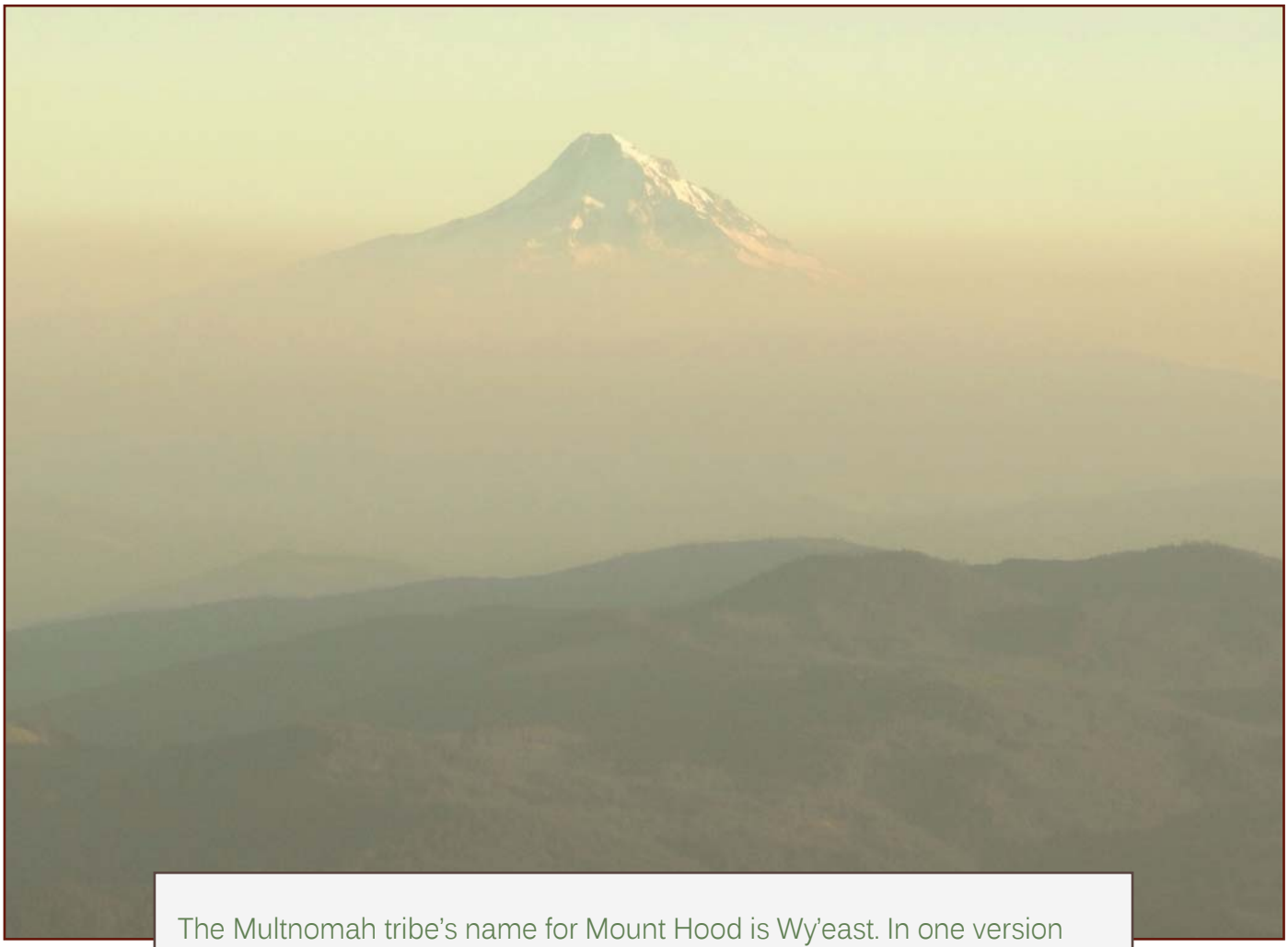
Wy'East Restored

A Plan to Restore Mt. Hood National Forest

Prepared by the Gifford Pinchot Task Force
Winter 2011



The Multnomah tribe's name for Mount Hood is Wy'east. In one version of the legend the two sons of the Great Spirit Sahale fell in love with the beautiful maiden Loowit who could not decide which to choose. The two braves, Wy'east and Klickitat, burned forests and villages in their battle over her. Sahale became enraged and smote the three lovers. Seeing what he had done he erected three mountain peaks to mark where each fell. He made beautiful Mount St. Helens for Loowit, proud and erect Mount Hood for Wy'east, and the somber Mount Adams for the mourning Klickitat.

-- Excerpt from: U.S. Department of Agriculture, Gifford Pinchot National Forest "Mount St. Helens" Brochure, 1980: Government Printing Office GPO 1980 699-331

The Gifford Pinchot Task Force would like to thank the following people for taking the time to provide comments on drafts of this restoration plan. This restoration plan does not necessarily reflect the views of those who reviewed and commented on the document. We take full responsibility for any and all mistakes and omissions.

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About the Gifford Pinchot Task Force

The Gifford Pinchot Task Force supports the biological diversity and communities of the Northwest through conservation and restoration of forests, rivers, fish, and wildlife.

The Task Force accomplishes its mission through the following programs.

Conservation

To recover thriving fish and wildlife populations and to protect community water sources, the Gifford Pinchot Task Force continues to work to protect our public lands from destructive mining, grazing, timber practices, and more. When we act to finally protect remaining mature and ancient forests and roadless areas, we will be able to look to the future with more confidence that we can successfully restore the biodiversity and resilience of our forest and watersheds.

Restoration

The Task Force's programs are deeply rooted in the foundation of ecological restoration—assisting the recovery of resilience and adaptive capacity of ecosystems that have been degraded, damaged, or destroyed. We work to reconnect fragmented landscapes so fish and wildlife habitats can survive floods, fire and drought – all of which are predicted to increase in intensity and occurrence with climate change. For example, we work with coalitions and rural community members to prioritize closure of roads, which can be turned into trails or other non-motorized recreational areas while restoring fish and wildlife habitat.

Policy

The Task Force works with other organizations and with coalitions to shape national legislation and Forest Service policies to protect and restore Northwest public lands.

Our Values

- Thriving biological diversity supports the high quality of life in the Northwest and is embodied by healthy fish runs, functioning forest ecosystems, clean drinking water, and inspirational recreational experiences.

- The Northwest is one of the best places to demonstrate that conservation and restoration can support thriving local communities because the region still has habitat, biodiversity, and an infrastructure of businesses and contractors that have expertise working in the woods and restoring watersheds.

- Collaboration with local community members, government, and other organizations is our preferred approach to addressing conservation issues.

- We have a responsibility to efficiently and carefully use the financial resources entrusted to us.

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Executive Summary

The Gifford Pinchot Task Force has been working since 1985 to support the biological diversity and communities of the Northwest through conservation and restoration of forests, rivers, fish, and wildlife. We work throughout the Northwest to reconnect fragmented landscapes so fish and wildlife habitats can survive floods, fire and drought – all of which are predicted to increase in intensity and occurrence with climate change. We work in multiple locations in the Northwest such as Mt. Hood National Forest while retaining a focus on the Gifford Pinchot National Forest. In spring of 2008 the Gifford Pinchot Task Force released *Restoring Volcano Country: A Plan for the Gifford Pinchot National Forest,* which is our vision for the Forest outlining a solid foundation for a return to healthy and abundant salmon runs in our streams, large contiguous blocks of old growth forest thriving with wildlife, watersheds that harbor magnificent top predators, and local family-wage jobs in the woods that help revitalize our rural communities. *Wy'East Restored* builds on this model of large scale strategic restoration to bridge healthy forests and communities throughout the Cascade Range.

This plan offers a vision for the strategic restoration of Mt. Hood National Forest. Mt. Hood National Forest already means so much to so many different groups of people. Its restoration could make it an even more important source of clean water, inspiration, and natural resource jobs for the region. Yet this vision is threatened by climate change, altered disturbance regimes, invasive species, and increasing pressures and impacts from an expanding human population. By identifying restoration priorities for the Mt. Hood area we hope to encourage the strategic investment of restoration dollars to counteract and minimize these increasing stresses and pressures.

Wy'East Restored takes an integrated view of the entire Mt. Hood National Forest to help prioritize restoration opportunities including the protection of large connected areas, protection of unique habitat, and actions to improve wildlife and aquatic habitat. It is intended to grow and change as new information, ideas, and opportunities are presented. We look forward to incorporating new ideas as we work with our many partners to put this vision to work on the ground. We hope this plan is useful for conservation organizations, collaborative groups, land managers, and others interested in the protection and restoration of the Mt. Hood area.

Introduction

Wy'East Restored is intended to assist in the strategic restoration of Mt. Hood National Forest. The work outlined in the following chapters is deeply rooted in the foundation of ecological restoration—assisting the recovery of resilience and adaptive capacity of ecosystems that have been degraded, damaged, or destroyed. Mt. Hood National Forest faces serious threats to its sustainability from a variety of stresses and pressures. Foremost are climate change, altered disturbance regimes, invasive species, inadequately maintained road system, and increasing pressures and impacts from an expanding human population. "Restoration" is a common way of describing much of the work aimed at addressing these issues. This definition is not what is often considered as restoration – a simplistic desire to return to some pre-settlement conditions. Those conditions are an important source of information, but not a target. We emphasize the restoration of ecological function and processes as more important than any particular historic species composition or landscape (or stand-level) forest structure.

A restoration-focused public lands management strategy will: 1) recover important habitats and native species; 2) create landscapes more resilient to disturbance from fire and climate change; and 3) create stable, family-wage economic opportunities in rural communities. *Wy'East Restored* takes an integrated view of the entire Mt. Hood National Forest to help prioritize restoration opportunities including the protection of large connected areas, protection of unique habitat, and actions to improve wildlife and aquatic habitat. We look forward to incorporating new ideas as we work with our many partners to put this vision to work on the ground.

This report highlights restoration strategies that focus on preserving large, connected areas of intact habitat to help make our forests and watersheds more resilient to disturbance and more amenable to the recovery of native biodiversity. The scale of the problems we are currently facing require that our solutions are visionary and effective enough to meet the challenges. Our best predictions forecast major range shifts of wildlife and large-scale changes in plant communities. Drinking water quality now protected in national forest lands will be threatened by the increasing frequency and severity of floods, aggravating erosion from manmade disturbances such as roads and clearcuts. Access to public lands for hunting, camping and other recreational activities will continue to be limited by deteriorating and flood-impacted road systems. Carnivore populations like American marten, native fish such as salmon and bull trout, and community water sources like Bull Run and Clackamas River will all benefit from restoration work in the Mount Hood area.

In addition to improving fish and wildlife habitat and water quality, restoration of our public lands provides a real opportunity to have a positive impact on the economic well being of rural communities. For example, removing old logging roads and fish barriers can help provide jobs for heavy equipment operators in an emerging restoration economy while also recovering salmon habitat.

Communities and Collaboration

Stakeholder relationships are critical to getting work done on the Forest. Effective restoration strategies and capacity to meet existing and future challenges will require that communities develop capacity to act as stewards of forest resources. The Mt. Hood National Forest is actively involved in numerous collaborations and partnerships engaged in landscape conservation, for example the Clackamas Stewardship Partners.

Clackamas Stewardship Partners

The GP Task Force has been working collaboratively with the Clackamas Stewardship Partners (CSP) since 2006. The CSP is a group of diverse stakeholders dedicated to restoring ecological function of the Clackamas River Basin while benefiting local economies. CSP has helped find common ground and implement a variety of restoration projects with the Forest Service. The term collaboration is often used in natural resource management contexts to describe the process of people with different perspectives working together to solve a problem. Collaboration offers opportunities to find solutions to commonly identified problems that are often more durable than those made in a more insular way. Collaboration also increases the opportunity to use unique contracting authorities like stewardship contracting, which allows land managers the ability to better meet local and community needs through unique contracting mechanisms (e.g., best value contracting, goods for services, retained receipts).

As of 2010 on the Clackamas River Ranger District alone, stewardship contracting has resulted in $3 million committed to funding resource restoration projects and generated an additional $3 million of retained receipts available for additional restoration projects. Currently the collaborative group is working with the Forest Service to close unneeded roads to benefit fish and wildlife. In 2009 the Clackamas River Ranger District planned for the removal of 117 miles of road removal in the Upper Clackamas watershed and CSP is currently engaging in the Forest's planning process to remove over 200 miles of road in the Collawash watershed.

Through our work with the CSP we identified the need to look at a larger view of the landscape and develop a strategy for restoration work. This plan looks at the larger landscape of the Mt. Hood area and identifies opportunities for protection and investment of restoration dollars.

With a serious investment, public lands restoration could support a modern day Civilian Conservation Corps program that could create jobs in some of our nation's most hard-hit communities. Public investments in forest and watershed restoration have immediate economic benefits. A recent University of Oregon study estimates that between 13 and 29 jobs are created or retained, and more than $2.1 million in economic activity is generated, for every $1 million invested in watershed restoration (Nielson-Pincus 2010). Watershed restoration has recently (2009) been identified as a key element in federal economic stimulus efforts designed to create jobs. This restoration has been made possible recently in the Pacific Northwest through the work of hundreds of collaborative groups across the region.

The Setting

The 1.1 million-acre urban national forest is framed by the Columbia River Gorge National Scenic Area to the north, Portland metro to the west, the Willamette National Forest and Confederated Tribes of Warm Springs to the south, the dry agriculture lands of Hood river and Wasco counties to the east.

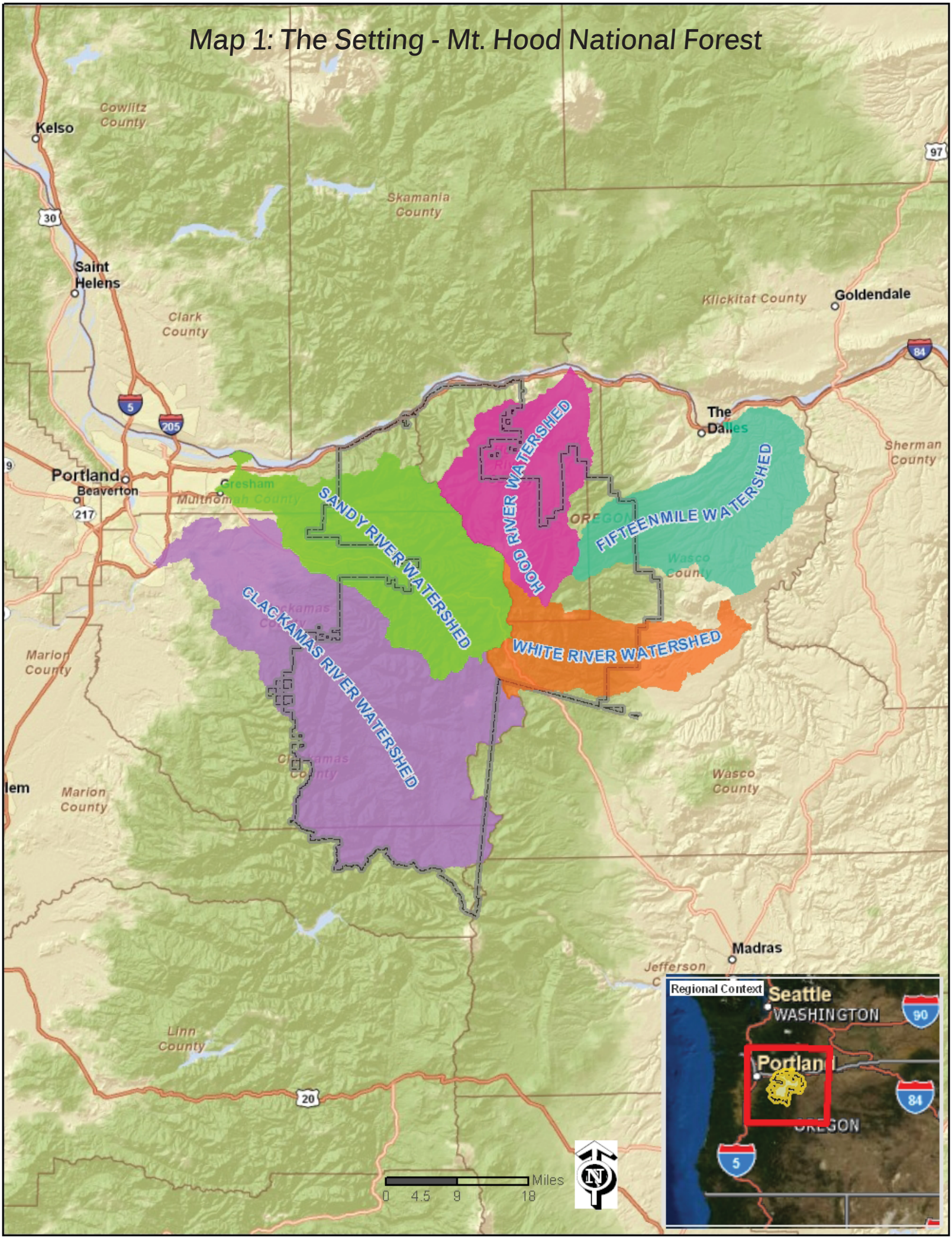
The Portland Metropolitan Area, with a population estimated at two million people, exerts the most significant social and economic influences on the Mt. Hood National Forest. Living only 50 miles from the Forest, most of Portland's residents can reach its accessible areas in less than an hour's drive. In contrast to the urbanized counties on the west side of the Forest, Hood River and Wasco counties on the east are mostly sparsely populated and rural. Ranching, farming, and timber are mainstays of these two counties.

