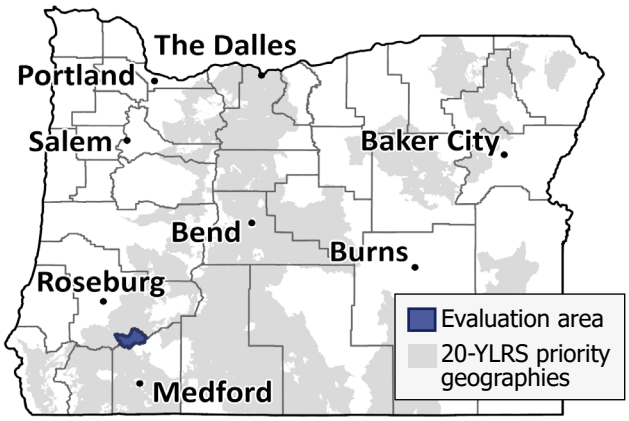
ELK CREEK AND UPPER COW CREEK
LANDSCAPE EVALUATION SUMMARY (2026)

The Oregon Department of Forestry's 20-Year Landscape Resilience Strategy (20-YLRS)[1] identified the Elk Creek and Upper Cow Creek watersheds as high priority for resilience-based management needs. The 20-YLRS aims to 1) reduce wildfire risk to communities, 2) adapt ecological systems to persist in a changing climate, 3) create functional aquatic and terrestrial ecosystems, and 4) support vibrant local economies. Organized around these four elements, this document presents current conditions, identifies restoration needs, and establishes treatment goals for the Elk Creek and Upper Cow Creek watersheds (hereafter "evaluation area").[2]

Evaluation area overview



Total acres	Forested acres	Treatment need (acres)
101,882	98,601	42,726

Figure 1. Evaluation area with 20-YLRS priority geographies. Watersheds (USGS, 2023); Counties (BLM, 2023); 20-YLRS Priority geographies (INR, 2023)

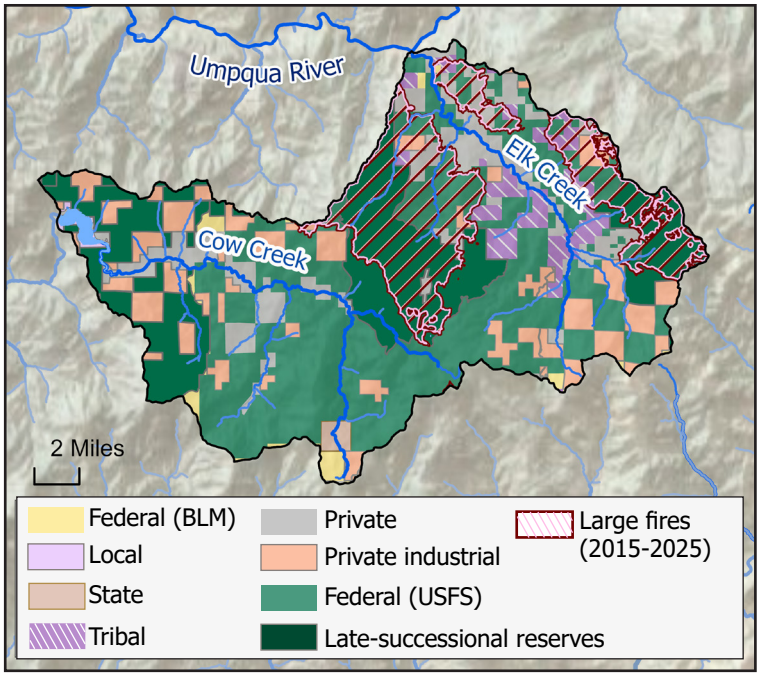


Figure 2. Geographic context. Land ownership (ODF, 2025); Hydrography (USGS, 2023); Highway network (ODOT, 2025); Cities (ODOT, 2024); Large fires (ISU, 2026)

The Elk Creek and Upper Cow Creek watersheds are in the Southern Oregon Coastal Basin, which contains the Umpqua River drainage (Figure 1). The evaluation area begins in the foothills of the western Cascade Range, near where the Cascades and Coast Range converge. Within the evaluation area, Elk Creek runs for 15 miles before it flows into the South Umpqua River. The mainstem of Cow Creek runs for 14 miles from the confluence of the East and South Forks of Cow Creek to the Galesville Reservoir. Elevations range from 986 to 5,094 feet. Annual precipitation ranges from 37 inches at low elevations to 64 inches at high elevations.

