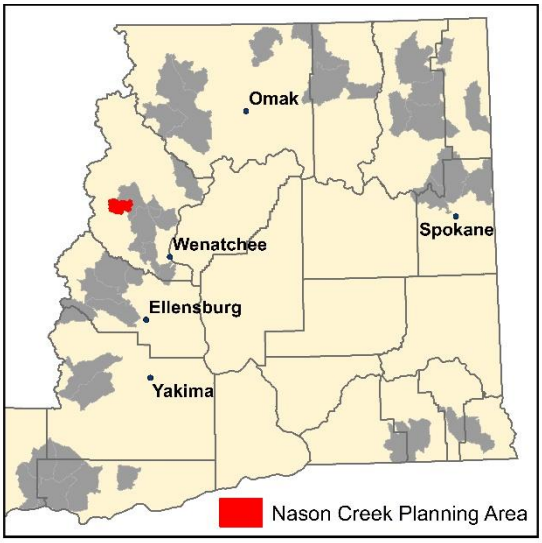
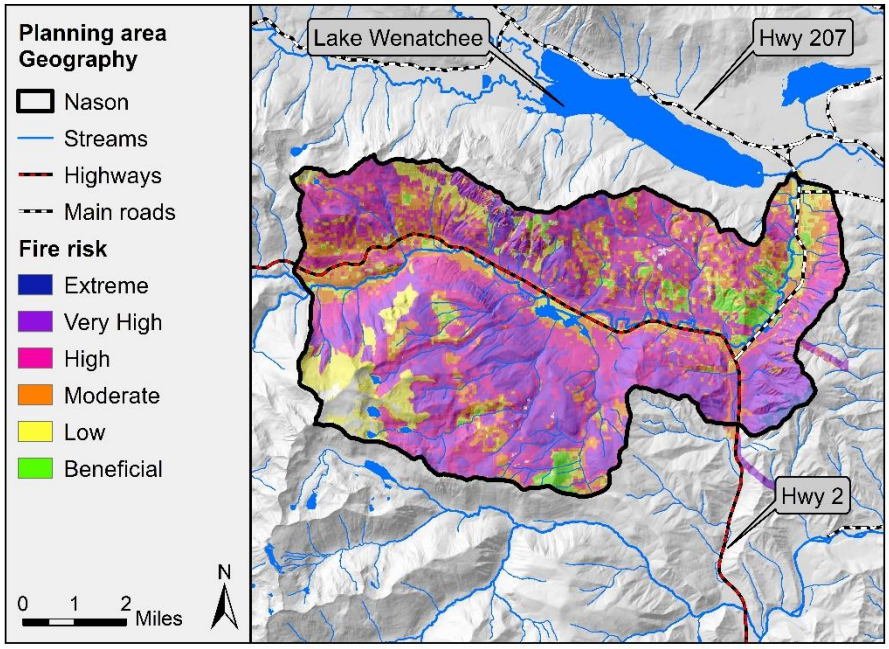
NASON CREEK PLANNING AREA
LANDSCAPE EVALUATION SUMMARY (2020)

Total Acres	Forested Acres	Treatment Goal (Acres)
31,679	29,243	6,750 - 11,500





Above: Figure 1. Planning area location.
Right: Figure 2. Planning area geography and fire risk to forests, homes, and infrastructure.

Planning Area Highlights

- This planning area is east of Steven's Pass and south and west of the DNR Upper Wenatchee 2018 planning area.
- This planning area is mostly dense, moist and cold mixed-conifer forests, with some dry forest in the eastern portion. Much of the area is highly productive and suitable for long-term timber production on all lands.
- Land ownership is 61% USFS, 16% industrial forestland, 9% Nason Community Forest, 12% small private landowners, and 2% DNR Trustlands.
- Fire risk and treatment need are high for most of the small private landowner parcels along Highways 2 and 207.
- Treating 23-39% of forested acres is recommended to increase resilience and reduce fire risk to communities using a combination of mechanical, prescribe fire, and managed wildfire treatments.
- High priority areas for potential treatments that maximize forest health and wildfire response benefit include locations north and east of Highway 2 in the eastern portion of the planning area.

LEARN MORE

This landscape evaluation was completed in 2020.
More details about DNR's priority planning areas are available at: **https://www.dnr.wa.gov/ForestHealthPlan**
Data products are available at: **https://bit.ly/ForestHealthData**

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Overarching Goals

Reduce wildfire risk and protect communities

Fire risk is high to very high in most of the planning area due to high fuel loading and moderate to high fire probability (Fig. 2). Risk is very high for the private parcels along Highways 2 and 207. In the northeastern portion, past fuels treatments on USFS land and fires and timber harvest on private land have reduced fire risk. Additional fuels treatments in this area are needed to flip the south-facing slope north of Highway 2 to mostly open forest with large trees of fire resistant species. Treatments in the south-central portion are also needed to break up the large, contiguous patches of dense forest and risk of a large crown fire. Finally, the wildland-urban interface needs extensive treatment.

