CHAPTER I

Project Background, Guidance, and Purpose

INTRODUCTION

This Environmental Assessment (EA) will detail the proposed activities within the project area and summarize public scoping and involvement. It will also describe effects associated with the proposed action with indicators for impacted resource areas.

This chapter describes the proposed actions for the Dry Restoration Project along with a description of the project area and the Purpose and Need for the proposed action. An outline is included of legislative requirements and environmental documents. This environmental analysis finds its basis in the Wenatchee National Forest Land and Resource Management Plan (USDA Forest Service, Wenatchee National Forest, 1990) and its amendments.

BACKGROUND

A *Restoration Project* is a suite of treatments proposed, analyzed, and implemented to meet a desired future condition. *Restoration Treatments*, or simply *treatments*, can include individual actions (proposed actions) such as timber harvest, prescribed fire, small-diameter thinning, and road repair, closure, or decommissioning.

Restoration of forest ecosystems requires a landscape perspective, which is essential for effective restoration of ecological processes and functions (USDA Forest Service, Okanogan-Wenatchee N.F., 2010). The Dry Restoration Project is the second of two projects planned within the 11,769 acre Dry Ridge Potential Landscape Treatment Area (PLTA). The analysis for the first project, Nelli Restoration, was completed in 2012 and the final decision notice was signed on June 28, 2013. Analyzing the entire PLTA allows the Forest Service to achieve the larger landscape perspective and better address cumulative effects to resources.

Dry Restoration will be tiered directly to the Nelli Restoration Project and will be incorporated by reference throughout this document. For a full copy of the Nelli Restoration EA or Decision Notice, contact the Naches Ranger Station at (509) 653-1401. Environmental consequences were analyzed at the Dry Ridge PLTA level for both projects.

Decisions from the Nelli Restoration Project within the Dry Ridge PLTA which will not be reconsidered under the Dry Restoration Project analysis include invasive species treatment, landscape-level prescribed fire underburning, travel access management, small diameter pre-commercial thinning, 1,586 acres of commercial timber harvest, aspen regeneration, and trail re-routes. New actions proposed under the Dry Restoration Project will complement the Nelli Restoration Project and enhance the restoration footprint on the landscape.

LOCATION

Figure 1.1: Dry Restoration Project; Vicinity Map

The Dry Restoration Project proposes specific treatments within the Dry Ridge PLTA. Landmarks within the project area include Nile Creek, Rattlesnake Creek, Orr Creek, Dry Creek, and the Nile Mill Site. The overall location is west of Naches, Washington in Township 16 North, Range 14 East, Sections 10 through 15, 23 through 29, and 32 through 36; Township 16 North, Range 15 East, Sections 18, 19, 30, and 31, and; Township 15 North, Range 14 East, Sections 1, 2, 3, 10, 11, and 12. The project area borders 5.5 miles of state and private land in the Nile Valley. Forest Roads providing access to the project area include 1600, 1601, 1613, 1631, and their associated collector and spur roads. The area is a favorite among horsemen, hunters, and snowmobilers.

PROJECT AREA DETERMINATION

A landscape evaluation using the Ecosystem Management Decision Support (EMDS) tool established the context of restoration project areas within the broader landscape and set priorities for where restoration should occur. Ecosystem Management Decision Support visually represented, by stand, the relative degree of departure of the vegetative condition, the susceptibility to uncharacteristic wildfire, and the ability to support selected focal wildlife species. More information on landscape level analysis and the determination of the Dry Ridge PLTA can be found in Chapter I of the Nelli EA. For the purposes of this document, the Dry Restoration Project area will be referred to as the Dry Ridge PLTA.

A desired condition was derived from EMDS outputs and higher-tiered plans, guides, and direction (see Desired Future Condition, page I-10). From these, a Purpose and Need for was described. The Purpose and Need for Action in turn led to the development of a proposed action. As further information became available through field reconnaissance, data collection, and public comment period a Refined Proposed Action was developed. The Refined Proposed Action will be discussed in detail in Chapter II.

Figure I.2: Forest Service specialists completing field reconnaissance on proposed treatment areas.

MANAGEMENT DIRECTION AND GUIDANCE

This project is tiered to the Final Environmental Impact Statement for the 1990 Wenatchee National Forest Land and Resource Management Plan, as amended by the Records of Decision for the Amendments to the Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl (Northwest Forest Plan or NWFP, 1994, 2001) and the Record of Decision for R6 Pacific Northwest Region Invasive Plant Program – Preventing and Managing Invasive Plants (USDA Forest Service, 2005). Hereafter, we refer to the combination of these plans in this document as the amended Wenatchee National Forest Plan (WFP). These documents assign the following land allocations within the Dry Ridge PLTA:

Table I.1: Northwest Forest Plan Land Allocations within the Dry Ridge PLTA.

NWFP Land Allocation	Project Area Acres (% of area)
Managed Late Successional Area	8,846 (75%)
Matrix	2,923 (25%)
State or Private	0 (0%)
Riparian Reserve	2,172 (18%)

Table I.2: Wenatchee Forest Plan Land Allocations within the Dry Ridge PLTA.

WFP Land Allocation	Project Area Acres (% of area)
Key Deer and Elk Habitat (EW1)	8,723 (74%)
General Forest (GF)	2,684 (23%)
Scenic Travelway, Partial Retention (ST2)	362 (3%)
State or Private	0 (0%)

Explanation of different land allocations and management policies will be discussed further in detail below.

Northwest Forest Plan Management Direction by Land Allocation

The Northwest Forest Plan allocation of Managed Late Successional Area (MLSA), and Riparian Reserve overlay the original Wenatchee Forest Plan direction. **Managed Late Successional Areas (MLSA)** are identified for certain owl activity centers on the eastside where regular and frequent fire is a natural part of the ecosystem. Managed Late Successional Areas are similar to Late-Successional Reserves Late-Successional Reserves (LSR) in that they are to be managed to protect and enhance conditions of late-successional and old-growth forest ecosystems, which serve as habitat for late-successional and old-growth related species including the white headed woodpecker and northern spotted owl.

Matrix consists of those federal lands outside the six categories of designated areas (Congressionally Reserved Areas, Late-Successional Reserves, Adaptive Management Areas, Managed Late-Successional Areas, Administratively Withdrawn Areas, and Riparian Reserves). Most timber harvest and other silvicultural activities would be conducted in that portion of the matrix with suitable forest lands, according to standards and guidelines.

Riparian Reserves overlay all other management allocations where streams, ponds, and wetlands are present and treatments within them are designed to meet and not retard attainment of the Aquatic Conservation Strategy (ACS) objectives. The Aquatic Conservation Strategy and the WFP soil standards and guidelines set forth objectives relative to the maintenance and restoration of sediment regimes, in-stream flows, and site productivity. Proposed activities must maintain the existing condition or lead to improved conditions in the long-term.

See Figure I.3 for visual representation of Northwest Forest Plan Land Allocations.

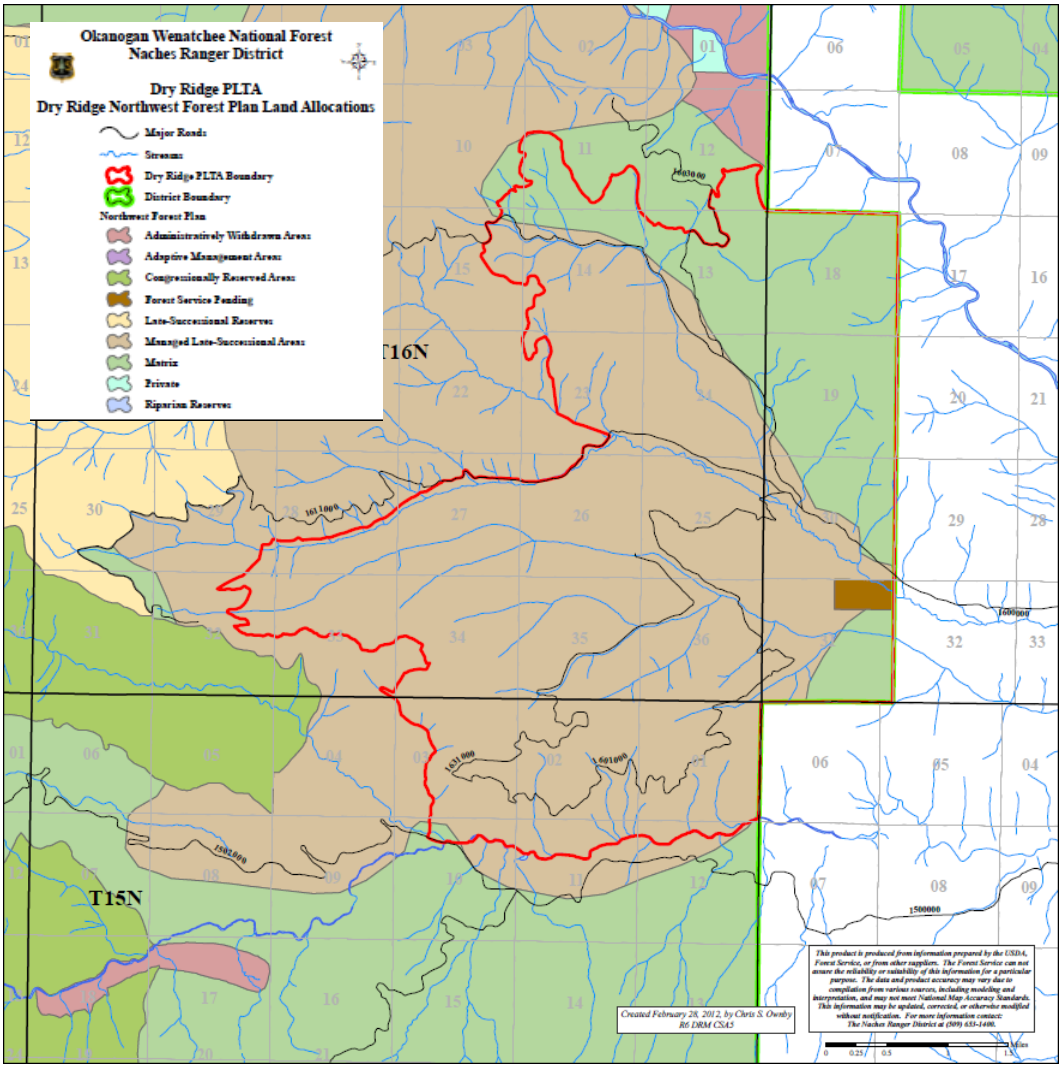


Figure I.3. Dry Ridge PLTA; Northwest Forest Plan Land Allocation.

Wenatchee Forest Plan Management Direction by Land Allocation

Key Deer and Elk Habitat (EW1) is designed to manage deer and elk winter range to meet habitat requirements for sustaining optimum carrying capacity.

General Forest (GF*)* provides for long-term growth and production of commercially valuable wood products at a high level of investment in silvicultural practices. Management will vary from intensive timber management typified by regular spacing, relatively even age and height, to those stands.

Scenic Travelway, Partial Retention (ST2) provides a near natural appearing foreground and middleground along scenic travel corridors. The proposed uses and vegetation management within the allocation will be integrated with the natural landscape so that activities are visually subordinate to the characteristic landscape.

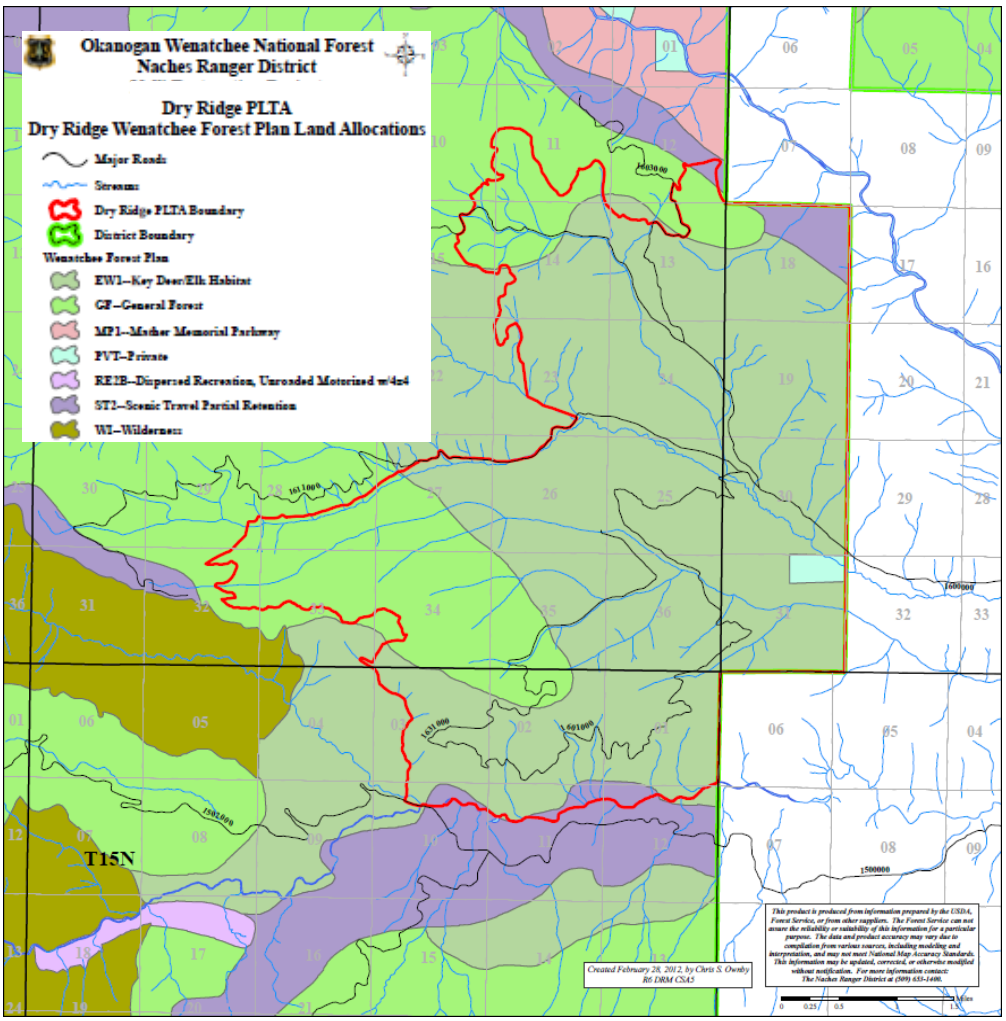


Figure I.4. Dry Ridge PLTA; Wenatchee Forest Plan Land Allocation.

