



## Restoration of watersheds and aquatic ecosystems.

*A focus on the Blue Mountains of Oregon and Washington.*



The increasing risk of uncharacteristic disturbances such as wildfire in dry, fire-dependent forests in the Blue Mountains has galvanized interest in restoration in the region. An obvious focus of this effort is the need for thinning and prescribed fire treatments to reduce dense stands resulting from decades of fire suppression. But ecosystem restoration needs go beyond trees to include some of the most important resources on national forests: soil, water, and aquatic life.



In the Blue Mountains and across the region, degraded forests and altered streamflows and habitats have compromised the ability of streams and lakes to meet society's long-term demands. For example, soil compaction and loss of wetlands accelerate runoff of rainfall, and reduce water storage and productivity of the landscape. Thousands of miles of streams fail to meet water quality standards. Eight aquatic species, including the region's prized salmon runs, are threatened or endangered.

Watershed and aquatic restoration can help reverse these negative trends. Blue Mountain national forests, in collaboration with partners, can implement high-priority restoration projects that will benefit aquatic ecosystems—creating benefits that carry far beyond the streambanks.



### **The lifeblood of the region**

Pacific Northwest national forests have some of the most productive soils on earth, are the source of about 40 percent of the annual streamflow in the region, and contain 25,000 miles of fish-bearing streams. These resources help sustain the economic, social, and cultural vitality of regional communities. In eastern Oregon for example, freshwater fishing generated \$116 million in expenditures in 2009.

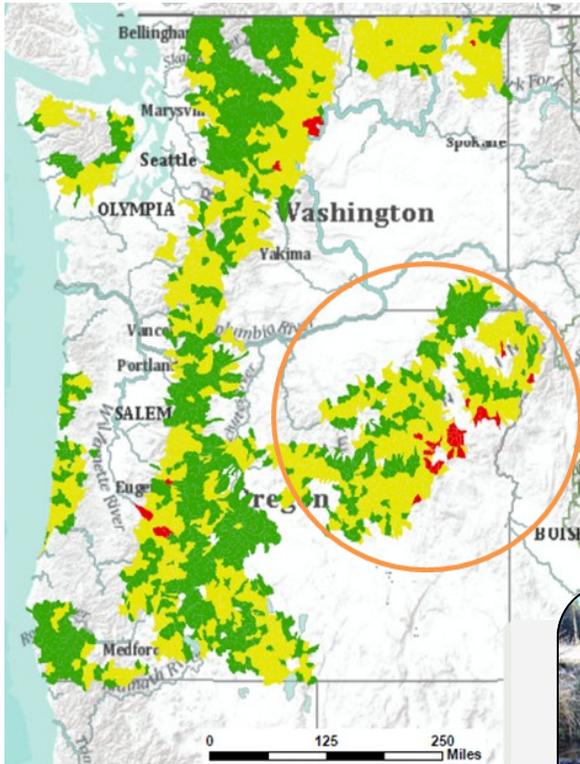


for the greatest good

## The scope of the problem.

A recent Forest Service assessment classified over half of national forest watersheds in the Pacific Northwest as either impaired or functioning at risk based on 12 ecological indicators. These watersheds require substantial restoration work. In addition, many of the watersheds that are functioning properly need work to maintain their good condition. These results point toward a need for restoration in the Blue Mountains (circled).