Increase resilience and prepare for climate change

By mid-century, almost all the north central and eastern portions are projected to have moisture stress levels currently associated with dry forest or woodland (Fig. 3). Dense forests in these areas will be vulnerable to drought. The western half of the planning area, which is mostly moist and cold forest, is projected to maintain low to moderate moisture deficit levels and thus should support dense forest, especially on north-facing slopes. However, dense forests dominated by silver, grand, sub-alpine fir may be susceptible to drought mortality, especially at their lower elevation limits. Treatments, as well as managed wildfires in roadless and other inaccessible areas, that reduce density and favor drought-tolerant species will support forest persistence into the future.

Sustain wildlife habitat

A very small amount (~2%) of the landscape is currently habitat for large tree, open canopy species (e.g. White Headed Woodpecker), although the patch sizes are adequate. The total amount and range of patch sizes of habitat for species that depend on moist, closed canopy forest with large trees (e.g. Northern Spotted Owl) is within desired ranges. However, approximately 1/3rd of this habitat has high fire risk and drought vulnerability. In high fire risk locations, reducing tree density and canopy cover will reduce crown fire potential and drought vulnerability while helping maintain habitat in the most sustainable locations (Fig. 7). Habitat for species that depend on cold, closed canopy forest with large trees (e.g. American Marten) is within but at the lower end of desired ranges for total amount and patch size.

Enhance rural economic development

Much of this planning area is highly productive forestland and is projected to remain so into the future. Most of the higher priority areas for commercial treatments have road access and are capable of producing significant timber volume. Reducing overall fire risk will reduce potential losses to private and public forestlands and help sustain the high level of recreational use and tourism in and around the planning area.

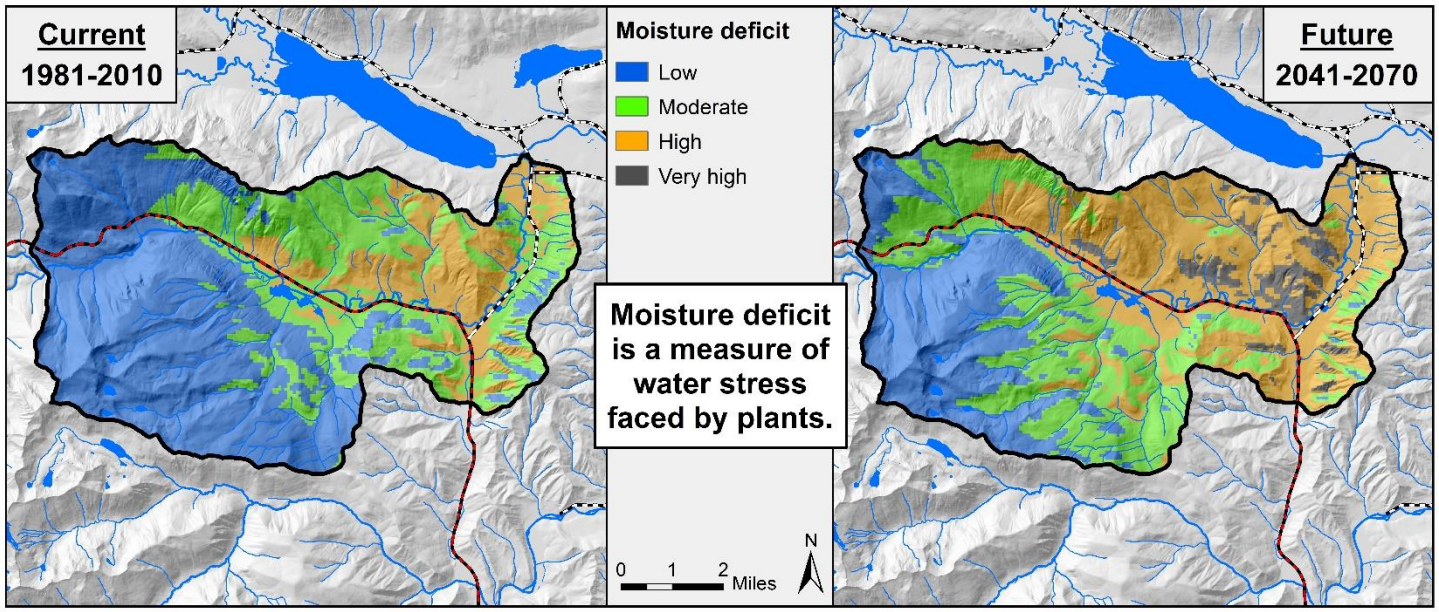


Figure 3. Current (left) and future (right) moisture stress levels based on water balance deficit. Low levels are associated with moist and cold forest types, high with dry forest types, and very high with woodland or shrub-steppe. Future climate is based on a business as usual greenhouse gas emissions scenario (RCP 8.5).

