



Eastern Washington Forest Health: Hazards, Accomplishments and Restoration Strategy

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A Report to the Washington State Legislature

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October 2014



WASHINGTON STATE DEPARTMENT OF
Natural Resources
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Executive Summary

Much of the 10 million acres of forestland in eastern Washington faces serious threats to forest health. Decades of fire suppression and past management practices that changed the species and structure of these forests have put them at higher risk of damage by disease, insects and wildfire.

An analysis by The Nature Conservancy and the U.S. Forest Service identified nearly 2.7 million acres of eastern Washington forestland requiring some sort of active management or disturbance to create forest structures more resilient against insects, diseases and wildfires.

Climate change is expected to worsen forest health and wildfire challenges. Projections for the Northwest indicate that increased summer temperatures and decreased summer precipitation will increase the area burned each year across eastern Washington by more than 300 percent by 2100, with some areas increasing as much as 500 percent compared with the area burned in 2000.

This report follows instructions from the Legislature to the Washington State Department of Natural Resources (DNR) to report on forest health hazard reduction treatments conducted on state, private, tribal and federal lands from fiscal year 2010 through fiscal year 2014; estimate forest restoration needs across land ownerships from fiscal year 2015 through fiscal year 2020; and recommend forest health hazard reduction treatments in eastern Washington through fiscal year 2020.

Tree thinning, harvest, and brush removal using hand crews or mechanized equipment are the most widely used treatments to reduce forest density and remove inappropriate tree species. Prescribed fire also is a restoration tool employed by some landowners to manage species composition and fuel loads. On average over the past five years, major landowners and managers conducted a mix of mechanical harvest and hazard reduction activities on approximately 145,000 acres annually and prescribed burning on 18,000 acres.

Unfortunately, the current level of restoration activity is not keeping pace with the increasing damage that wildfire, insects and disease are causing and will cause to eastern Washington forests. We can take additional preventive steps to improve forest health to avoid spending more money on fire suppression in years to come. Those steps would include increasing forest restoration across ownerships; improving markets for small-diameter wood; increasing the community and workforce capacity and expertise to conduct forest restoration; strengthening collaboration among forest landowners, stakeholders and others who have a role in reducing the numerous threats to the health of eastern Washington forests. A top priority should be to help homeowners, communities and land managers in fire-prone areas prepare for and reduce their exposure to wildfires.

The labor- and fuel-intensive nature of field operations, combined with a lack of markets for forest materials, prevent many forest treatments, such as thinning, from becoming economically self-sustaining. State and federal governments have made significant investments to improve forest health conditions, but restoration needs still outpace these public investments.

Achieving a self-sustaining level of restoration will require a combination of actions, including a near-term increase in funding for forest restoration, and monetizing the value of ecosystem services threatened by hazards to forest health. As we restore forests, we should look for ways to build markets for wood products generated during restoration treatments. Incentives for private investment in new processes, expanded infrastructure, and the promotion of wood as a renewable energy source can expand the use of these wood products and help them become more commercially viable.

A. Introduction

Forests in eastern Washington are out of balance. Historically, of the 10 million acres of forests in eastern Washington, 5 million acres experienced low-severity fire on average every 35 years or less (Barrett et al. 2010). The results of a century of fire exclusion, and past forest management are intersecting with the effects of periodic droughts and a changing climate to create damaging effects to forests and neighboring communities. Current conditions of altered forest structure and composition have contributed to damaging insect infestations and wildfires that are often more severe and extensive than would have occurred historically. There is a growing consensus among scientists, agencies, tribes, conservation organizations, landowners and managers that active restoration is needed to protect healthy, resilient forests and watersheds.



Figure 1: Historical photo comparison of changed forest conditions, 1930-2011, near Leecher Mountain in southwest Okanogan County. Shown is the Texas Creek drainage near Carlton, WA.

Credit: Upper photo by William B. Osborne, USDA Forest Service, 10/11/1930, from Records Group 95, National Archives and Records Administration, Seattle, WA. Bottom photo by John F. Marshall, 07/07 2011, for USDA Forest Service, PNW Research Station, Wenatchee, and Okanogan-Wenatchee NF.

Eastern Washington forests have experienced significant insect and disease damage in recent years (Table 1 and Figures 2 & 3). The acres of trees that have been killed or damaged by forest insects and diseases over the past decade is 150 percent greater than in the 1990s, 200 percent greater than in the 1980s, and 175 percent greater than in the 1970s (Figure 2). The National Insect and Disease Risk Map (NIDRM) projects continued elevated levels of damage will occur (Krist et al. 2014). NIDRM estimates that 2.7 million acres of Washington state forestland are at risk to suffer severe damage from insects and diseases over the next 15 years (Figure 4).

Table 1: Washington State Forest Insect and Disease Damage, 2009 -2013

Year	Acres Damaged	% Federal	% Tribal	% State	% Private
2009	1,730,000	59%	8%	12%	22%
2010	937,000	69%	7%	8%	15%
2011	950,000	62%	6%	13%	20%
2012	1,080,000	59%	8%	13%	20%
2013	593,000	55%	11%	11%	23%

Source: Aerial Insect and Disease Survey. WDNR and the USDA Forest Service.

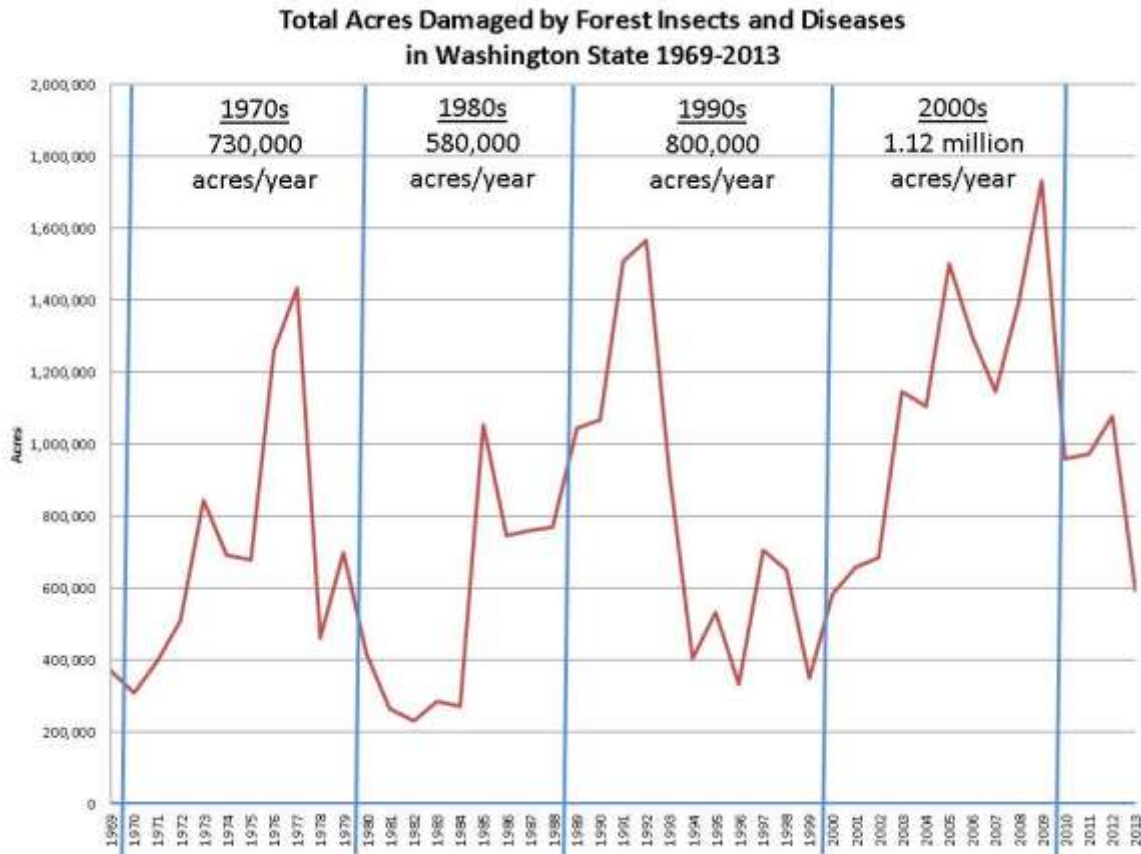


Figure 2: Total Acres Damaged by Forest Insects and Diseases in Washington 1969-2013.

Source: Aerial Insect and Disease Survey. Washington DNR and US Forest Service.

Eastern Washington Cumulative Tree Mortality 1998-2012

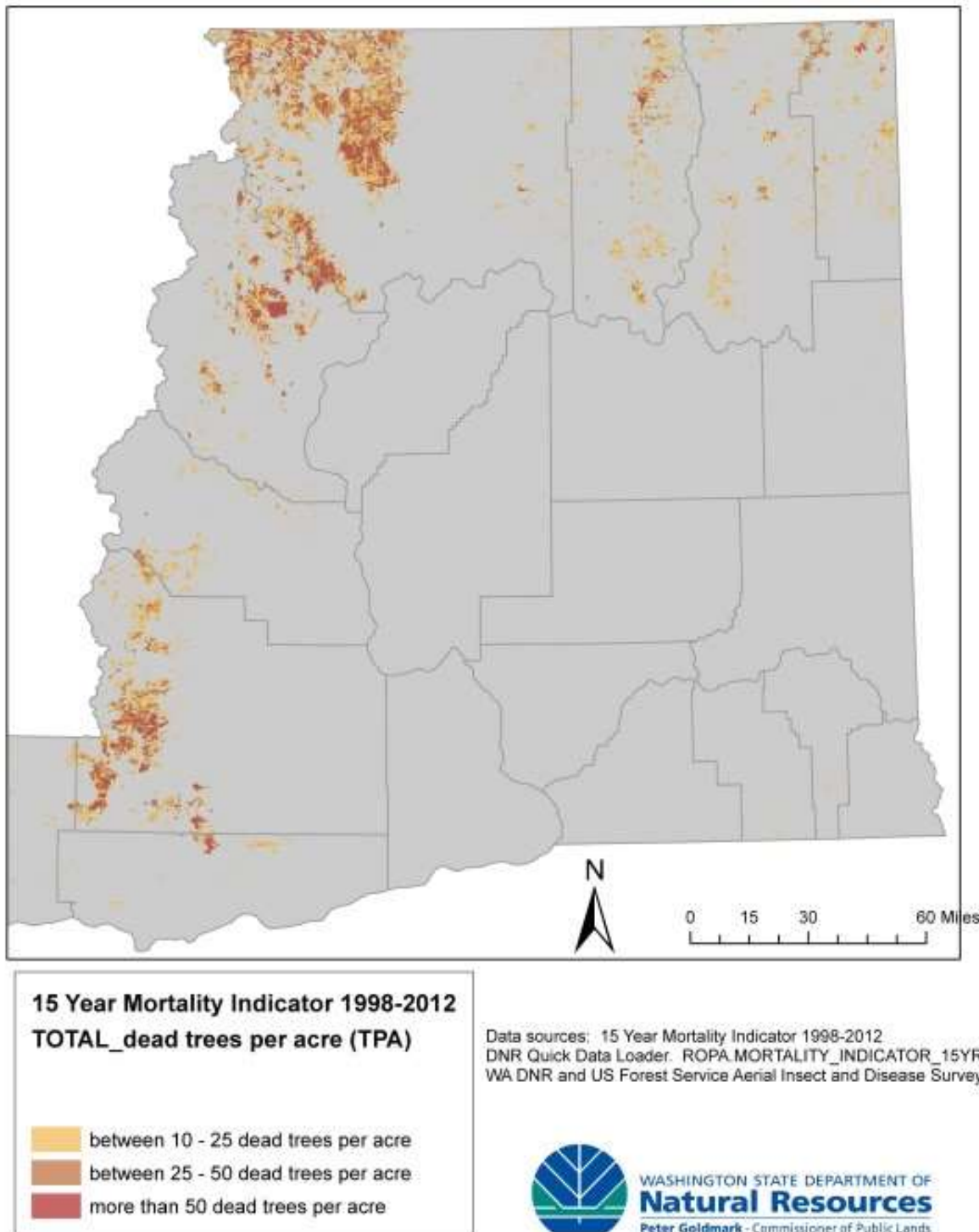


Figure 3: Cumulative Tree Mortality from Aerial Insect and Disease Survey, 1998-2012. Source: Washington DNR and US Forest Service.

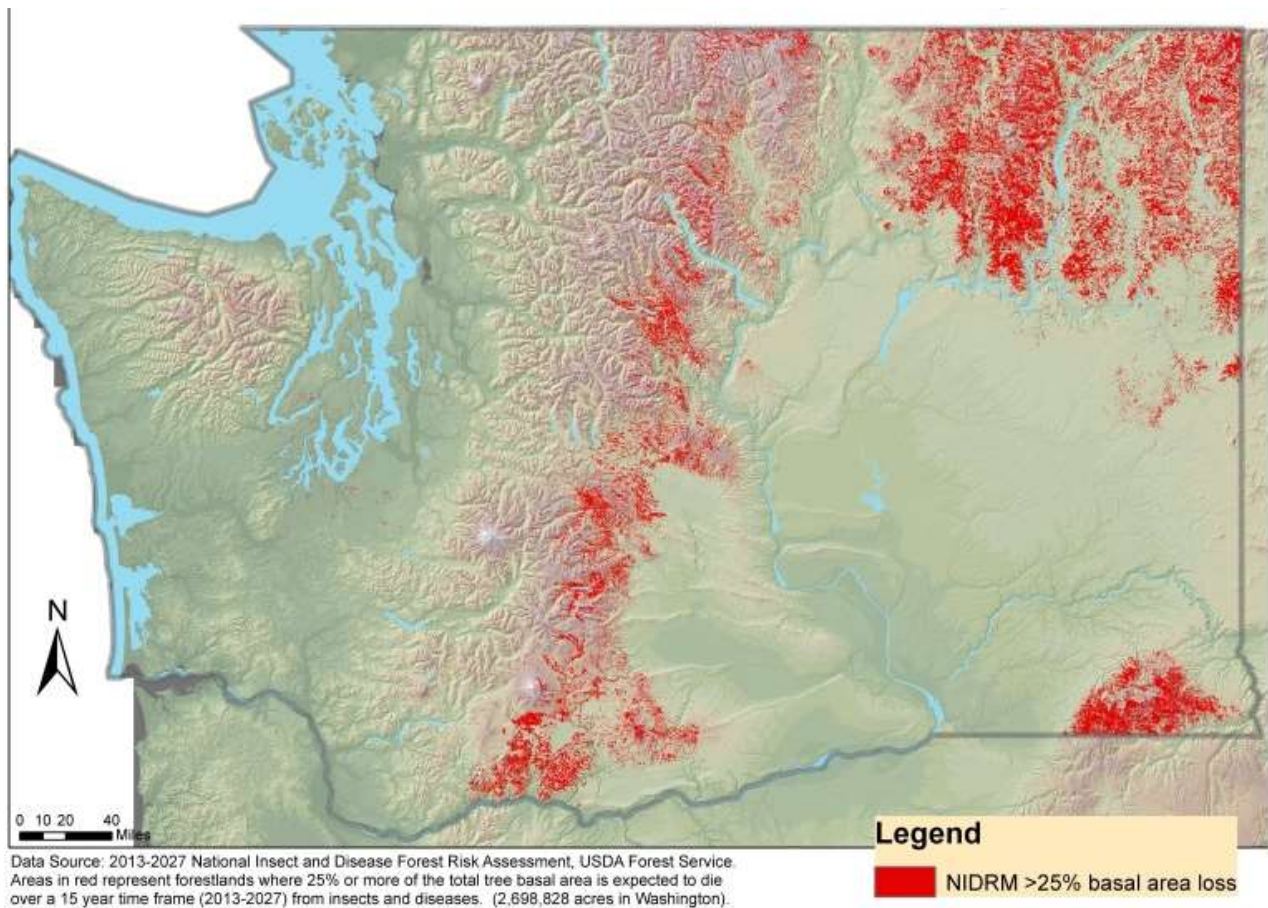


Figure 4: National Insect and Disease Risk Map (NIDRM) Projections of Tree Damage in Washington State, 2013–2027.

In 2007, the legislature amended state law governing forest health authorities and policy (RCW 76.06). The Commissioner of Public Lands was designated as the state’s lead for implementing a comprehensive program to improve forest health. The amended law added emphasis on coordination and assistance across private, federal, state and tribal land managers, recognizing that forest conditions need to be improved across large landscapes comprised of diverse ownership. The law defines “forest health” broadly as: *the condition of a forest being sound in ecological function, sustainable, resilient, and resistant to insects, diseases, fire and other disturbance, and having the capacity to meet landowner objectives.*

DNR initiated the state’s first forest health hazard warning process in November 2011 and convened a Forest Health Technical Advisory Committee. The committee evaluated forestlands in eastern Washington to determine whether a Forest Health Hazard Warning was warranted.