Huge expanses of the Forest, especially on the west side, are rugged. Above them all towers majestic Mount Hood, the tallest peak in Oregon. One of the volcanoes in the Cascade Mountain Range, this two-mile high mountain never loses its cap of snow.

The Pacific side of the Forest is virtually a different climatic and biological world compared to the east side. The climate of the west side's lower areas is mild and wet. Reflecting the climate and a history of occasional stand-replacing fires, plant life is western hemlock forest type dominated by western hemlock and Douglas-fir trees in dense cathedral-like stands of old growth, or in open stands carpeted with colorful flowers. The east side is more mixed conifers (Douglas fir, Grand fir, ponderosa pine). The east side is comparatively dry and temperatures are more extreme. At lower elevations, relatively open growth of ponderosa pine and Oregon white oak dominate the plant life in this drier climate.

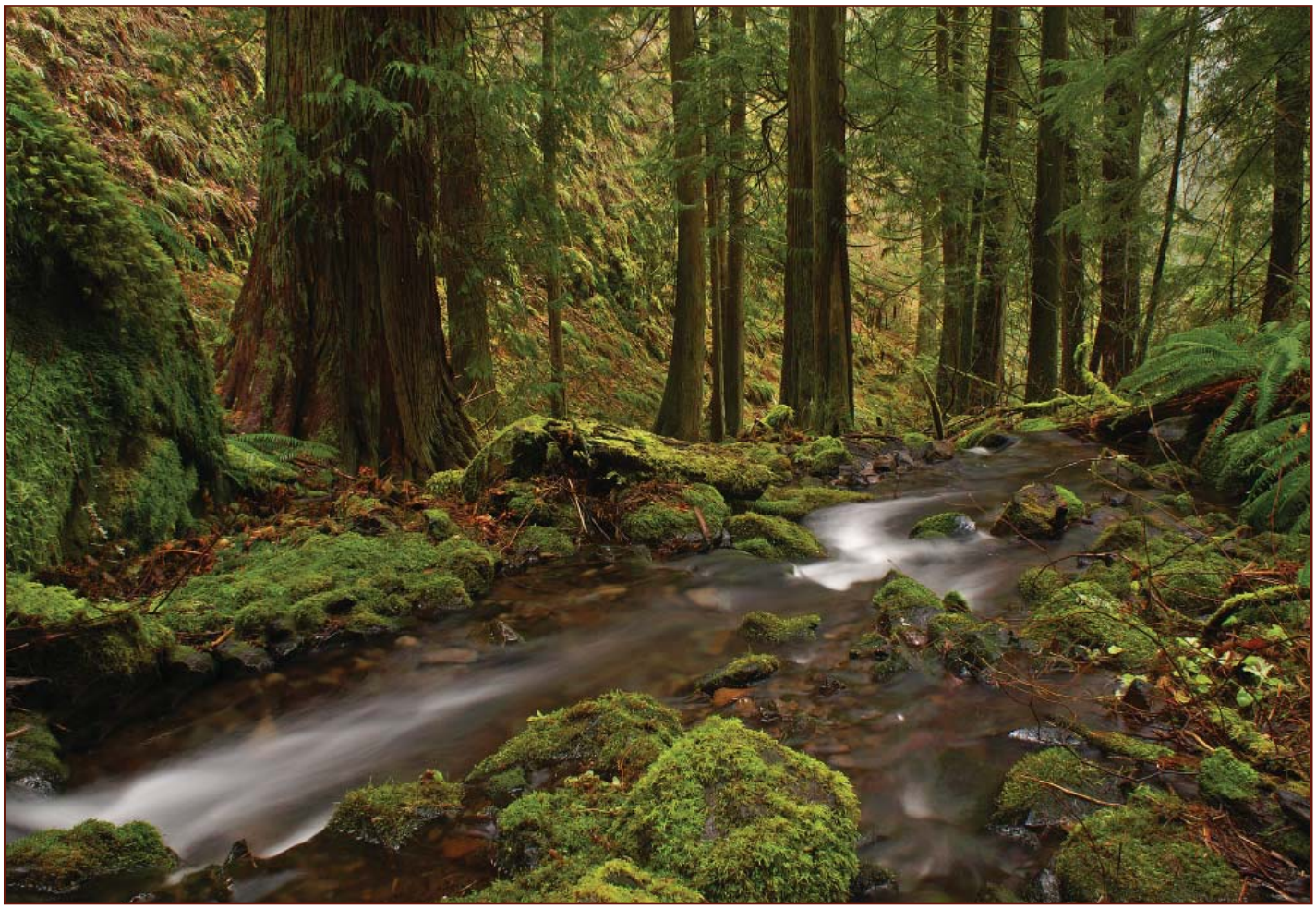
Hikers enjoy the drier eastern landscape.

Map 1: The Setting - Mt. Hood National Forest



Protection of Mature and Old Growth Forest

Despite a history of natural resource extraction, Mt. Hood National Forest is still home to large blocks of mature and old growth forest. Old-growth forests contain a rich array of plants and animals and store large amounts of carbon that mitigate climate change. Protecting remaining mature and old growth forest stands is the foundation of this restoration plan because it keeps large blocks of habitat intact and connected.



Old growth and mature forests are especially important for their carbon stores. Studies of Washington's Wind River ancient forest in the Gifford Pinchot National Forest (just across the Columbia River), for instance, found carbon stocks of over 900 metric tons CO_2e per acre (Ingerson & Anderson 2010). Altogether the top ten carbon storing forests in the nation store approximately 9.8 billion metric tons of CO_2e on about 19 million acres. Some of this carbon is stored in living trees and other vegetation, both above and below ground, some in standing or down dead wood, and some in soil. The amount of CO_2e stored in these forests can be better understood by comparing it to the CO_2e emitted by burning fossil fuels in the U.S. over a year—about 5.8 billion metric tons (Ingerson & Anderson 2010). Mount Hood National Forest is the sixth greatest carbon storing forest in America (Ingerson & Anderson 2010) and therefore plays an important role in defending against climate change.

By protecting mature and old growth forests we are allowing them to play an important role in long-term carbon sequestration and they are able to retain and continue to increase their carbon stores for centuries, due to their relatively long fire-return intervals and likely resistance to fire, drought, insects, and disease (Ingerson & Anderson, Luyssaert 2008). Annual carbon emissions in the U.S. from logging and wood processing exceed those from forest wildfires (Brown 2008).

to which younger natural forests and managed forests are not adapted. Late-successional forests are more effective at buffering microclimates during seasonal climatic extremes, producing food for those consumer organisms (e.g., fungi) which occupy late-successional forests, storing carbon, and cycling nutrients and water (FEMAT 1993).

Old growth forest habitat is defined as a structurally diverse forest with a patchy multi-storied

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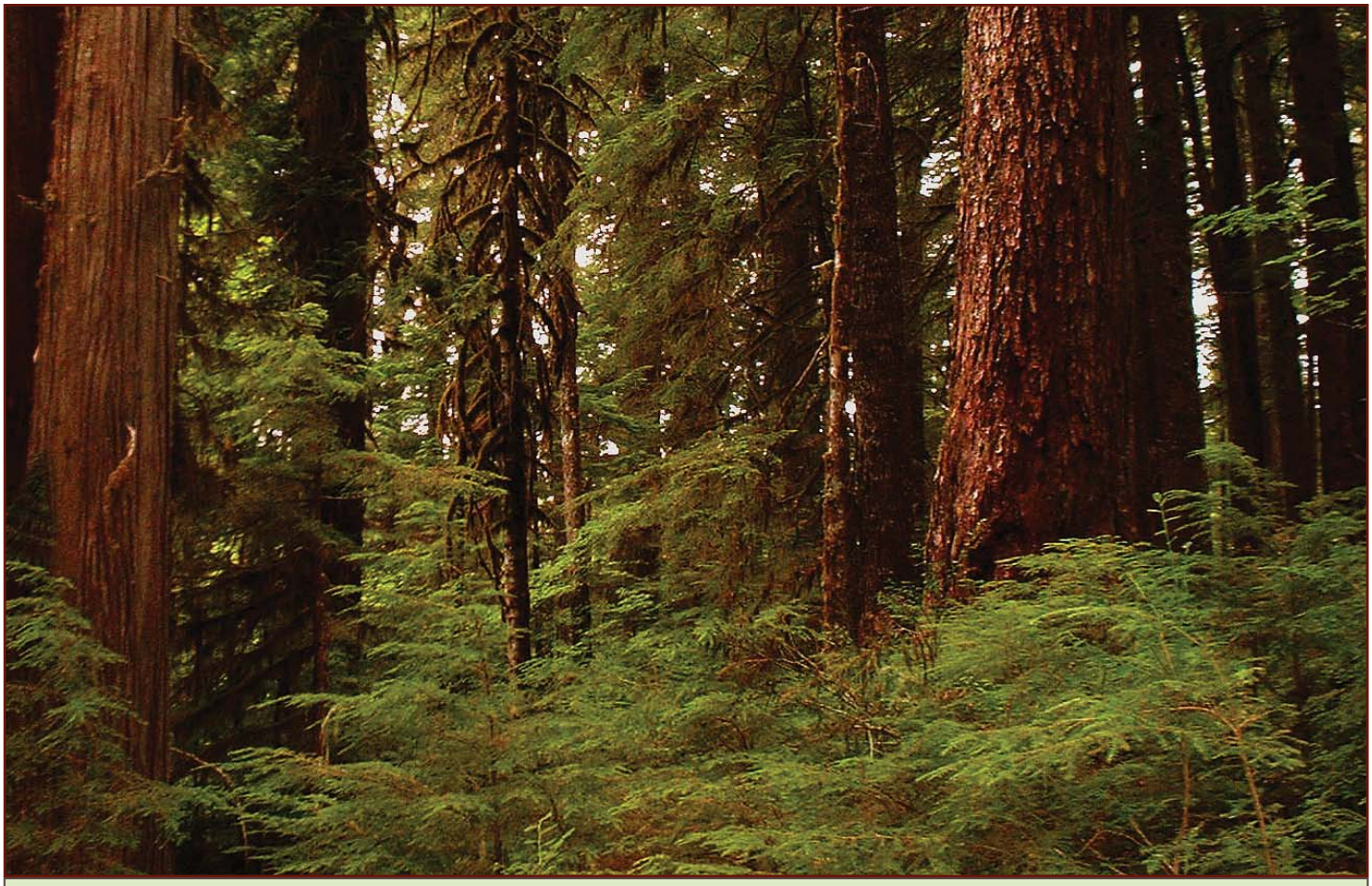
Old growth Forests in the Douglas-fir region are particularly effective at regulating water flows and reducing nutrient loss. In the Bull Run River watershed, fog drip from mature Douglas-fir forest adds 35 inches of precipitation per year, a 41% increase over that from rain and snow, and importantly, 1/3 of all precipitation in the dry May to September season (Harr 1982). Long-term forest management (i.e., timber harvest) in the watershed could reduce annual water yield and, more importantly, summer stream flow by reducing fog drip.

Thousands of species occupy late-successional and old-growth forests of the Pacific Northwest (FEMAT 1993). Late-successional ecosystems (mature and old growth forest) play a role

canopy with trees of varied ages, large living trees, large standing dead trees (snags) and dead and decaying trees on the forest floor (down woody debris), and species and functional processes that are representative of the potential natural community. Mature stands have begun to develop some of the structural characteristics associated with old growth forest habitat but have not yet fully developed into a structurally diverse forest. Mature and old growth forest should be protected and thinning on the west side of Mt. Hood should be focused in young forest stands to improve wildlife habitat and increase habitat connectivity across the forest. While old growth and mature forest is defined by the above characteristics and can be challenging to define by



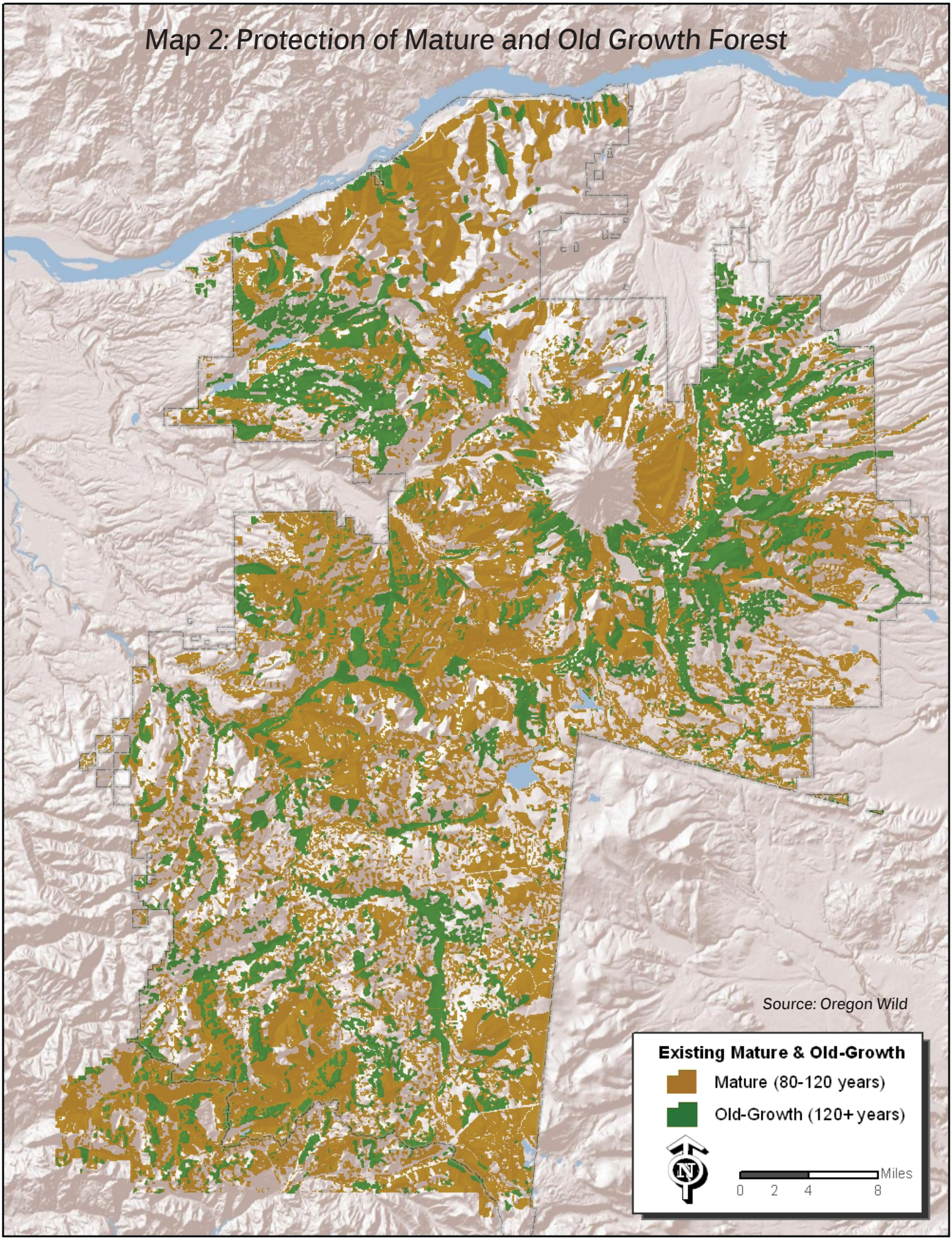
Thousands of species occupy late-successional and old-growth forests of the Pacific Northwest

age, for the purpose of this analysis and to show representative data, the GP Task Force used the more practical criteria of forest stands 80-120 years of age for mature forest and 120 years and older to identify old growth forest habitat (data provided by Oregon Wild). The following map highlights the small amount of old growth forest inventory and the need to protect the remaining stands.

Based on a comparison between historic (1850) and current vegetation maps, an estimated 23 percent of late-successional Douglas-fir mixed conifer forests remains in the West Cascades and less than 10 percent of historic low elevation and mid elevation (more than 4,500 feet) late successional forest remain (Source: Oregon Natural Heritage Information Center spatial data sets).

The Northwest Forest Plan was developed in 1994 to prevent the loss of species associated with old growth forests. Although the plan protected many mature and old growth forests in the Mount Hood National Forest, 167,000 acres of the total 647,000 acres (more than ¼) are at risk of being logged (GIS Analysis by Oregon Wild). Of the 167,000 acres, 38,000 of those are 120 years and older. The mature and old growth forest stands of Mt. Hood National Forest should be protected as a natural and national asset along with the many other important ecological services that healthy forests provide—from clean water to wildlife habitat.

Map 2: Protection of Mature and Old Growth Forest



Identifying Core Habitat and Connectivity

Roadless areas are important for watershed and ecosystem health. For example, over half of the nation's roadless areas supply water to downstream facilities that treat and distribute drinking water to the public (USFS 2000). "There is strong scientific evidence that roadless areas provide high-quality habitat for threatened species, contain important concentrations of old-growth forests and aquatic strongholds, and, in the absence of roads and other disturbances, provide a buffer against invasive species. Because over half the nation's roadless areas are at elevations above 7,000 feet, they are vital for wildlife seeking cool, moist conditions in the face of a warming climate. In contrast, the presence and human use of roads have been linked to increased wildlife mortality, fragmentation of habitat, changes in the physical and chemical environment, diminished water quality, introduction of invasive species, wildfire ignitions, and increases in landslide susceptibility" (Pew Environment Group 2010).