## Overall condition of Pacific Northwest national forest watersheds.



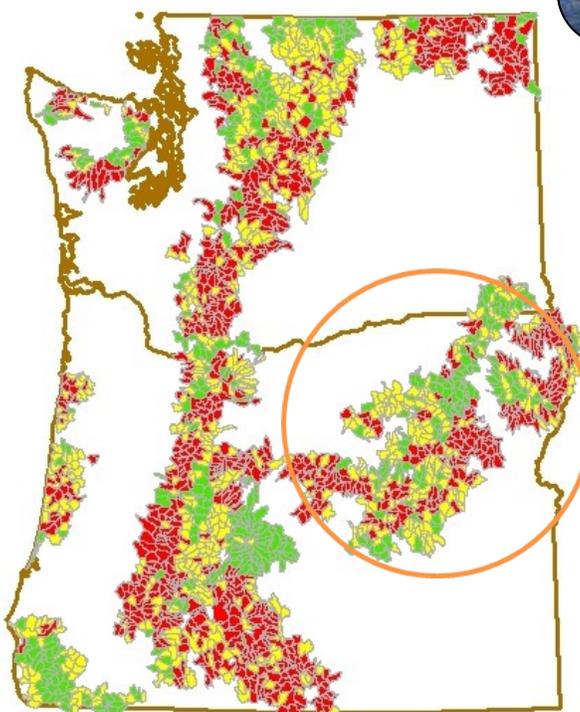
A closer look at the 12 indicators reveals specific restoration needs in the Blue Mountains. For example, restoration of natural fire regimes is critical. While engaging in that work, the Forest Service intends to integrate efforts to address other needs such as water quality, water quantity, aquatic habitat and species, riparian and wetland vegetation, range conditions, and road and trail conditions (see below).

### Percent of watersheds in each class

	Functioning properly	47
	Functioning at risk	51
	Impaired function	2



## Road and trail conditions.

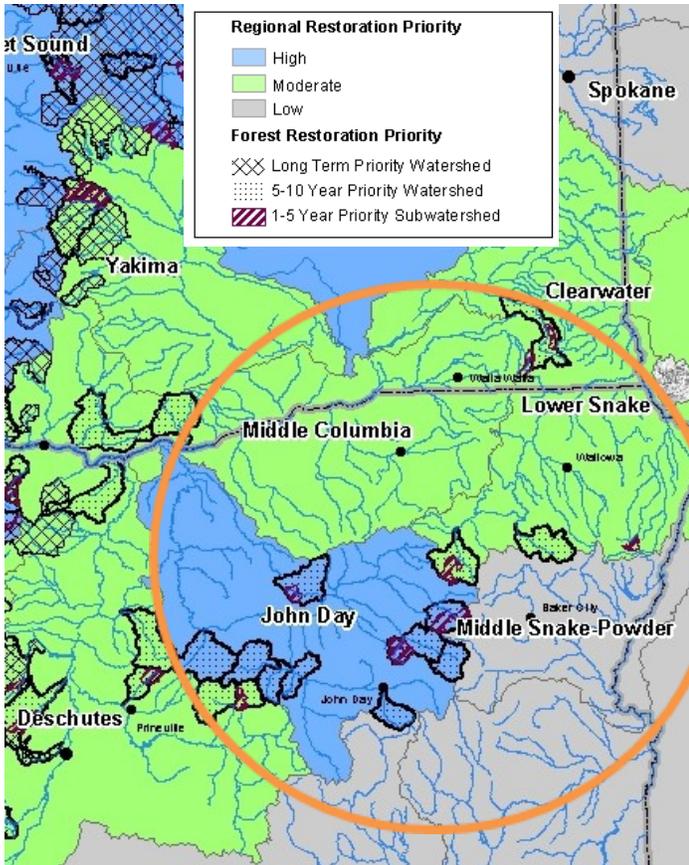


Restoration can involve reducing erosion or improving roads, which can fragment aquatic habitats, disconnect streams and floodplains, or cause water quality problems. Solutions include upgrading road-stream crossings to provide fish passage and accommodate larger flood flows that may result from wildfire. Some of this work can be accomplished with receipts from forest thinning activities via stewardship authorities.

### Percent of watersheds in each class

	Functioning properly	21
	Functioning at risk	34
	Impaired function	45

## The strategy.



**Blue Mountain priorities for restoration of watersheds and aquatic ecosystems.**

The Forest Service Pacific Northwest Region has identified priorities for watershed and aquatic restoration, as well as action plans to guide implementation.