Forest Managers are held to land allocation management standards from both the Wenatchee Forest Plan and the Northwest Forest Plan. In cases where multiple land designations overlap, the most conservative elements of each standard must be followed.

Additional Guidance

In 1997 the **Wenatchee National Forest completed an assessment of the LSR/MLSA network** (USDA Forest Service, Wenatchee National Forest, 1997) concluding that several of the reserves, including the Haystack MLSA, that were composed of dry forests were at high risk of loss of late-successional forest habitat from fires and insects. They recommended that treatments occur within LSRs and MLSAs to reduce the risk of large-scale habitat loss to fire and to restore dry forests to more sustainable conditions. Concurrence for these recommendations was received from the Regional Ecosystem Office in a letter dated October 8, 1997. Additional scientific reviews of spotted owl recovery have also recommended restoration treatments to reduce the loss of spotted owl habitat to uncharacteristic high-severity wildfires in dry forests (Courtney, et al., 2004) (Courtney, et al., 2008).

The Naches Mainstem and Wenas Watershed Analyses (USDA Forest Service, Naches Ranger District, 1995) is a landscape-level assessment, developed under the direction of the amended WFP. Review of this analysis helped develop the purpose and need for the Dry Restoration Project. The objectives in the Naches Mainstem and Wenas Watershed Analysis include increasing ecosystem sustainability by restoring historic tree stocking levels, species compositions, and successional stages across the landscape. Additional objectives noted in these documents are to reduce fuel loadings to levels within the historic range and to reestablish the natural role of fire in the landscape.

The **Okanogan and Wenatchee National Forest Restoration Strategy** (USDA Forest Service, Okanogan-Wenatchee National Forest, 2010) was a concerted effort to restore the sustainability and resiliency of forested ecosystems on the Okanogan-Wenatchee National Forest. According to the Forest Restoration Strategy:

> *Numerous assessments that provided a long list of peer-reviewed publications have identified that our forests are more susceptible to uncharacteristically severe fires and epidemic levels of insects and disease, and habitats are declining for late-successional and old forest associated species (Lehmkuhl et al. 1994, Hessburg et al. 1999a, Franklin et al. 2007). While our aging forest road network provides needed access for recreation and restoration treatments, it also affects the condition of aquatic ecosystems, requiring expensive repairs and untimely closures when slopes fail (Franklin et al. 2007, Binder et al. 2009, and Vano et al. 2009).*

Additional descriptions of general landscape objectives for specific ecosystem components can be found in Chapter I of the Nelli Restoration EA.

DESIRED FUTURE CONDITION

Based on the management direction and guidance above and the Ecosystem Management Decision Support (EMDS) analysis, the desired future condition of the Dry Restoration Project is one in which:

- Key components of the composition, structure, and pattern of forest vegetation are within an average of the natural and future range of variability.
- Forest vegetation is resilient to insect, disease, and uncharacteristic fire.
- Appropriate proportions of structural components on the landscape are restored or protected
- Forest composition, structure, function, and pattern are appropriate to the forest type and within the inherent range of variability.
- Protection of life, property, critical infrastructure, and resources can be achieved within normal risk inherent to wildland firefighting in a light fuel loading, dry forest type.
- Riparian Reserves are maintained or restored to provide aquatic habitat and passage for aquatic and terrestrial organisms including ponds, marshes and wetlands.

Below are representations of current stand conditions and future desired post-treatment conditions (Figures I.5-7).

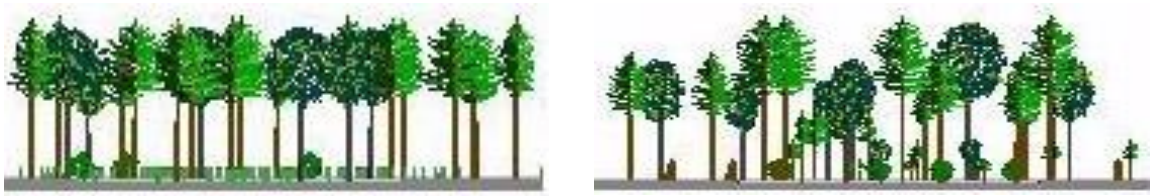


Figure I.5. Representation of the current condition; a typical stand in the dry forest type.

Figure I.6. Representation of the post-treatment condition.

Figure I.7. Representation of the desired future condition in the dry forest type/white- headed woodpecker habitat.

EXISTING CONDITION

<u>Vegetation Condition</u>

The Dry Ridge PLTA is dominated by dry forest vegetation. Historically, dry forest plant communities were maintained by frequent, low intensity surface fire. This process promoted the development of low and variable tree densities, light and patchy ground fuels, and favored fire-tolerant trees, such as ponderosa pine and Douglas-fir, and a low and patchy cover of associated fire-tolerant shrubs and herbs.

Field reconnaissance and landscape evaluation suggest that species composition, and stand and landscape pattern are departed from the reference condition. The reference condition describes the historic condition and considers the anticipated future condition. Fire suppression, timber harvest, road construction, and grazing by wild ungulates and domestic livestock have transformed forest spatial patterns and landscape ecology. Exclusion of fire as a natural disturbance process in the Dry Ridge PLTA has led to overstocked stands of shade tolerant tree species creating uncharacteristically high fuel loadings, a continuous ladder of fuel that facilitates fire to climbing into tree crowns and contiguous tree canopies that will support crown fires.

Figure I.8: Timber stand in the Dry Ridge PLTA (2011).

Logging practices have been as impactful as fire exclusion in increasing the severity of fires in much of the Dry Ridge PLTA. Spatially diverse, relatively open-canopy forests dominated by large trees were often replaced by closed-canopy forests, some of which are single-layered and others are vertically diverse. Forests with closed canopies of small trees or with multi-layered, variable canopies are more susceptible to stand-replacing fires than are open-canopy forests dominated by large trees.

The size and shape of patches and gaps (pattern) affects stand development, the movement of fire, and wildlife use. Structure refers to the vertical and horizontal development of a stand, and its description infers the distribution of size and age classes. Fire, disease and insects are a particular influence, and treatment often requires that particular age and size classes in a stand be removed to expedite its progress in developing-large diameter trees, a key component of late successional forests. Late successional forests provide habitat for several focal wildlife species including the white headed woodpecker, flammulated owl, and northern spotted owl. However, many of the stands within the Dry Ridge PLTA are not currently supplying habitat for these species and/or not be capable of providing long-term, sustainable habitat.

Dry Creek Stream Channel Condition

Within the Dry Restoration project area, field reconnaissance has identified a depletion of course woody debris within the riparian habitat of Dry Creek. The reduction of fallen and wind thrown trees within the stream channel have compromised the function and channel stability of a portion of Dry Creek.

Forest Products Condition

An overview of current market conditions indicates that delivered log prices for saw timber have improved slowly since the recession of 2009. Demands for framing lumber have slightly increased during 2014 due to a modest rise in housing starts.

Even though market conditions for wood products are slowly improving, the closure of two local saw mills in 2006 has had a significant impact on the definition of what the local community is when referring to the forest products industry. The closure of the Boise Cascade Mill in Yakima, and Layman Lumber Company in Naches, have resulted in the hauling of timber off the Naches

Ranger District to more distant mill locations in northeastern and north central Oregon since 2006. The closest remaining mill operating in Yakima County is Yakama Forest Products located in White Swan, which is located approximately 75 travel miles from the Dry Restoration Project.

The Naches Ranger District has historically provided commercially available wood products both locally and regionally. In recent years, however, the district has been providing a stagnant level of products, especially in reference to saw timber. Non-commercial methods of fuels reduction and wood removal such as pre-commercial thinning and prescribed fire are costly and labor intensive. Without commercially viable wood products, the district must default to use non-commercial methods to accomplish the desired landscape objectives.

More information on the existing condition of the Dry PLTA can be found in Chapter I of the Nelli EA.

PURPOSE AND NEED FOR ACTION

The Purpose and Need for action Elements are derived from the comparison of the existing condition with the desired future condition consistent with national and local guidance. The numbering of the Purpose and Need boxes is not meant to convey a priority or importance but is for ease of reference throughout the document.

Purpose and Need Element 1: Reduce fuels and restore stands on the landscape to provide resiliency to uncharacteristic wildfire, insects, and disease.

The Fire Risk Rating contained in the Watershed Analysis identified Nile-Dry Ridge as an area being of greatest concern as rated by high ignition potential within the low fire regime. The Okanogan-Wenatchee Forest Restoration Strategy states that the increase in the severity and frequency of summer droughts may lengthen fire seasons and result in larger and more severe wildfires. The WFP allows treatment of fuels in this area when consistent with the objectives of other land management areas. There is a need in the Dry Ridge PLTA to create an environment resilient to uncharacteristic wildfire, insect infestations, and other disease outbreaks.

Purpose and Need Element 2: Enhance or protect white-headed woodpecker, flammulated owl, and northern spotted owl habitat.

The Okanogan-Wenatchee Forest Restoration Strategy states “Wildland fire was an important factor in the loss of spotted owl habitat in the east-Cascades province”. Owls or their habitats are lost as a consequence of large-scale, high-severity fires (Courtney, et al. 2008). The Forest Restoration Strategy also states that the white-headed woodpecker responds favorably to thinning and burning restoration treatments. Restoration treatments should retain the largest trees and provide spatial variability in tree distribution.

Figure I.9: Spotted owl on Naches. R.D.

There is a need in the Dry Ridge PLTA to protect that habitat of the white-headed woodpecker, flammulated owl, and northern spotted owl from large-scale, high severity fires. There is also a need in the Dry Ridge PLTA to create additional white-headed woodpecker habitat with spatial variability, open spaces, and large trees.

Purpose and Need Element 3: Improve the stability and function of the coarse woody debris-depleted Dry Creek stream channel.

The Standards and Guidelines for Riparian Reserves in the Northwest Forest Plan (USDA Forest Service & USDI Bureau of Land Management, 1994) states that "Under the Aquatic Conservation Strategy, Riparian Reserves are used to maintain and restore riparian structures and functions of intermittent streams, confer benefits to riparian-dependent and associated species other than fish, enhance habitat conservation for organisms that dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide for greater connectivity of the watershed". The WFP Forest Wide Standards and Guidelines for Wildlife and Fisheries state a goal to "Maintain or enhance limited habitats to provide the habitat characteristics for dependent species. These habitats include, but are not limited to…ponds, marshes, (and) wetlands…", and to "strive to provide a high level of wildlife habitat diversity in each sub-basin".

There is a need in the Dry Ridge PLTA to improve the stability and function of Dry Creek to continue to maintain and restore its riparian structure.

Purpose and Need Element 4: Provide forest products (timber and firewood).

In 2010, the Okanogan-Wenatchee National Forest was accepted as a Collaborative Forest Landscape Restoration Program (CFLRP) forest, a program established by Congress with the Title IV Omnibus public Land Management Act. Important objectives of the Forest CFLRP include utilizing forest by-products and providing local jobs. Encouraging the utilization of forest restoration by-products can offset treatment costs and benefit local rural economics while improving forest health.

A summary of how the Dry Restoration Project accomplishes each Purpose and Need element can be found in Chapter II on page 14. Additional Purpose and Need elements were included in the broader Nelli Restoration Project.