FOREST OWNERSHIP IN EASTERN WASHINGTON

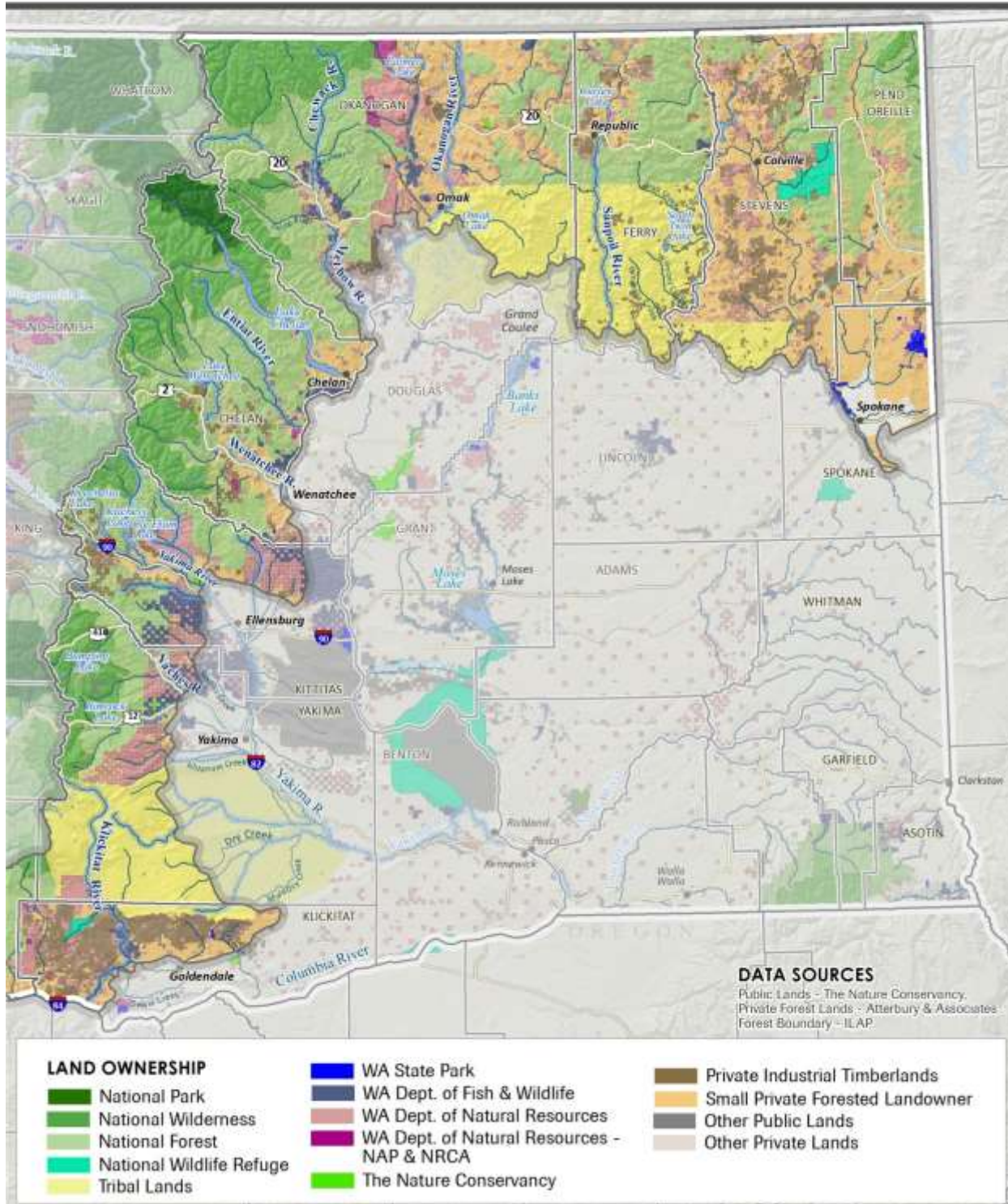


Figure 5: Forestland Ownership in Eastern Washington. Map produced by The Nature Conservancy.

Table 2: Major Eastern Washington Forestland Owners

Landowner	Forest Acres
USFS	4,882,331
DNR	762,633
Tribal	1,376,318
Small Private	1,583,685
Industrial	949,837
Total	9,554,804

Data Source: Rogers, Luke W, Andrew G Cooke, and Jeffrey M Cornick. 2012. The 2012 Washington State Biomass Database. Seattle, March 13, 2012.

Based on the committee’s findings, Commissioner of Public Lands Peter Goldmark issued the state’s first Forest Health Hazard Warnings for portions of Okanogan, Ferry, Klickitat and Yakima counties in August 2012 (Figure 6). The objective of a Warning is to focus attention, educate and encourage voluntary action by forest landowners and managers on a severe or emerging forest insect or disease concern. Since issuing the Forest Health Hazard Warnings in 2012, DNR has prioritized the Warning Areas for forest health hazard reduction treatments on state trust lands and private lands using funds provided in the state capital budget and federal grant funds provided by the US Forest Service.



Figure 6: Eastern Washington Forest Health Hazard Warning Areas, 2014. DNR.

The last two decades have seen a significant increase in the acreage and severity of wildfires across the western United States. Since 2009, over 1 million acres have burned in Washington state and suppression costs rose substantially (Table 3). The 2014 wildfire season was one of the most severe on record, including the state’s largest ever wildfire—the 256,108-acre Carlton Complex fire in Okanogan County. Climate change is expected to exacerbate forest health and wildfire damage over the coming decades. Projections for the Northwest indicate that the area burned each year could increase more than 300 percent by 2100 as compared with 2000 due to increased summer temperatures and decreased summer precipitation. (Littell et al. 2010 and Snover et al. 2013). Community, infrastructure, natural and economic values remain at high risk from wildfires across much of eastern Washington (Figure 8).

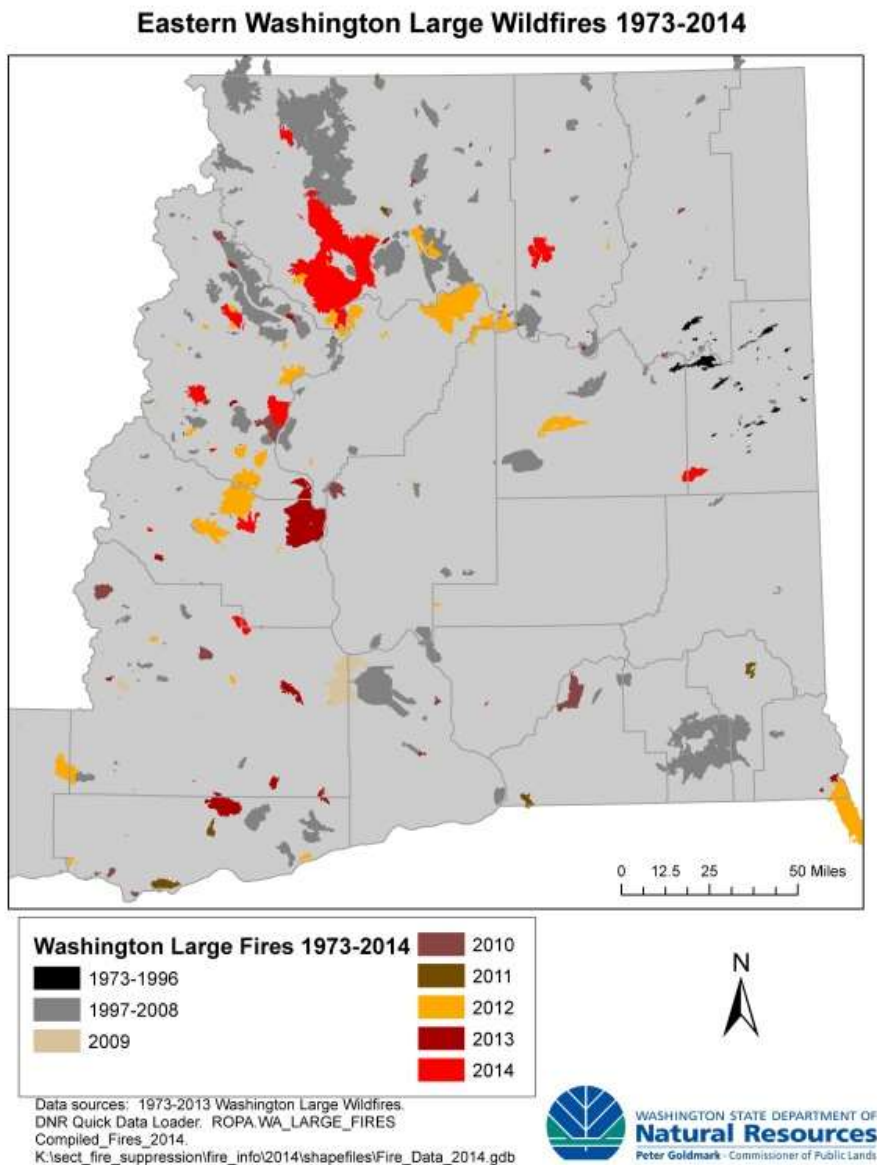


Figure 7: Eastern Washington Large Wildfires 1973-2014

Table 3: Washington State Wildfire Statistics, 2009 through 2014

Fire Year	# of Fires	Acres[^]	Wildfire Suppression Costs WA State^{^^}
2014	1,483	413,143*	\$93,000,000*
2013	1,547	180,545	\$30,894,933
2012	1,432	270,255	\$47,220,775
2011	1,023	22,028	\$13,281,564
2010	1,015	55,068	\$16,361,855
2009	1,970	95,238	\$25,874,213
Total	8,470	1,036,277	\$226,633,340

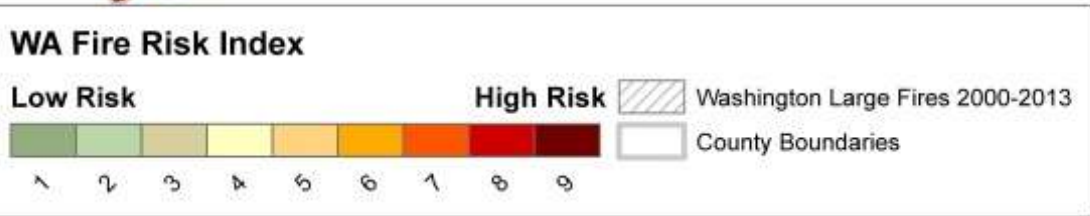
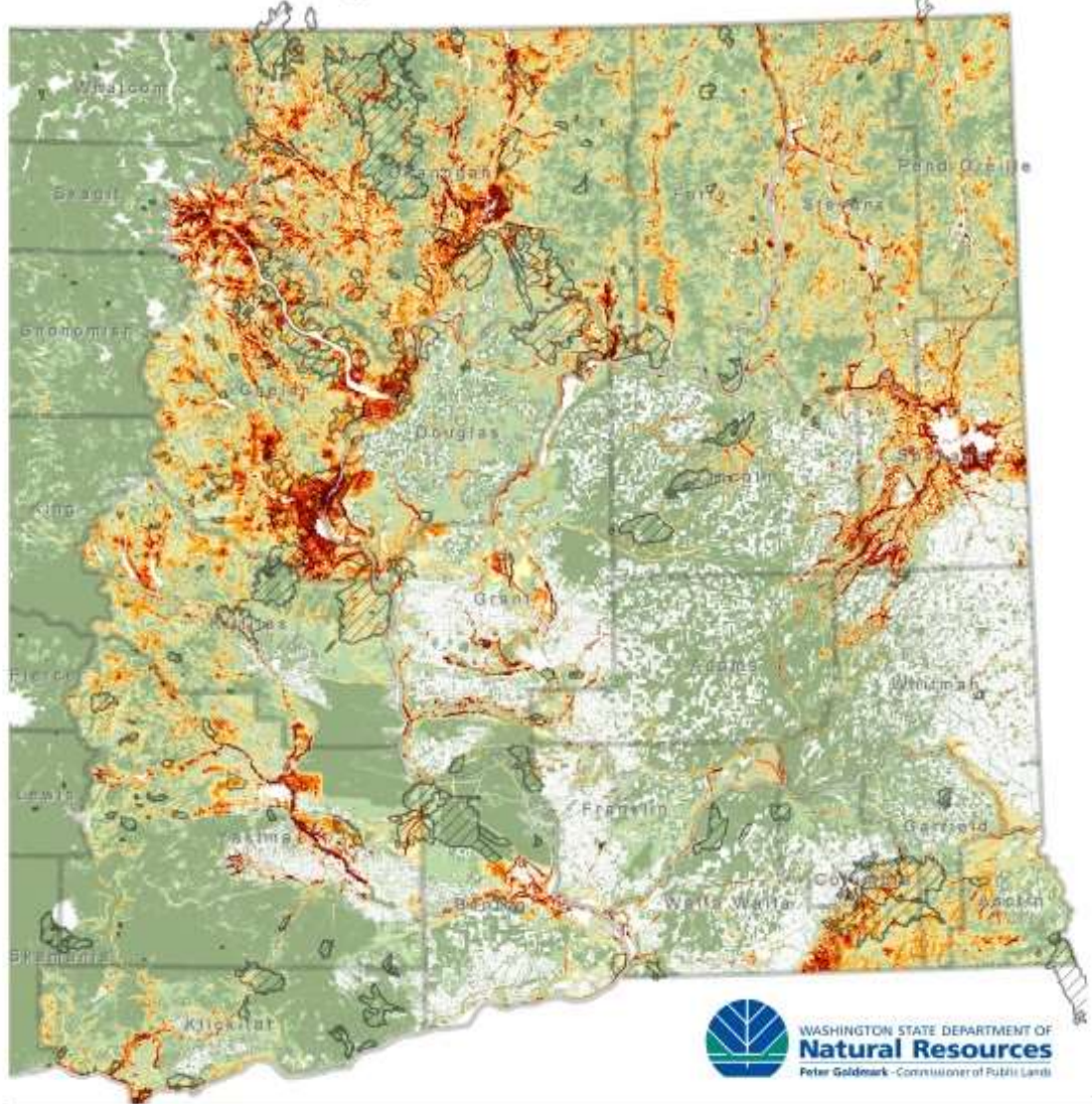
Note: [^] Acres represent forest and non-forest acres burned on state and federal jurisdictions in Washington State. From 2000 to 2013, non-forest areas comprised approximately 60% of the area burned and forests comprised approximately 40% of the area burned.

Note: ^{^^} Costs are Washington State General Fund, Disaster Response Account, Landowner Contingency Fund, General Fund-Federal and General Fund-Local fire suppression expenditures. Does not include federal wildfire expenditures.

Source: Northwest Interagency Coordination Center (acres) and Washington State Department of Natural Resources (costs).

*2014 data estimated as of 10/10/14 from Northwest Interagency Coordination Center.

Washington Wildfire Risk Index



Data Sources: WA Fire Risk Index, West Wide Wildfire Risk Assessment 2013. The Fire Risk Index (FRI) is calculated as the Fire Threat Index (FTI) times the Fire Effects Index (FEI). It is one of the two primary outputs of the West Wide Wildfire Risk Assessment (WWA) and is a measure of wildfire risk. It combines the probability of an acre burning with the expected effects if a fire occurs. This reflects the possibility of suffering loss. Map by: Chuck Hersey, WA DNR.

Figure 8: Washington Wildfire Risk Index. Calculated by the West Wide Wildfire Risk Assessment.

In response to these trends, beginning in 2010 the state Legislature appropriated supplemental funding from the state capital budget to accelerate forest hazard reduction and restoration activities in eastern Washington. Senate Bill 5035, Sec. 3204, 2013 Session, requested the Washington State Department of Natural Resources (DNR) to report to the Governor and 2015 State Legislature:

- A summary of forest health hazard reduction treatments conducted on state, private, tribal and federal lands from fiscal year 2010 through fiscal year 2014;
- An estimate of forest restoration needs across land ownerships from fiscal year 2015 through fiscal year 2020, and
- Mechanisms that the department recommends to fund forest health hazard reduction treatments in eastern Washington through fiscal year 2020.

B. Forest Health Accomplishments

Landowners and managers achieve forest health and fire hazard reduction through a variety of mechanical treatment methods or prescribed fire. These methods are tailored to the forest conditions on a given site, and the management objectives and capabilities of the landowner. Tree thinning, harvest, and brush removal using hand chainsaw crews or mechanized equipment are the most widely used treatments for reducing forest density and removing inappropriate tree species. These can be either “commercial” activities, meaning they generate net revenue for the landowner, or “non-commercial,” meaning they occur at a loss or require cost outlay. Although reducing forest health hazards is a consideration for virtually all eastern Washington landowners and managers, commercial harvests may or may not be primarily designed to support restoration objectives.

DNR collected information on commercial timber harvest and noncommercial treatments from DNR, the US Forest Service, Yakama Nation, Colville Confederated Tribes, Bureau of Land Management, Washington State Department of Fish and Wildlife and private landowners in eastern Washington to document the level of mechanical forest treatments occurring from 2009 to 2014 (Figure 9).