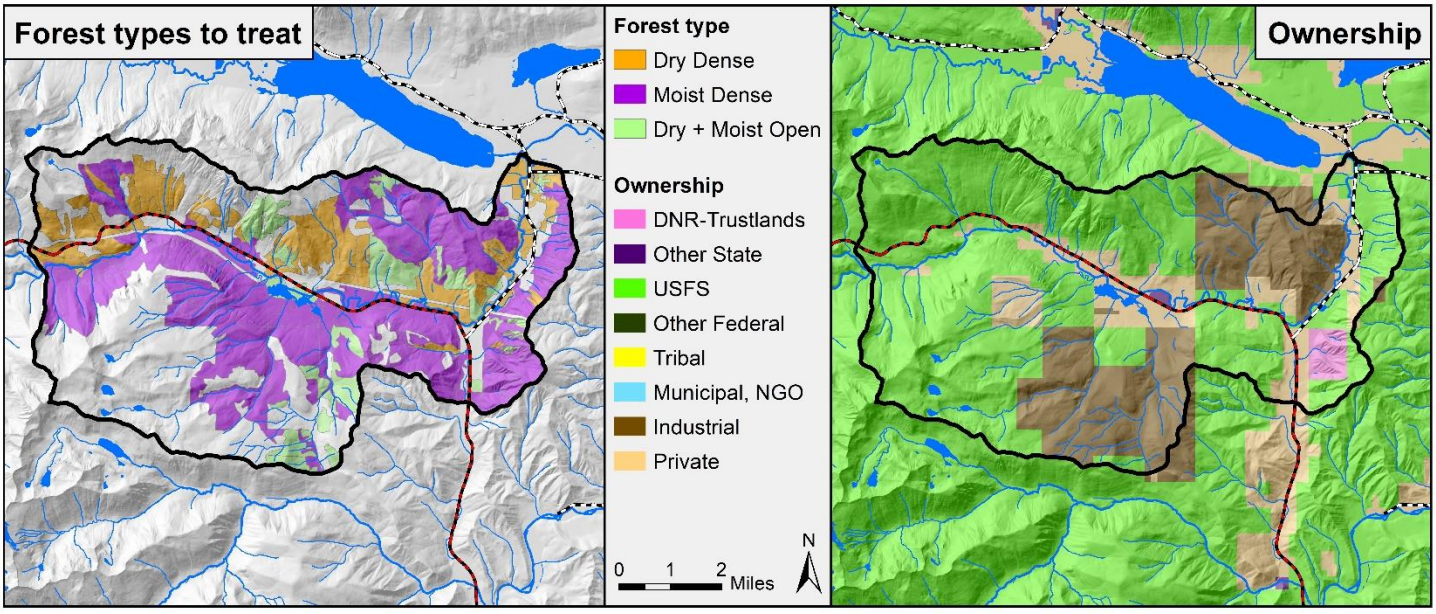
Forest Health Treatment Needs

Treating 6,750 to 11,500 acres is recommended to move the landscape into a resilient condition (23-39% of forested acres; Table 1). This total includes an estimated 5,750-10,000 acres to shift dense to open forest and 1,000-1,500 acres of maintenance treatments in existing open forest, based on current condition data from 2017 aerial photos. The majority of the treatment need and opportunity is on USFS land, although substantial need exists on other ownership types, including small private landowners and the Nason Community Forest.

Meeting this target range will require multiple treatment strategies (Table 1). Managed wildfire under safe conditions will be needed, especially in less accessible locations. Based on tree size class, many areas are commercially viable, although treatment type will depend on road access, logging systems, and other considerations. Individual landowners will conduct their own planning and decision-making processes to determine acres and types of treatments to achieve the landscape goals while meeting their own objectives and regulatory requirements.

Table 1. Summary of forest health treatment needs *(range represents low and high end of treatment need).*

Forest conditions to treat		Treatment need (acres)	Current acres by major landowner*				
Type	**Size class**		**USFS**	**Industrial**	**Community**	**Private**	**DNR**
Dry Dense	Small	250 - 500	20	159	726	114	0
	Medium-Large	3,500 - 4,000	3,419	191	175	979	177
Moist Dense	Small	500 - 1,500	239	801	795	264	0
	Medium-Large	1,500 - 4,000	4,672	524	78	671	249
Dry + Moist Open	Medium-Large	1,000 - 1,500	626	846	611	300	30
Total		**6,750 - 11,500**	**These are current acres, not targets*				
Anticipated treatment type		Noncommercial thin plus fuels treatment. May be fire only (prescribed or managed wildfire).					
		Commercial thin plus fuels treatment if access exists. May be noncommercial, fire only (prescribed or managed wildfire), or regeneration treatment.					
		Maintenance treatment: prescribed fire, managed wildfire, or mechanical fuels treatment. *Target range corresponds to 50-75% of dry open and 25-50% of moist open forests.*					



Left: Figure 4. Forest structure types that are overabundant relative to targets for a resilient landscape, as well as potential maintenance treatments. Only a portion of the areas shown need to be treated. Right: Figure 5. Current land ownership.