Roadless areas of 1,000 acres and more support high levels of biodiversity and should be protected, expanded, and connected. In 2001, with a dwindling amount of untouched land the U.S. Forest Service issued the Roadless Area Conservation Rule to save the few remaining expanses of true wildlands from development. Since its creation, the rule has received overwhelming public support, garnering more than four million public comments -- 95 percent of which have been positive. The Roadless Rule was under attack during the Bush Administration from 2001-2009, and it will remain open to threats until Congress passes legislation to permanently protect the

The need for animals to migrate through the forest is becoming more important as predators gradually return and certain types of habitat, such as the wet meadow above, become increasingly hard to find for species that rely on them, like these elk captured by a remote wildlife camera.

nation's remaining roadless areas. In addition, many of the roadless area in Mt. Hood National Forest should be considered for wilderness designation, which would ensure additional protections for these special places.

Wilderness and roadless areas serve as core habitat reserves, meaning they are the best places to start when creating a plan that aims to protect the Northwest's natural diversity and ecosystems. Core reserves are important pieces of any restoration plan because they (Noss et al. 1997):

- Help distribute species across their native range to make them less susceptible to extinction.
- Offer larger blocks of habitat that generally contain larger populations. Larger populations are better than smaller ones at recovering from disturbances such as floods, fires, landslides and other extreme weather events such as those predicted to increase by the world's leading climate scientists.

Large blocks of habitat are valuable for a number of wildlife and aquatic species because they serve as a refuge. They are particularly valuable for carnivores that are more elusive and more likely to be impacted by roads. Conservation biologists recognize that the recovery of predator species such as wolves, bears, fisher, and American marten are integral to restoring ecosystem health and providing top-down regulation of ecosystems. The absence of top predators can lead to an over abundance of other species which can in turn lead to the direct elimination of plant populations from overbrowsing, reproductive failure of canopy tree species, and the loss of ground-nesting birds and probably other small vertebrates (Soule 1999).

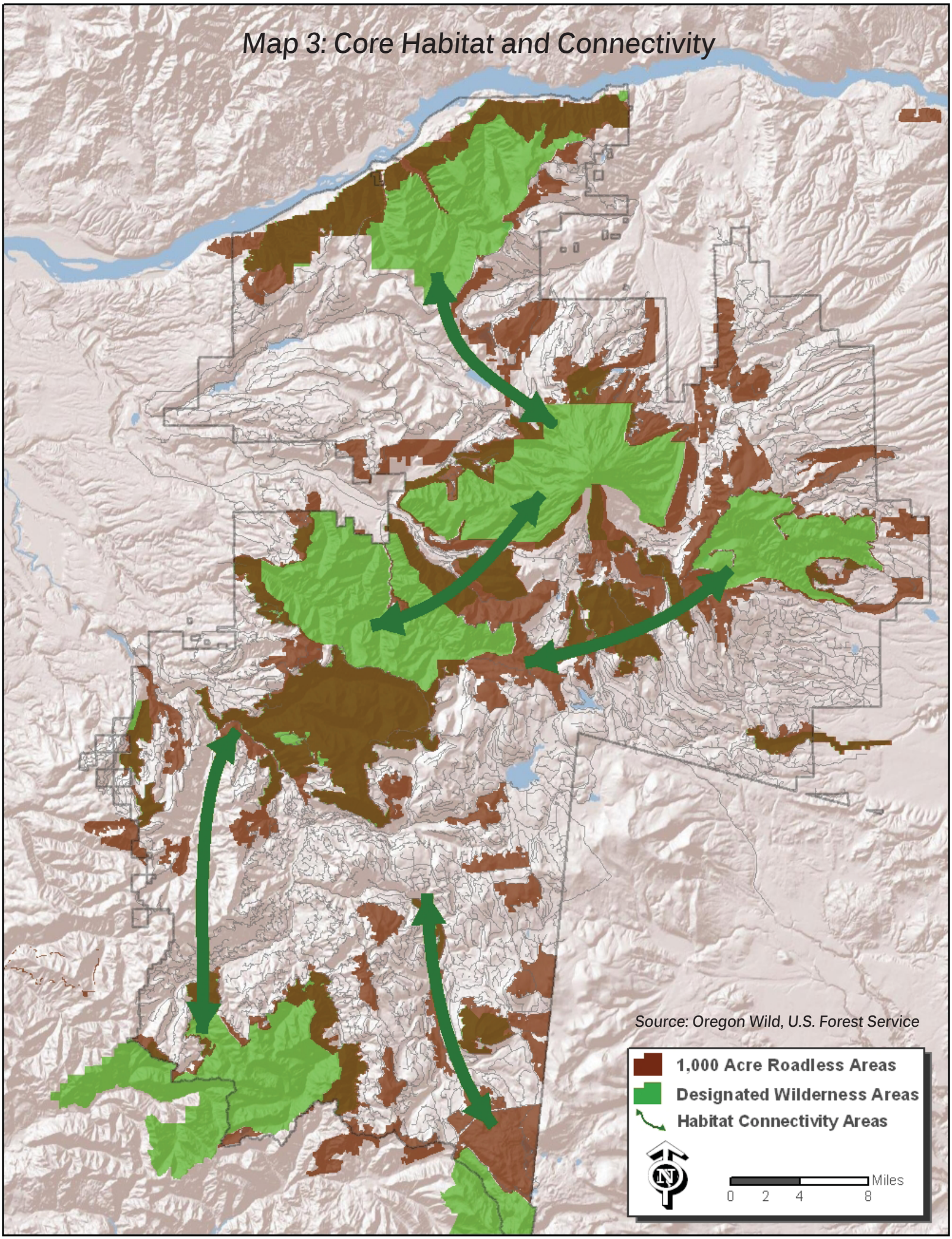
Large blocks of habitat are valuable for a number of wildlife and aquatic species because they serve as a refuge. They are particularly valuable for carnivores that are more elusive and more likely to be impacted by roads.

Core areas and reserves work better when they are close together or connected by restored areas of intact habitat. This plan considers the importance of restoring lands between core habitats to provide connectivity for migrating plants and wildlife. This report shows how Mt. Hood's core habitats could be connected by priority areas selected to protect drinking water, restore sensitive fish populations, and support the recovery of rare wildlife species. This report focuses on a small number of roads, the removal of which would have a great impact in increasing the size of core areas and improving the connections between them.

This plan considers the importance of restoring lands between core habitats.

Connections in the landscape have been demonstrated to have two major functions at the species level. Connections between important habitats support plant and wildlife migration to new habitats and also help populations share genetic adaptations that may be important in adapting to changing conditions (Soule & Terborgh 1999).

The following map highlights the current designated wilderness areas, roadless areas, and priority connections between core habitats. The map reflects the recent 2009 Omnibus Public Lands Management Act, which included 127,000 acres of new Wilderness around Mt. Hood and the Columbia Gorge. Wilderness and roadless areas are combined because they serve as core habitat reserves, meaning they are the best places to start when creating a plan that aims to protect the Northwest's natural diversity and ecosystems. These areas then require connectivity areas through old growth forests, riparian areas, and roadless areas. To effectively protect watersheds and wildlife habitat we need to include areas that extend to more diverse and lower elevation land areas. These areas include many critical unstable slopes, highly erodible soils, groundwater and spring water sources and forested wetlands, and other features of critical importance to watersheds. The connections were identified by looking at core habitat distribution. Some of the challenges related to connectivity on the Mt. Hood National Forest include the greater distance between roadless areas in the southern portion of the Forest. Further connectivity work should be focused in the southern area of the Forest especially because the next section on road removal identifies the southern area of the Forest as a priority for road removal to benefit fish and wildlife.


Map 3: Core Habitat and Connectivity
Source: Oregon Wild, U.S. Forest Service
1,000 Acre Roadless Areas
Designated Wilderness Areas
Habitat Connectivity Areas
N
Miles
0 2 4 8

Road Removal to Benefit Fish and Wildlife

Roads are widely recognized as a risk to aquatic ecosystems and terrestrial species on federal lands nationwide. They have numerous widespread, pervasive and, if left untreated, long-lasting biological and physical impacts that continue long after completion of construction. Road restoration has been specifically identified in the Northwest Forest Plan and other recent federal policies as a high priority for aquatic conservation on federal lands. Moreover, climate change will exacerbate current problems. For instance, high quality drinking water and fish habitat will be threatened by increasing frequency and severity of floods; and access to public lands for hunting, camping and other recreational activities could be limited by a deteriorating and flood-impacted road system.

Road restoration has been specifically identified in the Northwest Forest Plan and other recent federal policies as a high priority for aquatic conservation on federal lands

Addressing the impacts of the Forest Service's crumbling and destructive road system is one of the most important actions the Forest Service can take to help species and communities adapt to climate change. Mount Hood National Forest has 3,384 miles of roads in just over 1 million acres of Forest. Many of these roads are deteriorating, impacting threatened fish populations and fragmenting habitat for sensitive wildlife populations. Mt. Hood National Forest is currently working to address the road system by strategically closing unneeded roads that have a variety of impacts on water quality, and fish and wildlife species like salmon and deer and elk.

The Forest Service has not been able to reduce the road system fast enough to keep pace with the decreasing budget. Only 18% of Mt. Hood National Forest's road system needs are met with the current budget. Closing unneeded roads also reduces maintenance costs and better enables the Forest to focus resources on roads that are needed. The agency currently faces a road-maintenance backlog of $5.1 billion (U.S. Forest Service 2008A) and is poised to see that amount grow as many of the roads on the national forests near the end of their engineered lifespans. This backlog means Northwest residents often can't reach their favorite hiking, hunting and fishing areas because there is so little money to repair popular roads. The backlog also means increasingly severe impacts to fish and wildlife species, and as climate change throws more severe and frequent storms and floods in the mix, it means even more money will be needed to repair roads that will fail in the next round of storms. Conversely, an investment in, and reduction of, the road system now means good family wage jobs, the protection of community drinking water supplies, restoration of habitat for fish and wildlife, and a reduced future taxpayer burden.

In some cases regardless of maintenance, some roads built in the 1950s-1980s are simply located and designed in such a way they grossly accelerate erosion to a degree that cannot be mitigated by any level of maintenance. For example, stream-adjacent roads, mid-slope side cast roads, and roads located on alluvial and colluvial fans crossed by numerous small and shifting tributary streams (common on both sides of the cascades) are intrinsically deadly to water quality and fish habitat no matter how well they are maintained.

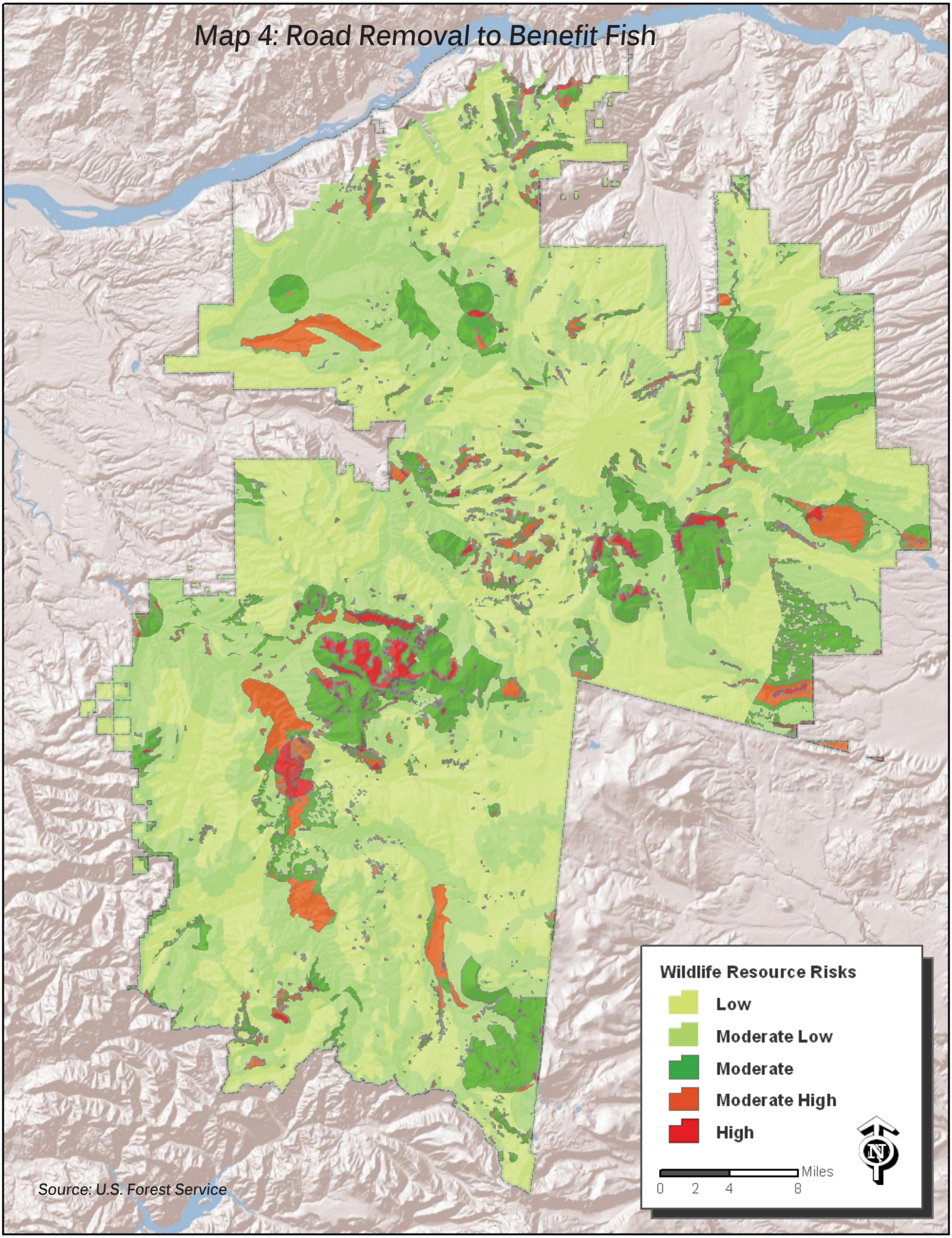
Repairing and decommissioning roads in our national forests is obviously a critical task. Road removal is well-tested technology and feasible. Research has demonstrated that road removal if properly executed prevents far more future erosion than the small amount of near-term erosion that is caused by the treatment. The Legacy Roads and Trails Remediation Initiative, now in its third year, is the right tool for the job. Across the nation, the program has already had a huge impact. Since 2007, the Forest Service has used Legacy Roads funding to decommission more than 2,000 miles of roads and to restore more than 1,100 miles of streams and 125,000 acres of habitat. In addition, Legacy Roads and Trails funds have improved more than 5,000 miles of core roads and 3,000 miles of trails on our national forests (Sacramento Bee). To date Congress has legislated $180 million dollars to help address roads posing risk to aquatic resources. The Washington Watershed Restoration Initiative, of which the GP Task Force is a partner, worked with Congressman Norm Dicks to establish this program (http://www.washingtonwatersheds.org/). Additional investments are needed to take advantage of this restoration opportunity.

The Forest Service is beginning to strategically assess their road system and determine which roads should be invested in for public access and which should be removed because they have extraordinary impacts on community water supplies, fish, or wildlife. Funding from Legacy Roads and Trails and other programs can then be used to implement the necessary decommissioning to restore fish and wildlife habitat, improve drinking water quality, reduce maintenance costs, and create restoration jobs.

Roadbed being decommissioned and transformed from packed dirt into fertile soil.