ORIGINAL PROPOSED ACTION SUMMARY

The Naches Ranger District mailed the Dry Restoration proposed management actions to the public and interested agencies on February 6, 2014. Proposed activities occur on 11,769 acres of National Forest System lands in the Dry Ridge Potential Landscape Treatment Area (PLTA). The proposed action for consideration under the Dry Restoration Project as originally planned in the scoping letter included commercial timber harvest, commercial or personal firewood cutting area, stream course stabilization within Dry Creek, and other connected actions necessary for implementation. The scoping letter in its entirety can be found in Appendix B of this document. A separate government to government consultation letter was mailed to Harry Smiskin,

Chairman, Yakama Nation and other Yakama Nation contacts on February 4, 2014. A public involvement summary and comment review can be found in Chapter IV of this EA.

The Forest Service Inter-disciplinary Team assigned to the Dry Restoration Project utilized feedback and internal information to further refines the activities presented in the original proposal. Minor changes included the addition of more specific details for connected actions like stream course stabilization and temporary roads. The new Refined Proposed Action can be found in its entirety in Chapter II of this document.

CHAPTER II

Proposed Action and Alternatives Considered

INTRODUCTION

This chapter describes the Refined Proposed Action and all other formulated alternatives. This chapter also references the No Action Alternative which will be analyzed alongside the other alternatives in Chapter III. The Original Proposed Action from the February 2014 scoping letter can be found in Appendix B.

ALTERNATIVE FORMATION

Issues identified during scoping are used to analyze the need for alternative development. The Refined Proposed Action is a result of public scoping comments and specific site knowledge gained through field reconnaissance by Forest Service specialists. As knowledge of the project area increased, specific proposed treatments, prescriptions, and locations could be detailed at a much more exact scale than was possible in the Original Proposed Action.

Unresolved Conflicts

The Interdisciplinary Team (IDT) considered all comments made during scoping (see Chapter IV for more information) and where applicable adjusted the Original Proposed Action to resolve those concerns. Adjustments were minor and included additional protection of riparian reserves, more specific information on road management within the project area, and the maximization of commercially viable timber. These adjustments continue to allow the project to meet WFP and NWFP standards and guidelines.

The Refined Proposed Action design criteria and Best Management Practices were selected to optimize vegetation restoration, while still minimizing potential impacts to other resources. A comprehensive and interdisciplinary project design allowed the IDT to avoid unresolved conflicts within the project area. As this project is prepared under the most current Forest Service National Environmental Policy Act (NEPA) regulations and there are no unresolved conflicts concerning alternative uses of available resources, no additional alternatives were fully developed. The range of alternatives presented, including No Action, addresses all topics raised during scoping.

No Action Alternative

Under Forest Service National Environmental Policy Act regulations, the evaluation of a No Action Alternative may be considered through the effects analysis by contrasting the impacts of the proposed actions with the current condition and expected future condition. Each resources area will analyze the impacts of the No Action Alternative in Chapter III to showcase the expected future condition within the Dry Restoration Project area if the project were not implemented.

Under the No Action Alternative, no vegetation treatments, firewood cutting areas, or Dry Creek stabilization would occur. Roads and trail maintenance would occur as allowed by funding and the District maintenance schedules under separate NEPA authorities. The Nelli Restoration Project will still be implemented under the No Action Alternative as the NEPA Decision has been made.

Refined Proposed Action Alternative

Summary of Actions

Commercial Harvest

This alternative proposes commercial harvest on 548 acres in dry forest stands (see Figure II.1). These stands are composed of Douglas fir, ponderosa pine, grand fir, and western larch trees. Commercial harvest will remove merchantable size material (greater than seven inches in diameter). Within the proposed 548 acres, 304 acres will use ground-based logging systems such as tractor, rubber-tired skidder, log forwarder, etc. The remaining 244 acres are located on steeper ground and will utilize skyline logging systems to yard timber to landings.

Firewood

An additional 200 acres will be made available for commercial or personal firewood cutting (see Figure II.1). These identified acres for firewood collection will include merchantable size green material in areas in need of thinning. These acres were assessed to be economical unviable for a commercial harvest operation.

Stream Course Stabilization

Stream course stabilization will occur within approximately two miles of the Dry creek channel (see Figure II.1). The stabilization treatment will consists of supplementing approximately 200 small and medium size trees ($\leq$15 inches diameter breast height (dbh)) into the bankfull channel and floodplain of Dry creek. The placement would occur from the National Forest boundary to the FSR 1631 stream crossing. Hand crews would fell trees in adjacent upland areas (100 feet or more from stream channel), transport them by foot to the stream, then strategically place single trees or complex log jams into the stream channel. Hand crews would fell trees with chain saws and transport them to the floodplain using hand equipment, jacks, winches, tools or cable yarding systems that are situated on system roads. Tree selection for instream enhancement would be consistent with silvicultural prescriptions planned for commercial harvest units. Tree species selected would include grand fir and Douglas fir trees, particularly under the drip line of large ponderosa pine, and diseased trees.

Connected Actions

Connected actions that are directly associated with the above proposed actions include:

- The construction of approximately three miles of temporary road to facilitate timber harvest operations. All project related temporary roads will be returned to their original closed state after the project is fully implemented. For the exact location of temporary roads see the project file.
- The installation of erosion control structures, vegetation and grass seeding in areas vulnerable to erosion (e.g. skid road and landings).
- The ripping of compacted soil on skid roads and landings in the proposed timber harvest areas to reduce soil compaction and to prepare seedbeds for vegetative planting.
- Specified road reconstruction to clean ditches and culverts as well as basic road maintenance activities. Activities will include grading and the abatement of road and log landing dust using water and/or chemicals such as sulfonated lignin (a byproduct from the production of wood pulp) or vegetable based oil. If necessary for dust abatement, one water drafting site would be located on Nile Creek at the FSR 1601 junction (see Sale Area map in project file). The Refined Proposed action does not propose any new changes to the status of system roads[1].
- The treatment and removal of activity fuels. Activity fuels, known as wood and slash left on site after commercial and firewood removal, will be piled and burned on site.

[1] All Forest System Road decisions were covered under the Nelli analysis (Nelli Decision Notice).

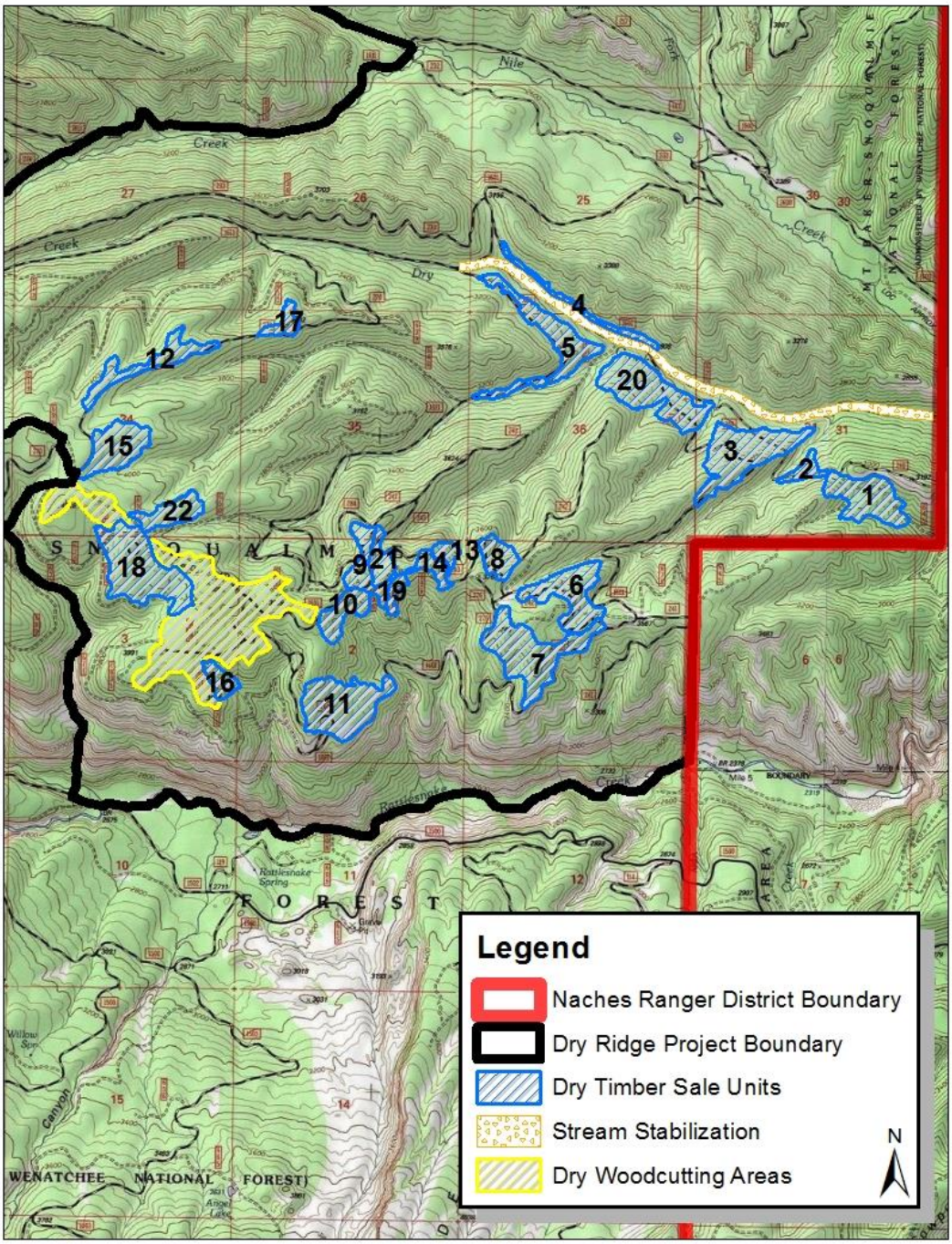


Figure II.1: Dry Restoration proposed activities including timber sale units, stream stabilization vicinity, and woodcutting area.

Commercial Logging and Firewood Unit Objectives and Prescriptions

The following tables (Table II.1-3) display specific treatment units within the Dry Restoration Project. Units are grouped together by similar landscape objectives. Each grouping of units has a primary stand objective, desired stand condition, and a treatment prescription. The location of each unit can be found in Figure II.1 above. Following each unit table are Forest Vegetation Simulator (FVS) figures (Figures II. 3-14) visually representing the current condition of units (before) compared to predicted post treatment condition (after).

The landscape objective groups are (1) white headed woodpecker habitat enhancement, (2) ponderosa pine stand initiation, and (3) maintaining stands with landscape reference conditions. More information on the formation of the unit prescriptions can be found in the silviculture specialist report in the project file.

Figure II. 2: Naches Ranger District timber crew utilizing unit prescriptions to mark trees.

Landscape Objective: White Headed Woodpecker Habitat Enhancement

Table II.1: Dry Prescriptions for Units with the Landscape Objective of White Headed Woodpecker Habitat Enhancement

Commercial Timber Sale Unit(s) *Non-Commercial stand number*	**Purpose & Need**	**Primary Stand Objective**	**Desired Stand Condition**	**Prescription**
1,4,7,10,11,15,16, 18,19,22	Restore vegetative structure, composition, and pattern, and allow natural processes to function that will provide resilience to uncharacteristic wildfire, insect, and disease. Enhance or protect white headed woodpecker habitat Reduce the potential of invasive species, and reduce established populations of these species	Protect old, large/very large trees, especially ponderosa pine. Create and maintain a low density understory. Maintain conditions for development of white-headed woodpecker habitat Restore departed stand level conditions for: spatial pattern; snags/coarse woody debris (CWD); and insect/disease.	Ponderosa pine cover type. Stem Exclusion Open Canopy, Young Forest Multi-Strata, or Old Forest Single Strata Large ponderosa pine, many of them decayed or with dead tops, dominate a low density forest. Understory density is low. Low levels of down logs/CWD. It will take a long time to achieve this condition as present level of large/very large trees is low.	Thin from below to remove most younger grand fir and Douglas-fir, especially those around old pines and those that aren't growing well. Remove dwarf mistletoe infected trees except for the old, very large, and a few clumps of large trees. Use prescribed fire to reduce surface fuel and to kill firs too small/expensive to be killed by mechanical means. If ponderosa pine unsuccessfully establishing through natural regeneration, consider planting at rate of 50 TPA. Ensure to not plant underneath overstory pine infected with dwarf mistletoe

Landscape Objective: White Headed Woodpecker Habitat Enhancement- continued

The following Forest Vegetation Simulator (FVS) figures are representations of forest stands before (at the time of inventory) and after the Refined Proposed Action (post-treatment condition) within the grouping of white headed woodpecker habitat enhancement units.

