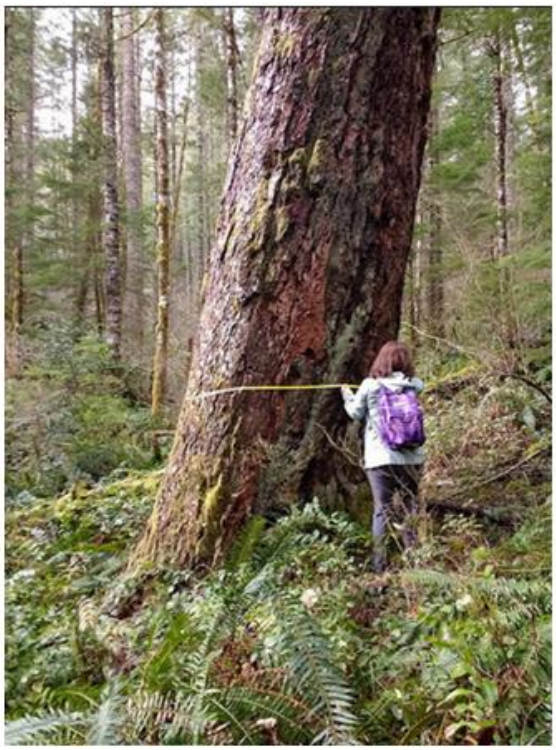
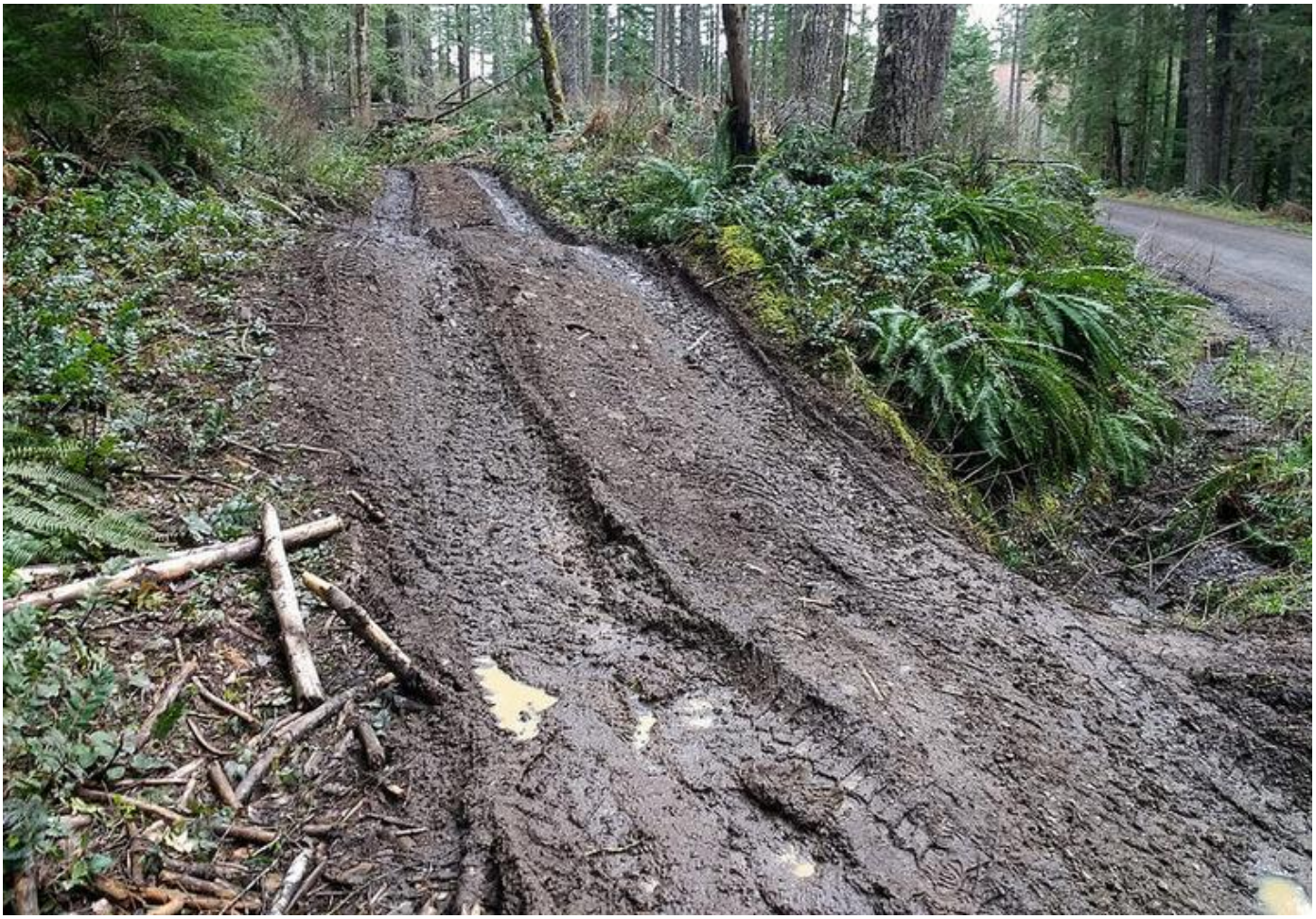
Vegetation Proposed Actions