Land cover in the evaluation area is 76% forest, 14% shrub/scrub, 5% herbaceous, 3% developed, and 1% agriculture.[3]

Approximately 58,000 acres, including most of the Elk Creek watershed and half of the Upper Cow Creek watershed, are managed by the Umpqua National Forest (Table 1). Almost a third of Umpqua National Forest lands within the evaluation area are designated as late-successional reserves by the Northwest Forest Plan (Figure 2).

Table 1. Percent land ownership in forested areas (ODF, 2025; Laughlin et al., 2025)

Owner	Percent
U.S. Forest Service	59
Bureau of Land Management	10
Other federal	0
State	1
Local	0
Tribal	5
Private industrial	14
Private non-industrial	11

[1] *More about Oregon's 20-YLRS at: https://www.oregon.gov/odf/documents/aboutodf/20-year-landscape-resiliency-strategy-booklet.pdf*
[2] *This document is part of a series of landscape evaluations. Other evaluations can be found at: https://hdl.handle.net/1794/33453*
[3] *Herbaceous and shrub/scrub land cover classes may include recently disturbed or regenerating forests.*

1 Reduce wildfire risk to communities

Average flame length shows the average expected flame length at a location based on simulated fires across many modeled fire scenarios. Higher values indicate areas where fires are expected to (on average) burn with greater intensity (Figure 3).

The Upper Cow Creek watershed has average flame lengths that are predominantly greater than 8 feet, and in many places greater than 12 feet, with scattered pockets of lower flame lengths. In the Elk Creek watershed, the area within the burn footprint of the 2015 Stouts Creek Fire (south of the confluence of Elk Creek and the South Umpqua River) has lower average expected flame lengths (0-4 feet), as do some areas burned by the Miles Fire in 2018, but the rest of the watershed has average flame lengths of greater than 8 feet. Fuels reduction treatments should focus on reducing wildfire risk to nearby communities by reducing forest density, removing ladder fuels, shifting species composition to fire and drought tolerant species, and reducing surface fuel loading. Table 2 summarizes fire history in the evaluation area.

2 Adapt ecological systems to persist in a changing climate

Drought stress and wildfire have increased within the evaluation area over the past several decades. Dry forest types are significantly departed from historical conditions, with increased forest density along with increased fuel loading and continuity. Warming exacerbates forest density by reducing water availability and increasing susceptibility to disturbances like wildfire, insects, and disease.

Estimates of climate water deficit (CWD), a measure of long-term moisture stress, show the Elk Creek and Upper Cow Creek watersheds have dried considerably over the last half-century (Figure 4). The 90th percentile CWD for dry forests was 181 mm in the late 20th century, meaning that 10% of the evaluation area's dry forests experienced water deficits greater than 181 mm. By the early 21st century, 55% of dry forests had water deficits greater than 181 mm. Trends in declining water availability to trees are likely to continue. Increasing moisture stress could lead to increased mortality, regeneration failures after disturbance, and composition shifts in low-elevation dry forest areas and loss of forest cover. The primary strategies for adapting forests in the evaluation area to future change are reducing competition for resources, shifting composition to more fire- and drought-tolerant species, and reducing surface fuel loading and continuity of fuels at both stand and landscape scales.

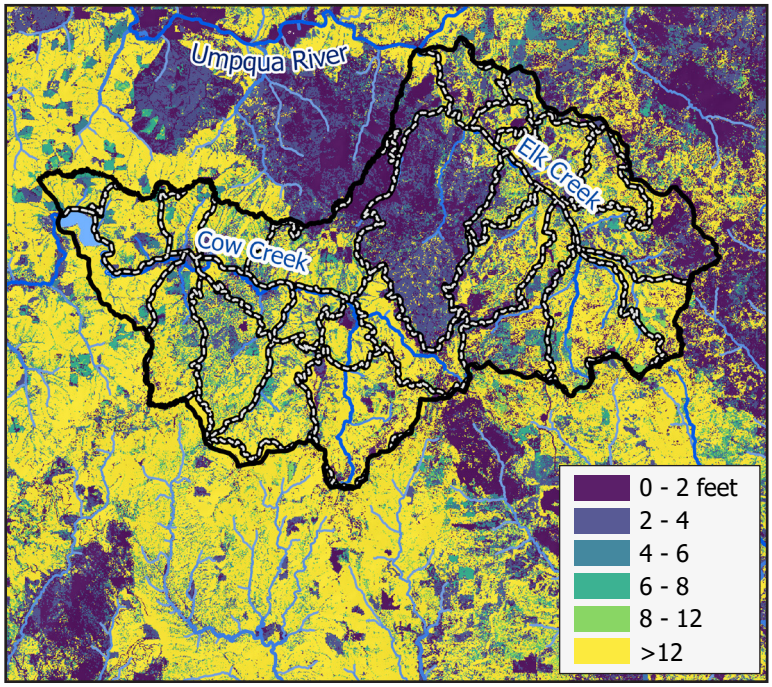


Figure 3. Average flame length (McEvoy et al., 2023), Potential operational delineations (PODs) shown as dotted black and white lines (USFS, 2021)