Dry dense forest treatment need

Currently, dense, multistory forest structure dominated by Douglas-fir is over-represented on dry sites. Large, contiguous patches of this forest type create high susceptibility to defoliating insects and crown fire. Treating 3,750-4,500 acres of this type (Table 1) is recommended to create large patches (~100-1000 acres) of open forest with large trees (Fig. 4). This will shift dry forests to open forest (Fig. 6), which is more resistant to fire and drought. Shifting composition toward ponderosa pine and reducing grand fir and Douglas-fir is also recommended.

Definitions

Vegetation Types

Cold forest: Upper elevation mixed-conifer forests with high-severity fires every 80-200+ years.

Dry forest: Ponderosa pine and Douglas-fir dominated forests that historically had surface fires every 5-25 years.

Moist forest: Forests that historically had mixed-severity fires every 30-100 years and were composed of fire-resistant (western larch, Douglas-fir) and fire-intolerant (grand fir) trees.

Woodland/Steppe: Grass and shrub lands that may have oak woodlands or up to 10% cover of conifers.

Forest structure

Large tree: Overstory diameter > 20 inches; **Medium tree:** Overstory diameter 10-20 inches; **Small tree:** Overstory diameter < 10 inches; **Dense canopy:** Greater than 40% tree canopy; **Open canopy:** Less than 40% tree canopy.

***Fuels*:** Shrubs, grasses, small trees, litter, duff, and dead wood.

Fuels Treatments: some combination of mechanical density reduction (commercial or non-commercial) and surface and ladder fuel reduction (prescribed fire, piling & burning, etc.).

Managed wildfire: fire is allowed to burn under safe conditions to achieve management goals; can be suppressed if conditions change.

Moist and cold dense forest treatment need

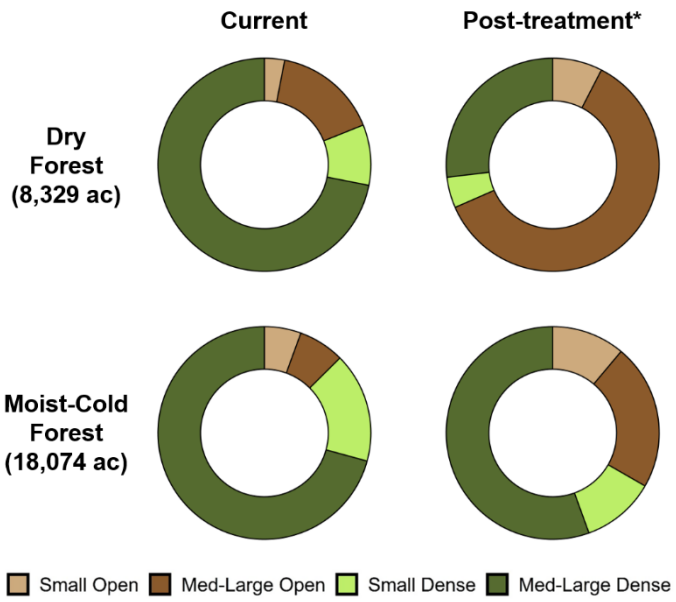
Dense, multistory forest is also over-represented in the moist forest portion of the planning area, and patch sizes are too large. Treating 2,000-5,500 acres of this forest type (Table 1, Fig. 4) is recommended to create a mosaic of open and dense forest that will reduce risks of a large crown fire and insect outbreaks. Increasing the relative composition of ponderosa pine and western larch is also needed to help these sites adapt to a warming climate. Following treatments, over 60% of the total moist and cold forest area would remain dense (Fig. 6) to meet habitat, wood production, and other objectives.