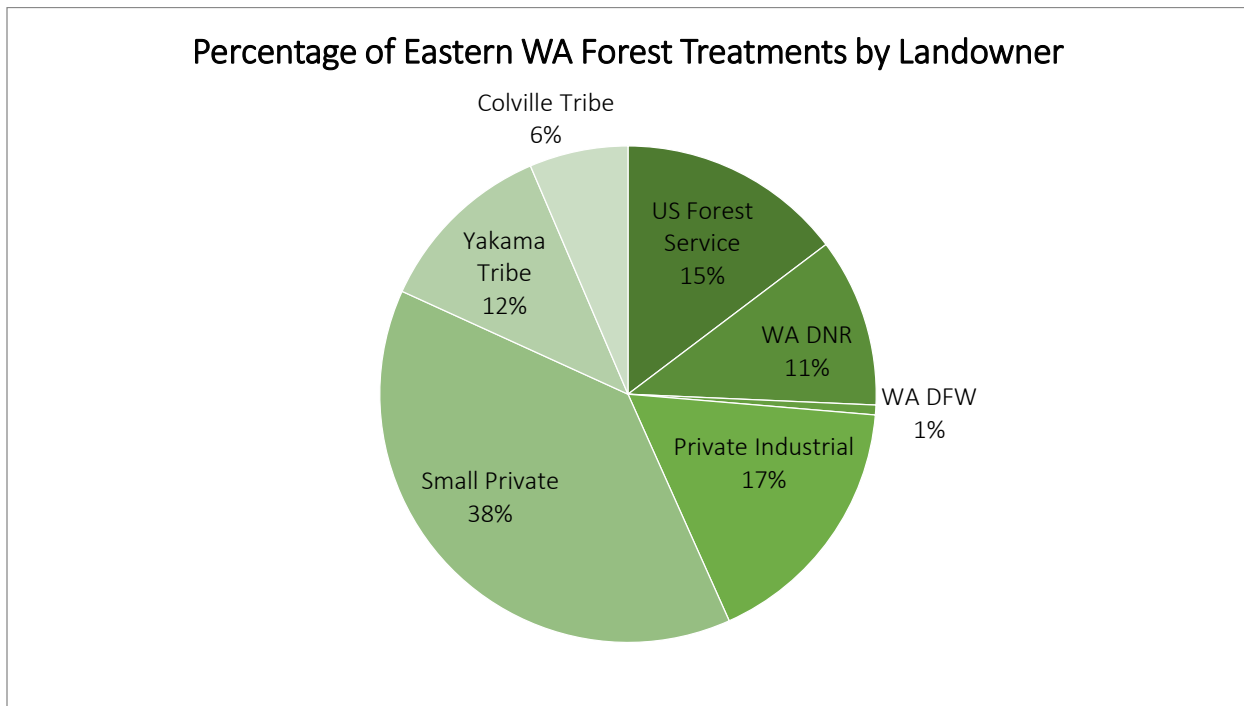


Figure 9: Percentage of Eastern Washington Forest Treatments by Landowner.

Table 4 summarizes the average yearly commercial and non-commercial forest treatments for the major forest landowners in eastern Washington.

Table 4: Eastern Washington Average Annual Commercial Timber Harvest and Non-Commercial Forest Treatments, 2009 to 2014

Landowner ¹	Commercial Harvests (Avg. acres/yr)	Non-commercial thinning (Avg. acres/yr)	Total (Avg. acres/yr)
US Forest Service ²	7,930	13,038	20,968
Bureau of Land Management ³	879	315	1,194
Washington State Dept. of Natural Resources	10,940 ⁴	5,287	16,227
Washington State Dept. of Fish and Wildlife	910 ⁵	100	1,010
Private Industrial	24,223 ⁵	Not available	24,223
Small Forest Landowners (non-industrial private)	49,326 ⁵	5,893 ⁶	55,219
Yakama Tribe ⁷	12,249	4,548	16,797
Colville Confederated Tribes ⁸	9,170	Not available	9,170
Total	115,627	29,181	144,808

1 Includes major landowners whose data were readily available. Does not include specific data on Washington State Parks, BLM, US Fish & Wildlife Service, Spokane Tribe, Kalispell Tribe.

2 US Forest Service derived from USFS FACTS database of accomplishments from 2009 to 2013. The US Forest Service treatments only reflect activities on the Okanogan-Wenatchee and Colville National Forests and the portions of the Umatilla and Gifford Pinchot National Forests that are in eastern Washington.

3. Bureau of Land Management (Mark Williams).

4. Includes 4,155 acres of Forest Improvement Treatments (break-even cost).

5. Derived from Forest Practices Applications database maintained by DNR and represents applications with an effective date of 7/1/2009 to 6/30/2014.

6. Includes DNR-funded projects, no data on activities conducted solely at landowners' expense.

7. Yakama Nation derived from GIS harvest layers representing harvests from 2009 to 2014.

8. Colville Confederated Tribes derived from GIS harvest layers representing harvests from 1985 to 2011.

Current patterns of land management activity reflect timber market conditions, agency budgets and many other factors. DNR funds its base land management activities from two main accounts—Resource Management Cost Account (RMCA) and Forest Development Account (FDA)—which accrue revenue through the proceeds of timber sales and other land management activity. The US Forest Service relies on federal appropriations. Tables 5 and 6 summarize recent base land management funding for DNR and the US Forest Service.

Table 5: DNR Timber and Vegetation Management Budgets for Eastern Washington, FY10 through FY14.

	Commercial Harvest	Non-Commercial	Forest Improvement Treatments	Total
FY 10	\$1,539,627	\$1,407,287	\$298,908	\$3,245,822
FY 11	\$1,526,627	\$1,023,011	\$207,137	\$2,756,775
FY 12	\$1,627,456	\$1,269,867	\$298,392	\$3,195,715
FY 13	\$1,674,819	\$1,409,728	\$339,897	\$3,424,444
FY 14	\$1,989,842	\$1,511,114	\$901,420	\$4,402,376
Total	\$8,358,371	\$6,621,007	\$2,045,754	\$17,025,132

Note: Fund sources RMCA and FDA; excludes supplemental appropriations, grants or other sources.

Table 6: US Forest Service Timber and Vegetation Management Budgets for the Colville and Okanogan-Wenatchee National Forests, FY10 through FY 14.

Timber and Vegetation Management Budgets			
	Colville National Forest	Okanogan-Wenatchee National Forest	Total
FY 10	\$5,047,000	\$9,757,000	\$14,804,000
FY 11	\$5,220,019	\$10,831,007	\$16,051,026
FY 12	\$6,087,101	\$8,524,432	\$14,611,533
FY 13	\$6,428,745	\$12,415,210	\$18,843,955
FY 14	\$7,669,119	\$12,361,522	\$20,030,641
Total	\$30,451,984	\$53,889,171	\$84,341,155

Source: US Forest Service. This table shows the Final Budget Allocation for Collaborative Forest Landscape (CFLR/CFLN), Forest Management (NFTM), Vegetation and Watershed Management (NFVW), Hazardous Fuels Reduction (WFHF), Cooperative Work-KV Regional Projects (CWK2), and Timber Salvage Sales (SSSS) funding for FY10-14 on the Colville and Okanogan-Wenatchee National Forests. NFTM, SSSS and CWK2 are the primary funding sources for timber target attainment, which includes funding for planning, prep, and administration of timber sales and stewardship contracts. WFHF is the primary funding source for hazardous fuel reduction, of which 30% may be used for timber sale planning. NFVW is the principle funding source for noncommercial vegetation management, which includes activities such as planting, timber stand improvement, and riparian improvement. CFLR funds the forests' CFLR projects, which may or may not include commercial timber removal. These are the primary funding codes for Forest Management on National Forest System lands.

Prescribed fire is another tool land managers employ to maintain healthy forests. Fire is a natural component of eastern Washington forests that can have many long-term ecological benefits when applied in the appropriate context. The tribes and the US Forest Service comprise the vast majority, 88 percent, of the prescribed fire acreage per year in Washington State (Table 7).

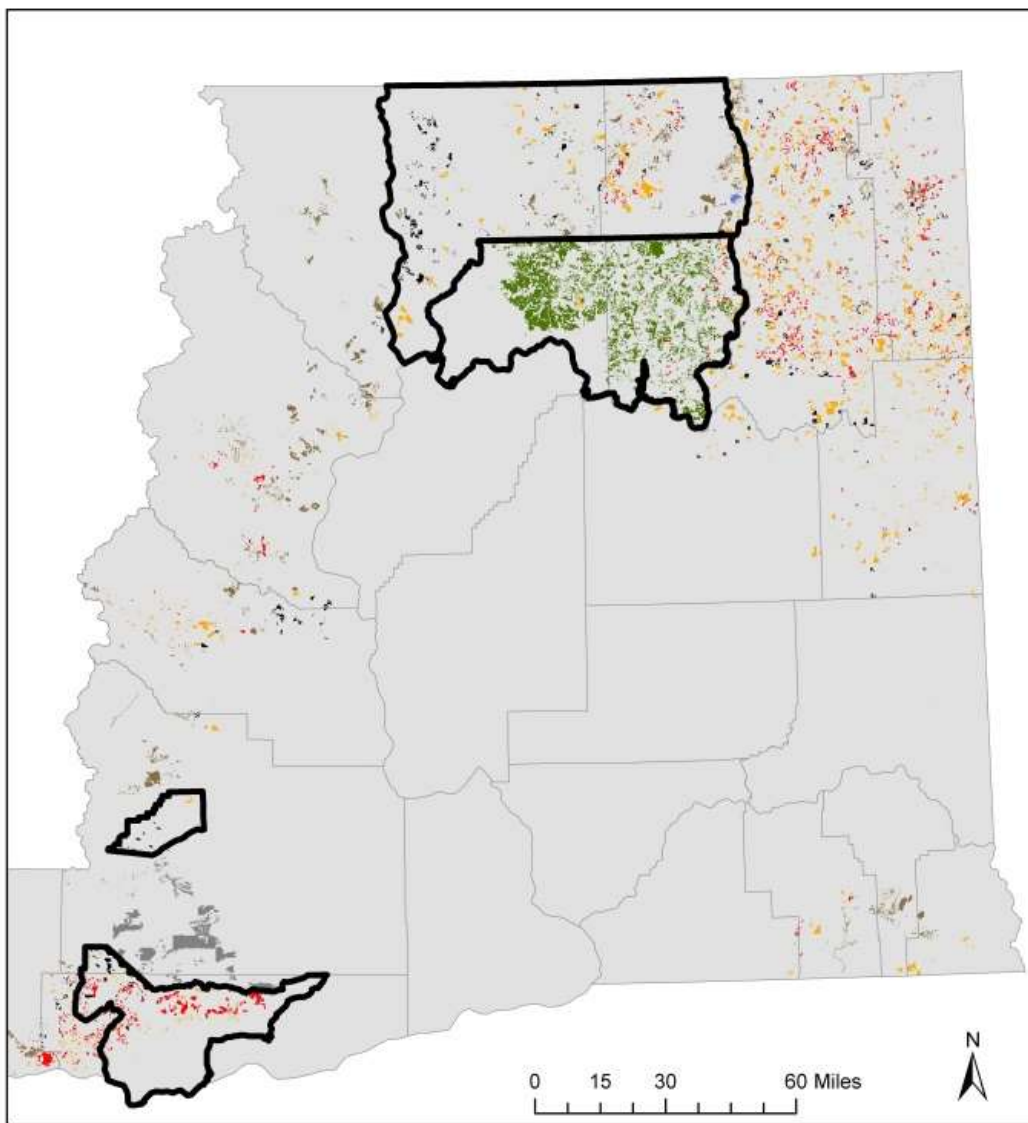
Table 7: Washington State Prescribed Fire Average Acres, 2009 to 2013

Landowner	Prescribed Fire Acres (Avg. acres/yr)
Bureau of Indian Affairs	7,096
Bureau of Land Management	461
US Fish and Wildlife Service	955
National Park Service	76
State (WDFW)	575
Other	0
US Forest Service	9,000
Total	18,163

Note: Prescribed fire acres includes forest and non-forest areas.

Source: National Interagency Coordination Center and WA Dept. of Fish and Wildlife.

Eastern Washington Commercial and Non-Commercial Forest Treatments



Legend

- US Forest Service treatments 2009-2013
- DNR treatments FY10-FY14
- Yakama treatments 2009-2014
- Colville treatments 1985-2011
- SFLO treatments FY10-FY14
- Major private (industrial) treatments FY10-FY14
- Forest Health Hazard Warning Area

Notes: Treatments represent both commercial and non-commercial treatments. USFS treatments represent only a portion of completed treatments as spatial data was not available for all completed USFS treatments.



Figure 10: Eastern Washington Commercial and Non-Commercial Forest Treatments, 2009–2014.

DNR Forest Health Accomplishments FY10-FY14

DNR STATE TRUST LAND COMMERCIAL HARVESTS & FOREST IMPROVEMENT TREATMENTS

On state trust lands, commercial harvests usually contain a forest health component by either reducing stand densities to site-appropriate levels through thinning or regenerating stands to provide for young, resilient growth. With commercial harvests, the revenue generated exceeds the cost of timber sale administration so these activities generate an economic return for the trust beneficiaries (Table 8).

There also are many forest stands with high health hazards but located too far from mills, contain a high density of small, lower-value trees or have site logistics that increase harvest costs. DNR worked with the legislature to address these marginally commercial stands in need of forest health treatments by creating authority to conduct forest improvement treatments (FIT). FIT sales are commercial harvests designed to address forest health hazards while meeting a break-even economic threshold and improving long-term economic returns for trust beneficiaries (Figure 11). The FIT program utilizes the value of merchantable products to offset the cost of removing material with low or no commercial value. Because of market fluctuations, some FIT sales actually end up generating some net income to trust beneficiaries while other FIT sales are implemented at a loss. DNR has used supplemental funding from the state capital budget and federal grants to cover the costs of preparing an accelerated program of FIT sales, and enabling FIT projects to proceed that would have operated at a loss. Table 8 displays aggregated commercial and FIT harvest accomplishments and supplemental funding.

Table 8: Eastern Washington DNR State Trust Lands; Commercial and FIT Harvest Treatments, FY10 through FY14.

Fiscal Year	Commercial Harvest (ac)	FIT (ac)	Total (ac)	FIT Supplemental Funding (\$)
FY10	11,789	2,601	14,390	\$262,173
FY11	4,395	5,077	9,472	
FY12	6,784	3,660	10,444	\$160,666
FY13	7,242	3,063	10,305	\$560,277
FY14	3,716	6,373	10,089	\$332,076
Total	33,926	20,774	54,700	\$1,315,192
Average/year	6,785	4,155	10,940	

Note: FIT supplemental funding reflects external funding sources (state capital, jobs bill and federal funds) used to offset FIT sales with a net cost.

FIT FY10-FY14 Total Delivered Value: \$33,958,524.39.

FIT FY10-FY14 Delivered Cost (inc. logging costs and DNR sale administration costs): \$30,574,153.16.

FIT FY10-FY14 Stumpage Value: \$3,240,166.23 (this is the net return to trust beneficiaries from FIT sales).



Figure 11: Forest Stand Conditions Before and After FIT Harvest. *Left.* Beetle Rock FIT pre-harvest stand conditions with dense ponderosa pine forest at high risk of damage from pine bark beetles. *Right.* FIT post-harvest stand conditions with a healthy, well-spaced ponderosa pine forest at low risk of damage from pine bark beetles and wildfire. Photos: Mike Johnson/ DNR.

DNR STATE TRUST LAND PRE-COMMERCIAL THINNING

DNR implements pre-commercial thinning (PCT), also known as non-commercial thinning, on state trust lands to reduce the density of young stands that have no current economic product value (Table 9). Proper thinning of young trees helps prevent forest health hazards from developing as the stand matures. Early thinning also accelerates tree growth, resulting in more rapid attainment of size requirements for forest product or habitat goals. PCT treatments generally do not remove timber; rather, the felled trees are left in place or piled and burned (Figure 12).

Table 9: Eastern Washington DNR State Trust Land Pre-Commercial Thinning

Year	PCT (acres)	PCT Cost (\$)
FY 10	1,035	\$197,908
FY 11	7,350	\$510,768
FY 12	4,097	\$364,460
FY 13	7,935	\$956,940
FY 14 and FY15 ¹	11,309	\$292,620 ²
Total	31,726	\$2,322,697
Avg/yr	5,287	

1. PCT acres for FY14 and FY15 represent completed and projected treatments during the biennium.
 2. PCT costs for FY 14 and FY 15 represent only costs for completed projects as of June 2014.



Figure 12: Commercial Thinning Results on DNR-managed State Trust Land. Trees on the right side of photo show the results of pre-commercial thinning. Trees on the left were not thinned.) Photo: Phil Anderson/DNR.

SMALL PRIVATE FOREST LANDOWNER TREATMENTS

DNR has secured federal and state capital funds to implement fuel reduction and forest health treatments on small, family-owned private forest lands in eastern Washington (Table 10). The US Forest Service is a very strong partner with the state of Washington on small private forestlands and provides most of the federal dollars for the small private forest landowner treatments listed in this report. These are non-commercial treatments that reduce stand density, prune trees and clear flammable brush. Felled trees are usually chipped and left on site or piled and burned. Depending on the project objectives these may focus on protecting homes and communities, or improving forest health conditions on larger parcels that create connectivity between adjacent projects on state and federal land. For state capital-funded projects landowners are required to share equally in the treatment cost, either in cash or an in-kind labor match. Federal grant projects generally carry the same requirement, although in special cases such as American Recovery and Reinvestment Act (ARRA) projects the cost-share requirement was lower.