Table 2. Fire perimeters summarized from the Historic Fires Database (ISU, 2026) and fire points from Wildland Fire Incident Locations (NIFC, 2026)

Fire history	2000-2010	2011-2019	2020-2025
Acres within burn perimeters	318	16,789	6,545
Wildfire ignitions (natural)	20	18	38
Wildfire ignitions (human-caused or unknown cause)	12	5	9

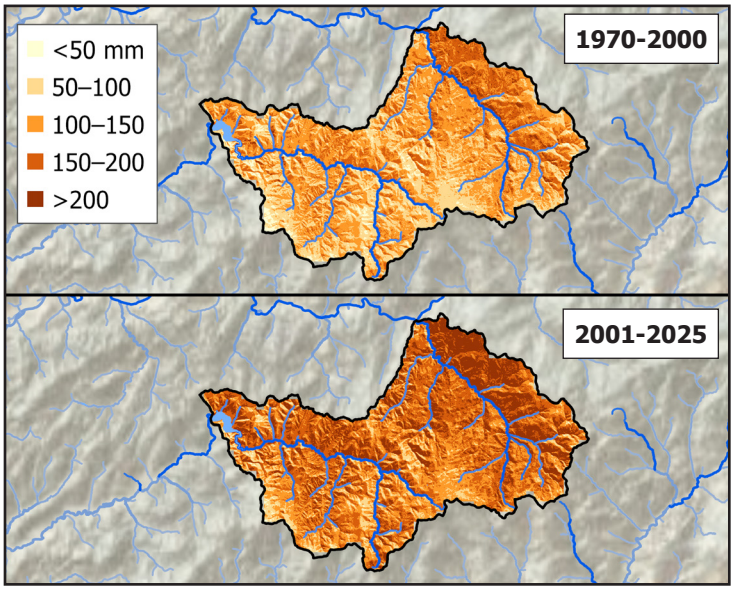


Figure 4. Climate water deficit 1970-2000 shown above and 2001-2025 shown below (University of Oregon, 2026)

3 Create functional aquatic and terrestrial ecosystems

Fuel treatments that aim to return forests to their natural range of variation can improve fish and wildlife habitat by reducing the threat of catastrophic wildfires, which have widespread and long-lasting impacts on terrestrial and aquatic species. Restoration treatments can also create more open canopy, structurally diverse conditions that support a wider array of wildlife than the overly dense, structurally uniform, closed-canopy forests produced by decades of fire suppression. Reducing stand density can also decrease competition and stress on trees, which makes them less vulnerable to insects and disease. By restoring more natural forest conditions, these treatments can create ecosystems that are more diverse and resilient and are better able to support fish and wildlife populations.

Insect and disease risk

Projected warmer average temperatures and lower or inconsistent precipitation are primary direct stressors to trees and invite opportunistic beetle pests. Site factors such as steep slopes, south-facing aspects, and rocky or poor soils can exacerbate these hot drought impacts. Mitigation and/or prevention of drought and opportunistic beetle activity includes strategies such as density reduction or shifts toward more drought-tolerant seedlots or tree species. Additionally, timely slash management is necessary for prevention of beetle outbreaks in pine species. The primary diseases in this area include root diseases such as laminated root rot and *Armillaria* in Douglas-fir and true fir. *Armillaria* is particularly impactful to stressed trees. General management for root diseases includes switching to non-host species or creating buffer cuts around heavily infested areas to prevent spread (Figure 5).