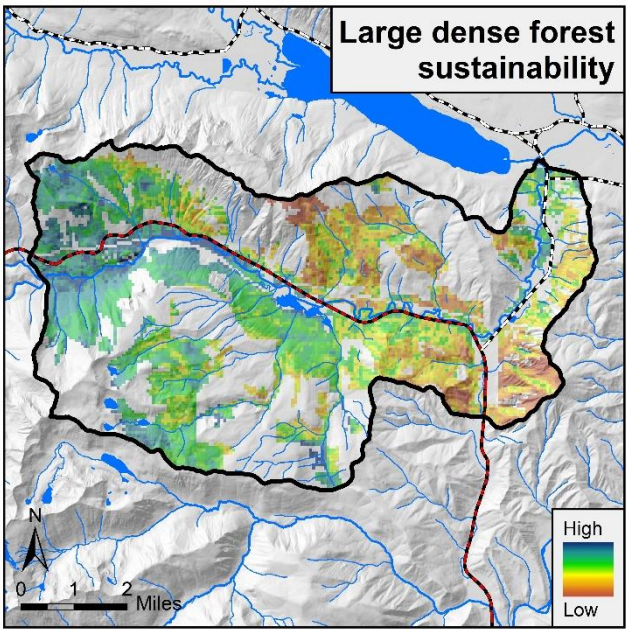
Open forest maintenance treatment need

Over the next 15 years, an estimated 1,000-1,500 acres of currently open forests on dry and moist sites will need prescribed fire, managed wildfire, or mechanical methods to maintain open conditions by reducing surface fuels and small trees. Specific maintenance strategies depend on landowner objectives and time since prior treatments.

Sustainable locations for large tree, dense forest

Locations with low to moderate current and future moisture deficits (Fig. 3) and low fire risk (Fig. 2) offer the most sustainable locations to maintain sufficient area and patch sizes of this habitat type and associated ecosystem functions. Sustainable locations include the western end of the planning area, north-facing slopes in the central portion, and the valley bottom area along Highway 207 (Fig. 7).





Left: Figure 6. Current and post-treatment proportions of forest types and structure classes. * mid-point of range in Table 1.
Right: Figure 7. Sustainability of current and potential large tree, dense forest based on fire risk and drought vulnerability.

Landscape Treatment Prioritization

Prioritizing for forest health & to reduce fire exposure of homes

Landscape treatment priority integrates three metrics of forest health – forest fire risk (Fig. 2), drought vulnerability (Fig. 3), and presence of overabundant forest structure types (Fig. 4) – with wildfire transmission to homes (Fig. 8). We also recommend incorporating the large dense forest sustainability layer (Fig. 7) as an overlay when selecting treatment locations. Wildfire transmission is high across most of the planning area, indicating that wildfires starting in these locations are expected to expose homes near Highway 2, Highway 207, and the Wenatchee River.

Treatment priorities

Landscape treatment priority is high throughout most of the planning area, with the exception of the southwestern portion (Fig. 9). North-facing slopes are particularly high priority due to fire risk and dense forest structure. Medium priority areas on roadless USFS lands in the northwestern portion indicate that managed wildfire may be appropriate under the right conditions. Some low priority areas may need treatment to address species composition, insect and disease risk, or other issues In addition, fuel reduction treatments, defensible space, and home hardening are needed to protect communities along Highways 2 and 207. High priority treatments that reduce fire risk in eastern portions of the planning area may help sustain large, dense forest habitat over time (Fig. 7).

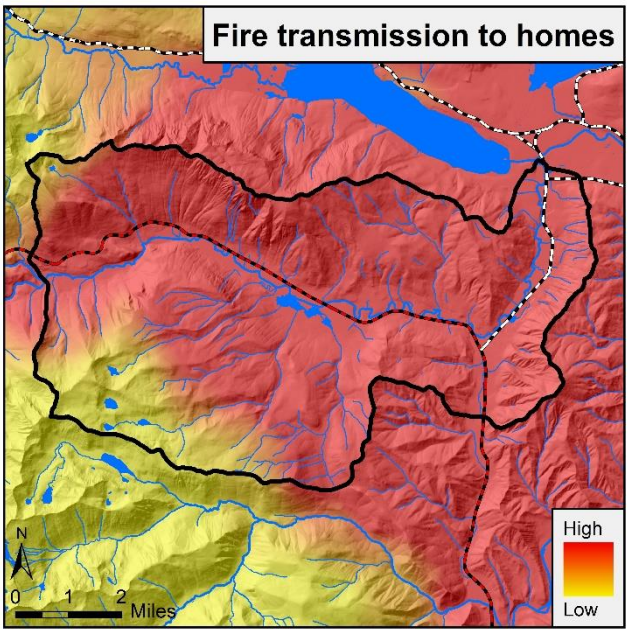


Figure 8. Fire transmission to homes shows where fires that expose structures are most likely to originate. It is based on simulated fire perimeters given contemporary patterns of fuels, topography, and wind.