Figure II.3: FVS representation of the condition of Unit 4 ***before*** *(at time of inventory): Young Forest Multi-Strata.*

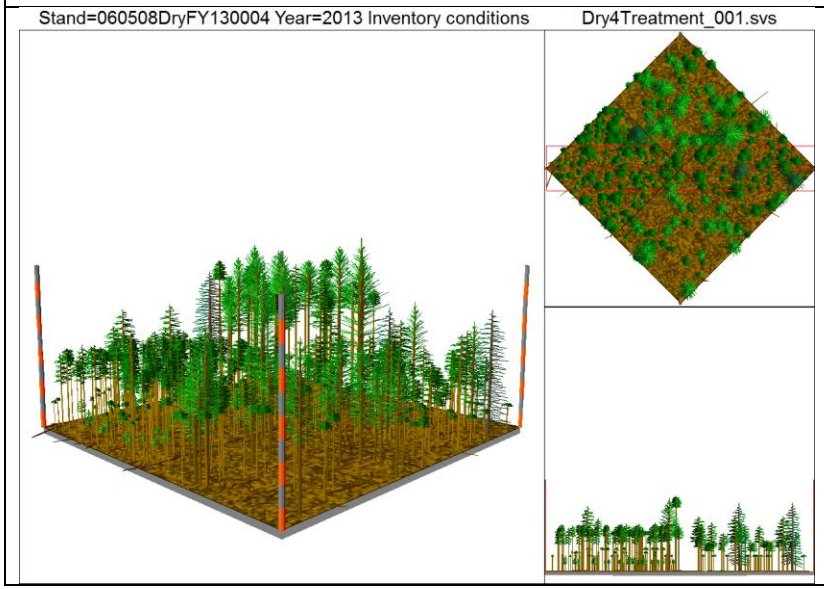
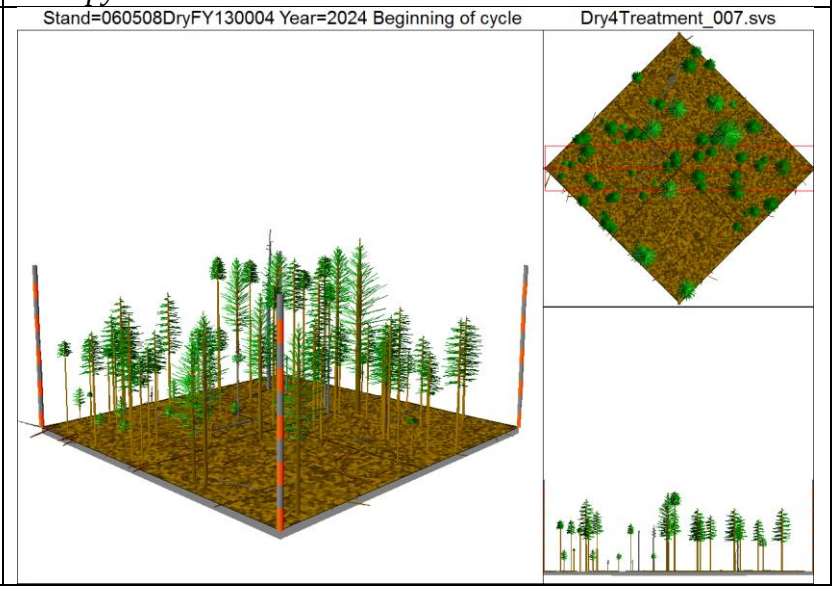


Figure II.4: FVS representation of ***after*** *(expected post-treatment condition) of Unit 4: Stem Exclusion Open Canopy.*



Landscape Objective: White Headed Woodpecker Habitat Enhancement- continued

Figure II.5: FVS representation of the condition of Unit 7 ***before*** *(at time of inventory): Young Forest Multi-Strata. Note Unit 11 similar in structure to Unit 7, although no data were collected.*

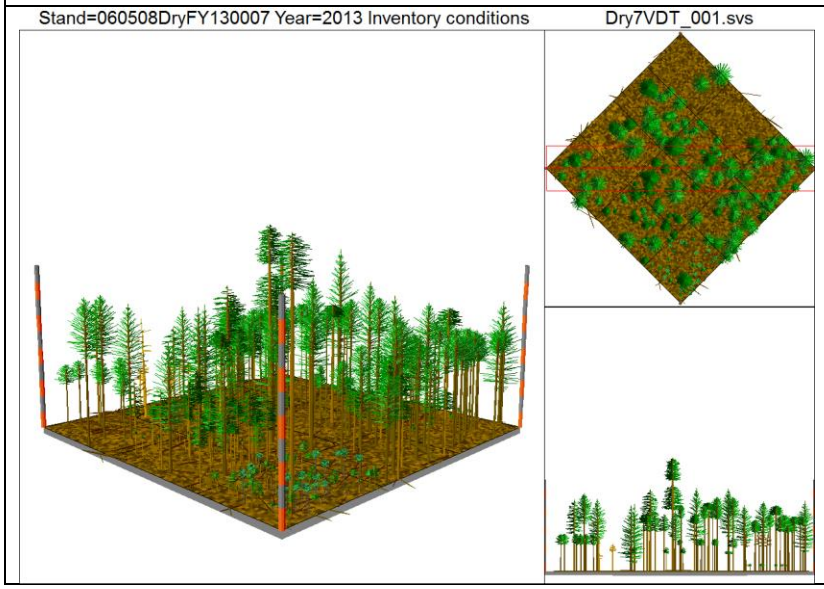
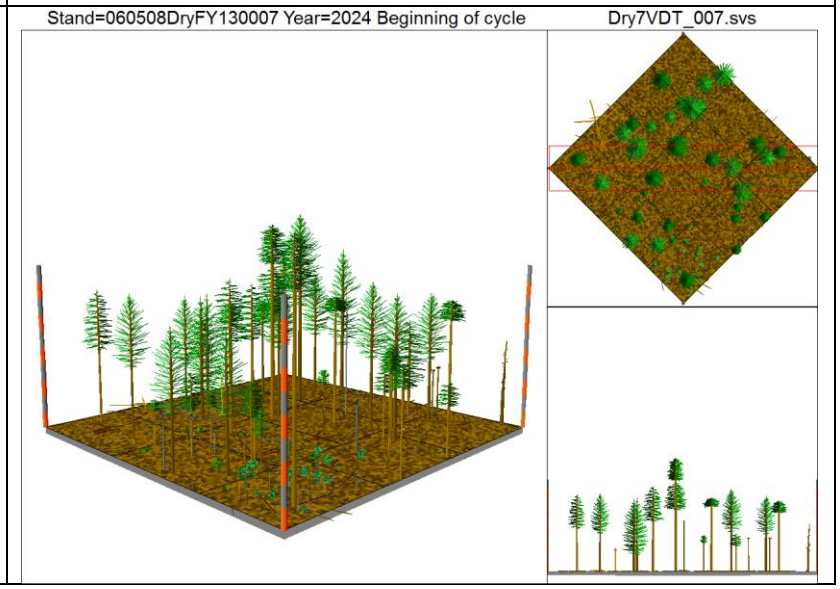


Figure II.6: FVS representation of ***after*** *(expected post-treatment condition) of Unit 7: Stem Exclusion Open Canopy. Note Unit 11 similar in structure to Unit 7, although no data were collected.*



Landscape Objective: White Headed Woodpecker Habitat Enhancement- continued

Figure II.7: FVS representation of the condition of Unit 19 ***before*** *(at time of inventory): Young Forest Multi-Strata.*

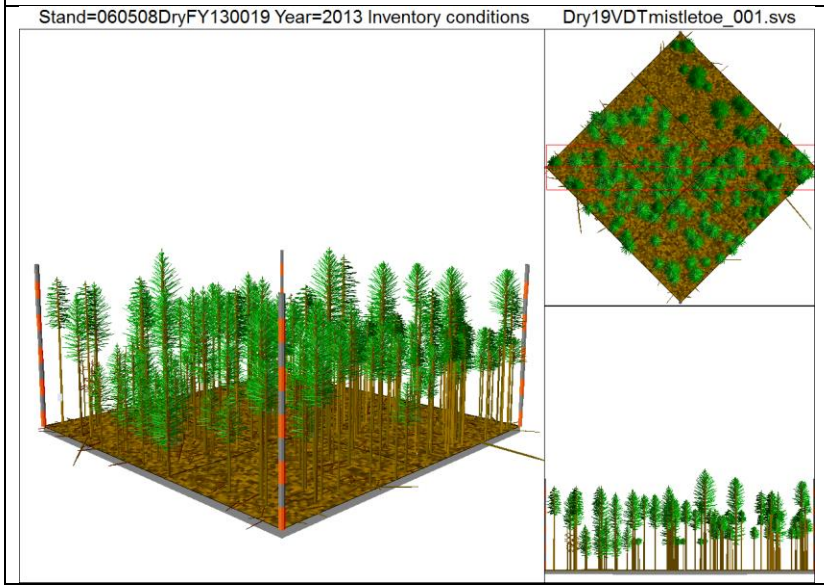
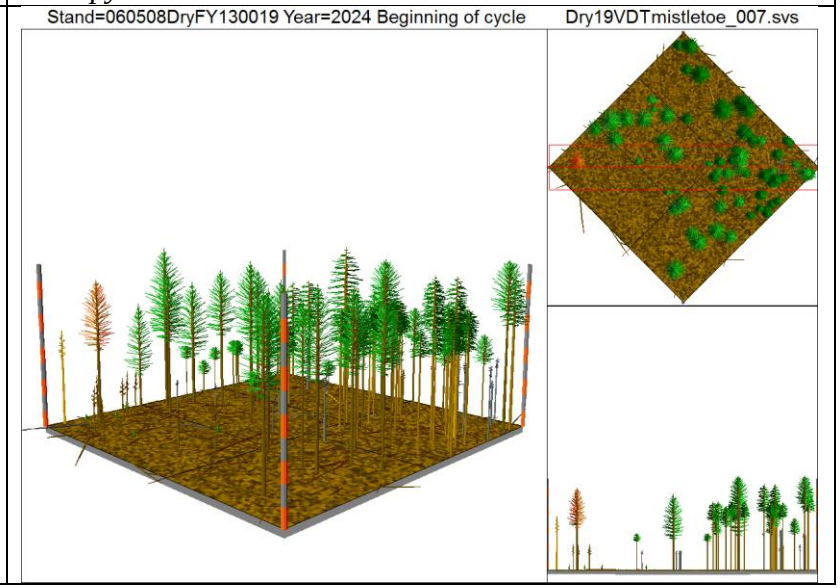


Figure II.8: FVS representation of ***after*** *(expected post-treatment condition) of Unit 19: Stem Exclusion Open Canopy.*



Landscape Objective: Ponderosa Pine Stand Initiation

Table II.2: Dry Prescriptions of Units with the Landscape Objective of Ponderosa Pine Stand Initiation

Commercial Timber Sale Unit(s) *Non-Commercial stand number*	**Purpose and Need**	**Primary Stand Objective**	**Desired Stand Condition**	**Prescription**
8,9,12,13,14,17,21 **Firewood Cutting Areas**	Restore vegetative structure, composition, and pattern, and allow natural processes to function that will provide resilience to uncharacteristic wildfire, insect, and disease. Reduce the potential of invasive species, and reduce established populations of these species Enhance or protect white headed woodpecker habitat	Sanitation cut to remove moderate to severely damaged trees to reduce spread of insect and disease, and to promote natural development of new cohort of ponderosa pine and Douglas-fir Restore departed stand level conditions for: spatial pattern; snags/CWD; and insect/disease.	Ponderosa pine cover type. Stand Initiation or Stem Exclusion Open Canopy Structure type. Large ponderosa pine, many of them decayed or with dead tops dominate, a low density forest. Understory density is low. Low levels of down logs/CWD. It will take a long time to achieve this condition as present level of large/very large trees is low.	Remove dwarf mistletoe infected trees except for the old and very large, and a few clumps of large trees. Retain some infected larch but kill them in place to minimize infection of regeneration. Use prescribed fire to reduce surface fuels, to create a seedbed, and to kill firs too small/expensive to be killed by mechanical means. Otherwise, consider using mechanical treatment to remove <7" infected with dwarf mistletoe and grand fir, to favor good ponderosa pine, dwarf mistletoe and western larch (i.e. uninfected) and maintain 50-100 tpa. If any grand fir>25" girdle to create snag and reduce spread of natural regeneration of this shade-tolerant species Plant ponderosa pine, or combination ponderosa pine and western larch if unsuccessfully establishing through natural regeneration at a rate of 50 TPA. Ensure to not plant underneath overstory pine infected with dwarf mistletoe

Landscape Objective: Ponderosa Pine Stand Initiation- continued

The following Forest Vegetation Simulator (FVS) figures are representations of forest stands before (at the time of inventory) and after the Refined Proposed Action (post-treatment condition) within the grouping of ponderosa pine stand initiation.