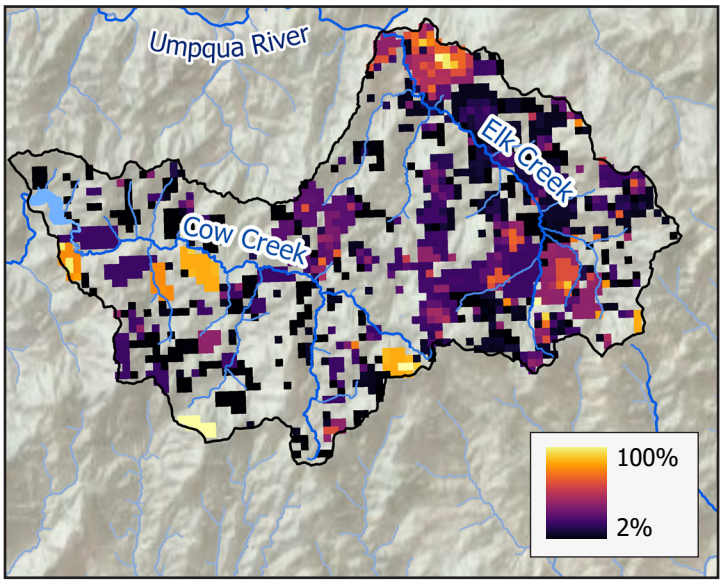


Figure 5. Percent impacted by insect and disease (2015-2025) (ODF, 2026)

Wildlife habitat

Mapped critical habitat for threatened and endangered species in the evaluation area includes 53,893 acres of U.S. Fish and Wildlife Service northern spotted owl (*Strix occidentalis caurina*) critical habitat (Figure 6). However, over 11,100 acres of critical habitat were burned by the 2015 Stouts Creek Fire, 2,800 acres were burned by the Miles Fire in 2018, and about 1,000 acres were burned by the 2024 Devils Knob Fire. Spotted owl habitat in those areas was likely significantly impacted. Around 19,000 acres of spotted owl critical habitat are in late-successional reserves designated by the Northwest Forest Plan. There is a total of 24 miles of National Oceanic and Atmospheric Administration Fisheries coho salmon (*Oncorhynchus kisutch*) critical habitat on Elk Creek and several of its tributaries. The evaluation area also contains a total of 188 miles of core cold water habitat as designated by the Oregon Department of Environmental Quality.

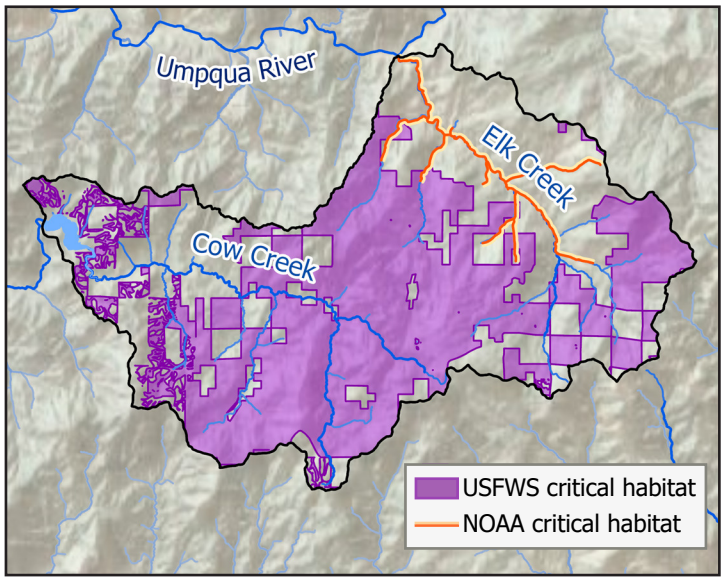


Figure 6. Critical habitat for threatened and endangered species (USFWS, 2026; NOAA, 2025)

Forest types and ecological departure analysis

Table 3 shows acres identified by the Region 6 Ecological Departure Analysis (Laughlin et al., 2025) as needing disturbance, such as fire or thinning, to address departures in forest type and seral class conditions from their historical range of variation (HRV). Current forest type and seral class distributions are shown in Figures 7 and 8, respectively.

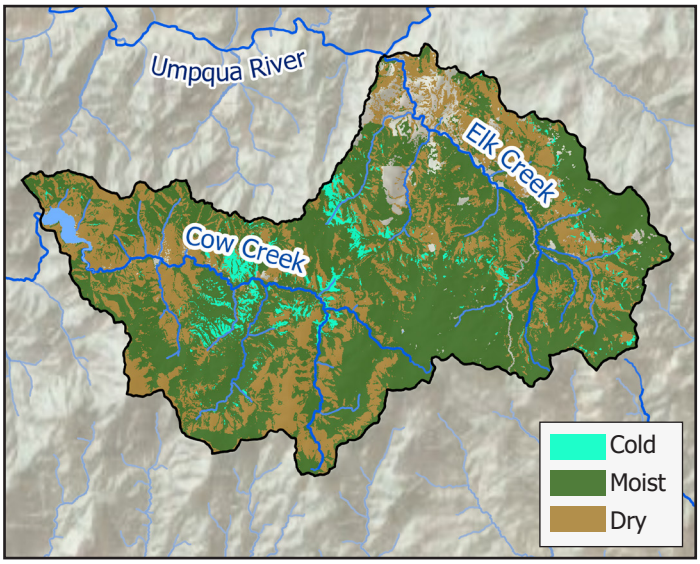


Figure 7. Forest type derived from modified Integrated Landscape Assessment Project Potential Vegetation Types (Laughlin et al., 2025)