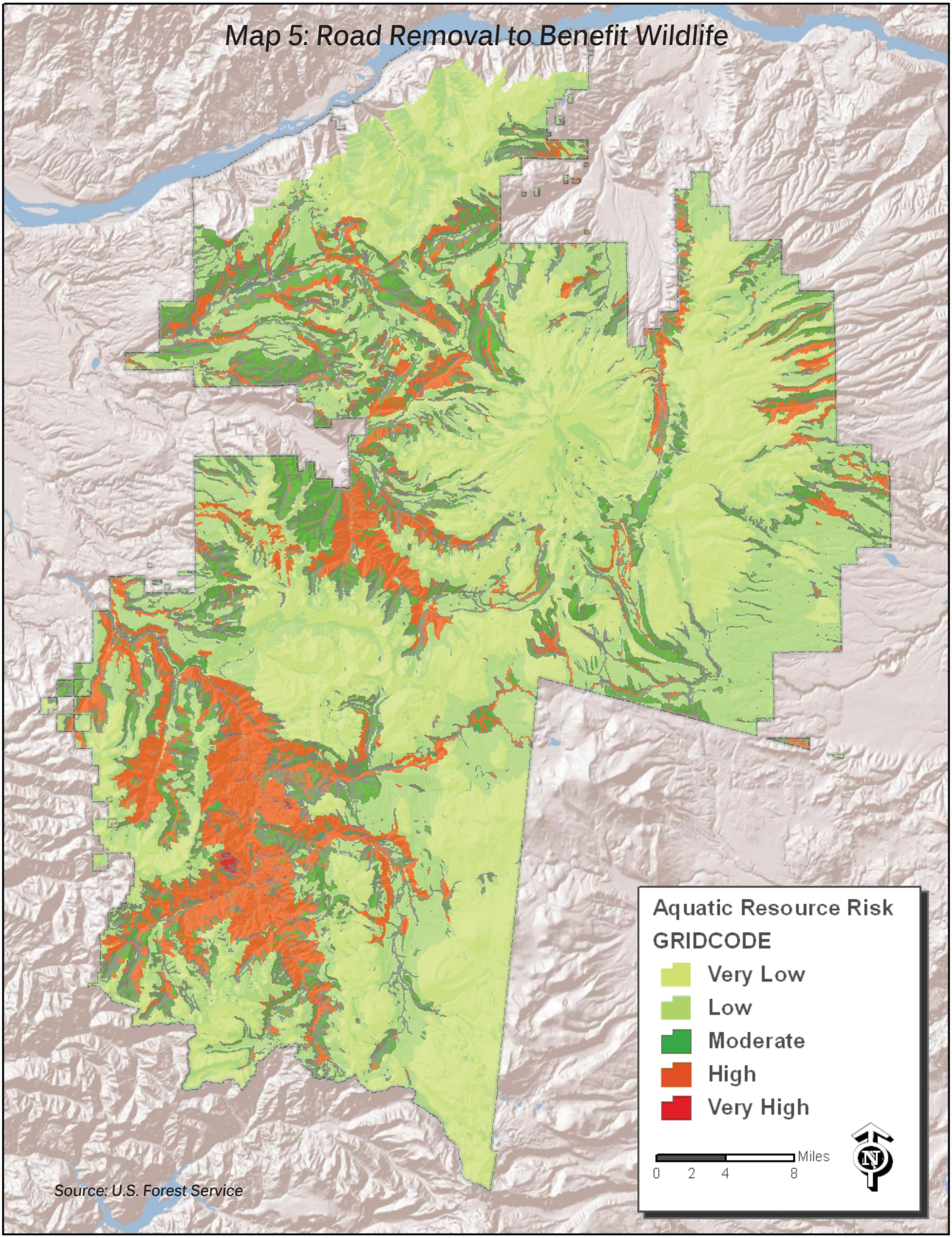
Using the Forest Service's roads analysis data, the following maps highlight priority areas for road removal to benefit aquatic species or terrestrial species. For more information on how these priorities were derived review the methodology section. This GIS could be improved with on-the-ground data on roads that been naturally closed, roads that have been closed by storms, and roads that have been recently removed or are scheduled for removal by the Mount Hood National Forest. The approach should focus on priority areas, how they overlap with other restoration priorities, and then take an in-depth on-the-ground scientific analysis to determine need and treatment. Site-specific analysis of benefits and impacts can be detailed in a National Environmental Policy Act (NEPA) document.

Map 4: Road Removal to Benefit Fish



Source: U.S. Forest Service

Map 5: Road Removal to Benefit Wildlife



Source: U.S. Forest Service

Aquatic Restoration and Drinking Water

The Forest is home to several native fish species, including many populations of salmon and trout federally listed under the Endangered Species Act (ESA). There are over 1,600 miles of fish-bearing streams on the Forest with approximately 300 miles supporting anadromous (i.e., ocean-going) populations of salmon and steelhead.

The five primary river basins on the Forest include:

- Clackamas River Basin
- Sandy River Basin
- Hood River Basin
- Fifteenmile Creek Basin
- White River Basin (Deschutes River system)

Long-term watershed changes have affected the hydrologic regime and fish populations. Changes such as timber harvesting, construction of road networks, and rural residential development have affected the five river basins. The federal lands, predominately managed by the Forest Service, make-up the vast majority (two-thirds to three quarters) of the Clackamas, Sandy, and Hood River basins. While Forest Service lands constitute a smaller portion of the Fifteenmile and White River basins, they still provide the preponderance of high quality, functioning aquatic habitat in both river systems.

There are a variety of excellent basin level aquatic strategy plans developed by a variety of partners including: the Forest Service, Sandy River Basin Partners, The Freshwater Trust, Clackamas River Basin Council, Hood River Watershed Group, Fifteenmile Coordinating Group. In addition, the Forest Service has developed finer scale data and conducted watershed analysis for the majority of watersheds on the Mt. Hood National Forest. They are available on their website, http://www.fs.fed.us/r6/mthood/publications/. There are also two larger scale federal plans focused on the recovery of salmon and steelhead, which are the Lower Columbia River Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead and the Oregon Mid-Columbia Steelhead Recovery Plan. Respectively, the federal plans provide a framework and roadmap for the conservation and recovery of four salmon and steelhead populations and for the recovery of ten Middle Columbia River steelhead populations that occupy Oregon tributaries to the Columbia River.

Where possible we included more refined data from the basin level plans (Sandy River Basin, Hood River Basin, and Fifteenmile Creek Basin) and where this data was not available (Clackamas River Basin) we used the coarser level data available in the regional plans. Because of the landscape level nature of this plan the watershed analyses developed by the Forest Service were not included, but during the implementation stage it is imperative that these documents are consulted. The Forest Service also has a regional Aquatic Conservation and Restoration Strategy, which protects and actively restores high priority watersheds with particular attention to habitat condition, aquatic organism passage and road stability.

From these plans, the GP Task Force has highlighted restoration strategies and priorities for each of the five basins. Restoration strategies include improving fish passage, restoring and enhancing riparian areas, managing invasive weeds, restoring stream and river channels, reduction of inputs of toxic chemicals and pes-

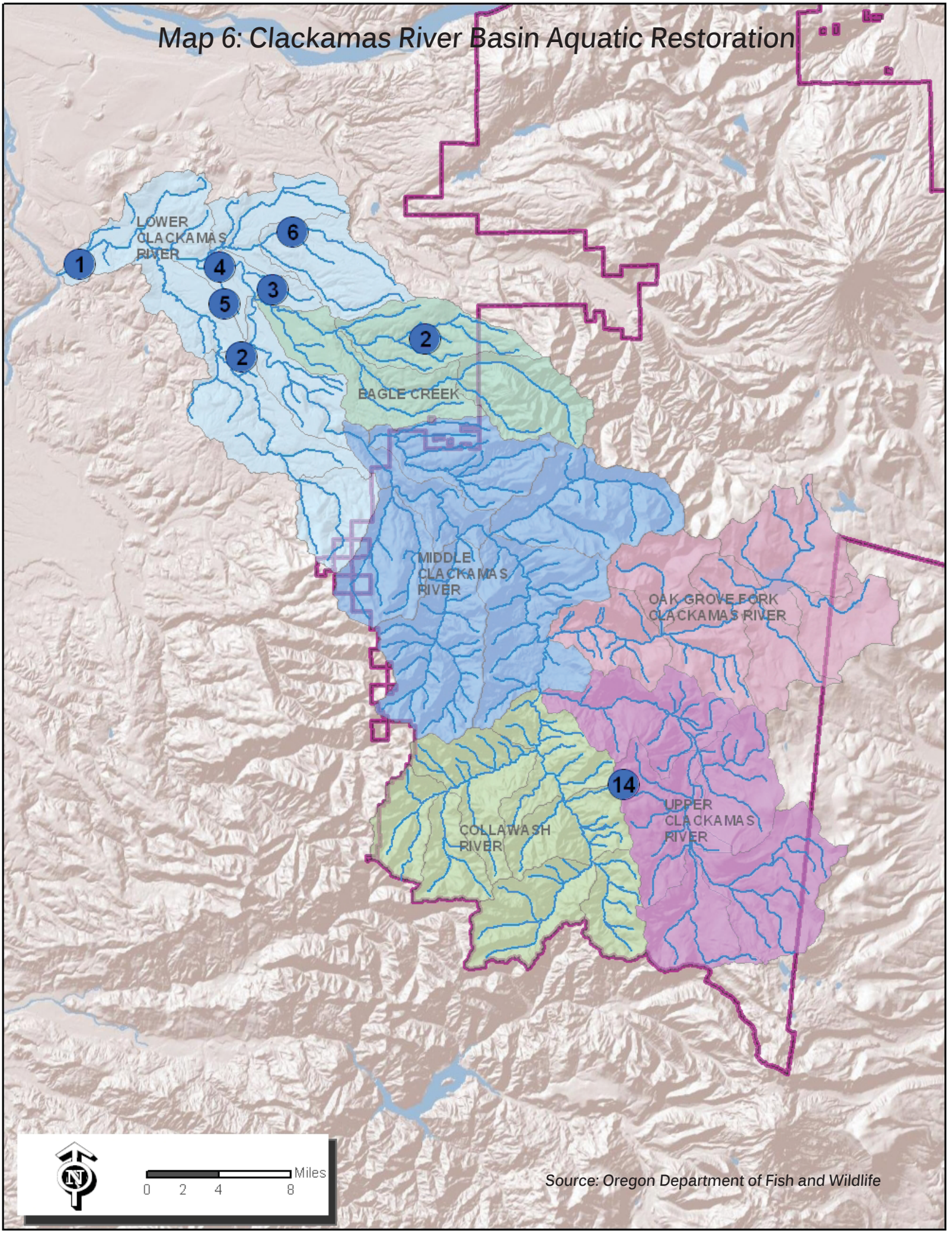
ticides that impact fish survival and behavior, and adding large wood to streams. The following maps highlight each of the four basins where information is available (currently no basin wide plan for the White River exists). The analysis takes a variety of approaches from Ecosystem Diagnosis and Treatment (modeling protocol of physical habitat and ecological conditions that helps identify limiting factors for fisheries) to identifying restoration actions based at broader spatial scales using stakeholder expertise and current science.

One important aspect of restoration not focused on in the above plans is the goal of improving water quality and quantity. Ninety-eight percent of the Forest is a municipal water supply. Oregon's water quality is regulated under the federal Clean Water Act by the Oregon Department of Environmental Quality (DEQ). Many streams in the Mount Hood area violate Oregon's water quality standards and are listed as impaired water bodies under the Clean Water Act. DEQ established clean water standards (e.g., bacteria, pH, dissolved oxygen, flow and sedimentation, and temperature) for Oregon's waters, and they develop and implement clean water plans for rivers and streams that do not meet clean water standards. For the Mt Hood National Forest, the streams are listed as impaired for temperature and on the eastside, there are some streams listed for sedimentation. The following maps (basin restoration strategy, municipal water supply, water quality limited streams, and fish barriers) highlights where we are getting our drinking water, where we can focus restoration efforts to provide clean water to communities and aquatic species, and passage for fish.

Clackamas River Basin Restoration Actions

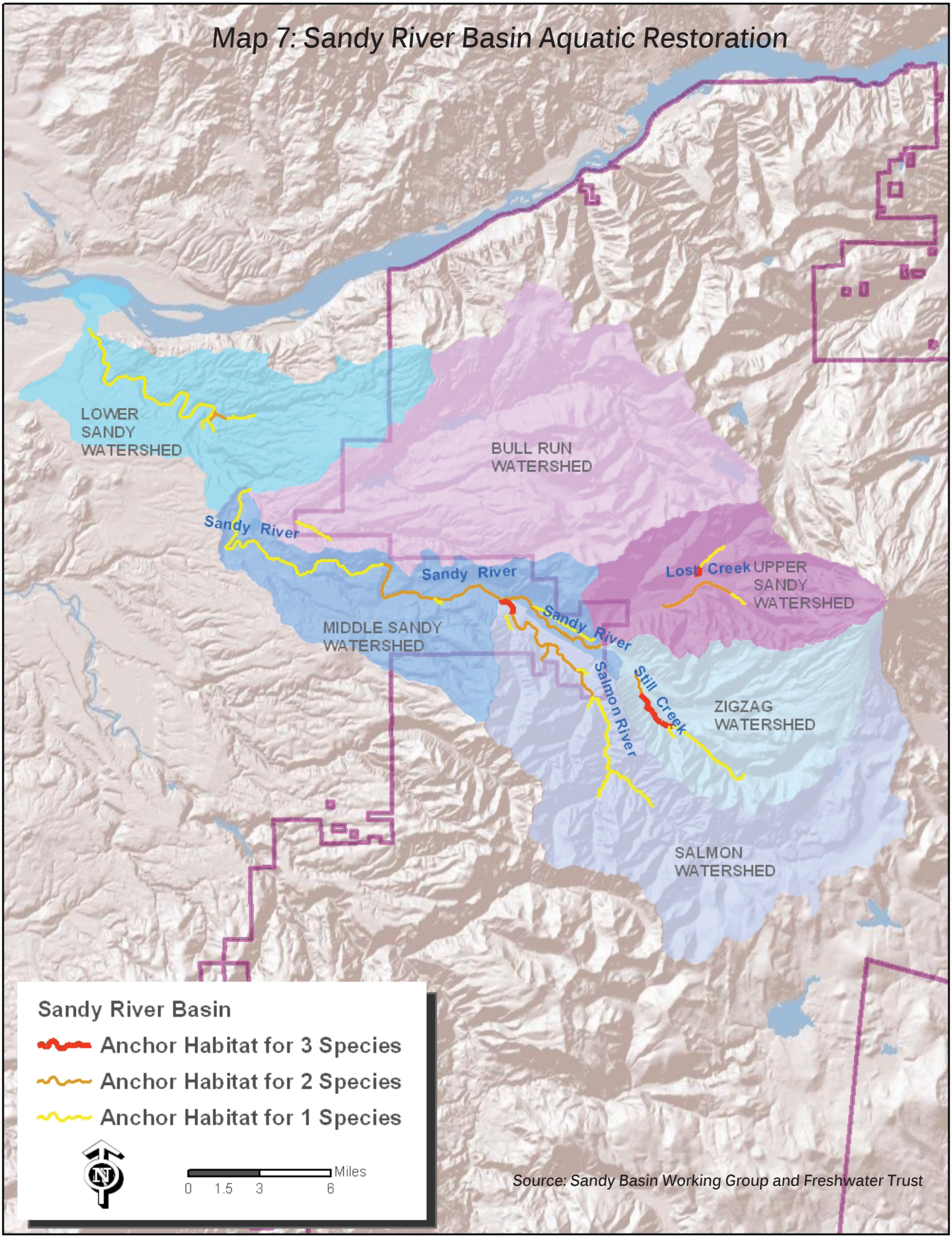
Map ID Number	Location	Action
1	Priority urban areas in lower watershed	Floodplain protection and restoration
2	Eagle Creek, Clear Creek	Instream habitat improvement and riparian restoration. Review landuse planning in context of salmon recovery needs (i.e., forest lands of higher value to salmon than urbanized lands). Provide incentives to promote good landowners stewardship
3	Mainstem Clackamas from River Mill Dam to Goose Creek	Instream habitat improvement and riparian restoration. Review landuse planning in context of salmon recovery needs (i.e., forest lands of higher value to salmon than urbanized lands). Provide incentives to promote good landowners stewardship
4	Mainstem Clackamas River from River Mill Dam to Abernathy Creek	Instream habitat improvement and riparian restoration. Review landuse planning in context of salmon recovery needs (i.e., forest lands of higher value to salmon than urbanized lands). Provide incentives to promote good landowners stewardship
5	Lower Clear Creek	Acquisition and easements (focus on Metro efforts)
6	Deep Creek	Reduce fine sediment loads through stormwater management, and floodplain/wetland restoration. Instream habitat improvement and riparian restoration. Review landuse planning in context of salmon recovery needs (i.e., forest lands of higher value to salmon than urbanized lands).
7-13	Outside Clackamas River Basin	Variety of actions, http://www.dfw.state.or.us/fish/CRP/lower_columbia_plan.asp
14	Upper Clackamas and Collawash	Reduce impact that roads have on impaired hydrograph
	Tributary streams below River Mill Dam	Riparian restoration (see Clackamas River Tributary Shading Plan-Clackamas River Basin Council-2008)
	Basin-wide	Flow improvements and riparian restoration that improve streamflows and water temperatures (particularly important to fall Chinook)
	Basin-wide	Inventory and protect seeps, springs, and other coldwater sources
	Basin-wide	Identify illegal water withdrawals, enforce existing water rights, promote water conservation, and identify priority areas for increased instream flows
	Basin-wide	Finish Clackamas Fish Habitat Analysis
	All areas within urban growth boundaries	Implement stormwater management plans where available and complete unfinished plans
	PGE hydro dams and associated mitigation areas	Passage improvement, flow modifications, habitat improvement identified in FERC license agreement.