Figure II.9: FVS representation of the condition of Unit 12 ***before*** *(at time of inventory): Young Forest Multi-Strata. Note Unit 17 similar in structure to Unit 12, although no data were collected.*

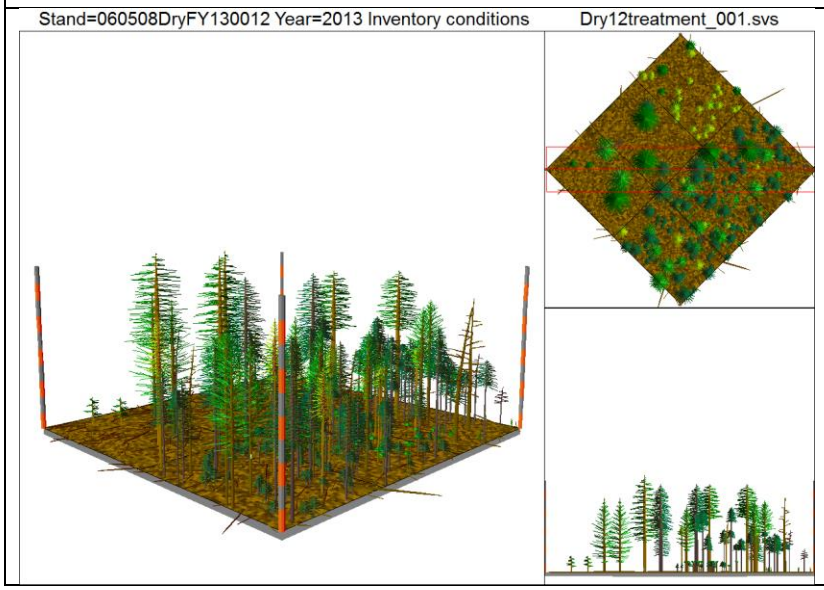
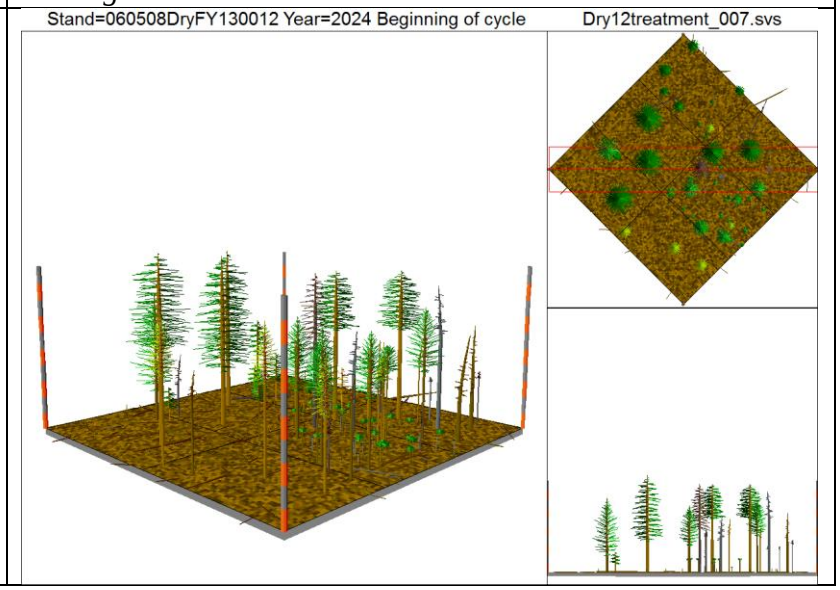


Figure II.10: FVS representation of ***after*** *(expected post-treatment condition) of Unit 12: Stem Exclusion Open Canopy. Note Unit 17 similar in structure to Unit 12, although no data were collected.*



Landscape Objective: Ponderosa Pine Stand Initiation- continued

Figure II.11: FVS representation of the condition of Unit 14 ***before*** *(at time of inventory): Young Forest Multi-Strata. Note Units 8 and 13 similar in structure to Unit 14, although no data were collected.*

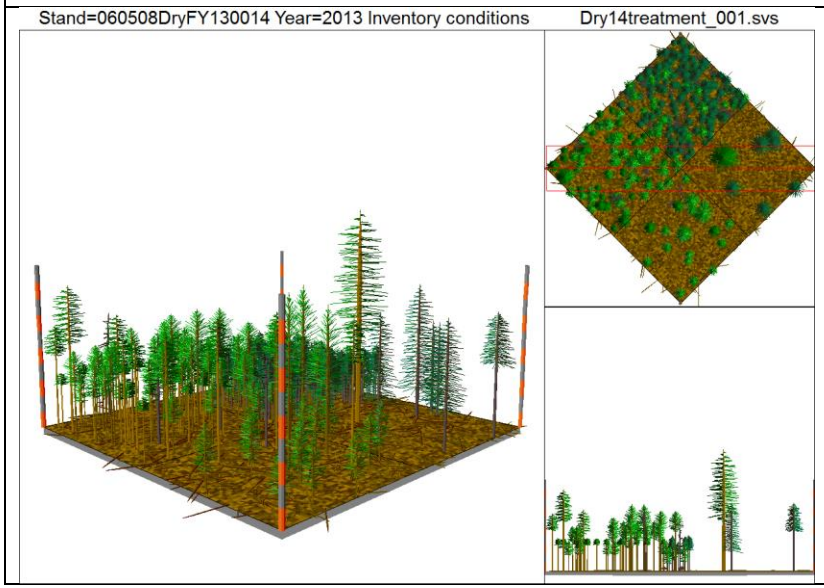
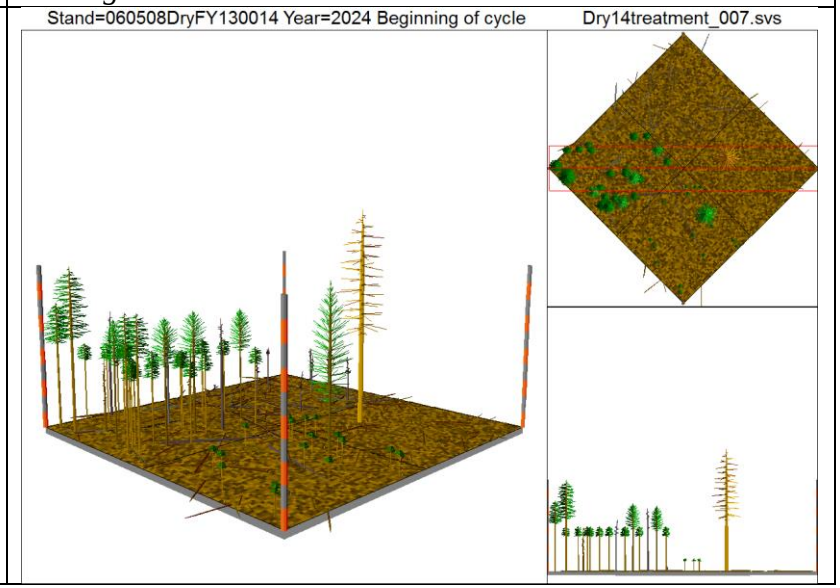


Figure II.12: FVS representation of ***after*** *(expected post-treatment condition) of Unit 14: Stem Exclusion Open Canopy. Note Units 8 and 13 similar in structure to Unit 12, although no data were collected.*



Landscape Objective: Maintains Stands within Landscape Reference Condition

Table II.3: Dry Prescriptions for Units with the Landscape Objective of Maintaining Stands within Landscape Reference Conditions.

Commercial Timber Sale Unit(s) *Non-Commercial stand number*	**Purpose and Need**	**Primary Stand Objective**	**Desired Stand Condition**	**Prescription**
2,3,5,6,20	Restore vegetative structure, composition, and pattern, and allow natural processes to function that will provide resilience to uncharacteristic wildfire, insect, and disease. Reduce the potential of invasive species, and reduce established populations of these species	Sanitation cut and/or thinning from below to remove moderate to severely damaged trees to reduce spread of insect and disease, and to promote natural development of new cohort of ponderosa pine and Douglas-fir Encourage/propagate a desirable composition of fire resilient species with the dry forest type (ponderosa pine, Douglas-fir, western larch) Restore departed stand level conditions for: spatial pattern; snags/CWD; and insect/disease.	Ponderosa pine cover type. Stem Exclusion Open Canopy, Understory Reinitiation, Young Forest Multi-story	Remove dwarf mistletoe infected trees except for the old and very large, and a few clumps of large trees. Retain some infected larch but kill them in place to minimize infection of regeneration. Use prescribed fire to reduce surface fuels, to create a seedbed, and to kill firs too small/expensive to be killed by mechanical means. Disrupt continuity between ground fuels and live crowns by utilizing fire and/or mechanical treatments to thin seedling and sapling size trees and raising the height to live crown (pruning) of live mid- and overstory trees If any grand fir>25” girdle to create snag and reduce spread of natural regeneration of this shade-tolerant species Plant ponderosa pine, or combination ponderosa pine and Douglas-fir or western larch if unsuccessfully establishing through natural regeneration at a rate of 50 TPA. Ensure to not plant underneath species specific overstory infected with dwarf mistletoe

Landscape Objective: Maintains Stands within Landscape Reference Condition- continued

The following Forest Vegetation Simulator (FVS) figures are representations of forest stands before (at the time of inventory) and after the Refined Proposed Action (post-treatment condition) within the grouping of Maintains Stands within Landscape Reference Condition.

Figure II.13: FVS representation of the condition of Unit 20 ***before*** *(at time of inventory): Young Forest Multi-Strata.*

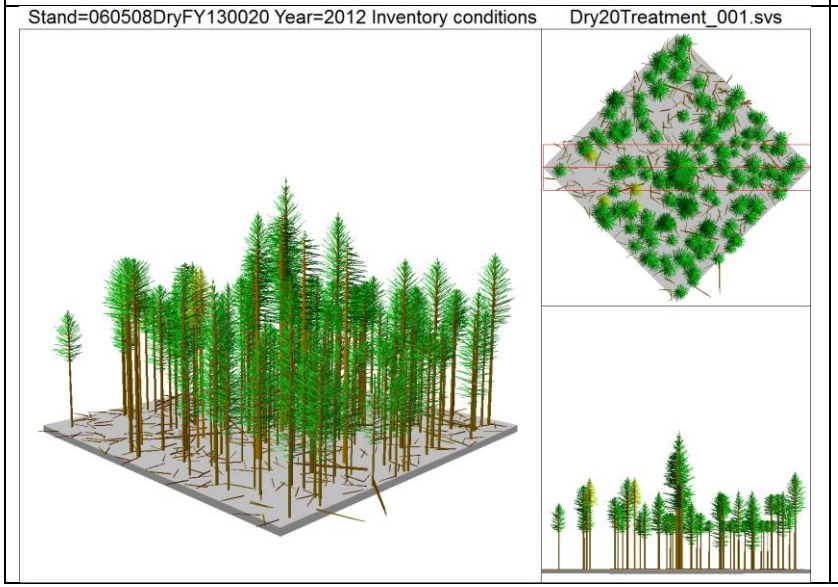
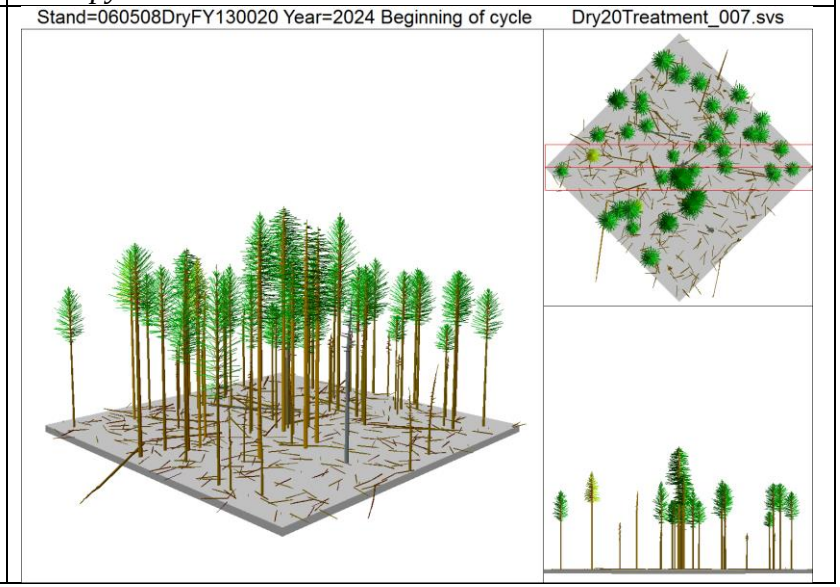


Figure II.14: FVS representation of ***after*** *(expected post-treatment condition) of Unit 20: Stem Exclusion Open Canopy.*



STANDARDS, GUIDELINES, AND BEST MANAGEMENT PRACTICES

The U.S. Department of Agriculture National Best Management Practices (BMP) Program was developed to improve agency performance and accountability in connection to national and state laws and regulations. The Forest Service has a long history of working with State and other partners to carry out BMP programs including agreements with the U.S. Environmental Protection Agency (EPA) and the Washington Department of Ecology. Each Forest Service region has BMP guidance documents consistent with its respective State BMP programs. Utilizing BMPs allow for a consistent approach to management.

A summary of applicable BMPs for the Refined Proposed Action is included in Appendix A of this analysis. Key elements of Forest Service standards and guides from Forest Service decisions and direction are also highlighted in Appendix A. Management direction from standards and guides and BMPs provide a consistent approach to implementation and monitoring beyond the specific project design criteria.

ALTERNATIVES ELIMATED FROM DETAILED STUDY

No alternative actions within the scope of the Dry Restoration purpose and need were proposed during the scoping or comment period. No additional action alternatives were analyzed and no alternatives were eliminated from detailed study.

IMPLEMENTATION TIMELINE

The Naches Ranger District plans to begin implementation of this project in July 2014. Commercial logging operations could begin as early as September 2014. The final timeline for logging activities will be determined after the contract is awarded. Stream channel stabilization is estimated to occur as early as July 2014. There is no estimated date of project completion at this time.