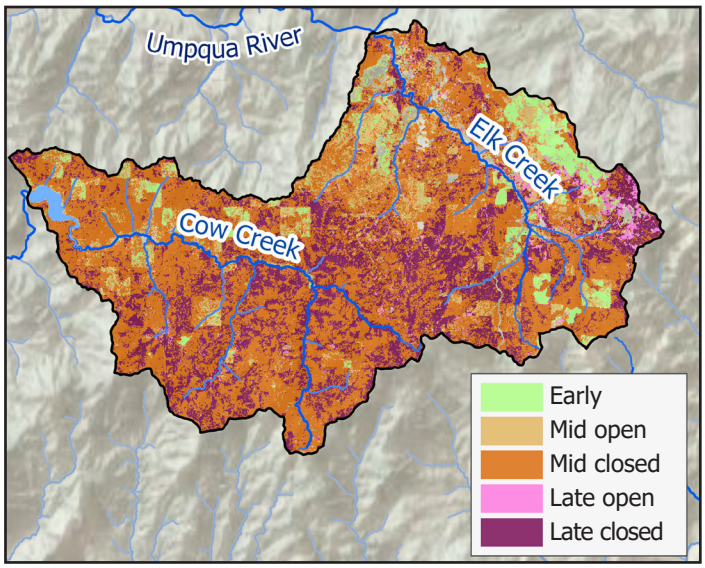


Figure 8. Seral class (Laughlin et al., 2025)

Table 3. Forest type and seral class combinations with departures from historical range of variation (HRV). See methods document for model limitations and historical departures for all forest types and seral classes in the evaluation area

Forest conditions		HRV departure	HRV departure proportional to land ownership					
Forest type	Seral class	Acres	USFS	BLM	State	Local	Tribal	Private
Moist	Mid closed	19,818	10,871	2,373	45	21	982	5,526
Dry	Mid closed	15,955	8,386	2,674	262	93	721	3,819
Moist	Late closed	5,148	4,011	640	9	4	60	424
Dry	Late closed	848	698	18	-	-	36	96
Various*	Various	**957**	663	14	-	-	35	245
Total		**42,726**	**24,629**	**5,719**	**316**	**118**	**1,834**	**10,110**

** Various includes moist mid open, cold mid closed, and cold late closed*

Forest treatment needs

The treatment narrative below summarizes our professional interpretation of the Region 6 Ecological Departure Analysis and implications for management of forest types in the evaluation area.

Moist forest

Mature and old-growth Douglas-fir stands seral to western hemlock or Pacific silver fir are not a priority for restoration treatments, with the exception of strategic shaded fuel breaks designed to protect communities and high value resources. Dense Douglas-fir tree plantations are a high priority for variable density thinning (Figure 9).

Dry forest

Dry mixed conifer forests of Douglas-fir, ponderosa pine, oak, and white fir are a high priority for variable density thinning. Thinning should be designed to reduce overall stand density, remove ladder fuels, and shift composition from Douglas-fir and white fir to ponderosa pine and oak. Reduction of surface fuel loading using post-thinning activity fuel treatments and prescribed fire is a critical component of fire risk mitigation. Restoration of oak woodlands, savannas, and meadows by removal of encroaching conifers is also a high priority.

Cold forest

True fir dominated cold forest is a minor component of the evaluation area and is not a priority for restoration treatments.