Map 6: Clackamas River Basin Aquatic Restoration



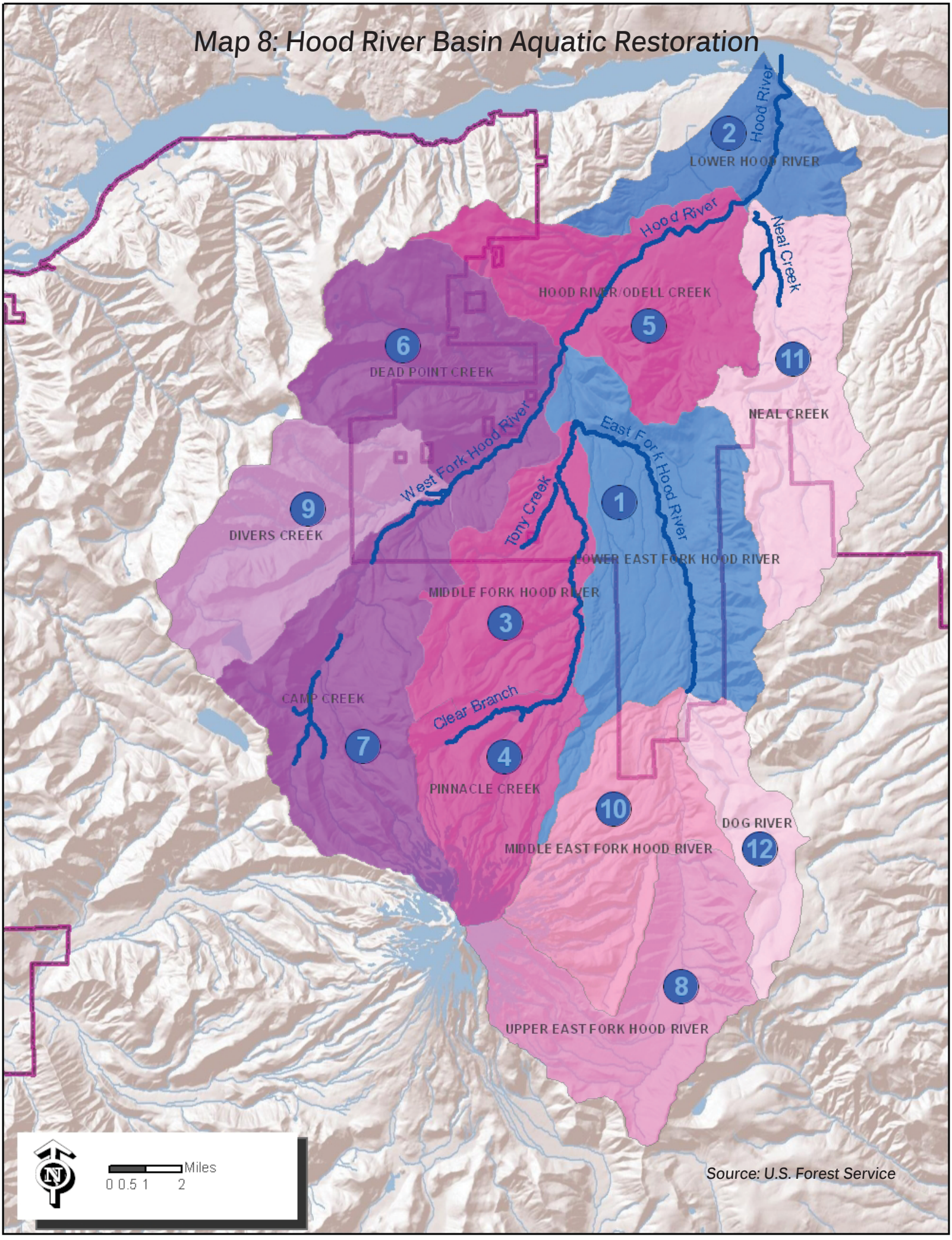
Source: Oregon Department of Fish and Wildlife

Map 7: Sandy River Basin Aquatic Restoration



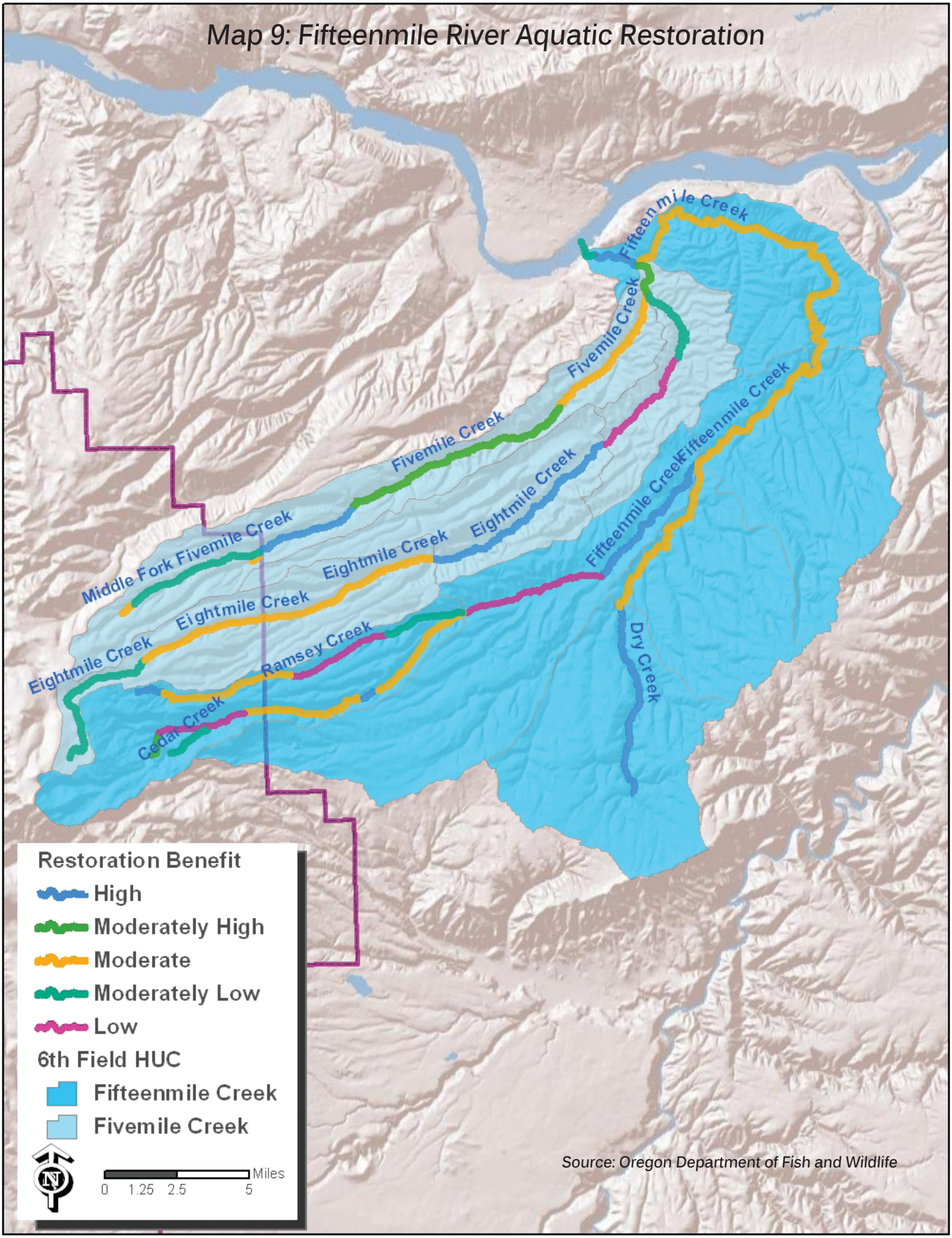
Source: Sandy Basin Working Group and Freshwater Trust

Map 8: Hood River Basin Aquatic Restoration



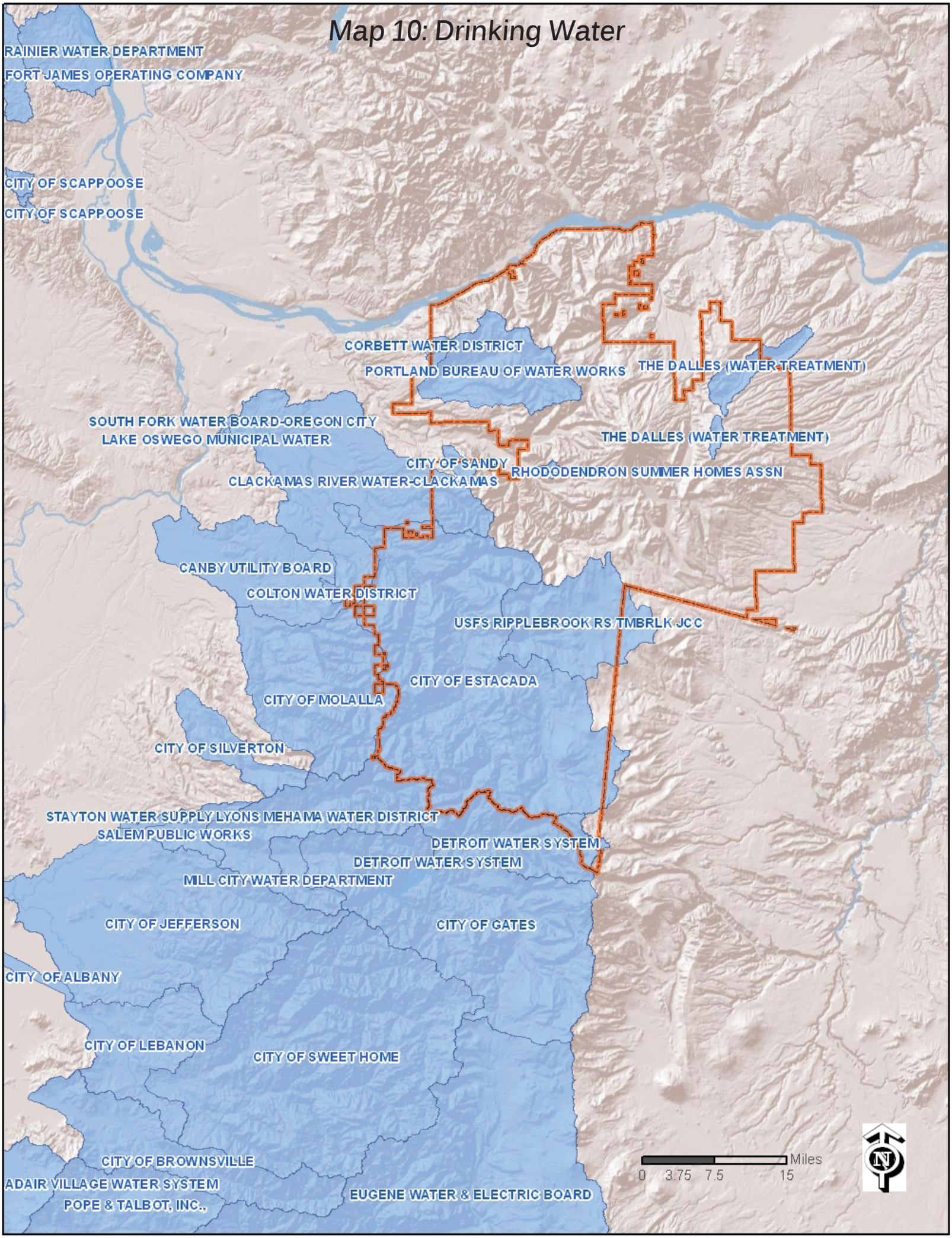
Source: U.S. Forest Service

Map 9: Fifteenmile River Aquatic Restoration

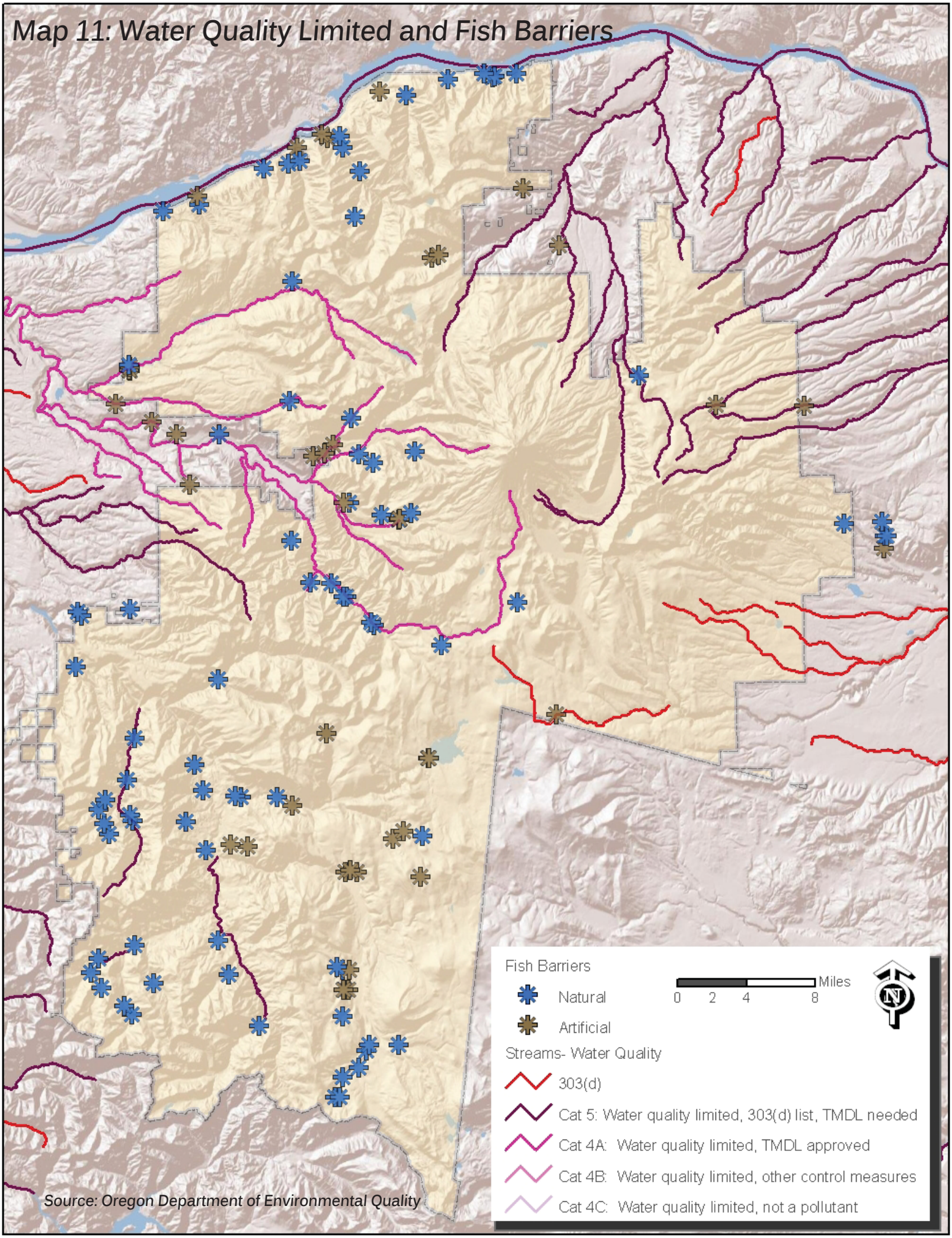


Source: Oregon Department of Fish and Wildlife

Map 10: Drinking Water



Map 11: Water Quality Limited and Fish Barriers



Source: Oregon Department of Environmental Quality

Climate Change

In a paper titled *The Implications of Climate Change for Conservation, Restoration, and Management of National Forest Lands*, Rick Brown demonstrates that "there is no question that strategies for addressing climate change, whether focused on mitigation or adaptation, entail substantial uncertainties and risks. Yet the uncertainties and risks of inaction are just as great" (Brown 2008). We should focus on restoration strategies that we are confident need to occur. Critically important and relatively simple actions that can be taken include (Hodgson et al. 2009, DellaSalla 2010):

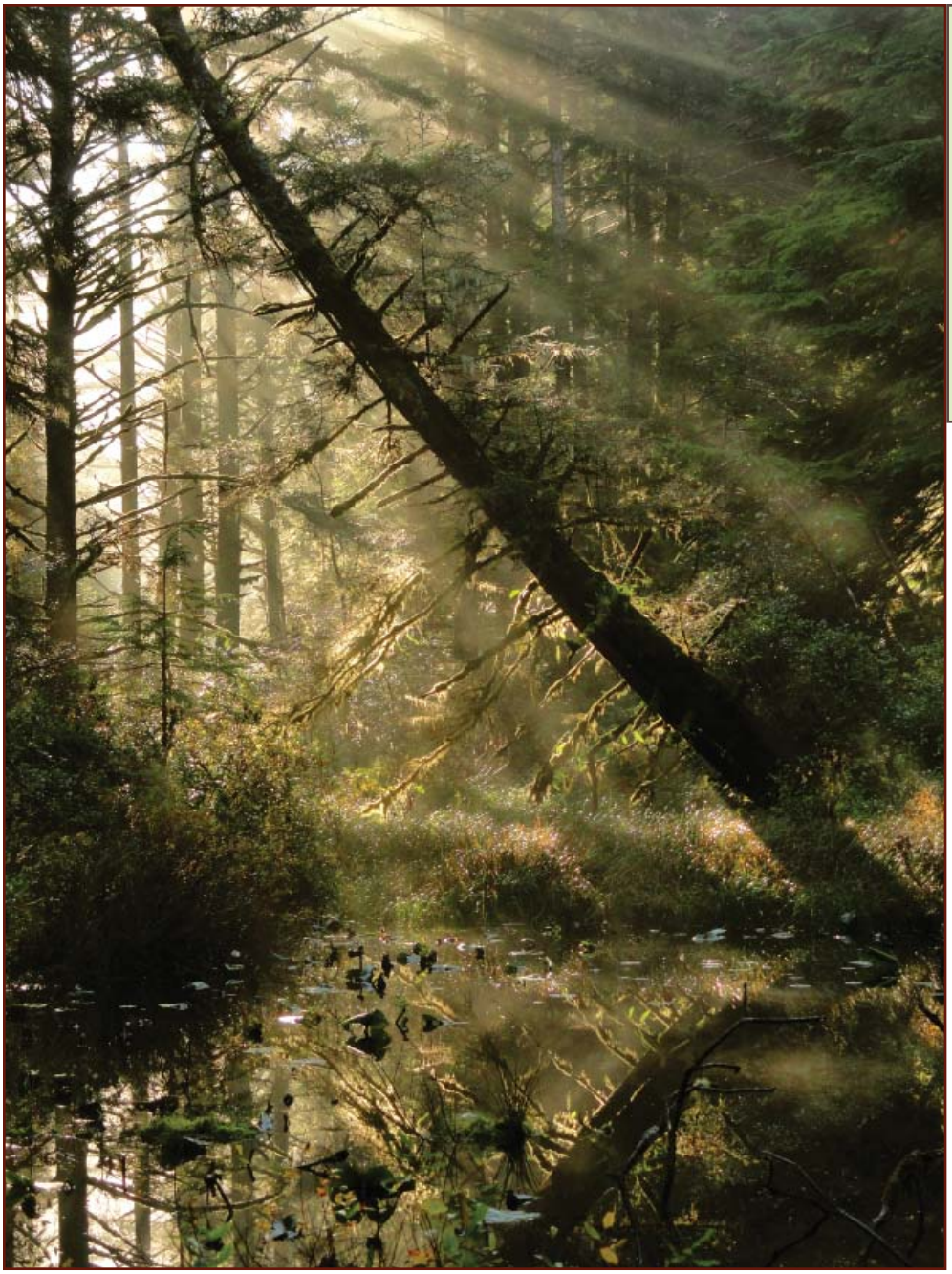
- increasing protected areas and make landscape more permeable by con necting these areas (locations of low human impacts);
- supporting environmental heterogeneity (high topographic and habitat diversity);
- concentrating efforts in centers of en demism (areas that harbor species that exist nowhere else on earth); and
- reducing other pressures such as likely impacts from floods, incursion into native habitats by invasive species, or loss of important habitats to conversion or logging