ABILITY OF ALTERNATIVES TO MEET THE PROJECT'S PURPOSE AND NEED

Table II.1: Summary of each Alternative's ability to meet the Dry Restoration Project Purpose and Need Elements.

Purpose and Need Element	Refined Proposed Action	No Action
1. Reduce fuels and restore stands on the landscape to provide resiliency to uncharacteristic wildfire, insects, and disease.	Proposed commercial timber and firewood unit treatments will reduce fuels and restore stands on the landscape to increase its resiliency to uncharacteristic wildfire, insects, and disease.	Taking no action will not increase the resiliency of the landscape to uncharacteristic wildfire, insects, and disease.
2. Enhance or protect white-headed woodpecker, flammulated owl, and northern spotted owl habitat.	Proposed commercial timber and firewood unit treatments will reduce fuels and provide resiliency to uncharacteristic wildfire. A landscape resilient to large–scale high severity fires will help protect existing and enhance additional wildlife habitat.	Project area is still at risk for large-scale high severity fires risking the loss of habitat for species including white headed woodpecker, flammulated owl, and northern spotted owl.
3. Improve the stability and function of the currently coarse woody debris-depleted Dry Creek stream channel.	Small and medium trees would be placed within the stream channel to provide additional coarse woody debris and to increase the quality of the aquatic habitat.	The aquatic habitat and coarse woody debris condition would remain the same in Dry Creek stream channel.
4. Provide forest products	Commercial timber and firewood would be available for sale.	No additional forest products would be available. Non-commercial labor intensive means of fuels reduction would be necessary to reduce fuels on landscape.

CHAPTER III

Affected Environment
Environmental Consequences

Introduction

This chapter identifies the probable consequences of implementing the Refined Proposed Action to the resources affected. It also describes the impacts of no action being taken. Chapter III summarizes the direct, indirect, and cumulative effects the alternatives may have to a reasonably foreseeable extent. Each resource area will emphasize the project's consistency with relevant environmental laws and guidance and outline if there are any impacts to Threatened, Endangered, Sensitive, or Survey and Manage species. If more information is desired, the specialist reports in their entirety are available in the project record. The resource areas detailed in this section are Vegetation, Fire and Fuels, Economics, Soil and Watershed, Fisheries and Aquatic Habitat, Wildlife, Travel and Access Management, Recreation, Visual Resources, Air Quality, and Cultural Resources. An icon representing each resource area signifies the beginning of each effects analysis section.

Many resources areas will reference Affected Environment and Environmental Consequences in the Nelli EA as Dry Restoration is nested within the Dry Ridge analysis area.

Figure III.1: Fall sunset on the Naches Ranger District.

Past, Present, and Reasonably Foreseeable Future Actions

The effects of past activities are represented in the baseline or existing condition for each issue area consistent with the President's Council on Environmental Quality's guidance on the Consideration of Past Actions in Cumulative Effects Analysis (June 24, 2005). This guidance states that "Generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions". Noteworthy past, present, and reasonably foreseeable future actions that contribute to the cumulative effects of this project include:

Table III.1: Past, present, and foreseeable activities in the Naches Mainstem and Rattlesnake Creek Watersheds that may contribute to cumulative effects of the Dry Restoration project.

NEPA Document, Project Name, or Activity	Treatments or Activities	Acres	Year
Pinus/Swamp Devil Project	Pinus II Timber Sale	913	1998
	Swamp Devil Timber	836	1997
	Sale	1,589	2001
	Pinus Underburn		
Sunip Project	Sunip Timber Sale	54	2000
Nile Project	West Nile Timber Sale	732	1998
	Nile Timber Sale	1,453	1998
	Upper West Nile	1,353	2001
	Underburn	1,196	2002
	Lower West Nile	3,353	2004
	Underburn	933	2000
	Nile Underburn		
	Nile RMEF		
	Underburn		
Rattle Project	Rattle Timber Sale	1,344	2003
	Buzzer Timber Sale	956	2004
	Fang Timber Sale	1,117	2005
	Venom Timber Sale	1,857	2008
	Devils Table	1,824	2005
	Underburn	725	2007
	Angel Lake		
	Underburn		
Canteen Project	Canteen Timber Sale	1,654	2007
	Flask Timber Sale	1,922	2008
	Jigger Timber Sale	397	2008
Gold Spring Restoration Project	Gold Spring Timber	364	2011-2014
	Sale Gold Spring	4,392	2015
	Underburn		
2013 Flood Projects	Repair FSR 1702 mile post 1.0		2013
	Decommission site at		2013

NEPA Document, Project Name, or Activity	Treatments or Activities	Acres	Year
	FSR 1700-416C mile post 0.1 Repair FSR 1708 mile post 0.0-4.0 Decommission site at FSR 1703 mile post 2.0 Decommission site at FSR 1704 mile post 1.3		2014 2014 2014
Forest System Road 1501 Project	Mile post 0.0 to 5.0 of FSR 1501 (entirely on WA State DNR land) will be decommissioned.	5 miles of road, approx. 20 acres	Current-2016
Recreation	Forest recreation activities	Entire watershed(s)	ongoing
Naches Sheep Allotment	Livestock grazing	58,030	ongoing
WA State DNR Connector Road	WA State is planning to build R5220 connector road in Little Rattlesnake Drainage	1.2 miles	2014-2016
Commercial Timber Management Outside National Forest Boundary	Potential commercial timber harvest on private and state-owned lands	Unknown	ongoing
Travel Management EIS	Okanogan-Wenatchee N.F. is completing federally mandated Travel Management	4 million	Decision 2015
Forest Plan Revision EIS	Okanogan-Wenatchee N.F. is developing an updated Forest Plan	4 million	Decision 2015
Dry Orr Landscape Analysis	Multiple restoration treatments as follows:	~70,000 acres under analysis	2011-2018
Glass Restoration	Timber harvest, ford improvement,	4,502	Current-2017

NEPA Document, Project Name, or Activity		Treatments or Activities	Acres	Year
		meadow restoration, pre-commercial thinning, prescribed fire		
Angel Underburn	Prescribed fire	6,893	Current-2015	

Figure III.2: Crews prescribed burning in the Angel Underburn 2013

Road Maintenance	Grading of road surface, road and culvert repair	Selected roads within the watersheds, as budget allows	ongoing	
Noxious Weed Management	See Nelli Restoration Project for detailed treatments	Entire watershed(s)	ongoing	
Nelli Restoration Project	Timber harvest, pre-commercial thinning, prescribed fire, road improvements, road maintenance level changes, road decommissioning, invasive weed treatments	11,679	Current-2018	

VEGETATION

AFFECTED ENVIRONMENT

The Dry Restoration Project (hereon Dry) is the second of two restoration projects proposed in the Nelli Project Area. The distribution of plant associations, successional stages and crown closure were described for the Nelli Project Area in the Nelli Restoration Project Environmental Analysis, pages III-3-4. According to corporate data, all units proposed for commercial treatment have been logged between 1960 and 1991 (Figure III.3). As a result it is unlikely to find old growth stands within commercial units, no less the Dry Ridge PLTA Project Area. Insect, disease, and wildfire discussions made in the environmental analysis for the Nelli Restoration Project (pages III-6 to III-8) also describe these issues for the Dry.

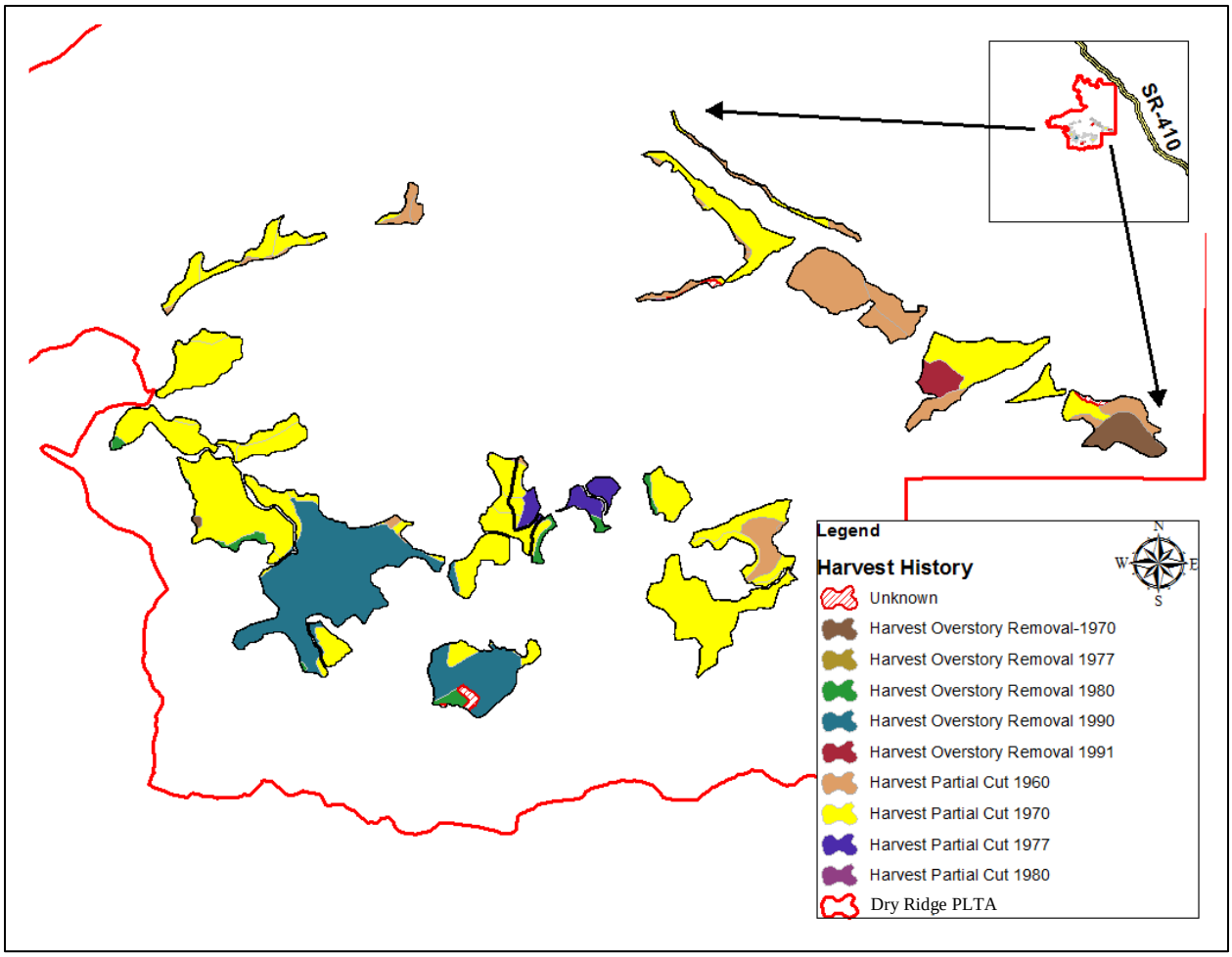


Figure III.3: Harvest history occurring within Dry proposed commercial units between 1960 and 1991.

ENVIRONMENTAL CONSEQUENCES

The landscape in which Dry is located is dominated by vegetation types that developed under a frequent, low severity fire regime. In this fire regime heavy fuel loadings typically did not develop, and shade intolerant, fire tolerant species were favored. Stands were more open, and small tree distribution was patchy and sparsely distributed.

No action

This alternative would result in no improvement in stand vigor or forest health. Stands left untreated would continue to stagnate, and trees would continue to grow with inadequate crowns and reduced diameter growth. There would be a continue trend of stands growing with increased tree densities, which would exceed the maximum capacity of the soils. With trees continuing to grow without check understory grass, forbs, and shrub would become shaded out and diminish. With increased inter-tree competition structural development would be delayed, and many of the few old tree structure made up of shade intolerant, fire tolerant species may not be maintained. Increased tree densities would also begin or continue to harbor insects and diseases which would continue the trend of decreasing stand vigor. This would result in a stand in decline, with many trees dead or dying.

Under the no action alternative the use of prescribed burning would still occur under the Nelli Restoration Project decision. However with no silvicultural treatments present fuel loading, ladder fuels, and the presence of continuous thickets of fire-intolerant species would remain intact, which would increase fire hazard, increase the likelihood of crown fire, and make control very difficult. If a prescribed burn converted into a wildfire it could result in a stand replacement fire where large patches of killed forest would be created. Any remaining large early seral tree species such as ponderosa pine and western larch would likely be killed. There would be no control of small tree thinning, and there would be no control on tree species selection and residual tree spacing.