These stream and watershed needs can be addressed through a combination of active and passive restoration. Active restoration requires implementation of a wide range of activities to reestablish natural ecological processes. These activities can include storing, decommissioning, or upgrading roads; removing habitat barriers; reconstructing or adding wood to streams; reestablishing natural streamflows; replanting riparian forests; decompacting and amending soils; and controlling invasive species. These actions are built on a foundation of passive restoration, where the management action is to reduce or eliminate environmental stressors (e.g., reducing livestock or recreation use in sensitive areas) and let the system recover naturally.



**Active restoration.** Old mining tailings were removed from floodplains in this Wallowa-Whitman National Forest project on the Upper Grande Ronde River. This improves habitat and water quality, and allows the river to access its floodplain.



**Passive restoration.** Livestock exclosures can be used along sensitive stream reaches to restore riparian and aquatic habitat.

## Investing in nature and people.

Given current funding levels, national forests in the Blue Mountains expect to implement \$20 million of watershed and aquatic restoration work in the next 5-10 years on 15 near-term priority subwatersheds. This represents less than one percent of the Blue Mountains, illustrating the need to accelerate the pace and scale of watershed restoration.

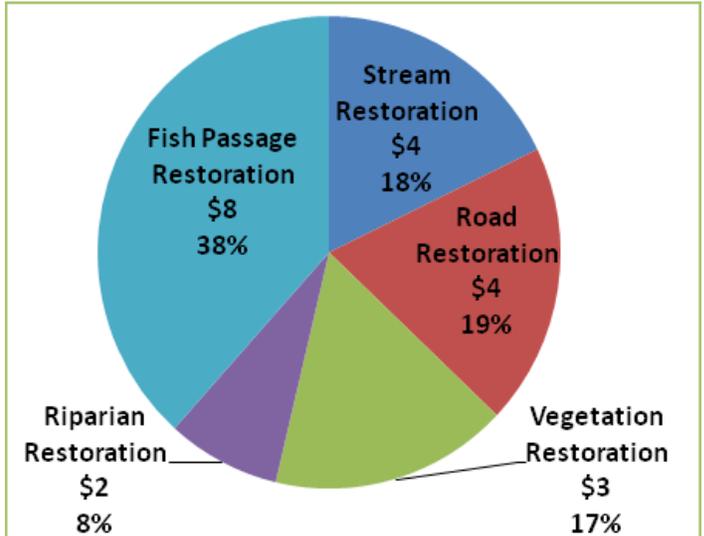
**Restoration works.** Project-level monitoring of active road restoration has shown that it can substantially reduce impacts on streams and watersheds. Likewise, channel restoration has improved aquatic habitat conditions, and fish passage projects have increased fish population resilience.

In addition, broad-scale monitoring has demonstrated that passive restoration can improve watershed conditions at landscape scales. This combination of active and passive restoration across vast landscapes demonstrates how national forests can serve as a conservation backbone for the region. This, combined with conservation and restoration on other lands, offers the greatest hope for restoring soils, streams, water quality, and our prized fish populations.

**Restoration IS work.** Restoration supports economic development in rural communities. Every \$1 million spent on watershed restoration in eastern Oregon national forests creates approximately 15 jobs, generating \$500,000 in total income, \$1.1 million in total industrial output, and \$25,000 in state tax revenue.

**Working together.** Collaboration with partners is essential to implementing restoration projects in the Blue Mountains. The strength and commitment of our partnerships allow us to leverage our resources and define restoration objectives that address a range of regional management concerns.

Estimated costs (\$ million) by restoration project type for 15 near-term priority subwatersheds in the Blue Mountains.



The greatest need is fish passage restoration, road restoration (including drainage improvements and decommissioning), and stream restoration. To maximize effectiveness, this work is being implemented in a structured and organized way across whole watersheds.



**Watershed restoration** helps support local economies, engages communities with their national forests, and contributes to the quality of life in the Pacific Northwest. For example, skilled equipment operators support fish habitat restoration projects, and volunteers assist with tree planting.