The Forest Service is working to establish a regional Climate Change Vulnerability Assessment (due end of 2011). This assessment intends to provide two essential contributions to adaptation planning. Specifically it plans to help in identifying which targets (species or systems) are likely to be most strongly affected by projected changes; and understanding why these resources are likely to be vulnerable, including the interaction between climate shifts and existing stressors. This will provide the context for finer-scale assessments, assist in setting management priorities, and provide critical information to manager who can make climate informed resource decisions. A key component will be an ecosystem restoration strategy. Also, the Forest Service currently has a "Roadmap for Responding to Climate Change," which identifies priorities for the Forest Service and lays out actions to incorporate adaptation, mitigation, engage partners, and education objectives http://www.fs.fed.us/climatechange/climate-update.shtml.

Because the Forest Service assessment is still being developed the GP Task Force chose to utilize data provided by the Oregon Climate Change Research Institute. In 2009, the University of Oregon Climate Leadership Initiative initiated a Climate Futures Forum process in the Lower Willamette River Sub-basin. The Oregon Climate Change Research Institute provided mid and end of century climate projections for the Lower Willamette region including changes in temperature, precipitation, snowpack, streamflow, fire, and vegetative conditions. While only Clackamas River Basin waters from Mt. Hood National Forest flow into the Lower Willamette, we have included the key recommendations as a starting place for restoration and a sample of the types of activities that could be helpful in other areas as well.

Aquatic and Terrestrial Systems

Protect existing, high quality habitat. Habitat protection policies should be revised to protect high quality habitat, instead of the current policy of protecting the most threatened habitats. Connectivity between habitats should be encouraged and stressors such as habitat fragmentation should be reduced. Protected habitat should be large enough to allow natural



Restoration of beavers will be key to building resilience in the region, as they are a keystone species for their disproportional influence on ecosystems as a result of their dam-building and feeding activities

processes like fire to occur. Federal spending priorities for the Forest Service and other agencies should be reallocated to ensure a priority is placed on protecting and restoring these crucial areas.

Revise species management. There needs to be reconsideration of how invasive plants as well as Threatened, Endangered and Sensitive (TES) species are managed. Agencies responsible for the recovery of sensitive species need to consider how to balance the demands of managing for an ever-growing list of species at risk of extinction. Consideration of the species' role in the ecosystem, the likelihood of recovery, and the likely impacts of climate change should all be considered. Some scientists are suggesting a new approach that shifts the focus of management from single species to suites or guilds of species, and this may be a more practical way for managers to assess diverse species needs more quickly so that actions can be taken in a timescale that will be effective. Species management should also focus on preparing for species that will be migrating from the south into the Lower Willamette.

Focus protection on keystone or umbrella species. Protection efforts by nongovernmental organizations, watershed councils, as well as local, regional and state government should focus on the species, habitats, and/or processes that provide general ecological benefits, as opposed to a species by species approach.

Increase and refocus monitoring. Shifting conditions under climate change increase the importance and need for adaptive management and monitoring. There is a need for monitoring of species' responses to habitat impacts from climate change, both short and long term, and monitoring of management strategies that are attempting to address those changes. Monitoring efforts by nongovernmental organizations and governmental agencies should focus on umbrella or keystone species which can act as indicators for the health of the ecosystem and other wildlife species. Involving the public in monitoring would increase citizen education while building support for management objectives.

Aquatic Systems

Protect floodplains. Connections between floodplains should be maximized along with increased efforts to create and maintain deep water and off channel habitats.

Increase the complexity of stream channels. Restoring the complexity of streams through changes in local regulations, reallocation of water rights, removal of passage barriers, and changes in land use planning increases resiliency to climate impacts.

Restore beaver presence in riparian communities. Restoration of beavers will be key to building resilience in the region, as they are a keystone species for their disproportional influence on ecosystems as a result of their dam-building and feeding activities (Driebe, Martinsen & Whitham 1998). Riparian plant communities (willow, cottonwood, and alder) thrive with beaver cuttings, resulting in denser growth patterns, which benefit other species such as nesting songbirds and arthropods (Baker et al. 2005; Hagar 1999; Martinsen, Driebe, & Whitham 1998). Beaver dams and ponds also create slack water habitat for juvenile salmon to feed and grow (Steelquist 1992). The effect of beaver and beaver dams on the winter habitat of juvenile salmonids is to increase potential habitat. Bryant (1984) found beaver ponds provided a large and complex volume of water for anadromous fish habitat and produced densities of coho generally higher than those reported in other systems of southwest Alaska (Morgan and Hinojosa n.d.). Debris jams, fallen trees, and brush provide cover for fish to hide from predators and refuge during high flows. Accumulation of downed woody debris in channels and surrounding floodplain areas provide nesting and roosting habitat, and food and cover for upland wildlife, waterfowl and songbirds, mink, otter, turtles, frogs and salamanders. Watershed councils can work to educate landowners on the value of beavers, and may need to work with local governments to provide incentives or change regulations.

Protect genetic diversity and recovery opportunities for fish. Habitat availability for fish should be maximized and passage barriers eliminated to the extent possible.

Terrestrial Systems

Restore natural fire regime. In collaboration with the Oregon Department of Forestry, federal and state land managers can increase prescribed burning while still protecting public health. More prescribed burning should occur in lower elevation areas in particular. Burning on forestlands by federal land managers of the Bureau of Land Management, Forest Service, and Fish and Wildlife Service, and state land managers is overseen by the Oregon Department of Forestry through the Smoke Management Program, which manages burning to ensure it occurs on days that will generate the least amount of smoke impacts to nearby com-

The natural fire regime has been impeded in and around Mount Hood National Forest for decades.

munities and lowest chance of violating particulate matter standards under the Clean Air Act. Additionally, limiting development in fire prone areas will protect new infrastructure, while existing infrastructure should be fire-proofed. More education of residents living in the fire prone areas on the value of prescribed burning and how to protect infrastructure is needed by emergency managers, public health workers, and community-based organizations.

Use a landscape scale approach to conservation. To maximize protection of habitat, a landscape scale approach is needed that integrates efforts happening at a more localized scale with broader regional approaches. Conservation-focused organizations and watershed councils should work with private landowners to help them understand the importance of diverse landscapes and to create networks of habitats.

Expand carbon sequestration efforts. Carbon sequestration should be considered as an objective under improved land management efforts. Carbon sequestration should not be the sole purpose of land management but should be integrated with other objectives such as the recovery of sensitive wildlife populations.

Protection and Restoration of Unique Habitat

There are a number of habitats valuable for fish and wildlife in Mt. Hood National Forest that are unique within the region, and over time the amount of these habitats has diminished significantly. Special habitats include white-bark pine ecosystems, pine oak woodlands, huckleberry fields, aspen stands, wetlands, and meadows. Maps are only available for white-park pine, pine oak woodland, huckleberry, and wetlands/meadows.

Whitebark Pine

Whitebark pine has been widely described as a "keystone" species in high-elevation forests (Tombak et al. 2001, Schwandt 2006), an important ecosystem component that influences the success of other organisms. The Pacific Northwest Region of the Forest Service has produced a Whitebark Pine Restoration Strategy for the Pacific Northwest Region that outlines the goals of restoring and conserving a network of viable populations of whitebark pine and describes priority actions to meet these goals. The future of whitebark pine in Oregon and Washington as well as throughout its range is of serious concern because of the species' vulnerability to the non-native fungus Cronartium ribicola (which causes white pine blister rust), its high susceptibility to infestation by mountain pine beetle, its risk of being destroyed in large and intense wildfires, and the likelihood of its being replaced in some subalpine mixed conifer forests by more shade-tolerant tree species, a trend that is exacerbated by fire exclusion (Aubry et al. 2008). Whitebark pine provides food for a number of wildlife species including Clark's nutcracker, grosbeaks, nuthatches, chipmunks, squirrels, and bears.

The Pacific Northwest Region strategy report determined eight whitebark pine management areas in Mt. Hood National Forest and the proposed actions include conserving the habitat, collecting cones, restoring (planting seeds or seedlings, thin, and prune) trees, and surveying condition of trees.

Pine-Oak Woodland

The East Cascades ecoregion of Mt. Hood National Forest contains pine-oak habitat, which is dominated by Oregon white oak and/or ponderosa pine. Pine-oak habitat is important for a variety of wildlife including Lewis' woodpecker, western gray squirrel, white-headed woodpecker, pygmy nuthatch, flammulated owl, and bats. Stopping the conversion of these lands by development and reintroducing fire could help conserve these unique areas. Special consideration will have to be given to controlling invasive species in these areas.

Huckleberry

Huckleberry production, specifically big huckleberry (Vaccinium membranaceum), is declining in many northwestern huckleberry fields including those in Mt. Hood National Forest. Huckleberries are important to American Indians, and several tribes harvest from the Mt. Hood including those represented by the Confederated Tribes of the Grande Ronde Community and the Confederated Tribes of the Warm Springs Reservation. The huckleberry is a main food source for a wide range of animals including deer, birds, rodents, insects, and the most well-known - black bears.

Huckleberries are a major component of the understory vegetation in certain high elevation coniferous forests of Mt. Hood National For-

Pine-oak habitat is important for a variety of wildlife including Lewis' woodpecker, western gray squirrel, white-headed woodpecker, pygmy nuthatch, flammulated owl, and bats.

est. Most popular huckleberry picking areas originated from uncontrolled wildfires or fires set by American Indians that were common in the Northwest before modern fire protection and control techniques were applied. After a large wildfire, huckleberries resprout, become fully productive in 10 to 15 years, and then remain productive for many years. However, with fire exclusion, trees grow up and eventually produce too much shade for huckleberry production. The bushes survive in the shade for many years but fruit production drops off until bushes are fruitless. In order to restore huckleberry production a combination of a revised fire suppression policy to restore huckleberry fields, prescribed burns, and silviculture techniques should be used. The huckleberry restoration map is a Forest Service GIS analysis that looked at silver fir and mountain hemlock stands to identify potential huckleberry fields. Field work to fully assess huckleberry restoration potential is needed.

Aspen

Aspen is a deciduous tree with spectacular fall foliage. Stands generally have high diversity and density of invertebrate prey. A suite of associated species, particularly songbirds, are entirely dependent on aspen. Aspen stands provide habitat for deer and elk, bats, black bear, beaver, rabbits, ruffed and blue grouse. Tree swallows, woodpeckers, and other birds nest in aspen cavities. Aspen occurs in the East Cascade ecoregion which is found on the eastern slopes of Mount Hood and the eastern portions of the Mt. Hood National Forest. Fire suppression, grazing, and invasive plants all

threaten aspen woodlands. Carefully reintroducing fire, using cattle and big game exclusion fences to encourage aspen reproduction and limit grazing, and controlling invasive plants will all help restore aspen woodlands.

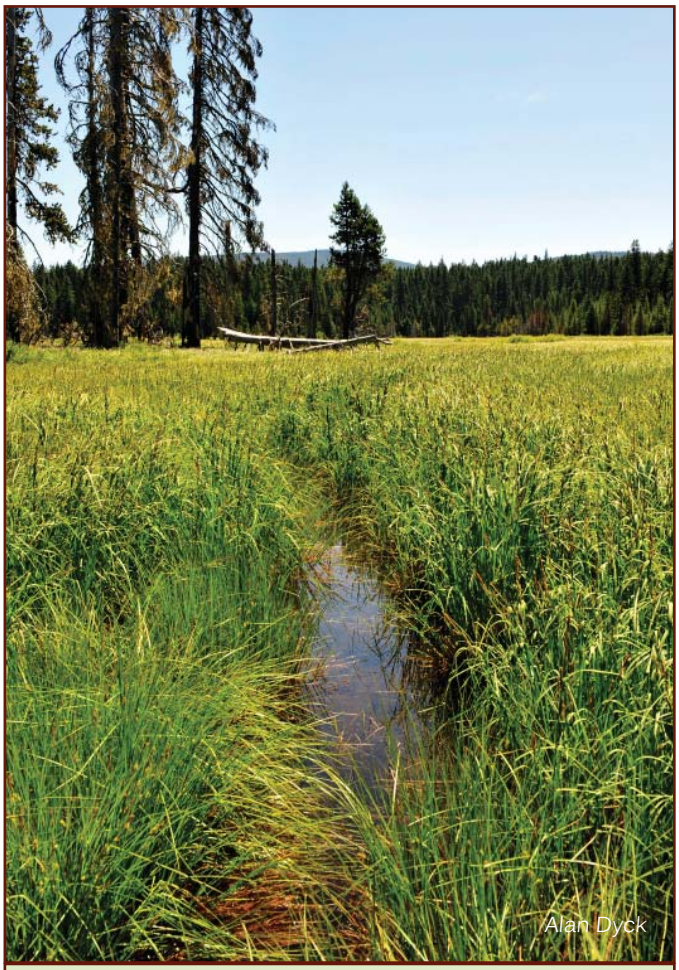
Wetlands

Wetlands provide important habitat for migrating and breeding waterfowl, shorebirds, water birds, songbirds, mammals, amphibians, and reptiles. Floodplain wetlands and backwater sloughs and swamps are important rearing habitat for juvenile salmon. Wetlands improve water quality by trapping and filtering sediments and toxins, recharge aquifers, store water, and reduce the severity of floods. A number of threats including habitat loss, reduced water availability, degraded water quality, and invasive species affect wetlands. The strategies to counteract these threats focus on identifying wetlands that have been altered or lost and need to be restored, using incentive programs to make water available, working to manage potential contaminants such as fertilizers and pesticides, and preventing invasive plants from becoming established.