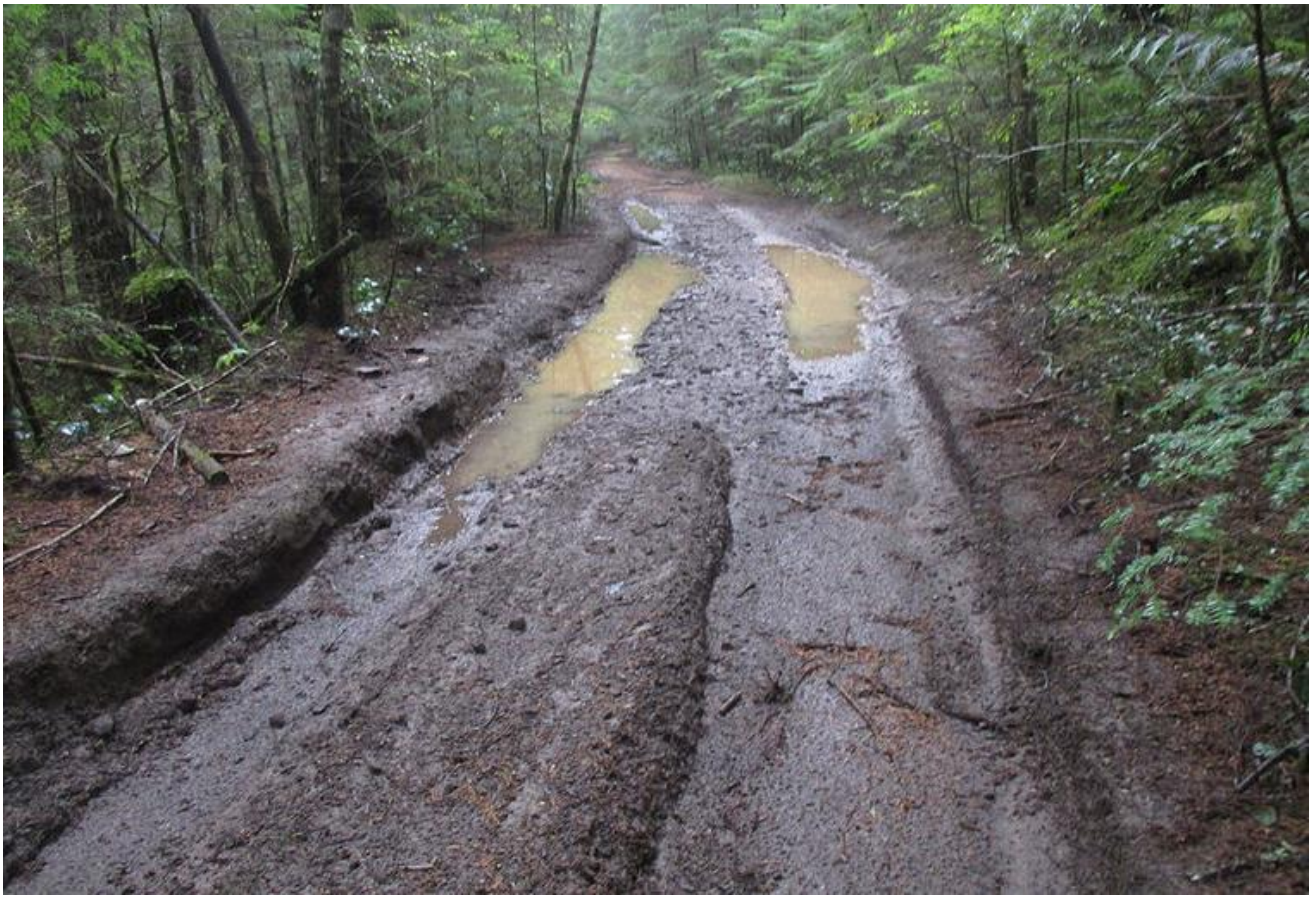
Purpose & Need	Proposed Action	Acres	Notes
Improve Forest Health, Growth and Diversity while Providing Forest Products	Variable-density thinning with Skips and Gaps	4,619	• 2,154 acres in Matrix, with two acre gaps and heavy thins for forage enhancement • 191 acres in LSR • 947 acres in Riparian Reserves • 202 acres of Matrix with an emphasis of improving owl habitat in the home range • 88 acres of thinning with a huckleberry enhancement emphasis • 985 acres of young-stand thinning and brushing • 52 acres of young-stand thinning and brushing and the removal trees in diseased areas followed by planting
Improve Owl Habitat	Create gaps	60	Cut and leave trees in small gaps to improving owl habitat in Matrix
Provide Forest Products and Create Early-Seral Habitat while Providing Forest Products	• Regeneration Harvest with Reserves • Site Preparation and Planting	255	In Matrix,
Enhance Forage	• Meadow Burn	2	
Fire Hazard Reduction	• Burning • Fuel Break	541	• 150 acres of piling and burning of slash along Road 4610 and property lines • 136 acres of under burning of thinned stands • 255 acres of under burning and grapple piling in regeneration harvest units