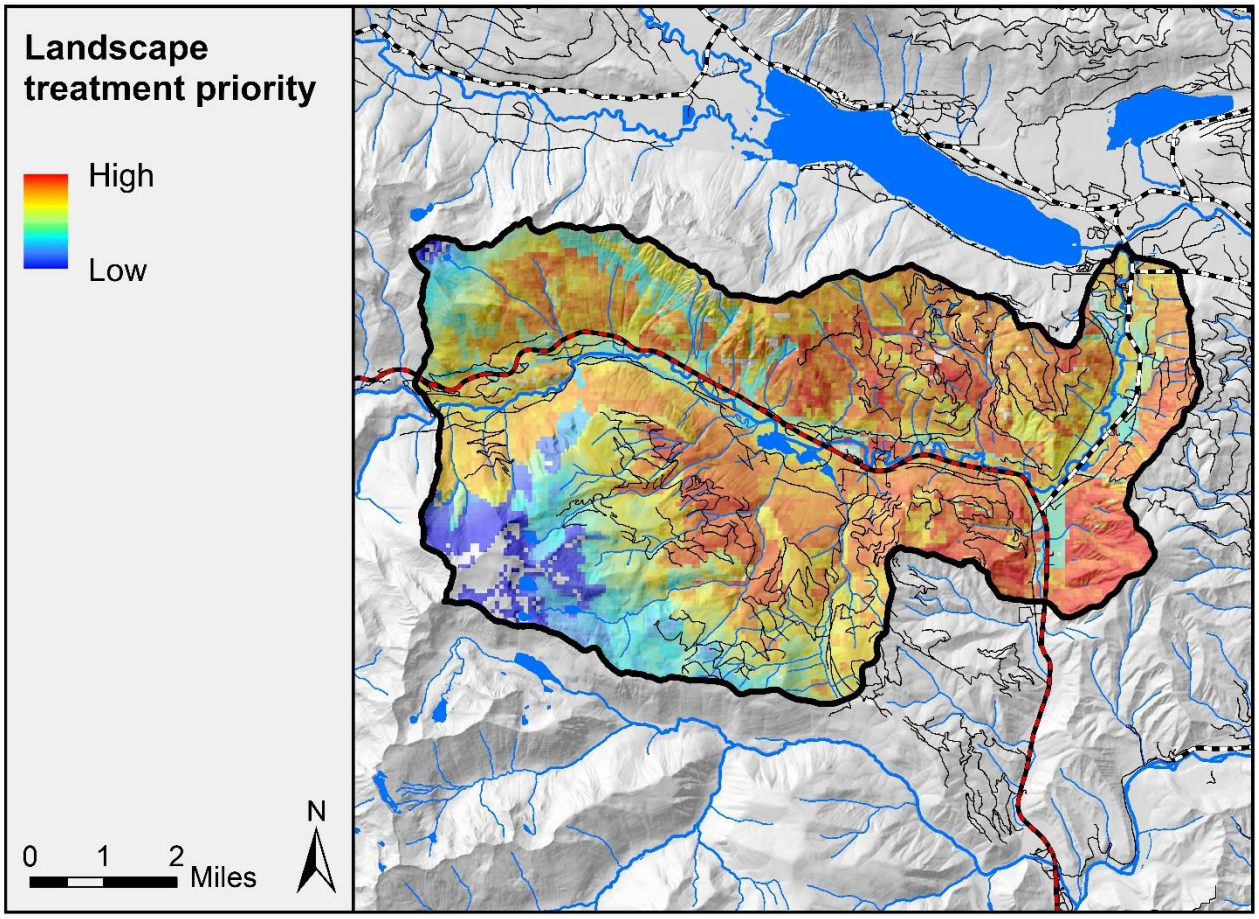


Figure 9. Landscape treatment priority is based on three metrics of forest health – forest fire risk (Fig. 1), drought vulnerability (Fig. 3), overabundant forest structure (Fig. 4) – as well as wildfire transmission to homes (Fig. 8).

Wildfire Response Benefit Prioritization

Dual benefits for forest health and wildfire response

It is necessary to conduct treatments to both improve forest health and reduce fire risk to communities as well as provide conditions where firefighters can safely and efficiently conduct fire operations (e.g. suppression, prescribed burning, and managed wildfire). The wildfire response benefit metric (WRB; Fig. 10) identifies and prioritizes locations where values at risk that are more likely to be the focus of fire operations (homes, infrastructure, sources of drinking water, and commercially managed lands) coincide with areas likely to transmit wildfire to homes and generate severe fire behavior. Because there are positive feedbacks between healthy, resilient forests and safe, effective fire operations, the WRB metric also integrates the landscape treatment priority map (Fig. 9).

Where WRB is highest, actions may be needed to create and maintain conditions that provide a tactical advantage for fire operations. These actions will vary with the local context and can include landscape-level forest health and fuel treatments, treatments along escape routes, resident and community fire mitigation activities (e.g. defensible space, home hardening), and improving signage and road conditions. The WRB metric provides a high-level prioritization, and additional work at the local level will be required to identify appropriate actions and assess their feasibility. WRB is useful for prioritizing Potential Control Lines (PCLs) for fire operations (Fig. 11). PCLs are a part of Potential Operational Delineations (PODs); see page 7.