Meadows

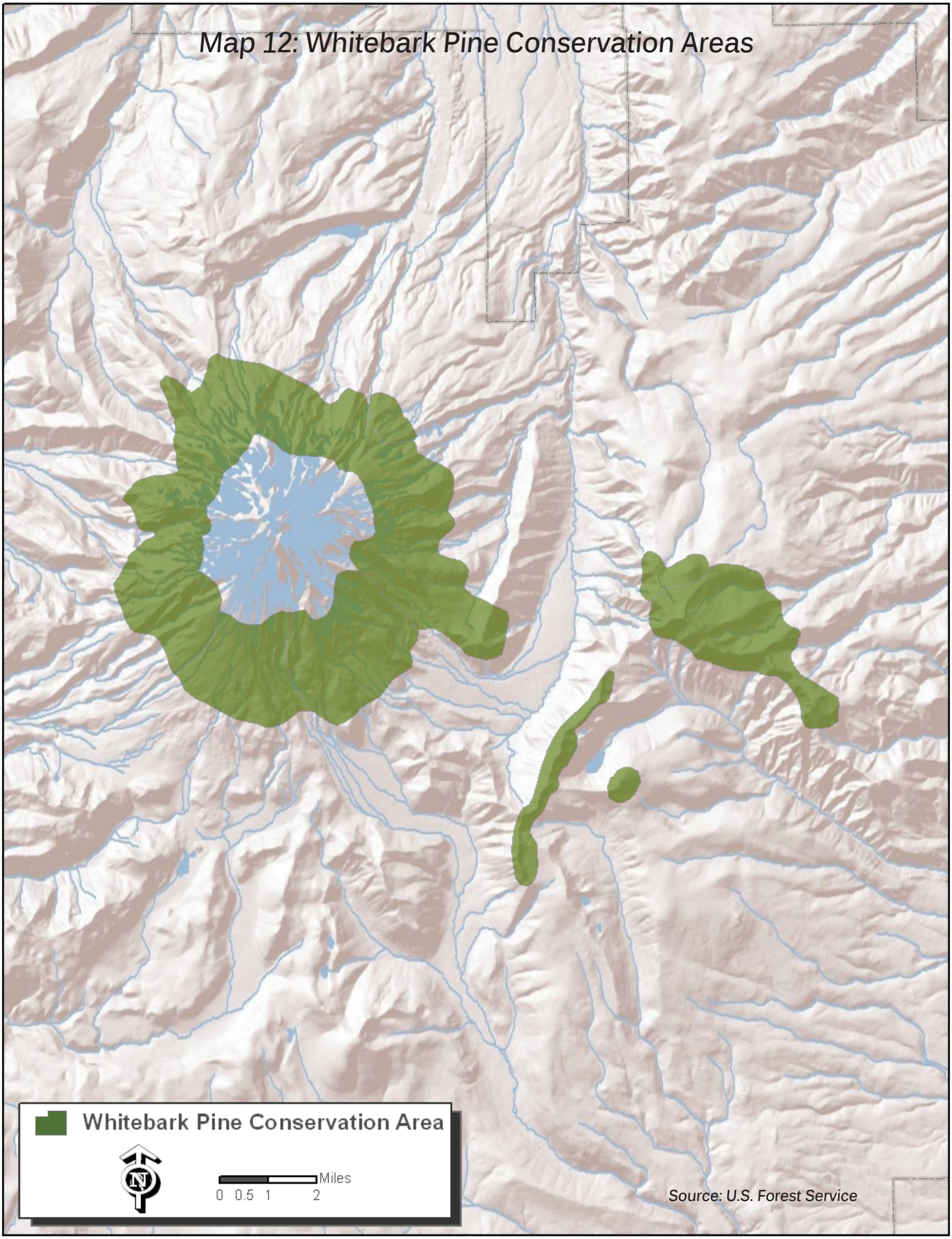
Native grasslands (including open dry meadows) are one of the most imperiled habitats in the western United States and are disappearing rapidly around the globe. A variety of wildlife rely on meadows including some migratory birds and deer and elk. Fire suppression has led to encroachment by shrubs and conifer trees, invasive species are displacing native plants, and land use conversion in low-elevation areas all threaten meadow habitat. Restoration restores natural ecosystem-forming processes—it does not substitute for or mimic them. These processes could include reintroduction of fire, herbivory (review of whether livestock grazing historically played a role in meadow deterioration and whether it is still occurring), and actions to remediate degraded hydrology (shallow groundwater systems and seasonal wet zones often sustain meadows).

The Forest Service produced a GIS map of special habitats, which includes cliffs, rock outcrops, scree and talus slopes, wet and dry meadows, and shrub areas. Included is a map identifying restoration opportunities for these special habitats. This map has not been validated and is not comprehensive for the entire Forest. Field work to verify and analyze restoration opportunities will be essential before restoration treatments are implemented.



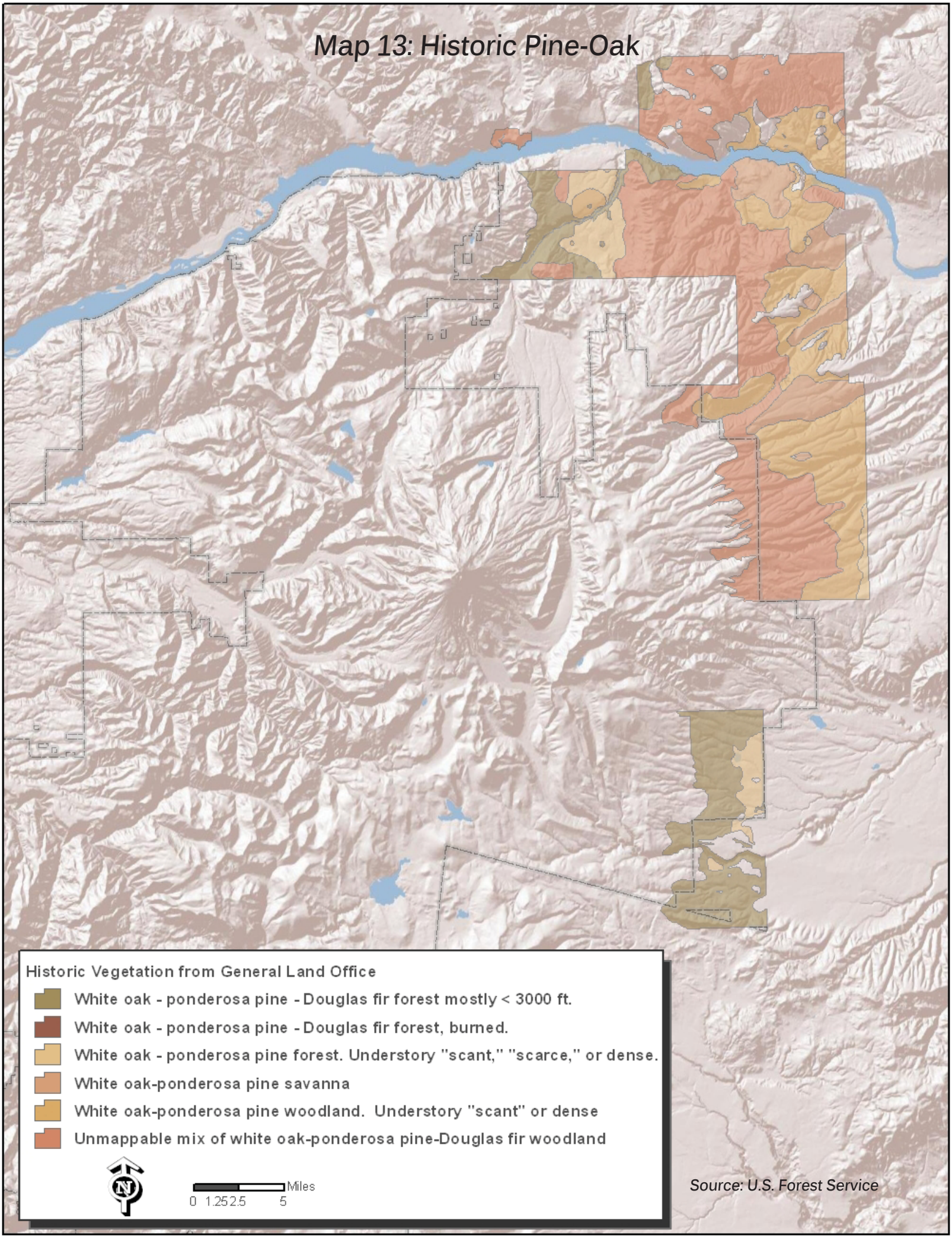
Floodplain wetlands and backwater sloughs and swamps are important rearing habitat for juvenile salmon.

Map 12: Whitebark Pine Conservation Areas



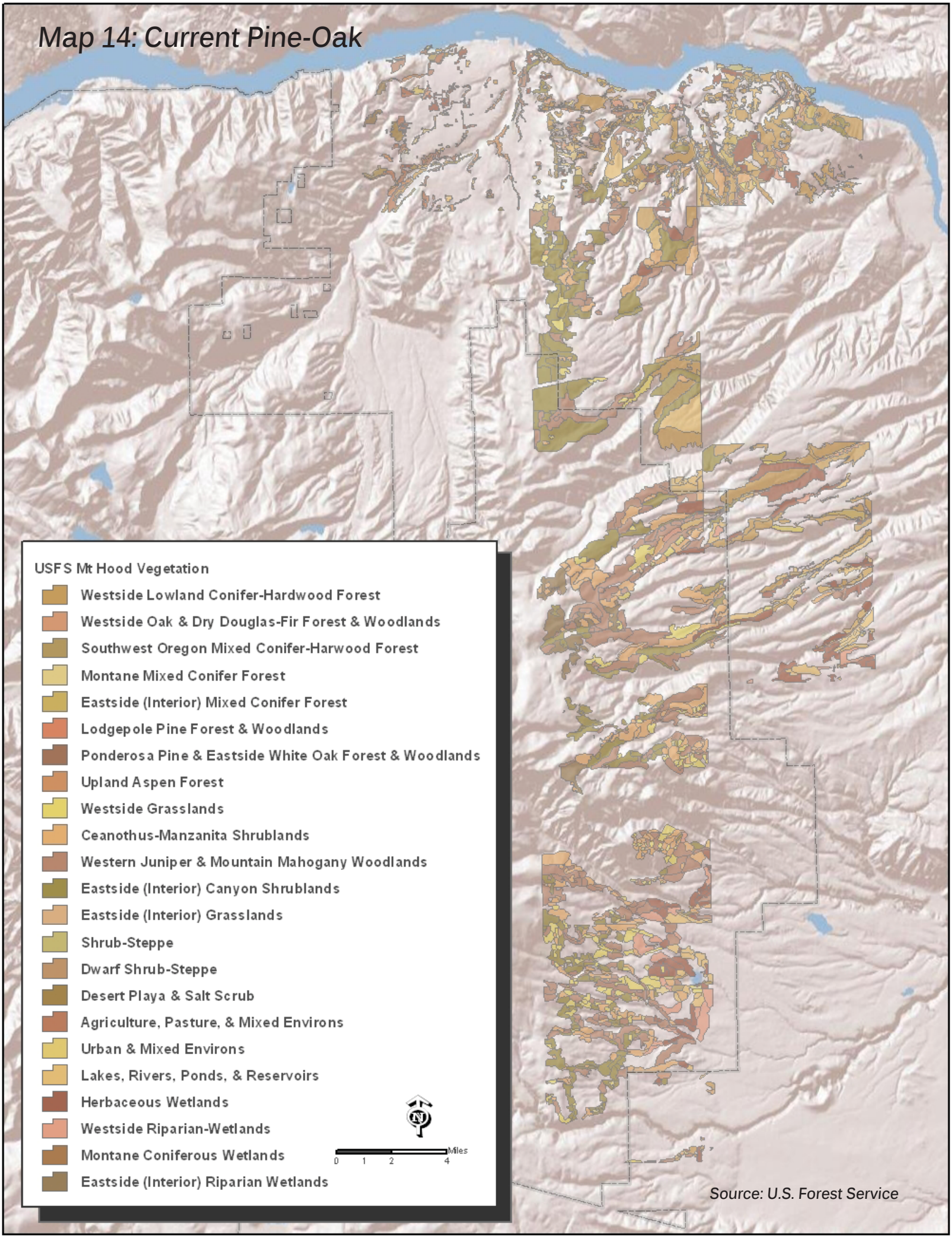
Source: U.S. Forest Service

Map 13: Historic Pine-Oak



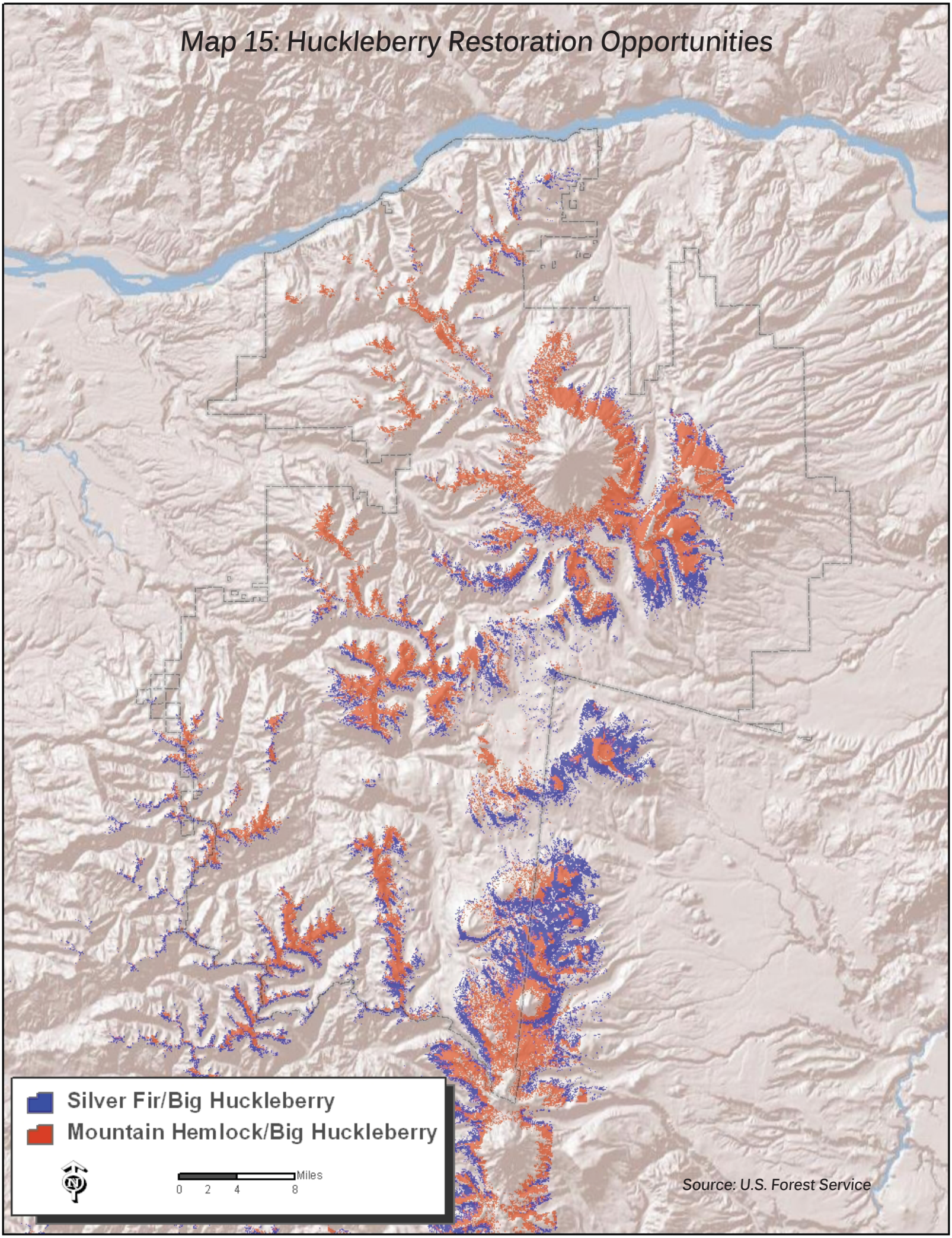
Source: U.S. Forest Service

Map 14: Current Pine-Oak



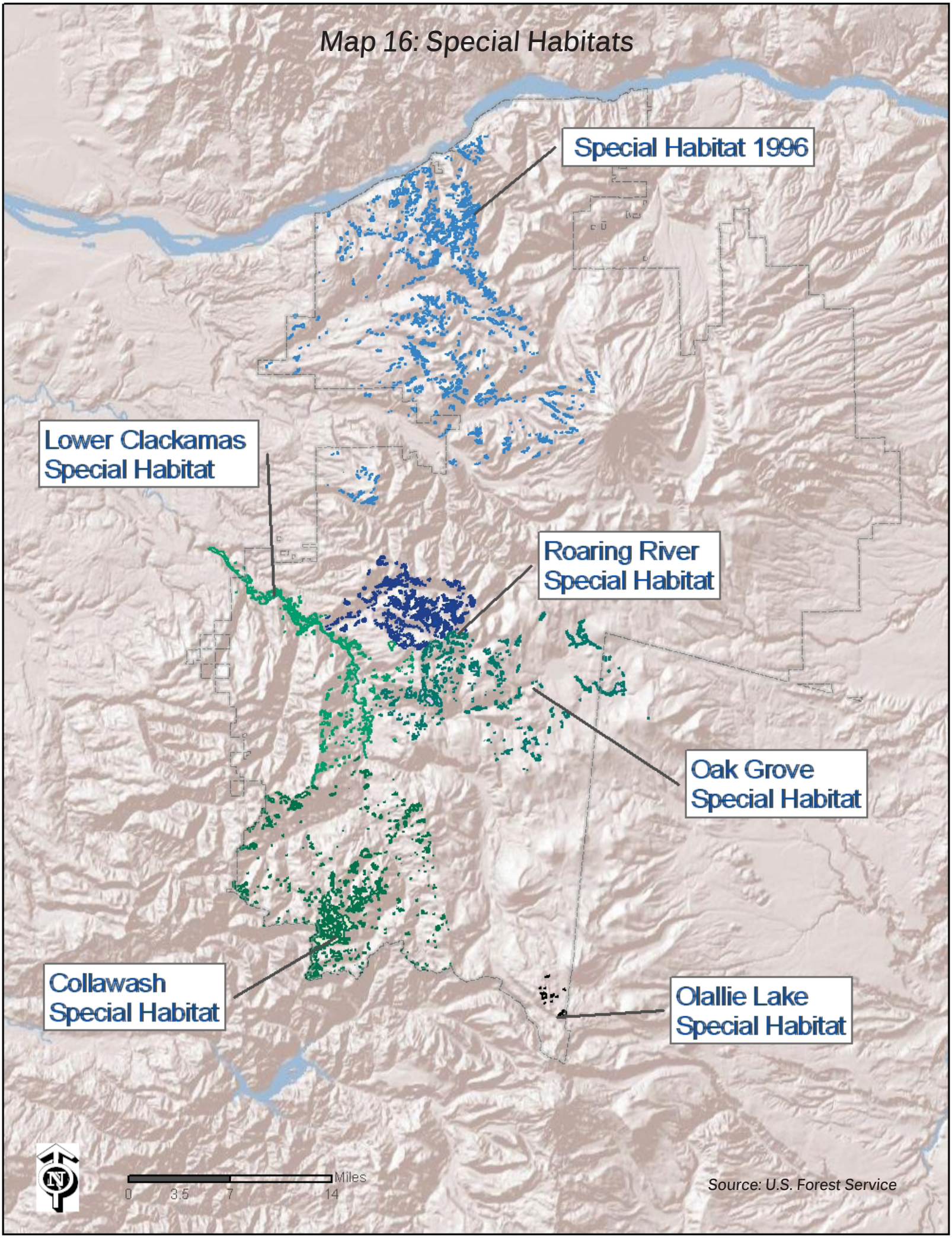
Source: U.S. Forest Service

Map 15: Huckleberry Restoration Opportunities



Source: U.S. Forest Service

Map 16: Special Habitats



Source: U.S. Forest Service

The Oregon Conservation Strategy

Developed by the Oregon Department of Fish & Wildlife (ODFW,) the Oregon Conservation Strategy is the overarching state strategy for conserving fish and wildlife. The goals of the Conservation Strategy are to maintain healthy fish and wildlife populations by maintaining and restoring functioning habitats, and preventing declines of at-risk species. Part of the Strategy featured Opportunity Areas to identify landscapes in Oregon where broad fish and wildlife conservation goals would be best met. ODFW used a three-step process to identify areas of land and water that provide the best opportunities for conservation actions for the Conservation Strategies strategy species and habitat. These steps included: 1) utilizing the computer modeling program MARXAN to identify areas as having the best suitability for multiple species and habitat; 2) validating the identified areas against other spatially-explicit planning and consulting with ODFW biologists; and 3) identifying where they overlapped with other planning efforts' priority areas. The strategy considers fish and wildlife from a statewide perspective, establishing a broader context for decisions about the species and habitats in greatest need of conservation attention. The framework for the plan is formed by key conservation issues 1) Land Use changes; 2) Invasive Species; 3) Disruption of Disturbance Regimes; 4) Barriers to Fish and Wildlife Movement; 5) Water Quantity and Quality; 6) Institutional Barriers to Voluntary Conservation. The strategy is focused on a voluntary, non-regulatory approach to addressing conservation in Oregon.