Table 10: Small Private Landowner Fuel Reduction and Forest Health Treatments in Eastern Washington Administered by DNR

State Funds	Acres	State Funds	Match Funds	Total
2009-2011	1,281	\$606,420	\$720,000	\$1,326,420
2011-2013	3,085	\$2,053,327	\$1,768,593	\$3,821,920
2013-2015 ¹	3,752	\$1,832,000	\$1,832,000	\$3,664,000
Total	8,118	\$4,491,747	\$4,320,593	\$8,812,340
Federal Funds				
Federal Funds	Acres	Federal Funds	Match Funds	Total
2009	10,140	\$5,903,254	\$1,525,316	\$7,428,570
2010	5,874	\$3,407,664	\$1,434,995	\$4,842,659
2011	2,214	\$1,505,820	\$710,067	\$2,215,887
2012	1,870	\$953,027	\$832,734	\$1,785,762
2013	1,251	\$704,350	\$702,712	\$1,407,062
Total	21,349	\$12,474,115	\$5,205,825	\$17,679,939
All Funding Sources				
All Funding Sources	Acres	State and Fed Funds	Match Funds	Total Cost
	29,467	\$16,965,862	\$9,526,417	\$26,492,279
DNR Private Avg/year	5,893	\$3,393,172	\$1,905,283	\$5,298,456

1. Includes completed and projected treatments for biennium.

These projects are delivered through DNR landowner assistance programs. DNR works to recruit landowner participation in projects, ensure project outcomes meet hazard reduction objectives, and provide contract oversight. DNR landowner assistance foresters conduct site visits with private landowners to assess their forest conditions and provide recommendations on management options.

Figure 13 shows a private landowner fuel reduction project in Stevens County, Washington, administered by DNR and funded with US Forest Service grant dollars. Prior to the fuel reduction treatment, the stand was at high risk for severe wildfire as the dense understory would serve as a ladder of fuel to carry a fire into the tree crowns. The stand was also at high risk for western spruce budworm defoliation as it had multiple canopy layers dominated by Douglas-fir. After the treatment the stand was at low risk of severe wildfire and spruce budworm damage. The private treatments funded by DNR are designed to address multiple forest health and wildfire risks simultaneously.



Figure 13: Fuel Reduction Thinning Results. Before (left) and after (right) fuel reduction thinning in Stevens County, Washington.

More broadly, DNR provides forest stewardship outreach, education, and technical assistance in partnership with Washington State University Extension, US Forest Service, USDA Natural Resource Conservation Service, conservation districts, and others. These efforts raise awareness of forest health hazards, assist landowners in taking appropriate action to reduce threats, and recruit participants for wildfire hazard reduction projects.

DNR and WSU Extension have focused intense landowner outreach efforts in the Forest Health Hazard Warning Areas. These efforts have included numerous forest health workshops, direct mailings, radio advertisements, television advertisements, factsheets, press releases and websites. The goal has been to maintain a persistent outreach campaign so that landowners are aware of the forest health issues in their area and the resources available to assist them.

In August 2012, DNR mailed 10,517 notices to landowners in the Warning Areas. The notices described what a Forest Health Hazard Warning meant, tools to help landowners assess if their forest was at risk and recommendations on how to reduce risk. A toll-free number and website were created where landowners could request assistance. DNR and WSU Extension also sponsored a series of forest health workshops in 2012 and 2013 to educate landowners about forest health in the region, what they can do to improve the resiliency of their forests and professional forestry assistance available. Eleven informational workshops and five all-day intensive hands-on field workshops were held in Goldendale, Tonasket, Republic, Glenwood, Chesaw, Wauconda, Curlew, Leavenworth, Everett and Vancouver—the latter two designed to reach “absentee” owners who do not live on their forest property year-round. A total of 416 landowners participated in the workshops. As a direct result of the Forest Health Hazard Warning outreach efforts DNR foresters provided technical assistance to over 500 landowners that manage more than 97,000 acres.

Private Fuel Reduction Treatment Case Study: Ann Stanton, Texas Creek Road, Okanogan County.

In the summer of 2014, the Carlton Complex Fire, the largest in Washington state history, burned over 250,000 acres in Okanogan County. Ann Stanton’s property was in the heart of the Carlton Complex Fire; here is her account of the fire and how her participation in DNR-funded fuel reduction treatments likely saved her home:

Our home on Texas Creek Road, among about a dozen other properties on that road which participated in the fuel reduction program, probably survived largely due to your grant. Furthermore, it may be that the existing tall Ponderosa Pines will survive as well due to the slow, cool burn we observed which stayed mostly in the grass and shrubs and below the crowns of the larger trees.

We had a first-hand view of the crowning fire that was occurring on non-thinned stands within the drainage basin, on properties that did not receive the fuel reduction thinning and chipping.

Even after taking all the standard recommended precautions, I believe our property and home would have been damaged to a much greater extent than what has occurred to-date if your program had not been applied to it.

In combination with your program, which slowed the fire, DNR fire crews were brilliant and professional in their response. The fire line they cut around our structures and the careful back-burning they initiated stopped the fire from advancing to the propane tank, the woodshed with several cords of stacked firewood, and the house itself. Even with the metal roof and cement plank siding on the house itself, we do not have confidence that the house would still be standing without your program and the fire crew’s dedicated efforts.



Figure 14: Ann Stanton Fuel Reduction Project, Texas Creek Road, Okanogan County. Photo was taken shortly after the Carlton Complex Fire. Fire stayed on the ground because trees were thinned and pruned. The retained ponderosa pine show few signs of scorching.

PUBLIC LANDOWNER TREATMENTS

DNR allocated some state capital budget funds for high priority forest health and fuel reduction treatments on Washington State Parks, Washington State Department of Fish and Wildlife and US Forest Service lands in eastern Washington. Table 11 summarizes the forest health and fuel reduction treatments performed with DNR-administered state capital funds for these lands. These treatments focused on areas of strategic importance like close proximity to residential areas, contiguous to state lands, and where past and planned investments could be leveraged toward broader hazard reduction outcomes. (Figures 15 and 16).

Table 11: Forest Health and Fuel Reduction Treatments Funded Through DNR on Washington State Parks, Washington Department of Fish and Wildlife, and US Forest Service Lands: FY 2010 to FY 2014

Landowner	Acres Treated	Cost
US Forest Service	4,823	\$552,343
WA State Department of Fish and Wildlife	1,127	\$171,455
WA State Parks	308	\$211,001
Totals	6,258	\$934,799



Figure 15. Before fuel-reduction thinning, Riverside State Park, Spokane, WA. Notice that this dense forest is adjacent to a residential neighborhood.



Figure 16. After fuel-reduction thinning, Riverside State Park, Spokane, WA. This is an example of strategic investments to lower wildfire risk in the wildland-urban interface.

C. Eastern Washington Forest Restoration Need

A fundamental forest health problem in eastern Washington is the change in dry forest structure and species composition that has made forest stands more susceptible to insect and disease outbreaks and severe wildfires. Quantifying restoration needs across the landscape can therefore be accomplished by comparing current forest conditions against an historic range of natural variability—how different are today’s forests from “normal” forests (Figure 17). From this basis, strategic choices can be made about where conditions are more likely to produce unnaturally severe insect outbreaks or wildfire hazards, and where these intersect with important public safety, economic, ecosystem or other values that should be prioritized for protection.



Figure 17: Comparison of Forest Conditions, 1934–2010, Kittitas County. This comparison of changed forest conditions between 1934 (top) and 2010 (bottom) shows the Pearson (Naneum) Creek drainage near Mission Peak in central Kittitas County.

Credit: Upper photo by Reino R. Sarlin, USDA Forest Service, 08/19/1934, Records Group 95, National Archives and Records Admin., Seattle. Lower photo by John F. Marshall 09/10/2010, for the USDA Forest Service, PNW Research Station, Wenatchee, and Okanogan-Wenatchee NF.

Forest Restoration Needs Analysis

The Nature Conservancy (TNC) and the US Forest Service (USFS) recently conducted an analysis of forest restoration needs in eastern Washington, eastern Oregon and southwest Oregon (Haugo et al. 2015). This analysis provides a comprehensive study of current forest structure in comparison to a natural range of variability (NRV) reference condition, based upon forest types that existed prior to European settlement. Through this comparison, quantitative estimates were developed of which forest structures are overrepresented or underrepresented on the landscape. Active or passive management pathways needed to restore forests within the historic norm were also estimated, and in summary, include:

- Thin/Burn – Forest structure requiring a reduction or rearrangement of tree density through either mechanical treatment or controlled burning.
- Thin/Burn + Grow – Forest structure changes through mechanical treatment or prescribed burning, followed by growth, typically to allow the recruitment of a large, old tree component.
- Grow Only – Young or mid-aged forest structures that simply need to mature and does not immediately require disturbance or treatment.

Based on the TNC-USFS analysis, nearly 2.7 million acres—about 30 percent of all eastern Washington forestland—is in need of some sort of disturbance/active treatment (Thin/Burn or Thin/Burn + Grow) to restore the NRV of forest structures across the landscape (Tables 12 and 13). The most common transition needed is from either the mid-age or older closed canopy structure to an open canopy structure (Figure 18). We have too many dense, closed canopy stands that need tree density reduced. Typically these stands will need a mechanical treatment to remove the excess tree stems, some sort of prescribed burn to maintain proper stand density once it has been established through mechanical means, and then time (succession) for growth of trees into the larger size classes. It is important to note that forest stands need continued treatments, typically every 10 to 20 years, following initial treatments to maintain appropriate density and species composition. Restoration treatments are not one and done, there is a long-term stewardship responsibility to maintain healthy, resilient forests.

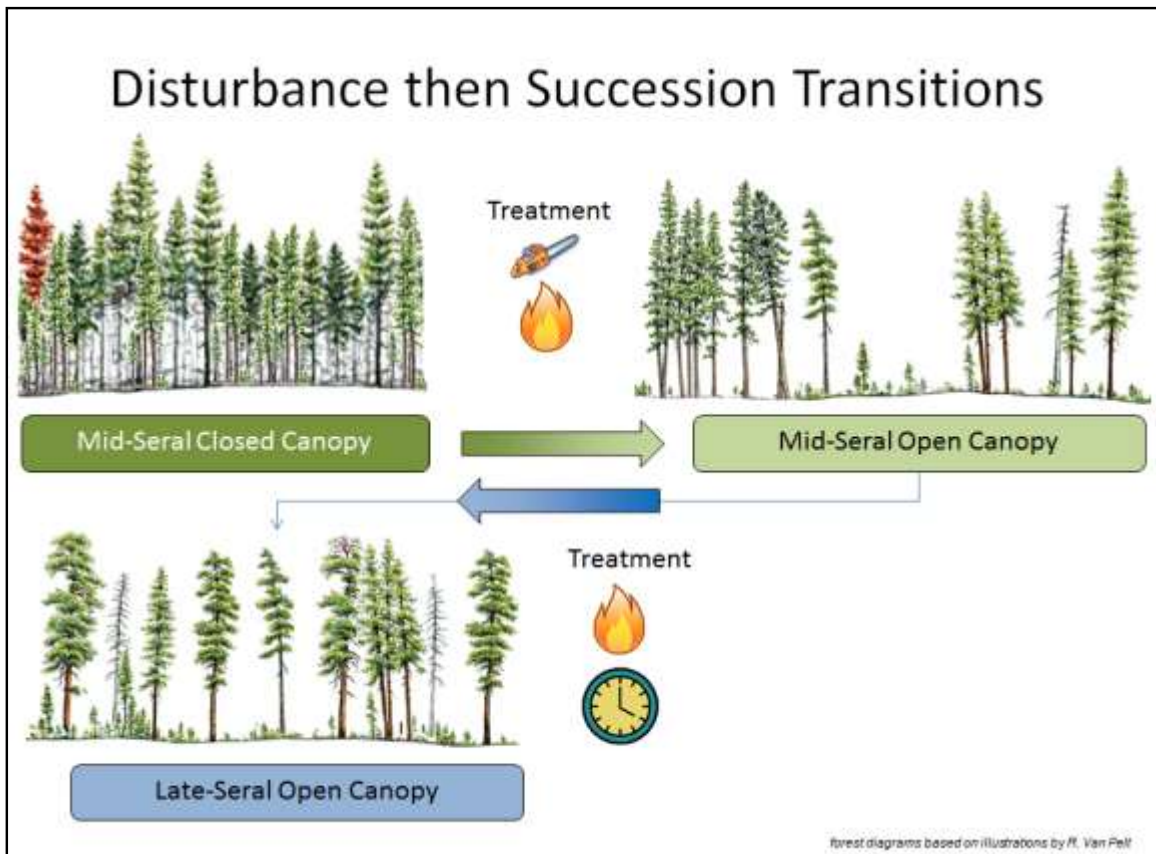


Figure 18: Forest Transitions: Disturbance then Succession. Example of transition from a mid-aged closed forest structure to older, open canopy structure using mechanical treatments followed by prescribed fire and time for trees to grow into larger size classes (Haugo et al. 2015).

DISTURBANCE RESTORATION NEEDS

This map highlights the percentage of all forests within a watershed in immediate need of mechanical thinning and/or fire to reduce tree density and/or canopy cover. While restoration frequently also requires time to regrow larger trees, "growth needs" are not represented on this map.

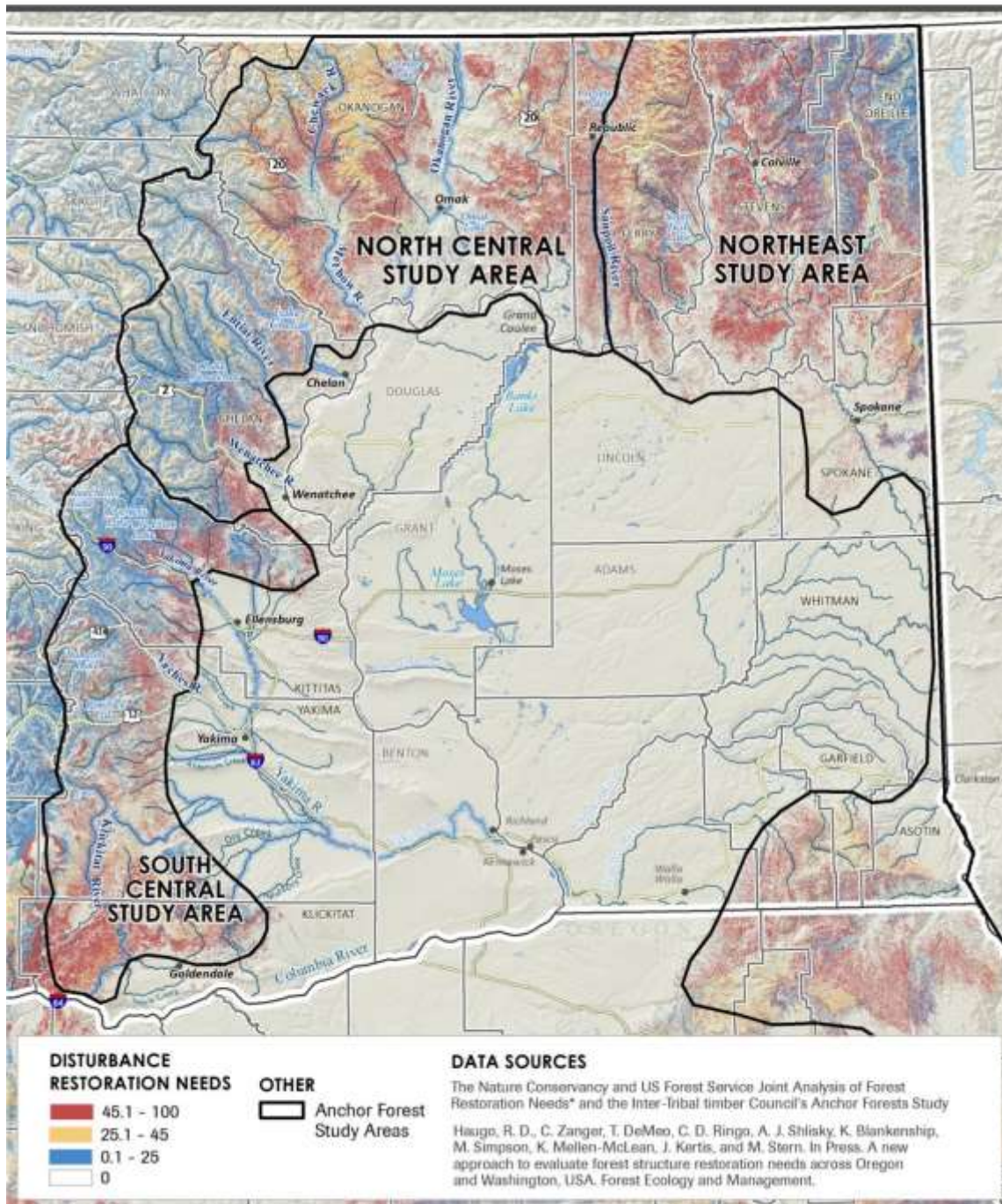


Figure 19: Disturbance Restoration Needs, Eastern Washington. Percentage of all forests within a watershed in immediate need of mechanical thinning and/ or prescribed fire to reduce tree density and/or canopy cover in Eastern Washington (Haugo et al. 2015).

Table 12: Eastern Washington Forest Structure Restoration Needs by Forest Ownership within the Anchor Forest Study Areas.