In the Nason Creek planning area, wildfire response benefit is highest along Highways 2 and 207 (Fig. 2), which constitute the major concentrations of homes and infrastructure in this planning area. Risk to commercially managed lands is highest south and southeast of Highway 2, which also coincides with the highest transmission to homes (Fig. 8) and landscape treatment priority (Fig. 9).

Definitions (continued)

Wildfire response benefit: Any tactical advantage gained for wildfire response activities from actions on the landscape, including identifying and consolidating existing anchor points and control lines and reducing potential fire behavior. Wildfire response benefit is not restricted to any specific fire management strategy; it is centered on conditions that improve fire operations safety and efficacy during suppression, prescribed fire, or managed wildfire.

Potential Control Lines (PCLs): Boundaries of Potential Operational Delineations (PODs) relevant to fire control operations (e.g. roads, ridgetops, and water bodies).

Potential Operational Delineations (PODs) for wildland fire: Landscape containers whose boundaries are potential control lines (PCLs). PODs are useful for planning strategic response to unplanned ignitions, strategic fuel planning, and prioritizing fuel treatments within PODs.

Commercially managed lands: Commercially managed forestlands include: DNR Trustlands, tribal forests, industrial forests, non-industrial private forests, and US Forest Service forests where timber is a primary management objective.

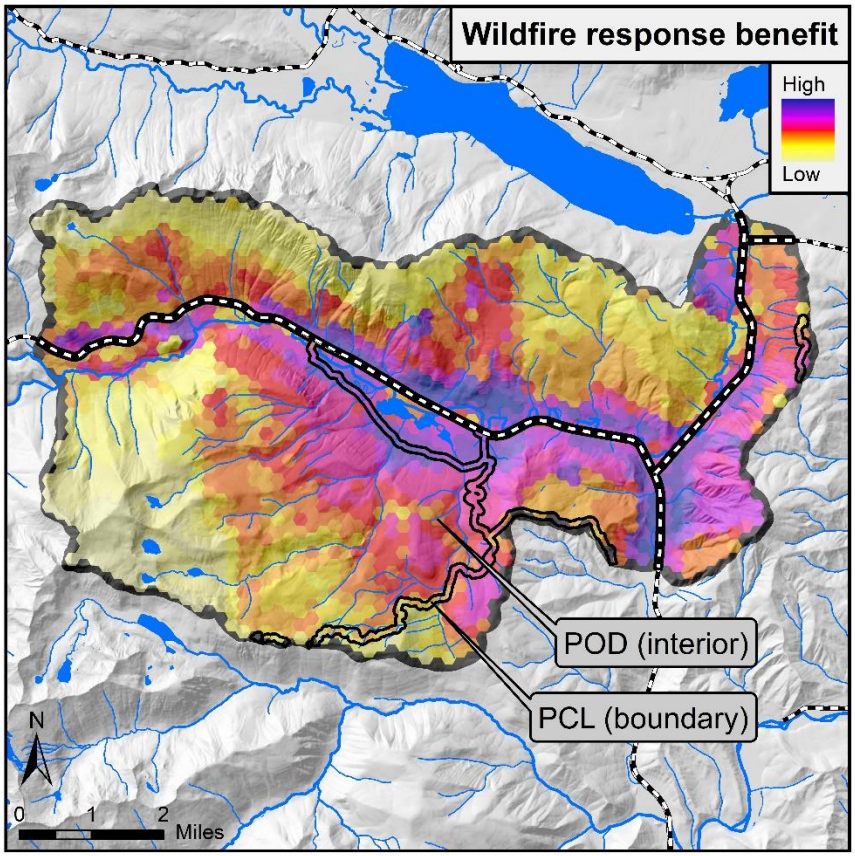


Figure 10. Wildfire response benefit (WRB) integrates multiple fire risk and forest health components. It includes four fire risk metrics representing highly valued resources – risk to homes, infrastructure, drinking water, commercially managed lands – as well as crown fire potential and wildfire transmission to homes (Fig. 8). Combined, these account for 75% of the wildfire response benefit. Landscape treatment priority (Fig. 9) accounts for the remaining 25%. Also shown are PODs: units bounded by PCLs (open black lines). One use of the WRB metric is to prioritize Potential Control Lines (PCLs) for fire operations (Fig. 11).

Prioritizing Landscape Treatments for Dual Benefits

Integration of forest health and wildfire response benefit using PODs

Potential Operational Delineations (PODs) provide a powerful spatial framework to communicate and identify locations that will deliver dual benefits for forest health and wildfire response at the landscape scale. PODs are large landscape areas delimited by Potential Control Lines (PCLs) for fire operations (suppression, prescribed fire, and managed wildfire) delineated by fire operations personnel. PCLs can be roads, ridgelines, or any artificial or natural fuelbreak that provides a strategic opportunity for fire operations. Summarizing landscape treatment priorities (Fig. 9) within PODs and wildfire response benefit priorities (Fig. 10) within PCLs enables planners and managers to identify, at a high level, locations where forest health or fuels treatments can be connected to a high-priority PCL that will support firefighter operations (e.g. ingress/egress route or opportunity for engagement).