Under the no action alternative the use of activity fuel prescribed burning or fuel treatments proposed by the Dry Restoration project would not be employed, which may result in a landscape which developed under frequent, low severity fires to increase in fire hazard. Increased fuel loading, increase ladder fuel development, and conversion of stands to thick, continuous fire-intolerant tree species would be expected. If no fuel treatments or prescribed burning were implemented within the commercial and firewood units, the risk to a crown fire would increase. If an uncontrollable wildfire were to occur, it could result in a stand replacement fire where large patches of killed forest would be created. Any remaining large early seral tree species such as ponderosa pine and western larch would likely be killed. There would be no control of small tree thinning, and there would be no control on tree species selection and residual tree spacing. If a wildfire were not to occur, stands would continue to become multi-storied stands with large trees made up of shade tolerant, fire intolerant species. This is strikingly different from historic conditions, where stands were more open and composed of shade intolerant and fire tolerant species. More information can be found in the Environmental Consequences for Fuels in this chapter.

In general, under the no action alternative where silvicultural, fuel, prescribed burning, or any combination of these treatments aren't employed: the economic value of value of forest products would not be realized, and the economic value of stand structure and composition would be difficult to maintain; the likelihood of insect outbreak and spread of disease would increase, fire hazard would increase, and overall stand vigor and forest health would decrease.

The district's fisheries biologist proposed to remove up to 200 trees ranging from <15" dbh across a two mile stretch of Dry Creek and place these along its bankfull channel and floodplain (see Chapter II-2). Given the size of the trees and the low numbers to be removed, direct and indirect effects of this proposal to the vegetation would be minimal. Tree removals would not make any appreciable effects to canopy cover, retained trees would not likely have any increased competitive advantage, and changes to potential fire behavior would be minimal.

Effects of Refined Proposed Action

Direct and Indirect Effects

Commercial and noncommercial treatments are proposed to meet the purpose and need and to move the project area towards the desired future condition. There are 11,769 acres within the Dry Ridge PLTA. Dry will treat 548 acres commercially treated acres and 200 acres for firewood removal.

Of the 548 acres approximately 307 are proposed to be treated using variable density thinning where "skips" are up to ½ acre in size and openings are up to two acres (see II-2). A skips area patches that will not see any treatment on them, they are skipped over. Openings between the skips would generally be created where trees infected with dwarf mistletoe and/or root disease will be removed and also clearing trees around large/very large or old ponderosa pine from one to three drip lines. Skips would be focused on complex patches, which have more structural and species complexity than the surrounding area. Characteristics of these gaps could include large snags, soft down logs, mistletoe brooms, and retention of some Douglas-fir and grand fir which can increase habitat diversity and create thermal cover for winter range. A buffer of at least 50' around complex patches containing a 3-5 tree clump of dwarf-mistletoe infected trees will be made in order to reduce the spread of this disease. Outside of skips and openings additional thinning would retain those trees which are growing vigorously and hence become more resilient to insect and disease. Examples of trees growing more vigorously include those with: little or no disease or insect damage; live crown at least 30%; little or no mechanical damage. These trees after treatment should release and increase in crown growth. Large, very large, and old trees would also be retained. Some dying or cull trees would be kept for snag recruitment. Thinning would also favor those early seral tree species which are shade intolerant and fire tolerant such as ponderosa pine and western larch. One potential negative effect of the Refined Proposed Action could be from the use of logging machinery. Some trees to be retained could incur mechanical damage during logging operations.

Where openings are created grass, forb and shrubs would be allowed to flourish and create forage. Openings would also allow early seral tree species to seed in naturally if there is a source nearby Otherwise planting ponderosa pine, western larch, Douglas-fir or any combination of these at a rate of 50 trees per acre to establish a future cohort may be required. Tree plantings

would ensure they are not planted within 100' of their own species already infected with dwarf mistletoe, and they would be planted to mimic some spatial pattern such as clumping and single trees in openings. The range of seedlings/saplings to retain would be 50-100 trees per acre, but should be targeted on the lower end.

Fire behavior in these stands would substantially be different. The likelihood of crown or stand replacement fires would be reduced because ladder fuels would be removed, canopy base height would increase, surface fuels would be reduced, and crown spacing would be further apart. The likelihood that residual trees would survive a wildfire would be high.

In summary, this proposal would: create a spatial pattern made up of clumps, complex patches and openings; decrease tree density, favoring shade intolerant, fire tolerant species; alter potential fire behavior so that the likelihood of a crown fire or stand replacement fire is low; provide thermal cover for winter range; increase grass, forb and shrub development; increase stand vigor and forest health. In the long term this proposal would prepare these units to move towards a desired future condition dominated by a single story of large, very large, and old trees made up of shade intolerant, fire tolerant species with a density within reference conditions as specified under the Forest's Restoration Strategy for dry forests. The understory would be low in density also predominantly made up of shade intolerant, fire tolerant species as a cohort to replace the overstory. Surface fuels would be low, and snag density would be within reference conditions as specified under the Forest's Restoration Strategy.

In the remaining 241 acres of commercial harvest units a sanitation cut would be proposed. During walkthroughs and some stand exam data collection it was found that these units are heavily infected with dwarf mistletoe, especially Douglas-fir dwarf mistletoe. Trees within these stands are dying or are already standing dead or on the ground. Grand fir are damaged by fir engraver, annosus root rot, or a combination of both. In these units large, very large and old trees would still be retained. If there were any trees showing signs of vigor then they would also be retained. Otherwise those trees infected with dwarf mistletoe (including Douglas-fir and western larch) unless they are ≥25" dbh, host trees showing no signs of infection but are in direct contact with those trees with infected crown, and shade tolerant tree species such as grand fir would be removed. If grand fir ≥25" dbh exist in these stands, this alternative proposes to girdle them if not in riparian areas to create a snag, and reduce spread of grand fir seedlings. As in the proposal for variable density thinning, logging operations could have a negative effect by incurring damage on trees to be retained.

Essentially, the sanitation cut could be considered a regeneration harvest, whereby the removal of heavily infected trees and shade tolerant species would create openings. Estimated canopy cover after the treatment maybe from 10-20%. With the openings created from the sanitation cut, grass, forbs, and shrubs would be allowed to flourish and create forage.

The residual trees would be in such low numbers that they may not be able to adequately reestablish a new cohort of early seral species. In these units planting of ponderosa pine, western larch, Douglas-fir, or any combination of these at a rate of 50 trees per acre would be done. Tree plantings would ensure they are not planted within 100' of their own species already infected with dwarf mistletoe, and they would be planted to mimic some spatial pattern such as clumping and single trees. Release of tree plantings may also be required to reduce grass, forb, and shrub

competition. The initial and ongoing maintenance (7-15 year return interval) prescribed burns would continue to remove competition

Fire behavior would also be different. The likelihood of crown or stand replacement fire would be low because there would be no ladder fuels, crown spacing would be further, and fuel loading would be lower. However with bigger openings created from the sanitation cut and an increase in a grass, forb, and shrub component the fire rate of spread may increase in the short term, yet fire intensity will still be much lower.

In summary this proposal would: remove most of the infected trees and those trees with incipient infection unless they are >=25" dbh to begin a new cohort of resistant trees; convert the units back to shade-intolerant, fire tolerant tree species with ground cover composed of grass, forb, or shrub; immediately alter the potential fire behavior from a crown fire or stand replacement fire to a lower intensity fire carried by grass, forb or shrub with a higher rate of spread; increase forest health. Because tree density would be low, post treatment tree planting of shade intolerant, fire tolerant species would likely be needed to supplement potential natural regeneration. In the long term these units will take much longer to achieve the desired future conditions than in those units where a variable density thinning is proposed because of the lack of large, very large, old tree structure.

Cumulative Effects

The Refined Proposed Action would begin to reverse the vegetation trends which have created current conditions promoted by past timber management practices, fire suppression, and the impacts of insect and disease. When the Refined Proposed Action is considered with the past vegetation trends, the proposed treatments would begin moving the forested landscape towards a condition more resilient to fire, insects and disease disturbances in the future by bringing back stand structures, densities, and species composition, and spatial pattern back to reference conditions. The proposed treatments would be intermediate steps to moving the landscape towards desired future conditions, such as old forest single story structure dominated by the more resilient ponderosa pine.

Within and outside of the project area are other and recent projects implementing objectives of resiliency with actions similar to Dry. These can positively contribute to cumulative effects, including favoring more resilient tree species, reducing tree density and intertree competition, reducing insect and disease hazard, and managing wildland fire fuels. Some of these projects include the Nelli Restoration Project, Angel Burn, Glass Restoration Project, Gold Spring Timber Sale, and Jigger, Flask, and Canteen Timber Sales (see III-1). The Nelli Restoration project proposed additional precommercial thinning, if prescribed burning in unavailable or unable to achieve desired conditions, to discriminate against shade tolerant, fire intolerant species such as grand fir and the early seral tree species. Noncommerical and precommercial thinning outlined in the Nelli Restoration project includes units within and outside commercial harvest units. For more information on silvicultural prescriptions and adaptive management in the Nelli Restoration Project, see Chapter II of the Nelli EA. The analysis area for this vegetation analysis includes the Dry Orr Landscape and the listed project areas above.

Livestock grazing occurs within the project area, road closures from the Forest's Travel Management, and prohibiting off-road motorized travel is unlikely to contribute to cumulative effects on forested vegetation. Lands outside of the project area and to the east are privately owned. As of this writing it is uncertain what future actions these private owners would take on their land. If private land owners do nothing it is these private forested lands would continue to stagnate, decrease in forest health and vigor, and increase fire hazard.

FIRE AND FUELS

AFFECTED ENVIRONMENT

Past management actions in the project area have altered the landscape in a way that has introduced elements not commonly associated with a dry site ponderosa pine landscape. These include tree species, stand densities, as well as vertical and horizontal arrangements of fuels not typical to dry forest stands. These changes combined with other common effects of this type of landscape alteration have ever changing effects to fuels and the corresponding fire behavior.

District historical fire data dating from 1970 displays statistical information such as fire size, location, date, and cause (human or lightning). An analysis of the project area shows approximately 31 reported wildfires, 9 caused by lighting, and 22 by human totaling approximately 7.2 acres. Even though these numbers are not considered high, the current insect and disease, and stand conditions are accelerating the degradation of the overall landscape vegetation health. Due to this deterioration and the departure of stand conditions from a typical dry site ponderosa pine landscape, the potential for large uncharacteristic wildfires exist.
For detailed information in relation to fuels and fire reference the Nelli Restoration Project Environmental Analysis, as this document covers the affected environment for both projects.

ENVIRONMENTAL CONSEQUENCES

No Action

If no action were taken in the Dry Restoration Project Area, the risk of uncharacteristic wildfire occurring would increase over time. In a Ponderosa Pine dominant landscape, fire plays a very important role in the landscape in regards to the ability for the ecosystem to manage itself in a healthy and sustainable way. Naches Ranger District historical fire data collection shows the proposed project area as not being host to large destructive wildfires. However, over time the accumulation of fuels combined with a stem per acre count of Douglas fir and Grand Fir that is uncharacteristic of a Ponderosa Pine ecosystem, the proposed project area is more susceptible to large destructive wildfire events.

Incorporated and surrounding focal wildlife species habitat (white headed woodpecker and northern spotted owl) would be at a risk of loss from wildfire, with that risk increasing over time as fuels accumulate. The natural decay rate would reduce fuels at a much slower rate than they would accumulate through ordinary pruning and mortality. Wildfire would reduce fuels as well as return fire as an ecological process within the project area, but could fail to meet Purposes and Needs of: (1) reducing fuels and restoring stand on the landscape to provide resilience to

uncharacteristic wildfire, insects, and disease and (2) enhancing or protecting white-headed woodpecker, flammulated owl, and northern spotted owl habitat. For more information in regards to a changing landscape combined with global climate projections that could affect the Dry Restoration Project area, refer to the Nelli Restoration Environmental analysis.

Effects of Refined Proposed Action

Direct and Indirect Effects

In general, the proposed actions in regards to fuels and fire in this project are designed to alter fuel conditions so that wildfire is less difficult to control, less disruptive, and less destructive. Given the right conditions, wildlands will inevitably burn. It is a misconception to think that treating fuels can ‘‘fire-proof’’ important areas. Fuel treatments in the Dry Restoration Project Area are intended to reduce fire severity and intensity but will not affect fire occurrence. The proposed silvicultural activities in the Dry Restoration Project Area directly seek to reduce detrimental fire effects on the landscape by reducing surface fuels, increasing the height distance to the live crown, decreasing crown density, and keeping large and very large trees of resistant species. These objectives are linked to the Purpose and Need for management action, specifically:

- Reducing fuels and restoring stand on the landscape to provide resilience to uncharacteristic wildfire, insects, and disease
- Enhancing or protecting white-headed woodpecker, flammulated owl, and northern spotted owl habitat

In the Dry Restoration Project Area, timber harvest and firewood removal is being proposed as methods to begin the restoration of composition, structure, and pattern on the landscape. Timber harvest is an effective means of removing excess stems from the over- and mid-stories, and is used to reduce aerial fuel continuity and subsequent fire behavior (crown fire). There is an inherent increase in down woody fuels from logging and precommercial thinning slash after harvest, which then potentially serves to create intense, fast spreading wildfires. This effect will be mitigated post-harvest through a variety of fuels treatments which are designed to be an on-going process that supports the intent of landscape restoration. For further detailed information of effects on fuels and fire in relation to the landscape, refer to the Nelli Restoration Project Environmental Analysis. The Vegetation Environmental Consequences section in this Chapter also discusses the impacts to the vegetation and fuels component of the landscape.