Forest Ownership	Total Forest	Thin/Burn		Thin/Burn then Grow		Growth Only	
	ac.	ac.	%	ac.	%	ac.	%
USFS	4,349,070	508,302	12%	611,372	14%	423,758	10%
State-DNR	662,340	96,285	15%	161,149	24%	50,480	8%
State-Other	127,591	16,125	13%	30,102	24%	6,235	5%
Tribal	1,237,160	121,685	10%	276,097	22%	72,119	6%
Private Industrial	858,848	111,434	13%	208,489	24%	72,134	8%
Private Non-Industrial	1,195,135	156,784	13%	309,630	26%	89,108	7%
Other	267,517	29,713	11%	41,337	15%	29,808	11%
Totals	8,697,661	1,040,328	12%	1,638,176	19%	743,642	9%

Source: Restoration needs definitions and analysis from Haugo et al. 2015 and forest ownership mapping from University of Washington Rural Technology Initiative. Study areas geographies and ownership from Inter-Tribal Timber Council Anchor Forests Study, overlaid on the TNC-USFS Forest Restoration Needs Analysis (Haugo et al. 2015).

Note: The restoration need acreages presented in the table reflect the restoration need within the Anchor Forests study areas in eastern Washington. The Anchor Forest study does not include the following portions of eastern Washington: eastern Skamania County, western Klickitat County and a small portion of northwest Okanogan County, thus the actual restoration need in eastern Washington is slightly greater than the numbers presented.

Table 13: Eastern Washington Total Active Forest Restoration Need by Ownership with the Anchor Forest Study Areas. (Disturbance and Disturbance/Succession)

Ownership	Total Active Restoration Need	
	Acres	Percent
USFS	1,119,674	42%
State-DNR	257,434	10%
State-Other	46,227	2%
Tribal	397,782	15%
Private Industrial	319,923	12%
Private Non-Industrial	466,414	17%
Other	71,050	3%
Total	2,678,504	

Source: Restoration needs definitions and analysis from Haugo et al. 2015 and forest ownership mapping from University of Washington Rural Technology Initiative. Study areas geographies and ownership from Inter-Tribal Timber Council Anchor Forests Study, overlaid on the TNC-USFS Forest Restoration Needs Analysis (Haugo et al. 2015).

Note: The restoration need acreages presented in the table reflect the restoration need within the Anchor Forests study areas in eastern Washington. The Anchor Forests study does not include the following portions of eastern Washington: eastern Skamania County, western Klickitat County and a small portion of northwest Okanogan County, thus the actual restoration need is slightly greater than the numbers presented.

Eastern Washington Active Restoration Need by Ownership

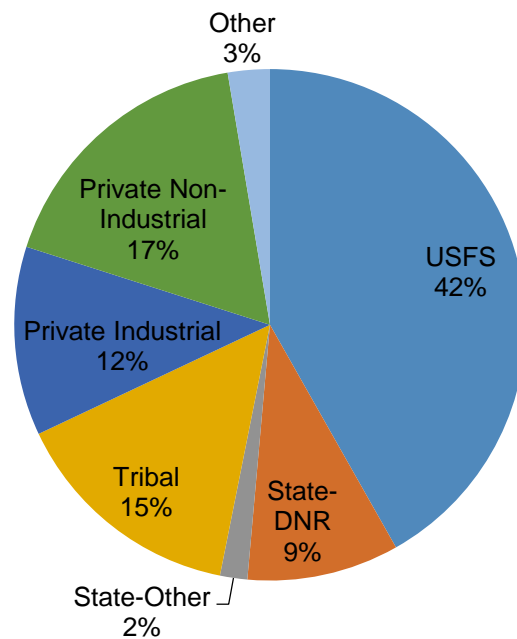


Figure 20: Eastern Washington Active Restoration Need by Ownership within Anchor Forests Study Areas.

Source: Restoration needs definitions and analysis from Haugo et al. 2015 and forest ownership mapping from University of Washington Rural Technology Initiative. Study areas geographies and ownership from Inter-Tribal Timber Council Anchor Forests Study, overlaid on the TNC-USFS Forest Restoration Needs Analysis (Haugo et al. 2015).

Note: The restoration need figures reflect the restoration need within the Anchor Forests study areas in eastern Washington. The Anchor Forests study does not include the following portions of eastern Washington: eastern Skamania County, western Klickitat County and a small portion of northwest Okanogan County, thus the actual restoration need is slightly greater than what is presented.

D. Economic and Funding Mechanisms to Enhance Restoration

The situation facing eastern Washington forests developed over the last 100 years. Millions of acres of unhealthy forests threaten the lives, property and prosperity of the state. A sustained period of strategic, committed actions from all the various landowners and stakeholders will be required to restore healthy, resilient forests. High treatment costs currently present a significant constraint to the amount of work that can be accomplished. To achieve healthy forests we must have robust economic and social systems that center around forest restoration. A sustained period of increased restoration activity can enhance and restore markets, infrastructure and investment that will be required to establish a self-sustaining forest management paradigm.

Economic Benefits and Avoided Costs of Forest Restoration

“The cost of fighting fire could and should be considered a cost of not removing high fuel loads...If the negative impacts that result from crown fires were fully reflected in the market, there would be high motivation to avoid them, providing necessary incentive to remove excessive fuel loads in spite of the cost” (Mason et al. 2006).

Catastrophic wildfire endangers lives, destroys property, and degrades public resources. Fire size, severity and frequency have grown with changes in forest conditions and drought. Over this century, number of acres burned is estimated to increase 3 to 5 times in eastern Washington (Littell et al. 2010, Peterson and Littell 2012, Snover et al. 2013, and Mote et al. 2014). Investments in fuel removals to reduce risk and severity of forest fires result in substantial public benefits. Forest treatment projects can be expensive to plan and implement, and generally don't break even financially due to factors such as weak market demand for small diameter timber. Yet, the avoided costs of fire suppression are substantial. For the past five fire years, DNR spent approximately \$200 million from the operating budget on fire suppression alone. In contrast, \$31 million from the capital budget, federal grants and landowner match has been spent on forest restoration (Figure 21).

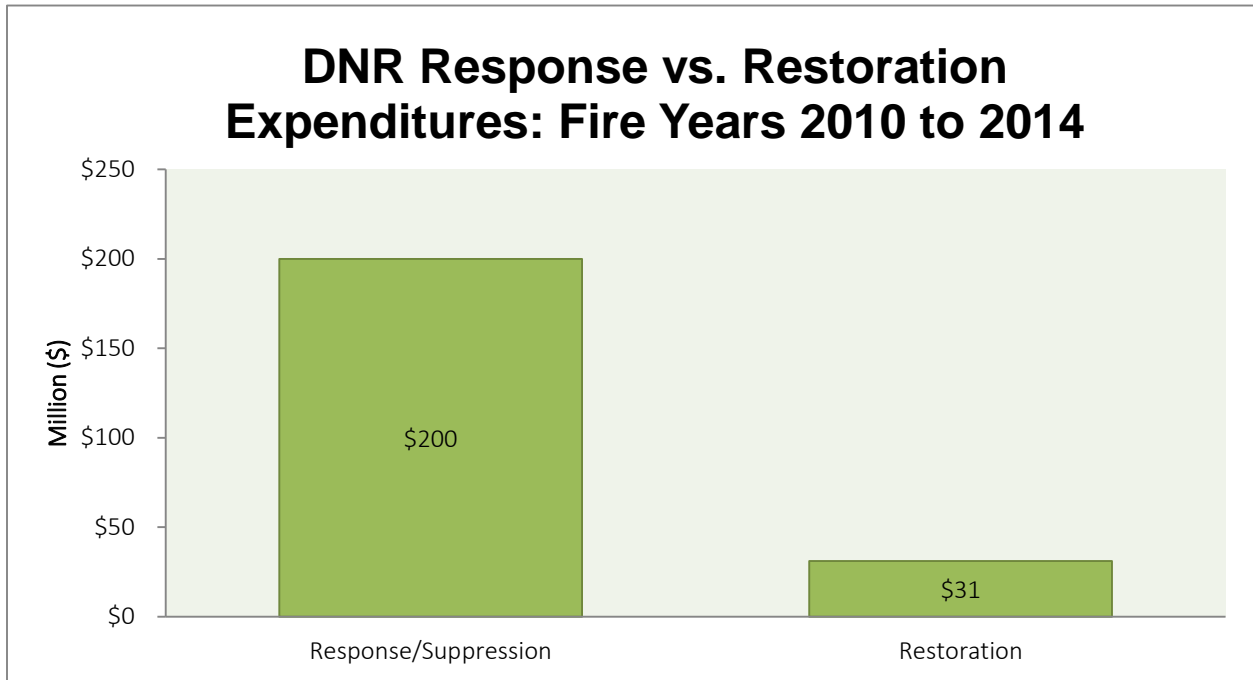


Figure 21: Washington DNR Fire Response (suppression) and Forest Restoration Expenditures, Fire Years 2010 through 2014.

Note: Response/suppression expenditures represent Washington State expenditures; restoration expenditures represent Washington State capital budget, federal grant and landowner match expenditures for active treatment measures funded by DNR on state and private lands.

At the federal level, the situation is worse yet: In 1991, firefighting accounted for only 13 percent of the US Forest Service’s budget whereas today, it consumes half. This has created an enormous gap in funding for maintaining the health and fire resiliency of our public forests and protecting at-risk communities. A recent report for the agency reveals that its firefighting workforce has more than doubled since 1998 while the number of land managers has shrunk by 35 percent.

Increased efforts to restore forests and treat fuels could have a positive effect on operating expenditures for fire suppression. A 2012 economic assessment from Oregon’s Federal Forest Advisory Committee found that every \$1 spent on restoration potentially avoids \$1.45 in fire suppression costs (Mason, Bruce & Girard, Inc. et al. 2012)

The Mokelumne Watershed Avoided Cost Analysis (Buckley et al. 2014) sought to answer the following question: “Does it make economic sense to increase investment in proactive forest management to reduce the risk of large, damaging wildfires?” Authored by a diverse set of stakeholders including the US Forest Service, The Nature Conservancy, and the Sierra Nevada Conservancy, the study concluded that “thinning the forests and reducing hazardous fuels would substantially reduce the probability, extent, and intensity of wildfire in the watershed, leading to

quantifiable cost savings. In short, strategic fuel reduction treatments are a good investment and produce multiple benefits to landowners, residents, and watershed interests and beneficiaries.” Focusing their analysis on the Upper Mokelumne River Watershed in California, the study’s research and modeling estimated that direct and indirect economic benefits of fuel reduction treatments are two to three times the costs.

Mason et al. (2006) found that “a cost/benefit analysis broadened to include market and nonmarket considerations indicates that the negative impacts of crown fires are underestimated and that the benefits of government investments in fuel reductions are substantial.” Impacts from wildfire can include:

- Loss of life, homes and property;
- Impacts to recreation, tourism, service, agriculture and forest economies;
- Loss of visual esthetics and recreational opportunities;
- Loss of habitat for threatened and endangered species;
- Increase in atmospheric carbon, methane and particulate matter associated with global warming;
- Loss and damage to public infrastructure;
- Costs of emergency soil stabilization, forest regeneration and other post-fire mitigation; and
- Negative human health impacts from smoke.

The study used some of these factors to summarize present-value costs and benefits associated with investments in fuel removals for fire risk reduction using the Okanogan and Fremont National Forests. Calculating the positive net benefits of fuel reduction treatments on market and nonmarket values, they estimate a positive net benefit per acre value of at least \$606 for moderate and at least \$1,402 for high-risk forestland. The authors note that these values are expected to increase if per-acre economic values tied to habitat protection, air and water quality protection, carbon credits, and others are also considered.

The 2012 Oregon forest restoration assessment found that \$1 million invested in restoration returns \$5.7 million to local economies. In Washington, Ferry County is part of the Forest Health Hazard Warning Area and is tied with two other rural counties for the highest unemployment rate in the state at 8.2 percent. Pend Oreille and Stevens counties are also well above the statewide unemployment rate (Figure 22). Ferry, Pend Oreille and Stevens counties have significant restoration needs as cited in the USFS- TNC restoration study and certainly would be a focus of increasing restoration efforts in Washington.

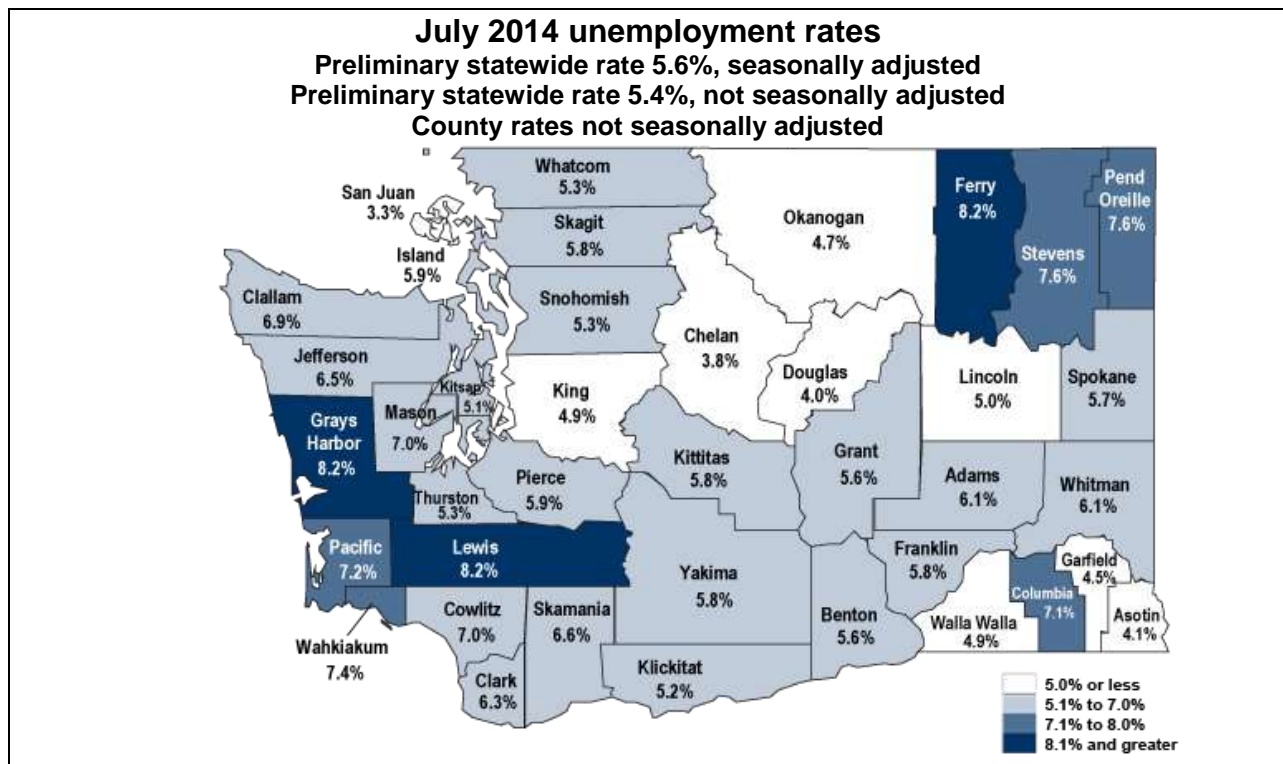


Figure 22: July 2014 Washington State Unemployment Rates by County. Sources: Washington State Employment Security Department and US Bureau of Labor Statistics.

Mechanisms to Fund Forest Health Treatments

State and federal government investments have accomplished significant amounts of hazard reduction treatment and are having a beneficial effect on landscape conditions, but restoration needs still outpace these investments. The relatively high cost structure for some treatments can be attributed to a lack of markets for currently low-value forest material, erosion of markets for traditional commercial material, and the labor- and transportation fuel-intensive nature of field operations. Achieving a self-sustaining level of restoration activity that can meet restoration needs will require a combination of actions related to funding and economic mechanisms:

- Sustaining a pulse of increased restoration activity in the near-term;
- Maintaining and enhancing existing and new markets for wood products generated during restoration treatments is essential to add value and increase the treatment footprint, such as through:
 - Creating incentives for investing in new processing and utilization technologies,
 - Retaining and expanding existing infrastructure, and
 - Utilization of wood as a renewable energy source and other initiatives;
- Monetizing values for ecosystem services threatened by forest health hazards.

The State of Oregon has been grappling with similar forest health issues as Washington state. In May 2014, Oregon released a legislative report that included several potential mechanisms to fund forest health treatments. The discussion below incorporates some of these concepts as well as others more specific to Washington state.

1. Residential Property or Water Bill Assessment

Property Assessment: (1) All homeowners within designated areas (i.e., WUI or the entire state) could pay an improved lot surcharge, or (2) the same residential landowners could be required to purchase a newly created WUI insurance policy, similar to how homeowners in flood plains are required to purchase flood insurance.

Water Bill Surcharge: Households that derive water from a forested watershed could be assessed a surcharge on municipal water bills, or on residential wells if applicable. This funding mechanism is already being used in Santa Fe, New Mexico and in Denver, Colorado to help protect vital forested watersheds at risk of severe damage from wildfires.