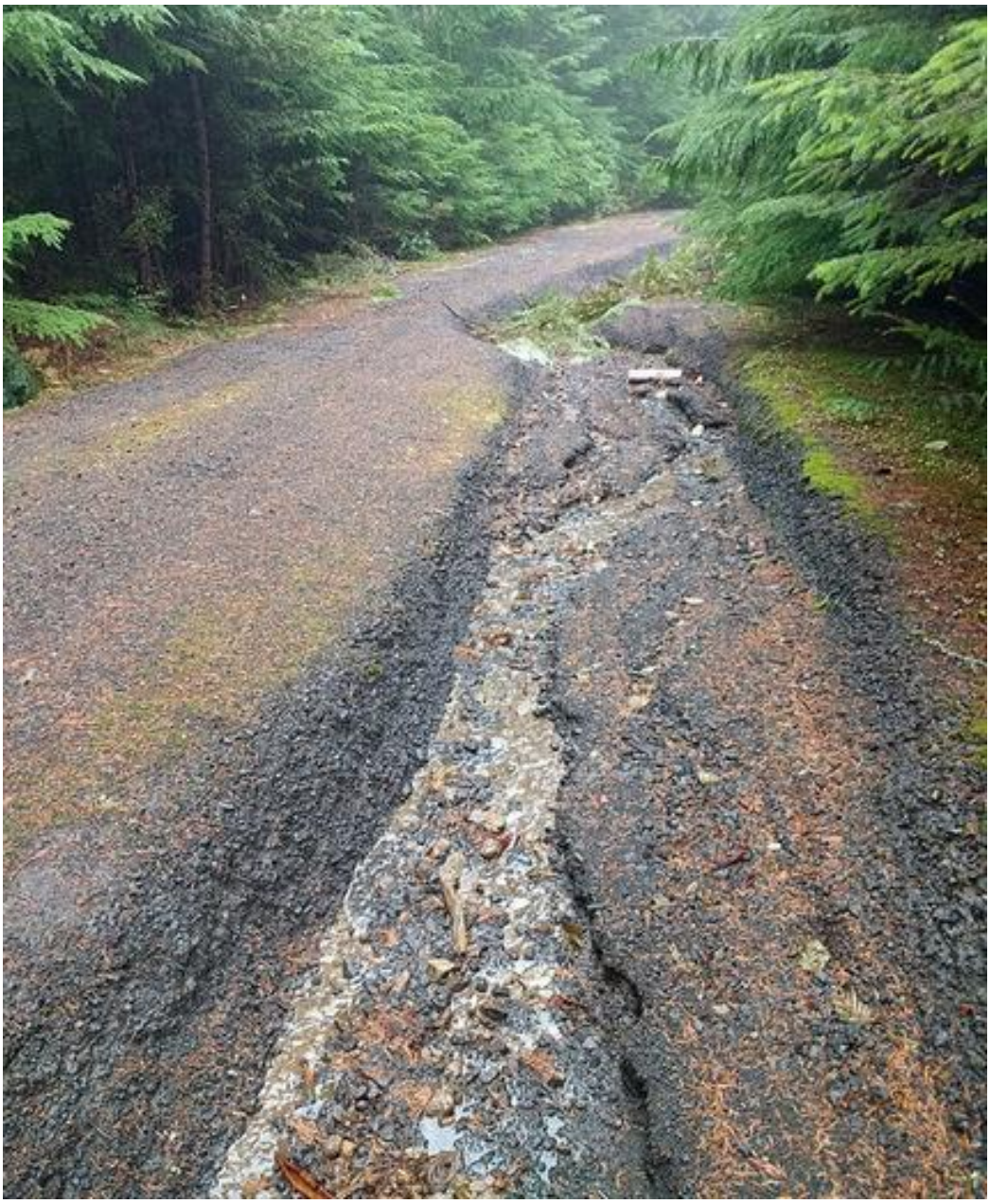


Summary of Transportation System Management Actions

Purpose & Need	Proposed Action	Miles	Notes
Manage the Road System to Allow for Safe Timber Hauling	Maintain and Repair Forest Service System Roads	70	The intensity of work varies based on location and the work recently accomplished by the Forest and other operators.
Provide Access for Vegetation Management	Construct and Reconstruct Temporary Roads	19.1	• 13.1 miles of new road construction in locations where no road alignment previously existed. (1.55 mi of this is needed due to OHV conversion of system roads to trails) • 4.1 miles of existing road alignment reconstruction on road alignments that were once temporary roads.(0.63 mi of this is needed due to OHV conversion of system roads to trails) • 1.9 miles of existing road alignment reconstruction on road alignments that were once system roads.(1.1 mi of this was decommissioned by OHV plan)
Reduce Resource Risks and Maintenance Costs Associated with Forest Service System Roads	Decommission and Close Forest Service System Roads	31.9	• 5.7 miles of active and passive decommissioning of roads no longer needed. • 26.2 miles of road closures that remain on the System.
Reduce Resource Risks and Maintenance Costs Associated with Forest Service System Roads	Convert Road to Non-Motorized Trail	1.2	4611 Remove culverts, retain a trail tread
Provide Access for Vegetation Management	Return Former Forest Service System Road Back to the System	1.2	4610115
Reduce Resource Impacts Associated with Unauthorized OHV Routes	Rehabilitate Unauthorized OHV routes	7.1	