Much of Mt. Hood National Forest and surrounding area is covered by one of ODFW priority conservation areas. This emphasizes the importance of public land restoration for conserving fish and wildlife. The GP Task Force has pulled out the applicable Conservation Opportunity Areas within Mt. Hood National Forest in the following map. Many of the recommended conservation actions align with previously identified strategies. In addition, ODFW, in cooperation with the Western Governors Association is assessing habitat connectivity across Oregon and may have results in the future that are relevant to the restoration of Mt. Hood National Forest.

Western Cascade Ecoregion-Conservation Opportunity Areas

Wauna Creek, a tributary of Eagle Creek, displays the cool and damp environment throughout the watershed which makes excellent habitat for numerous key salamander species.

WC-01. Eagle Creek

Located at the northern edge of the ecoregion in the Hatfield Wilder¬ness, this area is comprised of the Eagle Creek drainage which flows into the Columbia River.

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

An Oregon Spotted Frog Tadpole

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 Late Successional Reserve.
- Important area for winter steelhead, fall Chinook salmon and spring Chinook salmon

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 habi¬tat for several amphibian species.

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

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

Willamette Valley Ecoregion-Conservation Opportunity Areas

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, grass¬lands and floodplain forest.
- Area provides spawning habitat for several species of salmonids.

Key Species:

- Oregon Slender Salamander
- 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 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 Species:

- Coho Salmon
- Fall Chinook Salmon
- Pacific Lamprey
- 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

Collaborative groups can be great allies in stream conservation efforts. The Clackamas Stewardship Partners, above, are visiting a newly created side channel of the Clackamas River.

East Cascades Ecoregion-Conservation Opportunity Areas

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 Species:

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

EC-02. Wasco Oaks

Extends from the Columbia River up through Mt. Hood National Forest on the eastern side of Mount Hood.

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 Species:

- Lewis' Woodpecker
- Coastal Cutthroat Trout
- Winter Steelhead

Recommended Conservation Actions:

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

The East Fork Hood River. Key species in the Hood River Watershed iclude Fall Chinook Salmon and Winter Steelhead.

EC-03. Warm Springs River

Special Features:

- Naturally spawning spring chinook

Key Species:

- Olive-sided Flycatcher
- Bull Trout
- Summer Steelhead

Columbia Plateau Ecoregion-Conservation Opportunity Area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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 Species:

- Lewis' Woodpecker
- Western Gray Squirrel

Recommended Conservation Actions:

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


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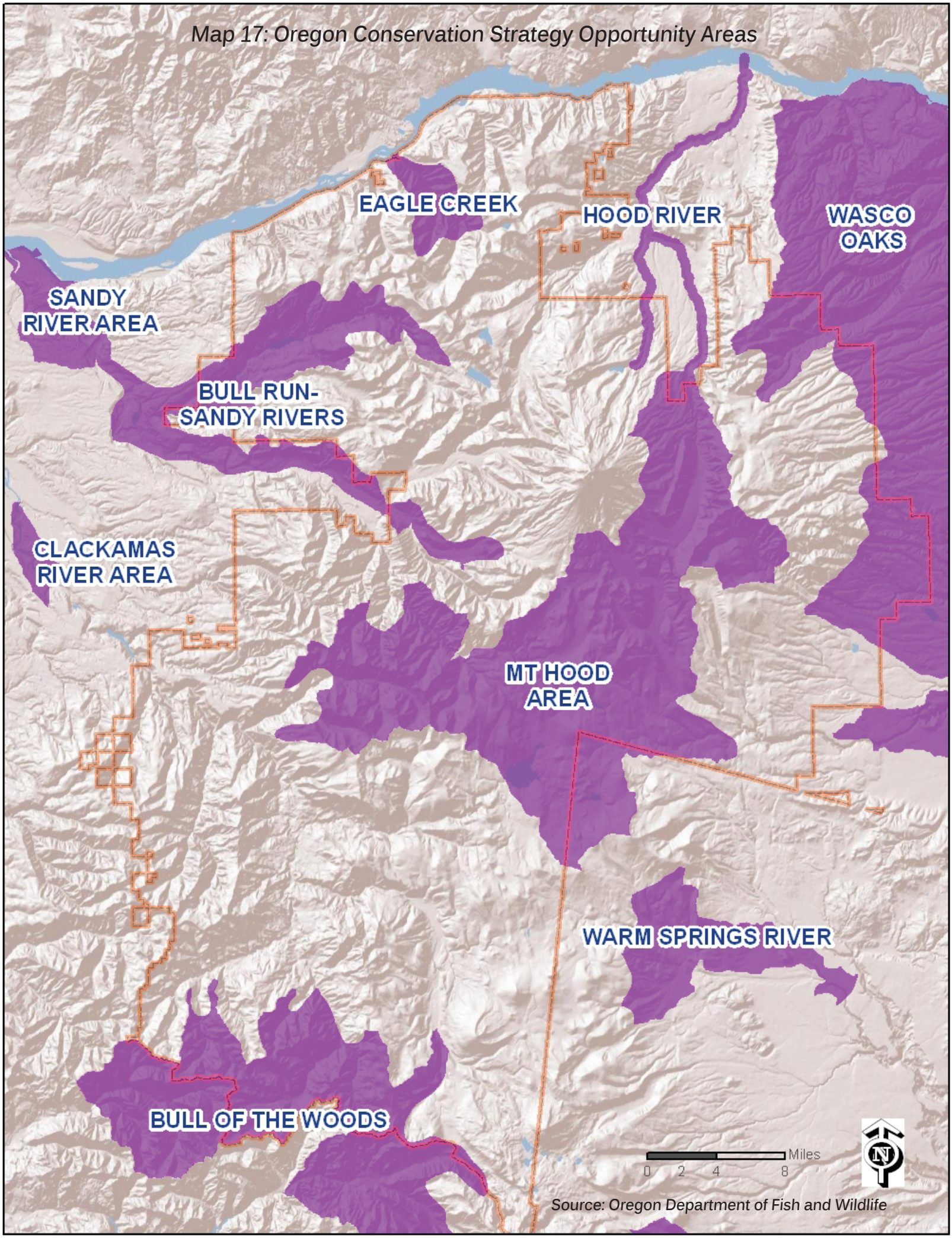
The White River starts it's journey high on the slopes of Mt Hood, above. At lower elevations it flows through much drier eastern environments.

Map 17: Oregon Conservation Strategy Opportunity Areas



Source: Oregon Department of Fish and Wildlife

Conclusion

For restoration to be successful on Mt. Hood National Forest the entire suite of activities outlined in *Wy'east Restored* should be implemented. We recognize there are limited resources to get all the necessary work done so it will be important to prioritize activities. There are a number of approaches to prioritizing activities and a combination that includes sequencing activities to ensure they are effective and efficient (e.g., road removal after upland restoration to allow access), and combining terrestrial and aquatic restoration by taking a watershed approach. As these approaches are considered it is important to remember there may be places where sequencing does not work, for example, where existing conditions threaten aquatic resources in such a way that aquatic targeted restoration should not be delayed waiting for upland restoration. In addition one should look at current opportunities, funding, and ability to leverage community support as possible reasons where particular restoration activities would be a higher priority.

This plan calls for protection of mature and old growth forests, core habitat reserved and connected, road removal to benefit fish and wildlife, aquatic restoration, community drinking water protection and conserving important fish and wildlife habitat. Our vision is a Mt. Hood National Forest where healthy and abundant salmon thrive in our streams, large contiguous blocks of habitat support spotted owls and top predators, clean cool drinking water flows from our watersheds, and local family-wage jobs are available in the woods.

To ensure this vision and plan are implemented we need a long-term investment from Congress and land managers, and supportive partners throughout the area. Creative funding mechanisms like the Legacy Roads and Trails Remediation Initiative described earlier in the road restoration chapter need to be designed and advocated for by partners and funded by Congress to make the vision described in this restoration plan a reality. Priorities, new information, and circumstances are constantly evolving. We look forward to incorporating new ideas as we work with our many partners to put this vision to work on the ground.

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Methodology

Geographical Information Systems (GIS) Methods and Data Sources

Scale

A "watershed" is an area of land that drains to the lowest point. The US Geological Survey assigns a Hydrological Unit Code (HUC) to watersheds. The HUCs are organized with a code from the largest to the smallest watershed (Region, Subregion, Basin, Subbasin, Watershed, Subwatershed. The data is presented at both the fourth field and fifth field watershed level.

Throughout the report, we provide maps at a variety of scales. For the large, regional graphics the scale is 420,000:1. For the smaller, watershed-wide maps the scale is from 200,000 to 300,000:1.

Protection of Mature and Old Growth Forest

Mature and old growth forest GIS shapefiles were provided by Oregon Wild. As stated in the Report, old growth forest habitat is generally defined as a structurally diverse forest with a patchy multi-storied canopy with trees of varied ages, large living trees, large standing dead trees (snags) and dead and decaying trees on the forest floor (down woody debris), and species and functional processes that are representative of the potential natural community. Mature stands have begun to develop some of the structural characteristics associated with ancient forest habitat but have not yet fully developed into a structurally diverse forest. Mature and old growth forest should be protected and thinning should be focused in young forest stands to improve wildlife habitat and increase habitat connectivity across the forest. While old growth and mature forest is generally defined by the above characteristics and can be challenging to define by age, for the purpose of this analysis and to show representative data the GP Task Force used the simplistic and much more practical criteria of forest stands 80-120 years of age for mature forest and 120 and older to identify ancient forest habitat. The map highlights that we have too little old growth forest and we should protect what we have.

Identifying core habitat and restoring corridors

Roadless area and Wilderness shapefiles were provided by Oregon Wild and the U.S. Forest Service. The map reflects the recent 2009 Omnibus Public Lands Management Act, which included 127,000 acres of new Wilderness around Mt. Hood and the Columbia Gorge. We analyzed the data to show how Mt. Hood's core habitats could be connected by priority corridors selected to protect drinking water, restore sensitive fish populations, and support the recovery of wildlife. The connections were identified by looking at core habitat distribution.

Road Removal to Benefit Fish and Wildlife

Data for these two maps was provided by the U.S. Forest Service. The Forest Service is currently working to strategically assess their road system and determine which roads should be invested in for public access and which should be removed because they have extraordinary impacts on community water supplies, fish, or wildlife. For current and accurate information it will be important to utilize the Access and Travel Management Plan. The GIS shapefile could be improved with on-the-ground data on roads that been naturally closed, roads that have been closed by storms, and roads that have been recently removed or are scheduled for removal by the Mount Hood National Forest.
The Mt. Hood National Forest completed a Roads Analysis in 2003 to guide decisions about roads (http://www.fs.fed.us/r6/mthood/publications/). The maps included in this report focus on the aquatic and terrestrial risk factors as developed by the Forest Service.

Aquatic

A composite rating was assigned to each road segment based on combining values of the individual aquatic risk factors. The lowest possible score for a road segment is 6 and the highest is 140. The actual scores varied from 6 to 126, with a range of scores of 120. The higher scores indicate higher potential adverse impact to aquatic systems. Risk ratings were summarized into categories from very low to very high using five natural breaks in the data.
The risk classes were then assigned an index ranging from 2 to 10 to weight the scores.

Risk Factor	Weighting Factor
Riparian Areas/Floodplains	1
Fish Passage	3
Landslide Hazard	2
Surface Erosion Hazard	1
Hydrologic Hazard	2
High Risk Stream Crossings	2
Stream Crossing Density	2

A road segment that scores in the "mid-range" of each of the eight aquatic risk factors would have a composite score of 65 (high risk class). This theoretical road segment has no culvert fish passage barrier, crosses a perennial non-fish bearing stream in an area downslope from a high landslide risk zone, is within a medium landslide hazard zone, has cutbanks and fillslopes with moderate surface erosion hazard, is within the transient snow zone, is within a watershed with a moderate number

Risk Class	Range of combined aquatic factor scores per road segment	Index
Very high	69 to 126	10
High	53 to 68	8
Moderate	42 to 52	6
Low	29 to 41	4
Very Low	6 to 28	2

of stream crossings per square mile, and does not impact a wetland. Even though no single aquatic risk factor in this example has a high potential adverse impact to aquatic systems, the cumulative potential adverse impact is high.

Terrestrial Wildlife

The purpose of the wildlife portion of the Roads Analysis is to examine each road on the Forest and compare it to wildlife values.

Point Values	Ranking
10	High
8	Moderate High
6	Moderate
4	Moderate Low
2	Low

One way to define the importance of the area bisected by a road is to develop a rating system that would numerically assign a value to the habitat based on the status of the species or how important this habitat is. The ratings for all of the wildlife species were totaled to determine relative importance of the habitat. The Forest Service looked at wolverine denning, spotted owls, Bald Eagles, road density in relation to deer and elk winter range, and other wildlife considerations like unique habitats-meadows, talus, and caves.

Aquatic Restoration and Drinking Water

The maps included in this section (basin restoration strategy, municipal water supply, water quality limited streams, and fish barriers) highlights where we are getting our drinking water, where we can focus restoration efforts to provide clean water to communities and aquatic species, and passage for fish. There are four aquatic basin restoration strategy maps (Clackamas Basin, Sandy River Basin, Hood River Basin, Fifteenmile). The data provided for Clackamas Basin map was provided by ODFW in 2010 and was a product of the Lower Columbia River Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead (http://www.dfw.state.or.us/fish/CRP/lower_columbia_plan.asp). The Sandy River Basin data was provided by Freshwater Trust. The Fifteenmile data was provided by ODFW through the Oregon Mid-Columbia Steelhead Recovery Plan. The map of demonstrates the Fifteenmile Creek steelhead population showing geographic areas that are currently in protected status, reaches identified for proposed protection management actions (priority 1 and 2), and reaches with high, moderate, low and very low restoration benefit from all (priority 1 and 2) proposed restoration actions. The Hood River Basin was provided by the Forest Service (http://www.fs.fed.us/r6/mthood/publications/). The analysis included in these plans takes a variety of approaches from Ecosystem Diagnosis and Treatment (modeling protocol of physical habitat and ecological conditions that helps identify limiting factors for fisheries) to identifying restoration actions based at broader spatial scales using stakeholder expertise and current science. Data for the municipal water supply and combined water quality limited and fish barrier maps were provided by the Oregon Department of Quality.

Protection and Restoration of Unique Habitat

The Forest Service provided the data sets for the maps included in this section (whitepark pine, pine oak woodland, huckleberry, and wetlands/meadows). The GIS map of special habitats, which includes cliffs, rock outcrops, scree and talus slopes, wet and dry meadows, and shrub areas map has not been validated and is not comprehensive for the entire Forest. Field work to verify and analyze restoration opportunities will be essential before restoration treatments are implemented.

The Oregon Conservation Strategy

All GIS data for the Oregon Conservation Strategy map was provided by Oregon Department of Fish and Wildlife (http://www.dfw.state.or.us/conservationstrategy/).

Back Cover: Wood Ducks enjoy a pond in the Mount Hood National Forest.
Photo by Alan Dyck.

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