In New Mexico, sediment and debris from the Cerro Grande Fire in 2000 caused \$17 million in damage to the water supply delivery infrastructure of Los Alamos, New Mexico. The City of Santa Fe estimated that a 10,000 acre fire in the Santa Fe River Watershed, which supplies over a third of its municipal water supply, could cost \$21.5 million in water-related infrastructure damages. In contrast, for one-fifth of the estimated cost, the city could protect its watershed by implementing water and vegetation management and public education for 20 years under their 2009 Santa Fe Municipal Watershed Plan. A March 2011 poll conducted by The Nature Conservancy and the Santa Fe Watershed Association found that 82 percent of ratepayers were willing to pay a charge of 65 cents a month to protect the City's water supply from the risk of catastrophic wildfire. With the help of partners, the City of Santa Fe proposed a rate-payer system to raise about \$200,000 annually for a water fund to address the need for work identified in the watershed plan. A grant from the New Mexico Water Trust funded the first three years of the watershed plan and postponed a mandatory rate increase (Carpe Diem West 2011).

In the areas of critical concern for Denver Water's water supply, the USFS and Denver Water have partnered to accelerate forest health treatments to better protect the watersheds from the negative effects of climate change and wildfire. Under the Forests to Faucets Partnership, Denver Water and the USFS will each invest \$16.5 million, totaling \$33 million toward restoration projects over five years in priority watersheds for Denver's water supply. In 2011, Denver Water calculated that the average residential household would pay a total of \$27 over the course of five years to cover the cost of the \$16.5 million investment in forest thinning and other wildfire fuels reduction work (Denver Water 2014).

2. Fire Related Insurance Surcharge

Create a surcharge on insurance lines such as fire, home, or commercial policies in the wildland-urban interface and direct the proceeds to forest health activities.

3. Retail Tax on Outdoor Gear or Other Products Tied to Forest Health

A tax would be collected by retail outlets selling the specified forest-health related products (e.g., outdoor clothing, tents, camp stoves, hiking boots, lumber, etc.) similar to the way Pittman-Robertson funds are collected on firearms and ammunition or Dingell-Johnson funds are collected on fishing gear. Revenue from the tax would then be routed to the proper state agency where it could be invested in proactive forest health work.

The State of California instituted a one percent (1%) assessment on purchases of lumber products and engineered wood products in 2013. Proceeds of the assessment fund regulatory, fire protection and restoration objectives

4. Capture/Share Savings in Fire Suppression Costs

Work with federal and state appropriators to transfer suppression cost savings to treatments that restore forests and reduce fuels.

The proposed Wildfire Disaster Funding Act (S. 1875, H.R. 3992) is federal legislation that would develop an emergency wildfire funding process for the US Forest Service and Department of the Interior. Similar to how other federal disaster response functions are funded, the cost of suppressing the most complex and severe wildfires would be drawn from an emergency fund instead of being cannibalized from the agencies' normal operating budgets. In turn, this could make corresponding operating budget amounts available for forest restoration objectives.

5. Increasing the Value of Forest Products Removed During Forest Health Treatments

The lack of sawmills in large portions of eastern Washington drives down the value of timber due to high transportation costs and makes many forest stands uneconomical for treatment. Also there are currently very few markets for the small diameter timber that often comprises the majority of stems harvested during a forest health treatment. Maintaining and expanding utilization infrastructure for the commercial timber products, as well as developing markets for the small diameter wood that currently has little commercial value, will increase revenue generated during forest health treatments and allow more acres to be treated.

Mechanisms to increase value of forest products could include:

- Tax credits for construction of infrastructure that uses small wood (wood biomass heat, biofuels, posts/poles, small diameter sawmills);
- Renewable energy production standards/credits;
- Transportation tax credit for small diameter wood; and
- Low interest loans for construction of forest products infrastructure.

6. State and Municipal Bonds

The State of Washington has used capital budget appropriations to fund forest health treatments on state and private lands and, to a limited extent, federal lands. The capital budget forest health treatment appropriations were financed with state-issued general obligation bonds, although other potential revenue sources could be considered for new bonding authority.

Municipalities and counties also have potential to issues bonds for forest health treatments. In 2012, residents of Flagstaff, Arizona, approved a \$10 million bond with 73 percent voter approval to support forest restoration work within key watersheds on the Coconino National Forest and State of Arizona lands. In 2010, the City of Flagstaff had experienced the Schultz Fire which cost, for fire suppression alone, \$10 million and was followed by severe, repeated flooding following the fire on the east side of the San Francisco Peaks (City of Flagstaff, 2012).

E. Eastern Washington Forest Restoration Strategy

The increasing frequency and severity of wildfires and forest health concerns throughout the western United States have caused governments and land managers to focus attention and resources on hazard reduction and restoration. Strategies have been developed to help assess hazards and prioritize actions at the national, regional, state, local and individual landowner levels—all include a prominent role for restoring resilient forest conditions. Most recently, a national Cohesive Wildfire Management Strategy was developed through a collaborative effort by federal, state, local, and tribal governments and nongovernmental partners and public stakeholders (Jewell and Vilsack, 2014). The three goals of the Strategy are:

- Restore and maintain landscapes: Landscapes across all ownerships are resilient to fire-related disturbances in accordance with management objectives.
- Fire-adapted communities: Human populations and infrastructure can withstand a wildfire without loss of life and property.
- Wildfire response: All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.

These broad outcomes provide a useful framework for understanding the many forest restoration and wildfire mitigation activities ongoing in Washington state. Strategic options explored in this report focus primarily on restoration across the landscape and the intersection between landscape conditions and fire-prone communities.

Comparing the restoration needs analysis (Section C) with current estimated levels of forest management activity (Section B), as well as accessibility and operability limitations, a general guide for work estimates and implementation timelines can be developed (Table 14). This represents a coarse estimate in that it does not incorporate significant factors such as:

- Forest growth;
- Drought- and climate change-induced increases in average annual acres burned by wildfires; and
- Continued forest conversion and residential development growth within fire-prone areas.

However, from this basic level of information the increase in restoration work that would correspond to meaningful progress toward hazard reduction can begin to be quantified. This analysis focuses on federal, state and non-industrial private forestlands, which together comprise 71 percent of the total restoration need.

Table 14: Eastern Washington Forest Restoration Need, Current Treatment Level and Target Treatment Levels for the US Forest Service, State of Washington and Small Private Forestlands.

	Forest Landowner		
	US Forest Service	State	Small Private
Total Active Restoration Need (acres) ¹	1,119,675	303,661	466,414
Readily Accessible Active Restoration Need (acres) ²	448,707	213,460	385,327
Current Treatment Levels (acres/year) ³	21,000	17,000	55,000
Years to Address Total Active Restoration Need	53 years	18 years	8 years
Years to Address Readily Accessible Active Restoration Need	21 years	13 years	7 years
Target Treatment Level			
Target Treatment Level (acres/year)	40,000	30,000	61,000
Years to Address Total Active Restoration Need	28 years	10 years	7.6 years
Years to Address Readily Accessible Active Restoration Need	11 years	7 years	6.3 years

1. Source: Eastern Washington forests Disturbance Restoration Needs (Disturbance Only+ Disturbance then succession) forest ownership within the Anchor Forests study areas. Restoration needs definitions and analysis from Haugo et al. 2015 and forest ownership mapping from University of Washington Rural Technology Initiative.

2. Source: Eastern Washington forests Disturbance Restoration Needs (Disturbance Only + Disturbance then Succession) from Haugo et al 2015 by land management designations and potential constraints on mechanical treatments by Anchor Forests Study Areas. Forest ownership, management zones, and slopes mapping from University of Washington Rural Technology Initiative. Readily accessible active restoration need reflects active restoration need (Disturbance Only+ Disturbance then succession) on uplands <45% slope within the Anchor Forests study areas in eastern Washington.

3. Current treatment levels reflect commercial and non-commercial mechanical treatments.

Note: The restoration need acreages presented in the table reflect the restoration need within the Anchor Forests study area in eastern Washington. The Anchor Forest study does not include the following portions of eastern Washington: eastern Skamania County, western Klickitat County and a small portion of northwest Okanogan County, thus the actual restoration need is slightly greater than the numbers presented.

Restoration Strategies

Building on the national Cohesive Strategy concepts, the following strategies would move toward Washington state’s forest restoration and community protection priorities. All proposed actions and funding sources are additive to ongoing levels of resource allocation. Estimates are provided for the five year period 2015 to 2020.

Strategy 1: Increase the pace and scale of forest restoration.

Strategy 2: Strengthen collaborative processes that engage all forest landowners and stakeholders.

Strategy 3: Promote Fire Adapted Communities.

Strategy 4: Increase workforce capacity and expertise for forest restoration.

Strategy 5: Strengthen existing and create new markets for small diameter wood.

Strategy 1: Increase the pace and scale of forest restoration

Increasing the pace and scale of forest restoration requires different strategies for US Forest Service, state and non-industrial private forestlands in eastern Washington, as each face unique barriers and challenges.

A. Accelerate project planning and implementation on US Forest Service lands.

Planning forest restoration projects on National Forests under the National Environmental Policy Act requires rigorous environmental data collection, analysis, and public involvement. The US Forest Service is actively seeking new approaches and efficiencies but the planning process remains challenging and resource-intensive. Recent federal initiatives like the Collaborative Forest Landscape Restoration Program have increased project implementation funding. DNR has made small investments of capital funds where planned, ready-to-implement federal projects are adjacent to state land and other high-priority areas. However, resources for planning new projects remain as a significant bottleneck. Members of numerous forest collaboratives around the state are actively working to both agree upon specific restoration and management objectives, and improve the planning process (see Strategy 2.A).

To support these efforts, state and federal investments could be used to pay for a new planning initiative that would test and implement innovative practices on eastern Washington National Forests similar to ongoing efforts in Oregon. In 2013, the Oregon Legislature appropriated \$2.88 million to increase restoration of federal forests. The \$2.88 million included:

- \$600,000 for forest collaboratives' coordinating staff
- \$750,000 for scientific and technical project work
- \$1.45 million to develop a business partnership with the US Forest Service to find efficiencies and test new practices.

These funds support data collection, analysis, and implementation, concentrating on innovations that hold promise for changing the way planning is done. This includes new ways to collect and use natural resource inventory data, meeting obligations to protect and manage heritage resources, and providing state crews to assist with layout, marking, and preparation of contracts.

The state appropriation has been successful in leveraging additional resources: The Forest Service increased funding for two major restoration projects by \$8.8 million, leveraging state allocations to the agency more than 6-to-1. In the Oregon Blue Mountains, a new, dedicated planning team has produced a draft Environmental Impact Statement in about one year's time covering a 100,000 acre planning area that will result in 20,000 to 30,000 acres of additional treatments that are ready to implement.

Based on this experience and discussions with the agency, a \$6 million total investment would fund a new planning team for five years.

To apply this concept in Washington, DNR would contract with local forest collaborative groups to perform restoration priority assessments in at least two large watersheds (approximately 50,000 acres in size). These assessments, in turn, form the basis for prioritized action on federal, state and private land within the watershed. Building on the landscape assessments, DNR will additionally contract for critical planning tasks such as environmental surveys, data collection, and analysis on US Forest Service components of the landscape to accelerate the decision-making process. Working with the collaboratives, additional innovations and efficiencies in the planning process would be evaluated and tested. An analysis of two 50,000-acre watersheds can be expected to result in approximately 30,000 acres of federal land treatment.

2015 -2020 state investment: \$2.3 million

2015-2020 federal investment: \$3.7 million

Recommended funding mechanism: State capital budget; State operating budget; Wildfire Disaster Funding Act or other increased federal investment by the US Forest Service.

Initial pilot funding for this strategy could come from the state capital budget, so long as project locations were selected in landscapes where state lands and other state infrastructure were at risk. The pilot would be led alongside and contracted with eastern Washington forest collaboratives. Based on evaluating the outcomes of the pilot projects, a strategy using federal funding, state operating funds or some combination thereof could be required to sustain an ongoing effort.

B. Accelerate forest health treatment implementation on state lands.

Using multiple funding sources, DNR has accelerated forest health treatments on state trust land. The restoration strategy goal is to increase treatment level on state lands to reach a total of 30,000 acres per year from the current level of 17,000 acres per year.

2015-2020 state investment: \$12.5 million

Recommended funding mechanism: State capital budget.

Continued capital budget investments in state trust lands help protect the state's long-term revenue generating capacity for trust beneficiaries, the largest of which is common school construction. Near-term losses are avoided, near-term economic benefits are directly generated, and restoration treatments increase revenue potential for the long-term.

C. Increase funding for forest health restoration and fuel reduction treatments on non-industrial private forestlands.

Of the estimated 2.6 million acres in eastern Washington that need forest restoration treatments, 31 percent are on private land. DNR will provide private forest landowners with matching grant funds to perform tree thinning in areas where forest health has deteriorated and wildfire hazards are high. These projects will focus in the 2012 Forest Health Hazard Warning Areas, as well as areas identified in local Community Wildfire Protection Plans (see Strategy 3.A) and forestland adjacent to Firewise communities (see Strategy 3.B). Creating and increasing interconnections between previously accomplished hazard reduction work on adjacent private, state and federal land will also be prioritized.

2015-2020 state investment: \$18.5 million

2015-2020 federal investment: Ongoing grants.

Recommended funding mechanisms: Property assessment, insurance surcharge, state capital budget.

Ongoing US Forest Service grants (see Section B) will sustain a base level of hazard reduction activity, but continuing at an accelerated pace will require additional funding sources. Passage of the Wildfire Disaster Funding Act or similar legislation could redirect federal funds currently obligated for wildfire suppression toward increased hazard reduction projects.

Capital budget investments on private lands that are contiguous to state trust lands help protect these investments and build toward a landscape-scale improvement in forest conditions. However, priorities for protecting at-risk communities do not always align geographically with trust land locations. As witnessed in 2014, significant impacts to state infrastructure and

expenditures also result from severe wildfires. Highways, electrical and communications infrastructure, water supplies, tax revenue from timber, agricultural, and service economies—to name only a few—were all severely damaged in the Carlton Complex and other large fires. Preliminary estimates of public infrastructure damages indicate \$35 million in losses. Continued near-term capital appropriations for hazard reduction and community protection can mitigate these impacts and represent significant cost savings. Longer-term funding strategies like a property assessment or insurance surcharge require additional time to evaluate and implement.

D. Prescribed burning.

Fire is a natural and necessary component of eastern Washington forests. Once a stand has been thinned to proper density, prescribed burning is often the least expensive means to maintain the desired forest structure and reduce fuel loads.

2015-2020 state investment: None.

Recommended funding mechanism: None.

Policy: Currently, there are many legal, regulatory and policy obstacles—air quality and smoke management, risk and liability—that prohibit the efficient use of prescribed fire on a meaningful scale. Convening federal, state, and private practitioners of prescribed burning and regulatory agencies to review legal, regulatory and policy obstacles could yield recommendations that encourage the safe and efficient use of prescribed burning in context of increasing the pace and scale of restoration and community protection.

E. Anchor Forests.

The economic and social consequences of losing our working forests have had devastating effects on small rural timber dependent communities. The primary purpose of the Anchor Forest Pilot Project is to maintain this land base. The project is funded by the US Forest Service and administered by the Intertribal Timber Council consisting of: Yakama Nation Tribal Forestry; Quinault Indian Nation; US Forest Service; DNR; and Yakama Indian Nation Department of Natural Resources. The Anchor Forests Pilot has three major goals: restore capacity and infrastructure; coordinate management across ownerships to address forest health and ecosystem process issues; and provide economic, social, and cultural benefits to local communities. It is a relatively large multi-ownership area that will support sustainable long-term wood and biomass production levels backed by local infrastructure and technical expertise, and endorsed politically and publicly to achieve desired land management objectives. There are three study areas in South Central, North Central, and North East Washington.

2015-2020 state investment: None, federally funded project.

Recommended funding mechanism: Federal grant.

Strategy 2: Strengthen collaborative processes that engage all forest landowners and stakeholders

A. Enhanced funding to Forest Collaboratives

Forest collaboratives have proven to be an effective means in Washington for increasing trust and communication among stakeholders and getting more work done in the woods. Forest collaboratives are a model to enhance the communication, trust and efficiency of forest management by working together to develop a shared vision, goals and implement strategies that sustain ecological, economic and social values. These groups have successfully worked to reduce environmental conflict and accelerate project planning on US Forest Service land, two key bottlenecks to increased federal restoration work.

Forest collaboratives are playing a critical role in restoring eastern Washington forests. There are several forest collaboratives in Washington, including but not limited to:

- North Central Washington Forest Health Collaborative (Okanogan Wenatchee National Forest)
- Northeast Washington Forestry Coalition (Colville National Forest)
- Olympic Peninsula Collaborative (Olympic National Forest)
- Pinchot Partners (Gifford Pinchot National Forest)
- South Gifford Pinchot Collaborative (Gifford Pinchot National Forest)
- Tapash Sustainable Forest Collaborative (Okanogan Wenatchee National Forest)
- Chumstick Wildfire Stewardship Coalition
- Washington Prescribed Fire Council
- Washington Fire Adapted Communities Learning Network and the South Central Resource Conservation and Development Council

Each collaborative has a different geographic focus, structure and membership, but they all share broad goals to facilitate science-based forest management that improves forest health, benefits local communities and sustains a rural forest products economy. The focus of these collaboratives is largely on federal forest management, but many employ an all-lands perspective as well. Some collaboratives are also expanding to engage neighboring communities to increase community investment in crucial roles in preparing before, during and after wildfire.