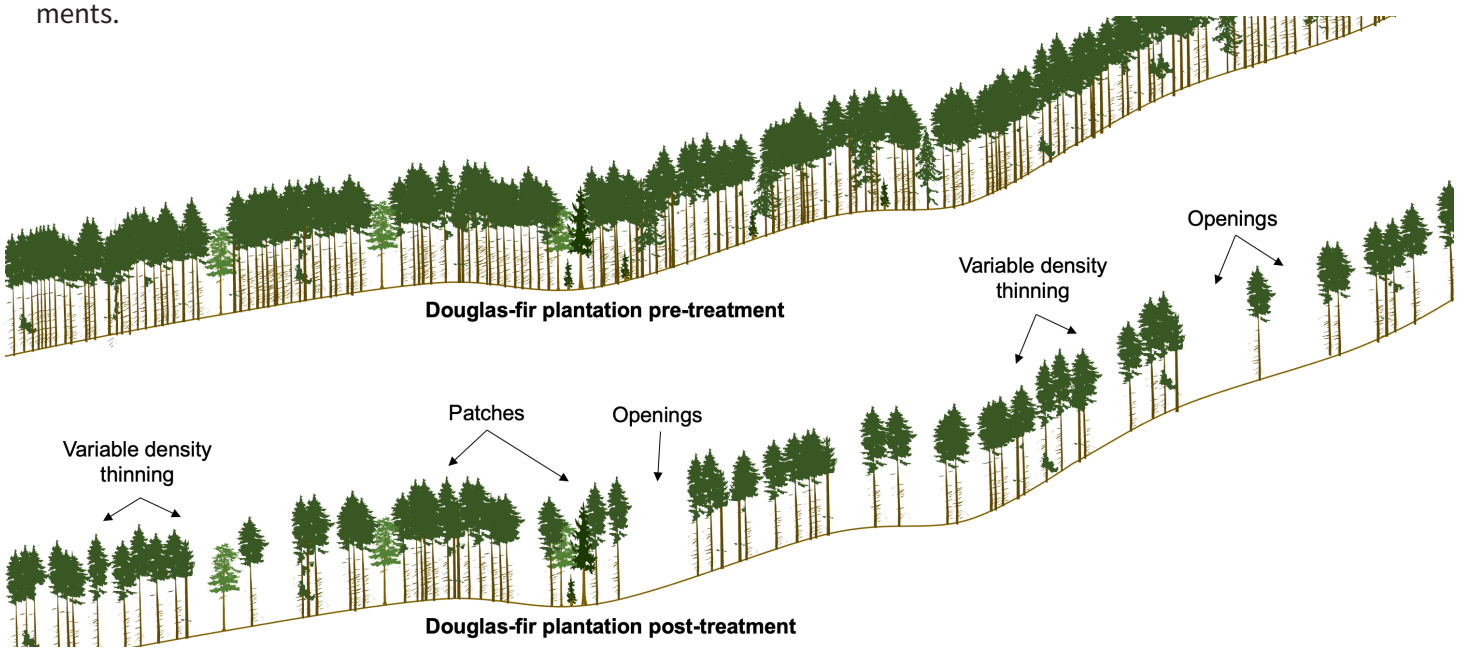


Figure 9. Model of moist Douglas-fir plantation group selection and variable density thinning

Presence of old trees

Historically, there were extensive moist forest stands dominated by centuries-old Douglas-fir. Drier forest types had extensive older pine and oak. Total abundance of old trees has been significantly reduced by historical logging and recent fires (Figure 10). The most important opportunities to increase old tree cover are maintenance of existing complex moist Douglas-fir stands and thinning in dry forest stands to increase resistance of remaining older pine, oak, and Douglas-fir.

Fire return interval

Fire history research in nearby watersheds indicates that historical fire return intervals ranged from 6-17 years in the driest oak and pine woodlands to 50-150 years in moister Douglas-fir dominated forests.

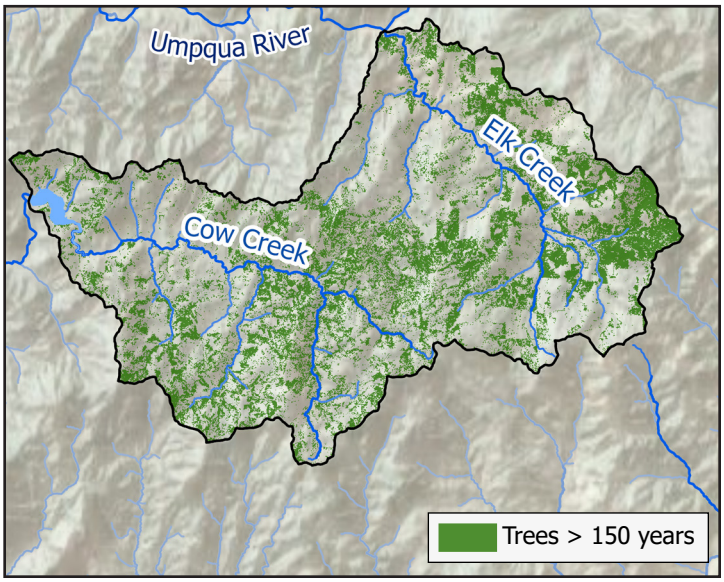


Figure 10. Old trees (LEMMA, 2021)