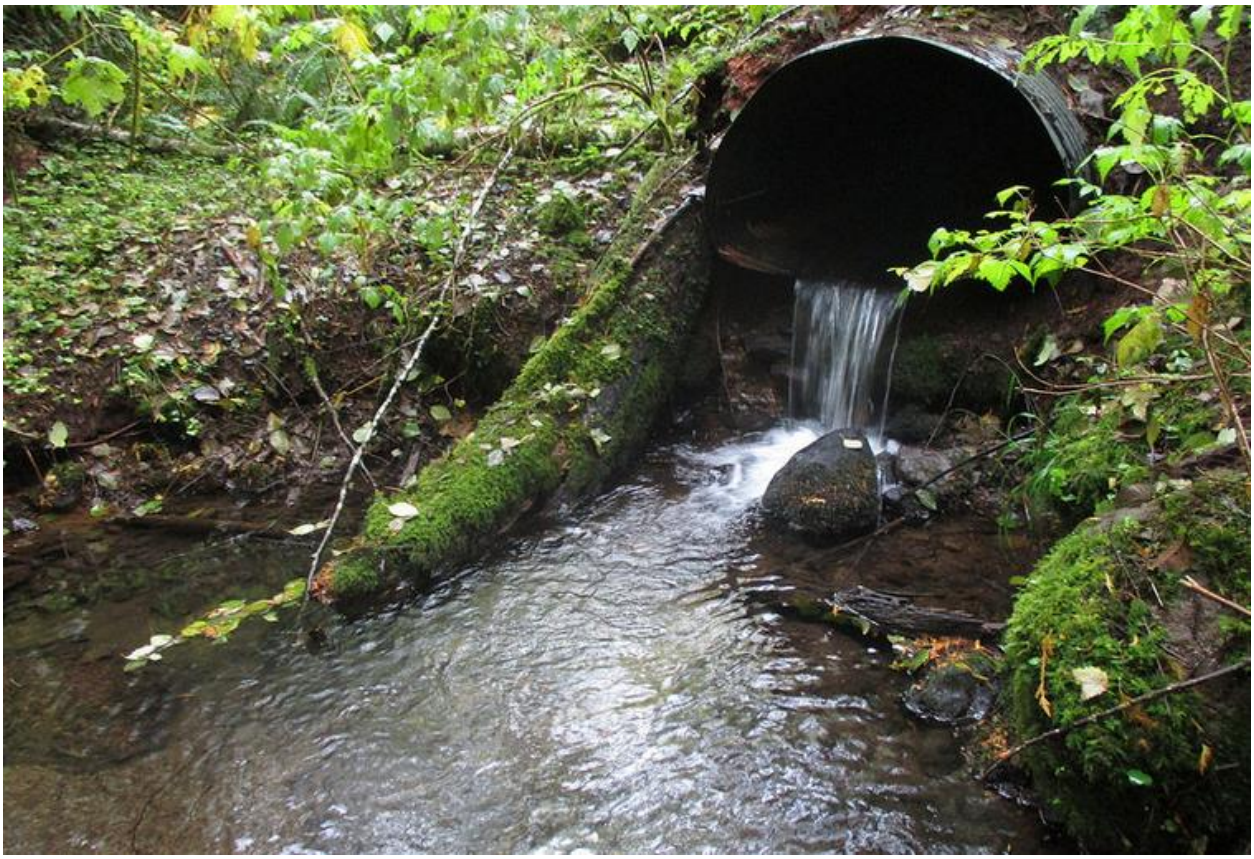


Aquatic/Riparian Habitat Enhancement

The desired condition for streams, lakes and riparian areas is for them to be fully functional to meet the needs of aquatic and riparian species and to provide clean water. It is also desirable to maintain an appropriate network of roads and access points that provide for visitor enjoyment of the Forest while minimizing risks to aquatic resources. These desired conditions are described in the Forest Plan on pages Four-3, Four-5 & Four-34 and in the Northwest