In September 2014, the first summit of Washington forest collaboratives was held in Wenatchee, Washington. The objective was to identify common challenges and needs, drawing from individual groups' experiences on their respective National Forests. Several key themes emerged during the summit regarding forest restoration:

- The pace and scale of forest restoration must be increased. This will require more funding for treatments and also more markets forest products generated during treatment.
- Firm commitments to implementing a program of restoration work are necessary in order that businesses can plan for a sustainable supply of material from federal lands, and acquire capital to expand infrastructure.
- Federal lands project planning is currently a bottleneck that is making it difficult to increase the pace of forest restoration on federal lands. Ideas to get more planning done include: work with US Forest Service to change policy allowing retained receipts to be used for planning; utilize state funding to leverage federal funding for innovative planning practices similar to what is being done in the Oregon Blue Mountains; and contracting NEPA planning.
- The role forest collaboratives play could be enhanced by state support for collaborative coordination, professional development and capacity building.
- Resources are needed to quantify the social and economic benefits of forest restoration, including both direct and indirect benefits.

Many collaborative members cited the innovative approach the state of Oregon took to support restoration efforts on federal lands (see Strategy 1.A).

2015-2020 state/federal investment: \$1 million

Recommended funding mechanism: State operating budget; Wildfire Disaster Funding Act or other increased federal investment by the US Forest Service.

Following implementation of the pilot planning projects described in Strategy 1.A, ongoing support for the work of Washington's forest collaboratives will help extend and sustain accelerated federal lands treatment and enhance cross-boundary coordination of restoration work. As an ongoing expense this could be funded through the state or federal operating budget.

Strategy 3: Promote Fire Adapted Communities

The Fire Adapted Communities (FAC) initiative is helping homeowners, communities and land managers in fire-prone areas proactively prepare for inevitable fires—to “live with fire” safely. A fire adapted community acknowledges and takes responsibility for its wildfire risk, and implements appropriate actions before, during and after wildfire. Actions not only address forest

restoration but also resident safety, homes, neighborhoods, businesses and infrastructure, open spaces and other community assets.

A. Community Wildfire Protection Plan Implementation

Communities across Washington have come together to identify community protection priorities through the Community Wildfire Protection Plan process. Completed in an ongoing effort beginning around 2000, these protection plans are locally developed—most commonly at the county scale—and address issues such as wildfire response, hazard mitigation, community preparedness, structure protection or all of the above. However, many communities lack a mechanism for implementing these projects. DNR has successfully competed for an ongoing program of federal grants to implement hazard reduction projects in accordance with the Plans. Where appropriate, state capital funding has been used to leverage and extend the benefits of federally-funded projects. Continued hazard reduction funding focused upon community protection reduces risks to people in harm's way, helps control wildfire suppression costs and provides an incentive for communities to take proactive measures to protect themselves from wildfires.

2015-2020 state investment: See Strategy 1.C.

Recommended funding mechanism: See Strategy 1.C.

B. Firewise 50 Challenge

Washington has over 100 recognized Firewise USA communities, the second-highest number of any state in the nation. Yet, Washington also has among the highest proportion of development in fire-prone areas of any western state. The state's devastating 2014 wildfire season resulted in the loss of hundreds of homes, but also provided clear evidence and examples of homes and communities that were saved from damage due to investments in Firewise. This project will provide grants to communities and local collaborators (counties, fire districts, conservation districts) to reach a target of establishing 50 new Firewise communities and complete near-term implementation actions to increase public safety. To achieve recognition as Firewise, a community must: obtain a wildfire risk assessment as a written document from a qualified entity; form a board or committee, and create an action plan based on the assessment; invest a minimum of \$2 per capita in local Firewise actions for the year; and, conduct a "Firewise Day" event. Each new community that seeks to enroll in the program contributes its own resources to meet basic Firewise standards, and upon doing so will also receive an implementation grant for their hazard reduction action plan through the Forest Corps component of this strategy (see Strategy 4.A). Implementation actions will include hazard reduction work directly around homes and in

immediately surrounding forestland (see Strategy 1.A). The project is estimated to reduce hazards to approximately 1,500 homes.

2015-2020 state investment: \$1.3 million

Recommended funding mechanism: State capital budget; property assessment or insurance surcharge; Wildfire Disaster Funding Act or other increased federal investment by the US Forest Service.

Ongoing US Forest Service grants (see Section B) will sustain a base level of Firewise community projects, but continuing at an accelerated pace will require additional funding sources. Passage of the Wildfire Disaster Funding Act or similar legislation could redirect federal funds currently obligated for wildfire suppression toward increased Firewise projects.

Development in the wildland-urban interface is a significant factor driving wildfire suppression costs. Damage to homes and communities was extensive in the 2014 season, with home losses from the Carlton Complex Fire estimated at \$28 million and public infrastructure losses estimated at \$35 million. Continued near-term capital appropriations for hazard reduction and community protection can mitigate these impacts and represent significant cost savings. Longer-term funding strategies like a property assessment or insurance surcharge require additional time to evaluate and implement.

C. Expand Washington State Fire Adapted Communities Learning Network

The learning network concept encourages the development and sharing of best practices and innovations in order to accelerate the engagement of communities to take actions and implement best practices to be prepared before, during, and after wildfires statewide. Currently, the learning network model has been successfully used at the national level. A Washington State Fire Adapted Communities Learning Network is being initiated through a partnership between the Bureau of Land Management and the national Fire Adapted Communities Learning Network. State support could increase the number of pilot communities receiving support to collaboratively develop and share best practices, and promote the importance of local communities taking responsibility for their role in a fire adapted ecosystem.

2015-2020 state/federal investment: Scalable

Recommended funding mechanism: State operating budget; property assessment or insurance surcharge; Wildfire Disaster Funding Act or other increased federal investment by the US Forest Service.

D. Forestland Conversion: Keep Working Forests Working

Conversion of forestland increases wildfire risk and costs of wildfire suppression. The expansion of the wildland-urban interface “substantially increases the complexity of fire control, particularly in the fire-prone ecosystems of the Western states,” (Society of American Foresters 2010). Keeping working forests working as a means to decrease development in the wildland urban interface will help reduce suppression costs and protect a whole host of conservation values.

In addition to increased wildfire risk and cost, forestland conversion to other land uses can have many undesirable ecological, social, and economic consequences. “Permanent conversion of forests often leads to increased runoff and sedimentation, higher peak stream flows, loss of riparian vegetation, and increased stream temperatures, all of which lead to long-term adverse effects on water quality. In addition, forestland conversion results in direct loss of carbon storage and wildlife habitat, including the habitats of migratory birds and many threatened or endangered species, and adverse effects on aquatic habitats and fish, particularly cold-water fish such as trout, salmon, and other anadromous species. Conversion and fragmentation of forestland also decreases the outdoor recreation opportunities available to our growing, increasingly urbanized population. Once forests are fragmented or parcel size is reduced, the remaining forested tracts may become too small to support ongoing investment in forest management,” (Society of American Foresters 2010). In order to reign in the costs of wildfire, addressing the issue of forestland conversion and expansion of the wildland-urban interface should be considered. DNR is hoping to work collaboratively with other state agencies and partners to identify areas of opportunity to make meaningful and substantive change to the policy environment in Washington that will favor greater working forest retention.

Policy: Broad program areas initially identified as having some promise include the following:

- Better protection of working forest lands under the Growth Management Act.
- State tax and fiscal policy that substantially favors retention of working forests.
- Continued development of ecosystem service markets, including water quality, water quantity, and carbon.
- Strong alignment of policies for working forests retention with state climate change policy and proposals.
- Strong alignment of policies for working forests retention with Puget Sound recovery goals.
- Better sources of public funding for working forest retention in the form of working forest easements, establishment of community forests, Puget Sound recovery funding, and local taxing authority.

Strategy 4: Increase workforce capacity and expertise for forest restoration

Increasing the pace and scale of forest restoration work in eastern Washington requires a larger, more skilled workforce. There is a relatively small pool of qualified restoration contractors. The current forestry workforce has shrunk in response to reduced agency budgets, timber market fluctuations, mill closures and reduced harvest activity. Workforce demographics and retirements are contributing to the loss of experienced personnel. This strategy proposes to harness the benefits of an increase in restoration project work toward simultaneously recruiting new people to the field and developing professional skills.

A. Forest Corps

The concept of developing a “Forest Corps” is an objective in DNR’s 2014 agency Strategic Plan and will involve work experience, job training and mentorship opportunities for returning military veterans.

A portion of the Forest Corps initiative will contribute directly toward forest restoration and hazard reduction objectives. DNR will contract with a combination of Washington Conservation Corps (WCC) and national Student Conservation Association (SCA) programs, including SCA’s Veterans Fire Corps program, to deploy 30 five-person veteran crews. These crews will work in conjunction with the Firewise 50 Challenge (see Strategy 3.C) communities to perform hazard reduction projects immediately adjacent to homes, as outlined in the community’s Firewise action plan. Created in 2010 in cooperation with the US Forest Service, the Veterans Fire Corps trains and engages teams of military veterans in wildland fire mitigation. This project is estimated to reduce hazards to approximately 1,500 homes by performing tree thinning, pruning and brush disposal.

2015-2020 state investment: \$5 million.

Recommended funding mechanism: State capital budget.

DNR continues to develop the full scope, costs, and potential partnerships involved with the Forest Corps initiative. Capital funds would be for project completion only, but provide the opportunity to create leverage with additional resources.

Strategy 5: Strengthen existing and create new markets for small diameter wood

A. Wood Energy in Public Facilities

Basic infrastructure investments in schools and other public facilities provide opportunities to increase low-value wood utilization and offset forest restoration costs. Preferential treatment for wood fired boilers and combined heat and power capacity in routine boiler replacement or new facility construction would encourage broader adoption of these technologies.

Besides a school in Forks, Washington, there are no public facilities in the state that use wood energy. There are many examples across the country where wood chip or pellet boilers have been deployed that make economic and environmental sense. The Washington State Forest Biomass Coordination Group coordinated by DNR, the Washington Department of Commerce and WSU Extension Energy Program obtained federal funding to provide technical assistance and outreach on wood energy for public facilities. This grant leverages existing state investments in wood pellet boilers for schools from the FY13-15 capital budget as well as the federally funded Forest Products Financial Assistance Program managed by the Washington Department of Commerce.

Central Washington University (CWU) provides another near-term example of this opportunity. A feasibility study will be completed in October 2014 to determine if wood energy is a viable option for CWU. A 5MW combined heat and power wood chip boiler at CWU would consume about 50,000 tons of chips/year from 5,000 acres of restoration treatments. If the state is going to make a capital investment in a new boiler at CWU, it should seriously consider a wood boiler that can provide a clean, renewable energy source for the campus as well as address the severe forest health and wildfire risks in the region.

2015-2020 state/federal investment: Project-specific.

Recommended funding mechanism: State capital budget, existing federal grant programs.

B. Small-Diameter Sawmill(s) in North-Central Washington

North and central Washington suffer from an absence of forest products infrastructure that can process small-diameter commercial material. This, in turn, renders restoration activity economically difficult. A sustained focus from the State of Washington on increasing forest restoration will contribute to a reliable supply of this material around which infrastructure could be sited. In addition, the state could provide incentives to attract private investments in new mills such as tax credits and low-interest loans.

2015-2020 state/federal investment: Scalable/project specific.

C. Wood Biofuels and other Innovative Uses

Washington State University and the University of Washington have each received \$40 million from the US Department of Agriculture to study the conversion of woody biomass into transportation fuels. The state has supported these research efforts and should continue to support these and other efforts that focus on technological improvements and creating new markets for woody biomass.

2015-2020 state/federal investment: Scalable/project specific.

Policy: Ensure wood based biofuels qualify for state and federal renewable fuel standards.

References

Barrett, S., Havlina, D., Jones, J., Hann, W.J., Frame, C., Hamilton, D., Schon, K., DeMeo, T., Hutter, L., Menakis, J., 2010. Interagency Fire Regime Condition Class (FRCC) Guidebook, version 3.0. In. USDA Forest Service, US Department of the Interior, and The Nature Conservancy. [Online], available: <http://www.frcc.gov/>.

Buckley, M., N. Beck, P. Bowden, M. E. Miller, B. Hill, C. Luce, W. J. Elliot, N. Enstice, K. Podolak, E. Winford, S. L. Smith, M. Bokach, M. Reichert, D. Edelson, and J. Gaither. 2014. “Mokelumne watershed avoided cost analysis: Why Sierra fuel treatments make economic sense.” A report prepared for the Sierra Nevada Conservancy, The Nature Conservancy, and U.S. Department of Agriculture, Forest Service. Sierra Nevada Conservancy. Auburn, California. Online: <http://www.sierranevadaconservancy.ca.gov/mokelumne>

Carpe Diem West. (2011). Healthy Headwater’s Success Story: Santa Fe, New Mexico – Sustaining the Watershed. http://www.carpediemwest.org/sites/carpediemwest.org/files/Santa%20Fe%20Success%20Story_0.pdf

City of Flagstaff, Arizona and the Flagstaff Ranger District, Coconino National Forest. (December 2012). “Flagstaff Watershed Protection Project Executive Summary & Implementation Plan.” <http://www.flagstaff.az.gov/DocumentCenter/View/41236>

Denver Water. (2014). Frequently Asked Questions: Partnership with U.S. Forest Service for Watershed Management <http://www.denverwater.org/SupplyPlanning/WaterSupply/PartnershipUSFS/FAQs/>

Earth Economics. (2013). “The Economic Impact of the 2013 Rim Fire on Natural Lands Preliminary Assessment.” <http://www.eartheconomics.org/FileLibrary/file/Reports/Earth%20Economics%20Rim%20Fire%20Report%2011.27.2013.pdf>

Haugo, R., Zanger, C., DeMeo T., Ringo, C., Shlisky, A., Blankenship, K., Simpson, M., Mellen-McLean, K., Kertis, J., Stern, M., 2015. *A new approach to evaluate forest structure restoration needs across Oregon and Washington, USA*. For. Ecol. Manage., 335: 37-60. <http://authors.elsevier.com/sd/article/S0378112714005519>

Jewell, S., Vilsack, T. (2014). National Cohesive Wildfire Management Strategy. USDA Forest Service and US Department of the Interior. <http://www.forestsandrangelands.gov/strategy/thestrategy.shtml>

Krist Jr., F., Ellenwood, J., Woods, M., McMahan, A., Cowardin, J., Ryerson, D., Sapio, F., Zweifler, M., and Romero, S. (2014). “National Insect and Disease Forest Risk Assessment.” USDA Forest Service Forest Health Technology Enterprise Team. FHTET-14-01. http://www.fs.fed.us/foresthealth/technology/pdfs/2012_RiskMap_Report_web.pdf

Littell, J.S. et al. 2010. Forest ecosystems, disturbance, and climatic change in Washington State, USA. *Climatic Change* 102: 129-158, doi: 10.1007/s10584-010-9858-x.

Mason, Bruce & Girard, Inc., Forest Econ Inc., Institute for Natural Resources, and Northwest Economic Research Center, Portland State University. (2012). “National Forest Health Restoration: An Economic

Assessment of Forest Restoration on Oregon’s Eastside National Forests.”

http://www.oregon.gov/gov/docs/OR_Forest_Restoration_Econ_Assessment_Nov_2012.pdf

Mason, C.L., Lippke, B.R., Zobrist, K.W., Bloxton Jr., T.D., Ceder, K.R., Comnick, J.M., McCarter, J.B., Rogers, H.K. (2006). “Investments in Fuel Removal to Avoid Forest Fires Result in Substantial Benefits.” *Journal of Forestry* 104, 27 -31.

Mote, P., A. K. Snover, S. Capalbo, S. D. Eigenbrode, P. Glick, J. Littell, R. Raymond, and S. Reeder, 2014: Ch. 21: Northwest. *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 487-513. doi:10.7930/J04Q7RWX.

Oregon Department of Forestry. (May 2014). “SB 357 Report to the Legislature Federal Forest Management.” <https://olis.leg.state.or.us/liz/201311/Downloads/CommitteeMeetingDocument/37232>

Peterson DL & Littell JS (2012). Risk assessment for wildfire in the western United States. *Effects of climatic variability and change on forest ecosystems: a comprehensive science synthesis for the U.S. forest sector*, eds Vose JM, Peterson DL, & Patel-Weynard T (Gen. Tech. Rep. PNW-GTR-870. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR).

Rogers, Luke W, Andrew G Cooke, and Jeffrey M Comnick. 2012. “The 2012 Washington State Biomass Database.” Seattle, WA, March 13.