Achieving forest health and wildfire response goals will require primarily large, landscape-level treatments across PODs (~100's-1,000's of acres) and, to a lesser extent, targeted treatments along PCLs.

There is important work to do in all Nason Creek PODs to achieve the forest health treatment targets in Table 1. Multiple opportunities for treatments that provide dual benefit occur in the first priority PODs north of Highways 2 and 207. First priority PCLs correspond to Highway 2 running E-W and include a forest road connecting the highway to McCue Ridge to the south. Further work is needed to assess PCLs locally for their condition and detailed treatment needs, which will depend on management goals and values at risk. Ideally, landscape treatments will be implemented adjacent to priority PCLs where feasible to maximize both forest health and wildfire response goals.

Achieving forest health and wildfire response dual benefits will require primarily large, landscape-level treatments across PODs (~100's-1,000's of acres) and, to a lesser extent, targeted treatments along PCLs. These two approaches combined will contribute to restoring and maintaining large portions of the landscape in a resilient condition while providing safe and effective areas for firefighter engagement during suppression, prescribed fire, or managed wildfire operations.

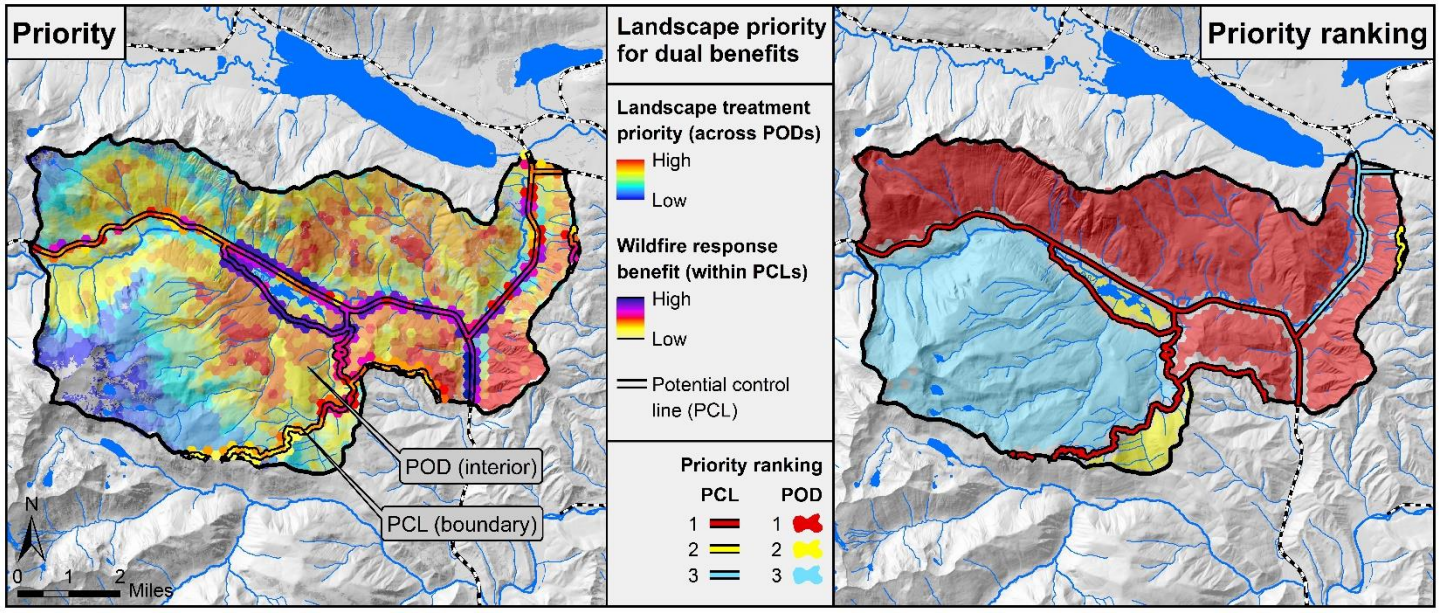


Figure 11. Landscape prioritization of dual benefits using PODs as a spatial framework to summarize treatment priorities. Both maps display landscape treatment priority within PODs and wildfire response benefit within PCLs. The map on the left shows the datasets at the raster level, while the map on the right shows the same information summarized and ranked within PODs and PCLs. PCL width is inflated to display spatial patterns. *PODs shown here are part of an ongoing process towards an all-lands delineation; POD boundaries are subject to change following on-the-ground vetting and continued dialogue among wildfire agencies and stakeholders.*