Precommercial thinning and prescribed burning in dry mixed conifer stands in southern Oregon. Photo: James D. Johnston

4 Support vibrant local economies

Socioeconomic context

The Elk Creek and Upper Cow Creek watersheds are located within Douglas County and border Jackson County (Table 4). The total population in these two counties in 2020 was 334,460. Thirty-one percent of residents were considered low-income, which is higher than the statewide percentage of 27%. Compared to the state of Oregon overall, the area had about the same proportion of residents under age 18 (20%) and a lower proportion of residents ages 25-44 (23%). In contrast, there was a larger share of residents ages 65 and older (25%). Workforce non-participation was 45%, which was also higher than the statewide average of 38%.

Restoration treatments in the evaluation area were slightly more costly than Oregon's 20-YLRS priority geographies, ranking in the 66th percentile for estimated restoration costs. At the 84th percentile, the evaluation area had higher revenue potential compared to other 20-YLRS priority geographies in the state. The evaluation area ranked in the 83rd percentile for local contractor capacity (Figure 11).

Table 4. Socioeconomic characteristics (U.S. Census Bureau, Decennial Census, 2020 [Table P12]; American Community Survey 5-Year Estimates, 2020-2024 [Tables B23025, C17002])

	Evaluation area counties	State of Oregon	Location quotient[i]
Total population	334,460	4,237,256	-
Low-income population	105,296 (31%)	1,140,423 (27%)	1.17
Population under 18	66,469 (20%)	866,604 (20%)	0.97
Population age 25-44	77,404 (23%)	1,159,452 (27%)	0.85
Population age 65+	81,839 (24%)	795,108 (19%)	1.30
Workforce non-participation rate[ii]	45%	38%	1.19

[i] *Location quotients above 1 mean that the value is higher for the selected counties than the state mean; LQs below 1 mean that the value is lower than the state mean.*

[ii] *Represents the percentage of the labor force-eligible population that is neither employed nor actively seeking employment. High non-participation rates may reflect factors such as retirement and discouragement from seeking work.*



Figure 11. Percentile ranking for potential revenue, cost, and contractor capacity. Percentile rankings show the evaluation area as compared to all other 20-YLRS priority geographies in the state. The 50th percentile line represents the 20-YLRS priority geographies median

Restoration cost estimates

We calculated a restoration cost index that incorporates haul distances to timber processing facilities, watershed slopes, and road density. The composite cost index is the mean of location quotients for those three variables.

Timber processing facilities

Distance to timber processing facilities is a major expense for restoration contractors. The mean drive time to timber processing facilities within the Elk Creek and Upper Cow Creek watersheds was approximately 40 minutes, which is about 11 minutes shorter than the mean across all 20-YLRS priority geographies (Figure 12). Nearby timber processing facilities include DR Johnson Lumber, Roseburg Forest Products, and Herbert Lumber Company in Riddle, as well as Swanson Group in Glendale.

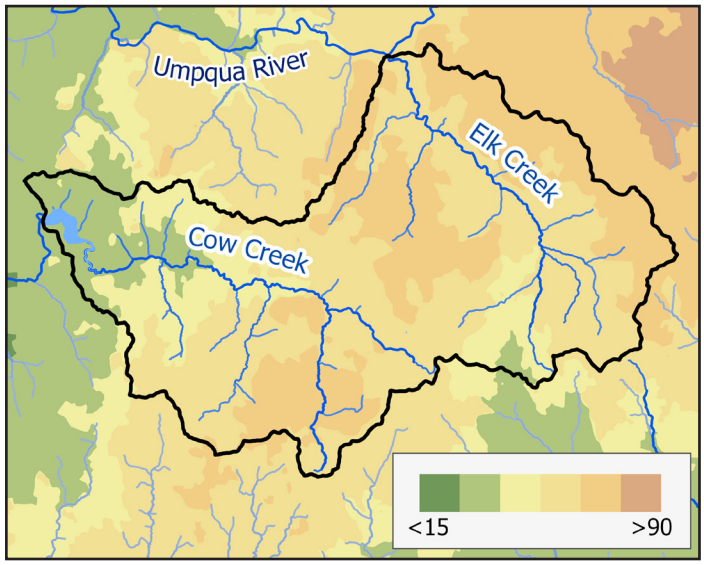


Figure 12. Drive time in minutes to nearest timber processing facility (BBER, 2026; ODF, 2025)

Slope and road density

Forest slopes and road access are important considerations for estimating costs of restoration treatments. Slopes greater than 40 percent require more costly specialized equipment. Slopes greater than 65 percent present even more challenges. Areas with lower density of roads are logistically challenging, as logs and other biomass must be transported longer distances to areas accessible by log trucks.