Society of American Foresters. (2010). Loss of U.S. Forest Land: A Position Statement of the Society of American Foresters. http://www.eforester.org/fp/documents/Loss_of_forest_land.pdf

Snover, A.K, G.S. Mauger, L.C. Whitely Binder, M. Krosby, and I. Tohver. 2013. Climate Change Impacts and Adaptation in Washington State: Technical Summaries for Decision Makers. State of Knowledge Report prepared for the Washington State Department of Ecology. Climate Impacts Group, University of Washington, Seattle. <http://cses.washington.edu/db/pdf/snoveretalsok816.pdf>

Washington State Employment Security Department. (2014). “July 2014 unemployment rates.” Figure from: <https://fortress.wa.gov/esd/employmentdata/reports-publications/economic-reports/monthly-employment-report/map-of-county-unemployment-rates>

Appendix

Department of Natural Resources Capital Project Request: 2015-17 Biennium

Capital Project Request

2015-17 Biennium

Version: 01 15-17 Submittal

Report Number: CBS002

Date Run: 9/18/2014 8:16AM

Project Number: 30000224

Project Title: Forest Hazard Reduction

Description

Starting Fiscal Year: 2016

Project Class: Program

Agency Priority: 2

Project Summary

Eastern Washington has significant forest health problems where forests are overcrowded and susceptible to damage from insects, disease and wildfire. In August 2012 the Commission of Public Lands established the state's first ever Forest Health Hazard Warning for parts of Ferry, Okanogan, Klickitat and Yakima Counties. Actively managing those forests sustains and renews their capacity to supply economic and environmental benefits that would otherwise be lost. This proposal enables 60,000 acres of forest health pre-commercial thinning or Forest Improvement Treatments on state trust land, treating 14,350 acres of private forest land, and treating 8,000 acres of federal land. An additional 1,500 acres of private forest land would be brought under forest health management plans. It continues implementation of a Forest Health Hazard Warning (RCW 76.06.160-180) to motivate strategic attention and mobilize treatments in an area threatened by forest insects or disease that requires diverse landowner participation.

Project Description**What is the proposed project?**

The project continues and accelerates an integrated, prioritized program of work to reduce forest hazards in areas threatened by forest insects, disease or wildfire. This project will accomplish forest health restoration and fuel reduction treatments on Federal, State and private forest land; establish new Firewise communities and reduce hazards around homes; accomplish community protection work by providing opportunities for veterans and build capacity for natural resource protection careers; and accomplish reforestation on areas damaged by wildfire and other disasters. In total, 45,000 acres will receive hazard reduction treatments, including 50 communities and 1,500 homes, and 8,000 acres damaged by recent wildfires will be reforested. Investments in cross-boundary planning will facilitate the accomplishment of an additional 30,000 acres of hazard reduction on US Forest Service land.

What opportunity or problem is driving this request?

Eastern Washington has areas of worsening forest health conditions due to overcrowded trees that have become damaged and are susceptible to increased damage from insects, disease and wildfire. In 2014 over 380,000 acres burned in wildfires in Washington State, an area more than six times greater than the five-year average. Throughout the decade of the 2000s insects and diseases damaged, on average, 1.3 million acres per year (an area greater than the size of Pierce County). The average annual damage during the 2000s was 1.5 times more than in the 1990s, and twice the average of the 1980s.

A recent analysis conducted by The Nature Conservancy and the US Forest Service identified about 3.0 million acres of eastern Washington forest land that require some sort of active management to restore forest structures that are more resilient against insects/diseases/wildfires. In 2012 the Commissioner of Public Lands established the state's first Forest Health Hazard Warning (RCW 76.06.160-180) for parts of Ferry, Okanogan, Klickitat and Yakima Counties. Actively managing those forests provides economic and environmental benefits that would otherwise be lost. Of the 3 million acres identified, approximately 43% are on federal land, 31% are on private land, and 10% are on state land, with the balance on tribally managed land.

Homes, developments and communities are increasingly interspersed within fire-prone landscapes, compounding fire impacts and presenting a danger to public safety. More than 300 homes were lost in the 2014 Carlton Complex wildfire. Nationally, wildfires destroyed over 11,000 structures in the 2011-2013 seasons alone. Washington ranks third among all western states in the percentage of fire-prone lands that have been developed.

Average wildfire seasons are burning three times as many acres and lasting two months longer than in 1990. University of Washington Climate Impacts Group projections indicate another near-doubling of average acres burned by 2020.

Current levels of forest management and hazard reduction, accelerated by recent state capital and federal funding, are occurring on an average of approximately 141,000 acres per year. At this rate, and assuming all activities are contributing to hazard reduction objectives, it would take more than 20 years to address the identified restoration needs. The impact of this proposal, if sustained, would be to reduce the timeframe for achieving restoration needs by 25%.

Capital Project Request

2015-17 Biennium

Version: 01 15-17 Submittal

Report Number: CBS002

Date Run: 9/18/2014 8:16AM

Project Number: 30000224

Project Title: Forest Hazard Reduction

Description

Implementing a state strategy that focuses on accelerating restoration of resilient forest conditions across state, private, and federal forestland is the primary opportunity driving this request.

What opportunity or problem is driving this request?

Eastern Washington has areas of worsening forest health conditions due to overcrowded trees that have become damaged and are susceptible to increased damage from insects, disease and wildfire. In 2014 over 380,000 acres burned in wildfires in Washington State, an area more than six times greater than the five-year average. Throughout the decade of the 2000s insects and diseases damaged, on average, 1.3 million acres per year (an area greater than the size of Pierce County). The average annual damage during the 2000s was 1.5 times more than in the 1990s, and twice the average of the 1980s.

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Current levels of forest management and hazard reduction, accelerated by recent state capital and federal funding, are occurring on an average of approximately 141,000 acres per year. At this rate, and assuming all activities are contributing to hazard reduction objectives, it would take more than 20 years to address the identified restoration needs.

Implementing a state strategy that focuses on accelerating restoration of resilient forest conditions across state, private, and federal forestland is the primary opportunity driving this request.

How does the project support the agency and statewide results?

The Department of Natural Resources has constitutional obligations, statutory responsibilities, and a leadership role to achieve forest health restoration and protection for all landowners. Goals 1, 2, 5 and 7 of the DNR Strategic Plan 2014-2017 (http://www.dnr.wa.gov/Publications/em_strategic_plan_2014_2017.pdf) prioritize sustainable management of forested trust lands, wildfire prevention and protection, adapting to climate change, and strengthening the agency's long-term financial stability. The Hazard Warning and Forest Health Collaborative processes have created partnerships with citizens and local governments to recognize vulnerable conditions, collaborate to implement remedial strategies, and ensure environmental protection.

The Governor's Results Washington *Sustainable Energy and a Clean Environment Goal 3* includes an initiative for DNR to increase treatment of forested lands for forest health and fire reduction.

What are the specific benefits of this project?

In total, project activities will achieve 45,000 acres of direct treatment projects to reduce forest health and wildfire hazards across state, private and federal lands; directly protect 50 communities and 1,500 homes from wildfire hazards; replant trees on 8,000 acres of private land damaged by recent wildfires; and will make planning investments to facilitate the treatment of an

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Project Title: Forest Hazard Reduction

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additional 30,000 acres of US Forest Service land.

State Lands Forest Health Restoration: (\$5,000,000) State trust lands provide critical funding to constitutional beneficiaries, the largest of which is the common school trust. Wildfire and forest insect damage incurs near-term losses and threatens the long-term viability of these revenue-producing assets for the state. The project will achieve 25,000 acres of Forest Improvement Treatments and pre-commercial thinning in high-risk areas for forest insect outbreaks. Approximately 1,000 acres will receive thinning treatment in the Teanaway Community Forest. The project will also achieve 3,500 acres of non-commercial fuels reduction designed to increase connectivity of fire-safe conditions between state lands and neighboring private land and community protection projects conducted with previous funding sources. Total accomplishment will be 29,500 acres.

Firewise 50 Challenge: (\$1,300,000) Washington has over 100 recognized Firewise USA communities, the second-highest number of any state in the nation. Yet, Washington also has among the highest proportion of development in fire-prone areas of any western state. The state's devastating 2014 wildfire season resulted in the loss of hundreds of homes, but also provided clear evidence and examples of homes and communities that were saved from damage due to investments in Firewise. This project will provide grants to communities and local collaborators (counties, fire districts, Conservation Districts) to reach a target of establishing 50 new Firewise communities and complete near-term implementation actions to increase public safety. To achieve recognition as Firewise, a community must: Obtain a wildfire risk assessment as a written document from a qualified entity; Form a board or committee, and create an action plan based on the assessment; Invest a minimum of \$2 per capita in local Firewise actions for the year; and, Conduct a "Firewise Day" event. Each new community that seeks to enroll in the program contributes its own resources to meet basic Firewise standards, and upon doing so will also receive an implementation grant for their hazard reduction action plan under the related Veterans Forest Corps component of this proposal. Implementation actions will include hazard reduction work directly around homes and in immediately surrounding forestland. The project is estimated to reduce hazards to approximately 1,500 homes.

Veterans Forest Corps: (\$2,000,000) DNR will contract with a combination of Washington Conservation Corps (WCC) and national Student Conservation Association (SCA) programs, including SCA's Veterans Fire Corps program, to deploy 15 five-person crews comprised of military veterans. These crews will work in conjunction with the Firewise 50 Challenge communities to perform hazard reduction projects immediately adjacent to homes, as outlined in the community's Firewise action plan. Created in 2010 in cooperation with the US Forest Service, the Veterans Fire Corps trains and engages teams of military veterans in wildland fire mitigation. This project is estimated to reduce hazards to approximately 1,500 homes by performing tree thinning, pruning and brush disposal.

Private Lands Forest Health and Fire Hazard Reduction: (\$7,500,000) Of the estimated 3 million acres in eastern Washington that need forest restoration treatments, 31 percent are on private land. DNR will provide 50/50 matching grant funds to small, nonindustrial private forest landowners in areas of high forest health and wildfire hazard to perform tree thinning. These projects will focus in the 2012 Forest Health Hazard Warning Areas, as well as areas identified in local Community Wildfire Protection Plans and forestland adjacent to Firewise communities. Creating and increasing interconnections between previously accomplished hazard reduction work on adjacent private, state and federal land will also be prioritized. A total of 11,500 acres will receive hazard reduction treatments.

Cross-Boundary Forest Health Restoration: (\$2,300,000) The pattern of land ownership across eastern Washington is complex, and forest health and wildfire disasters that originate on one ownership readily cross over to affect adjacent owners. Of the 3 million acres in eastern Washington estimated to need forest restoration treatments, 43 percent are on US Forest Service-managed land. In the last five years, US Forest Service land has accounted for between 70 and 84% of the acres affected by pine bark beetles, the state's leading tree-killing insect. Forest health treatments are needed across the landscape and federal neighbors need state support to increase the pace of restoration actions. This project will directly fund hazard reduction contracts on approximately 5,000 acres of high-risk areas where environmental planning is already complete and work can begin immediately.

In addition, DNR will contract with local forest collaborative groups to perform restoration priority assessments in at least two large watersheds (approximately 50,000 acres in size). These assessments, in turn, form the basis for prioritized action on federal, state and private land within the watershed. Identified actions can be implemented quickly on non-federal land, but federal decisions will require additional planning. Building on the landscape assessments, DNR will additionally contract for

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Description

critical planning tasks such as environmental surveys, data collection, and analysis on US Forest Service components of the landscape to accelerate the decision-making process. An analysis of two 50,000-acre watersheds can be expected to result in approximately 30,000 acres of federal land treatment.

Reforestation in Wildfire-Damaged Areas: (\$2,000,000) Of the thousands of acres of forestland burned in 2014 and other recent wildfires, a few landowners will be able to recover some valuable timber through salvage harvest and replant the area pursuant to state regulations. Most, however, will not have sufficient value in their trees to perform salvage operations that would offset the cost of replanting, and will therefore be unable to reforest unless they can afford to pay out-of-pocket for the service. Through this project, DNR will provide 50/50 matching grant funds to forest landowners who are not performing timber salvage to fund replanting of appropriate tree species following wildfire damage on approximately 8,000 acres.

How will clients be affected and services change if this project is funded?

There is 3.0 million acres of eastern Washington forests that need active management to restore resilient forest structures. From 2009 to 2014, the US Forest Service, DNR, WDFW, private forest industry, small forest landowners, the Yakama Nation and the Colville Confederated Tribes have been treating approximately 141,000 acres per year with commercial timber harvests and non-commercial treatments. Using resources provided by the legislature in the 2012 session, DNR has provided enhanced service to clients in the Forest Health Hazard Warning Areas to evaluate risks, prioritize actions, and fund tree thinning projects. The Warning designation raised awareness of forest health issues, and focused state and federal resources in specific areas to address emerging issues. Landowners, local governments, federal agencies and tribes were supportive of this action and are participating actively in implementation. Large wildfires increase awareness of forest health conditions and the urgent need to conduct restoration treatments. With over 380,000 acres and over 300 homes burned in 2014, there is a high demand and urgency to continue to increase treatments and capacity. This project will more than double the current level of state funded hazard reduction treatments on private and State Trust forest lands.

How will other state programs or other units of government be affected if this project is funded?

The proposed forestry treatments are all conducted under standard Forest Practices regulations and practices. An increased workload of Forest Practices applications is anticipated, but is manageable within current resources. As a product of ongoing outreach and assistance with landowners, additional participation in other federal grant-funded hazard reduction activities administered by DNR and additional independent actions by landowners are anticipated to occur. These outcomes are consistent with Community Wildfire Protection Plan priorities developed at the county and community levels. DNR will continue to coordinate and encourage actions on neighboring federal lands, which comprise the majority of forestland in eastern Washington and account for most of the forest damage.

What is the impact on the state operating budget?

There is no direct impact on the state's operating budget, but improved forest health conditions would mitigate future fire suppression costs.

Why is this the best option or alternative?

Small up-front investments in preventive actions save millions in lost asset value and revenue generating potential for trust beneficiaries, save millions in wildfire suppression costs from the state general fund, protect citizens' homes and infrastructure, and generate immediate-term economic benefits. Recent studies indicate that \$1 invested in restoration can yield \$1.60 in wildfire suppression cost reductions, and that \$1 invested in restoration also generates \$6 in overall economic benefit. The Forest Health Hazard Warning designation has succeeded in focusing attention, resources and action on improving forest resiliency to insects and wildfires. Focusing further landscape restoration efforts around the Warnings, the restoration needs analysis and community protection objectives will protect state trust lands' revenue-generating ability, protect public safety, deliver significant avoided costs, direct economic benefits, and sustain environmental service values. Continued implementation work will demonstrate this authority as an effective means to leverage actions across focused areas that make a bigger difference for the landscape than scattershot actions by individuals.

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Cost figures are based on similar current forest health treatment efforts and assume that an equal or greater amount will be paid by private landowners. Projects on private land cost more per acre than state land because of smaller acreage sites involved and more work required to administer and facilitate the treatment activities with many small individual landowners. Generally the nature of the thinning that is accomplished is non-commercial, and therefore no offsetting revenue is generated to reduce the cost. Landowners are encouraged to conduct any commercial harvest operations in advance, and public funds are utilized to thin small trees afterward.

What is the agency's funding strategy for this project?

Proposed funding is the State Building Construction Account. There is no match required; however, there is potential that this capital project could be used as matching funds for future federal grants. Landowners commit to 50/50 share of treatment costs.

Location

City: Statewide

County: Statewide

Legislative District: 098

Project Type

Project Management

Growth Management impacts

This project is compliant with the Growth Management Act.

New Facility: No

Funding

Acct Code	Account Title	Estimated Total	Expenditures		2015-17 Fiscal Period	
			Prior Biennium	Current Biennium	Reapprops	New Approps
057-1	State Bldg Constr-State	104,000,000		4,000,000		20,000,000
	Total	104,000,000	0	4,000,000	0	20,000,000

Future Fiscal Periods

Acct Code	Account Title	Future Fiscal Periods			
		2017-19	2019-21	2021-23	2023-25
057-1	State Bldg Constr-State	20,000,000	20,000,000	20,000,000	20,000,000
	Total	20,000,000	20,000,000	20,000,000	20,000,000

Operating Impacts

No Operating Impact

Acknowledgements

The Washington State Department of Natural Resources would like to acknowledge and thank the following individuals and organizations who contributed to the review and development of this report:

Ryan Haugo, The Nature Conservancy

Reese Lolley, The Nature Conservancy

Tracy Beck, US Forest Service

Debbie Hollen, US Forest Service

William Aney, US Forest Service

Francis Vella, US Forest Service

Maia Enzer, US Forest Service

Luke Rogers, University of Washington

Jeffrey Connick, University of Washington

Dave Werntz, Conservation Northwest

Steve Andringa, Yakama Nation Tribal Forestry

Everett Isaac, Yakama Nation Tribal Forestry

Gloria Flora, Sustainable Obtainable Solutions

Patrick Shannon, Sustainable Northwest

Annie Schmidt, Chumstick Wildfire Stewardship Coalition

Jay McLaughlin, Mount Adams Resource Stewards

Melody Kreimes, Upper Columbia Salmon Recovery Board

Isaiah Hirschfield, Northwest Interagency Coordination Center

Richard Tveten, Washington State Department of Fish and Wildlife

Aaron Everett, Washington State Department of Natural Resources

Josh Halofsky, Washington State Department of Natural Resources

Lauren Burnes, Washington State Department of Natural Resources

Chuck Hersey, Washington State Department of Natural Resources

Aleksandar Dozic, Washington State Department of Natural Resources

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Glenn Kohler, Washington State Department of Natural Resources

Liz Smith, Washington State Department of Natural Resources

Kim Buechel, Washington State Department of Natural Resources

Megan Fitzgerald-McGowan, Washington State Department of Natural Resources

Jim Cahill, Washington State Office of Financial Management