Forest Plan on pages B-9 and C-32. A primary purpose of this project is to enhance aquatic and riparian habitat. The proposed action includes restoring and repairing the following areas.

Aquatic Habitat Enhancement – Culverts

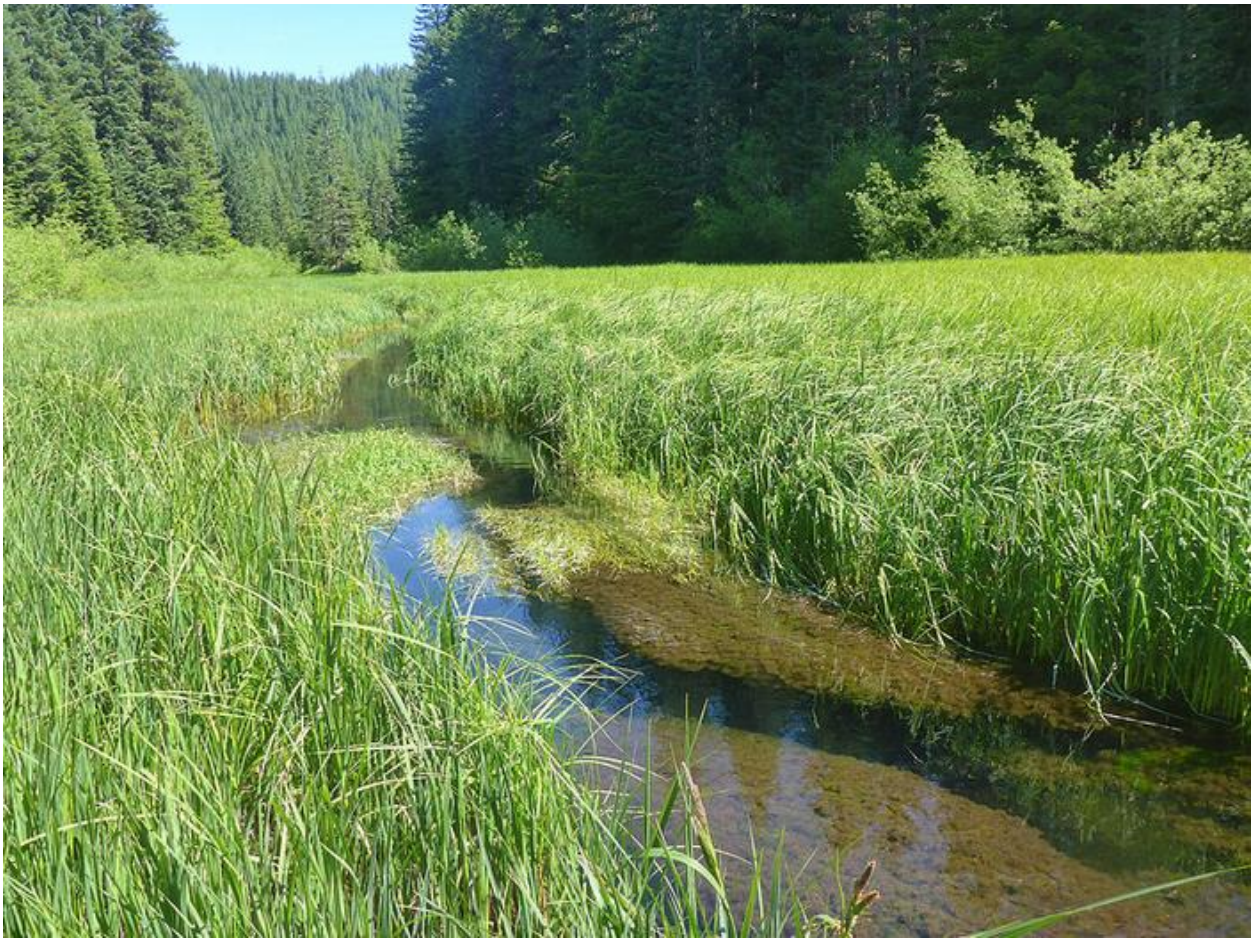
1. 4611 at upper crossing of Winslow Creek (Replace)
2. 4613130 at Whisky Creek (Remove)
3. 4614120 at Whisky Creek (Replace)
4. 4613 at Dry Creek (Replace)
5. 4612 at Boyer Creek (Replace)
6. 4613 at Bedford Creek (Replace)
7. 4612140 at NF Boyer Creek (Replace)