Seventy-three percent of slopes within the Elk Creek and Upper Cow Creek watersheds were below thresholds requiring specialized logging equipment (i.e., 40%; Figures 13 and 14). In terms of treatment costs, the proportion of steeper slopes relative to all 20-YLRS priority geographies is higher than average. Road density analysis suggests that the evaluation area is slightly above the mean for all priority geographies.

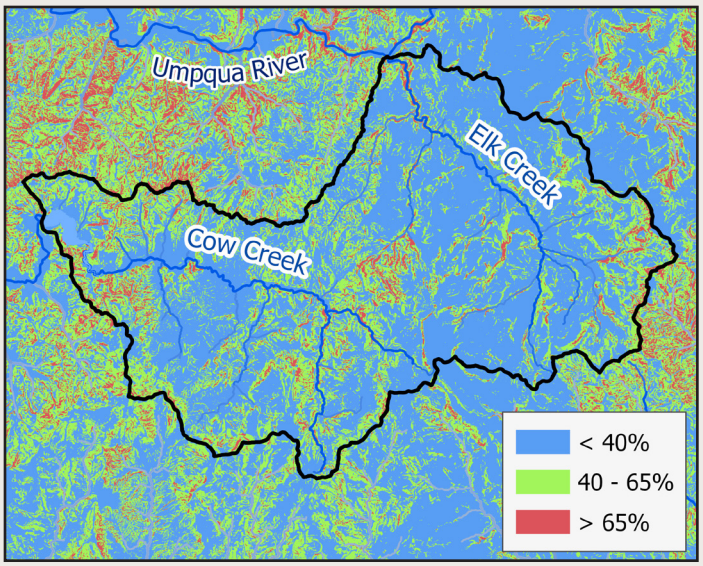


Figure 13. Percent slope for Elk Creek and Upper Cow Creek watersheds (ODF, 2023)

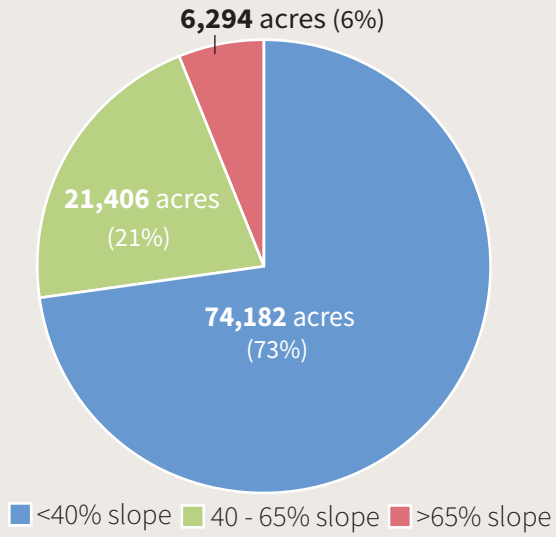


Figure 14. Total acres and proportion for percent slope classes (as shown in Figure 13)

Potential revenue estimates

Median revenue from commercial treatments during the 2017-2023 period was $2,140 per acre, ranking in the 84th percentile (Table 5). This suggests that expected revenues from commercial treatments in the evaluation area were higher relative to all Oregon 20-YLRS National Forest priority geographies, which had a median revenue of $357 per acre and median volume of 7.0 MBF per acre.

Table 5. Median per acre revenue, median per acre volume, and revenue percentile rank for Elk Creek and Upper Cow Creek watersheds commercial treatments (TIM, 2023; FACTS, 2023)

Median revenue per acre	Median volume per acre (MBF)	Revenue percentile rank
$2,140	17.8	84

Contractor capacity

A total of 141 Oregon businesses with federal intensive forestry work contracts between 2017 and 2023 were located within a 130-minute drive of the evaluation area. A 130-minute drive is the median drive time for Oregon contractors to 20-YLRS priority geographies. Considering all 20-YLRS priority geographies, contractor capacity for the evaluation area are about 71 percent higher than average, ranking in the 83rd percentile.

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METHODS | https://hdl.handle.net/1794/33482