Stream Habitat Enhancement - Large Woody Debris

1. North Fork Clackamas River
2. Bedford Creek
3. Winslow Creek

Beaver Habitat and Wetland Restoration at Tumala Meadows



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Land use strategies to mitigate climate change in carbon dense temperate forests

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Strategies to mitigate carbon dioxide emissions through forestry activities have been proposed, but ecosystem process-based integration of climate change, enhanced CO_2, disturbance from fire, and management actions at regional scales are extremely limited. Here, we examine the relative merits of afforestation, reforestation, management changes, and harvest residue bioenergy use in the Pacific Northwest. This region represents some of the highest carbon density forests in the world, which can store carbon in trees for 800 y or more. Oregon's net ecosystem carbon balance (NECB) was equivalent to 72% of total emissions in 2011–2015. By 2100, simulations show increased net carbon uptake with little change in wildfires. Reforestation, afforestation, lengthened harvest cycles on private lands, and restricting harvest on public lands increase NECB 56% by 2100, with the latter two actions contributing the most. Resultant cobenefits included water availability and biodiversity, primarily from increased forest area, age, and species diversity. Converting 127,000 ha of irrigated grass crops to native forests could decrease irrigation demand by 233 billion $m^3 \cdot y^{-1}$. Utilizing harvest residues for bioenergy production instead of leaving them in forests to decompose increased emissions in the short-

The appropriateness and effectiveness of mitigation strategies within regions vary depending on the current forest sink, competition with land-use and watershed protection, and environmental conditions affecting forest sustainability and resilience. Few process-based regional studies have quantified strategies that could actually be implemented, are low-risk, and do not depend on developing technologies. Our previous studies focused on regional modeling of the effects of forest thinning on net ecosystem carbon balance (NECB) and net emissions, as well as improving modeled drought sensitivity (9, 10), while this study focuses mainly on strategies to enhance forest carbon.

Our study region is Oregon in the Pacific Northwest, where coastal and montane forests have high biomass and carbon sequestration potential. They represent coastal forests from northern California to southeast Alaska, where trees live 800 y or more and biomass can exceed that of tropical forests (11) (Fig. S1). The semiarid ecoregions consist of woodlands that experience frequent fires (12). Land-use history is a major determinant of forest carbon balance. Harvest was the dominant cause of tree mortality (2003–2012) and accounted for fivefold as much mortality as that from fire