Cumulative Effects

For the Cumulative Effects discussion of fuels and fire, the analysis area will be the project area boundary, the northeast portion of the Naches Mainstem watershed, and the Rattlesnake Creek watershed.

Treatment of fuels is an ongoing process that must be continually addressed over time. The Refined Proposed Action would have a beneficial cumulative effect on fuels reduction, minimizing the risk of uncharacteristic wildfire. These wildfire events could have severe effects, some of which are, negative impacts on the ecosystem, large and long lasting smoke impacts,

safety concerns for firefighters, the general public, as well as the local residents adjacent to the area. The short-term effect would be the reduction and rearrangement of fuels.

The Nelli Restoration Project included decisions on vegetation, fire, and fuels including commercial timber harvest units, precommercial thinning units, pile burning, and landscape level prescribed burning. Environmental consequences from the Nelli Restoration Project for Vegetation and Fuels can be found on page III-12-40 of the Nelli EA. Cumulative effects of the Nelli Restoration project include fuels reduction, minimizing the risk of uncharacteristic wildfire, and providing protection for focal wildlife species.

Past projects in the analysis area whose effects could contribute cumulatively with the proposed Dry Restoration Project would be the Nile and West Nile timber sales (Nile Timber Sale Environmental Analysis). These projects had activities such as commercial harvesting, pre-commercial thinning, and prescribed burning. These activities have begun a cycle of continuing landscape treatments. Combining the activities of the past and the similar activities proposed, a pattern could be established where this landscape sees natural processes such as fire occur on a regular basis. As this continuing cycle of treatments evolves we could expect our footprint on the landscape to have a similar effect as the natural process would have, thereby creating a long term, fire adapted ecosystem.

Future actions, together with past and present actions in the analysis area would continue to move vegetation types and age class diversity within the analysis area toward desired conditions in the Wenatchee Land and Resource Management Plan, Watershed Analysis, and landscape evaluation. Further, the proposed actions of the Dry Restoration Project area (548 acres commercial and 200 acres for firewood removal) in conjunction with the immediately adjacent Nelli Restoration Project Area (1,509 acres) will combine to create a landscape that will be more resilient to large uncharacteristic wildfires. This will support the intent of landscape restoration within the Dry Ridge Potential Landscape Treatment Area.

ECONOMICS

This document examines a proposal to implement forest restoration treatments that would create a resilient landscape commensurate with natural and future ranges of variability. This section will discuss the financial aspects of this proposed investment.

No Action

Protection of Non-Market Resource Values

Non-market resources would not be protected from uncharacteristic wildfires, insect, and disease. Any fuels reductions would need to be implemented through costly non-commercial, labor intensive vegetation treatments covered under the Nelli Restoration Project.

Protection of Existing Market Value Resources

Range, timber, recreation, and private property are all resources with an assignable market value. Although the Forest Service does not calculate the potential value lost, these resources will remain at risk from uncharacteristic wildfires, insect, and disease if the Dry Restoration Project is not implemented.

Monetary Return from the Sale of Products

No timber or wood products would be available for commercial markets; therefore, the Forest Service would receive no monetary returns from the sale of these products.

Protection of Prior Investments

Portions of the analysis area have had both commercial and non-commercial treatments in the past to reduce stand density, susceptibility to insects and disease, and fuels buildup. Without continued treatments, these previous investments and the gains that have been achieved are at an increasing risk of loss through catastrophic fire.

Effects of Refined Proposed Action

Direct and Indirect Effects

Benefits

While the costs of implementing the proposed action can be expressed in monetary terms, the benefits are not so easily quantified and involve both market and non-market values. These benefits include the following:

Figure III.4 Typical logging truck.

Protection of Non-Market Resource Values

Large-scale stand replacement fires, especially in areas where they are not characteristic of the inherent fire regime, can cause substantial damage to forest resources. Resources such as soil, wildlife habitat, and water, along with scenic values can be substantially affected at a very large scale and for an extended period. This type of loss can be difficult to measure in monetary terms but is nonetheless important in terms of ecosystem health. Returning the area to a condition where fire can play a more natural role in the ecosystem would help ensure that these resources are protected and managed in a sustainable manner. For a more thorough discussion of non-market resource benefits see the soils, water, and scenery sections of this document.

Protection of Existing Market Value Resources

The risk of loss of resources is always present in the forest environment. The level or degree of loss will be influenced by the effectiveness of vegetation treatments. Resources that are at risk from fire, such as range, timber, recreation, and private property are more commonly assigned a monetary value. However, because of the uncertainty regarding risk, and the timing and scale of future fires, it is difficult to assign a dollar figure to the actual losses that would be avoided or reduced because of treatments. The fuels analysis in this document suggests that risk of a large-scale fire is much greater if no action is taken, or worse, if only a partial treatment with no prescribed fire is implemented.

Monetary Return from the Sale of Products

The proposed action includes 548 acres of restoration treatment where commercially valuable timber would be removed as a byproduct of that treatment. The value of these marketable products can reduce the overall costs of the project.

Protection of Prior Investments

Treatments proposed in the Refined Proposed Action would move previously treated stands even further towards the desired condition and in some cases would be implemented at much reduced costs and with improved revenue due to these earlier treatments. Continued treatments would also preserve the gains previously achieved on the landscape.

Costs

Table III.2, below, displays the probable costs associated with the Dry Restoration Project Appropriated funding or grants would be needed to fully implement all element of the Refined Proposed Action. Costs associated with specific fuels treatments such as non-commercial thinning (TSI), natural (non-activity) fuels treatments, and Forest Service road closure and decommissioning were determined and accounted for within the Nelli EA, and not included in this project cost analysis. The total cost of the Dry Restoration Project, offset by product value, is estimated to be approximately $5.8 million.

Table III.2: Cost/return analysis.[1]

Treatments	**Units**	**Value/Cost per unit**	**Cost/Return**
Planning Costs	Environmental Assessment		-$250,000
Commercial Timber Value	2.5 mmbf	$52/mbf	+$130,000
Activity Fuels	548 acres	$201/acre[2]	-$110,148

[1] The costs and values are not absolute, but are typical of recent history, and are presented for comparison.

Treatments	Units	Value/Cost per unit	Cost/Return
Treatment cost			
Firewood Value	200 acres	$40/mbf	+$8,000
Stream course stabilization	25 acres	$480/acre	-$12,000 +$12,000 (grant value)
Total			**-$222,148**

Mmbf= Million board-feet
Mbf= Thousand board-feet

Cumulative Effects

The analysis area for the economics analysis is Yakima County, utilizing market information from five years ago to an estimated ten years in the future. This project will contribute wood products in the form of firewood and commercially viable logs to a commercial or private market. The scale of this project is so small that it is not possible to determine direct economic benefits to the community or to the greater Yakima County. Furthermore, in light of recent market conditions, logs could travel great distances outside of Yakima County depending on the specific timber sale purchaser. This project in combination with other federal and non-federal timber sales will contribute to a more consistent output of wood products to available markets.

SOIL AND WATERSHED RESOURCES

AFFECTED ENVIRONMENT

Analysis methods used include review of the Forest Plan and Watershed Analysis documents mentioned in Chapter I and review and verification of existing field inventories (field notes in analysis file). More information can also be found in the Soils and Watershed Resources specialist report in the project file.

The Dry project area is within the Naches fifth-field and Nile and Dry sixth-field Hydrologic Unit Code (HUC) watersheds and within the Rattlesnake fifth-field and Lower Rattlesnake sixth field HUC watersheds. Physical characteristics of the watersheds were described in the Nelli EA.

Soils

Soils in the Dry Project Area are derived almost entirely from basalts and andesites with volcanic ash in the upper surface layers. The varying soil depth, surface texture, and rock content result in

[2]Inflated to Contract Termination Date of 2018. Costs include fuels inventory, disposal of landing piles, burn plan preparation, underburning, and associated empirical costs. Overhead rates are not included.

varying degrees of susceptibility to compaction, physical disturbance, surface erosion, and suitability for restoration treatments. Soil characteristics for the project area and acreage by soil mapping unit are described in the Nelli EA.

Soil disturbance hazards and past watershed disturbances were evaluated and described for the Dry Project Area in the Nelli EA.

Existing conditions were evaluated for the project area using the Forest Service protocol for soil disturbance based on visual site disturbance classes from past activities. These results are summarized in the Soil and Watershed Resources Specialist Report. The average disturbance level under current conditions in the proposed project area is approximately five to eight percent within proposed treatment units.

Water Quality

Existing water quality, state standards and 303(d) listings were described for the Dry project area in the Nelli EA. Nile Creek, Rattlesnake Creek and the Naches River downstream of the planning area have all exceeded the state temperature standard of 61 degrees Fahrenheit (F) daily maximum for several days during the summer sampling period. These streams have been designated as water quality limited (category 5) for temperature on the current Washington State 303(d) list.

Water temperature has been monitored at sites on Nile and Dry Creeks during the summer period for over 10 years. The seven day average maximum daily temperature for Nile Creek has averaged 64.6 degrees at the Forest System Road (FSR) 1601 crossing and 60.1 degrees approximately one mile upstream at the FSR 1611 crossing. The seven day average maximum daily temperature for Dry Creek has averaged 54.2 degrees at the FSR 1601 crossing. Complete water temperature data is available in the analysis file.

Under the Total Maximum Daily Load (TMDL) process for impaired streams, Washington State Department of Ecology prepared a technical report for listed streams on the Wenatchee National Forest (WDOE 2003). Minimum shade requirements were calculated based on geomorphic landtype, site potential tree height, and stream channel size to meet Clean Water Act compliance for water temperatures. The TMDL allocation for lower reaches of Nile and Dry Creeks on National Forest Lands is 58 percent effective shade which is currently being met by existing riparian vegetation and topographic shading.

Water diversions for domestic and irrigation use at private residences downstream of the project area and groundwater resources are described in the Nelli EA.

ENVIRONMENTAL CONSEQUENCES

Proposed actions related to commercial timber harvesting have the potential to adversely affect soils, water quality, and associated overall watershed condition. Effects of Stream Restoration Treatments are also discussed in this section.

No Action

Taking no management action would result in no increased project related short-term risk to site productivity, surface erosion, and water quality due to no additional area being disturbed by harvest or fuels operations and road construction or maintenance. In the long-term, there would be no potential benefits from restoration of compacted areas or reduced risk of catastrophic fire due to fuel reduction treatments. Risk of detrimental effects from catastrophic wildfire would not be reduced. Potential effects would be loss of soil nutrients from vaporization during high intensity wildfire and increased rates of soil erosion and stream sedimentation. Existing soil compaction from previous harvest activities would recover more slowly as natural vegetation and physical processes restore soil function.

If no action is taken the opportunity to restore the Dry Creek stream channel with woody debris placement would not be achieved. Channel stability would continue to be degraded due to lack of large woody debris. This will result in downcutting of the channel bed from elevated stream flow velocities. For more in depth description of the habitat features see the fisheries specialist report.

Effects of the Refined Proposed Action

Direct and Indirect Effects

Effects of Vegetation Treatments and Connected Actions

Effects were evaluated against Aquatic Conservation Strategy (ACS) objectives and the WFP soil standards and guidelines relative to the maintenance and restoration of sediment regimes, in-stream flows, and site productivity (See ACS consistency under Fisheries and Aquatic Resources). Impacts of timber harvest and associated activities have the potential to alter hydrologic timing and flow, the amount of sediment/substrate moved through the system and where it is deposited, and upland site productivity as further described in the Nelli EA.

Harvest Activities and Soil

Effects on soils include soil compaction from logging equipment on skid trails, at landings, and on temporary roads. This leads to increased water runoff and lowered growth potential for vegetation. Ground disturbing activities which compact, displace, or remove the protective duff layer from soils are most likely to affect soil stability and water quality. A more in depth description of soil disturbance mechanisms is included in the Nelli EA and the Dry Project Soil and Watershed Specialist Report. Design criteria and mitigation measures (Chapter II) are expected to maintain site productivity and protect soil and watershed resources by reducing the area and degree of disturbance due to proposed activities.

Requiring designated skid trails, utilizing existing trails when feasible, and skyline yarding on slopes greater than 35 percent during implementation of this project is expected to reduce the risk of any additional compaction resulting from yarding operations.

Log Hauling and Sediment and Water Quality

The Hillslope Erosion Model (HEM) was used to evaluate the effects of the proposed action on the delivery of sediment to stream channels as described in the Nelli EA. For this project no new roads will be constructed with channel crossings or proximity to riparian areas. Changes in levels of road use due to log hauling were evaluated to determine changes in sediment yields at stream crossings. This project will utilize roads which have a total of 17 stream crossings of which 14 are intermittent and three are perennial. Most likely during logging operations not all of the crossings will be utilized at one time but for modeling purposes all were assumed to be used. The entire Nile Creek, Dry Creek, and Lower Rattlesnake 6th field HUCs were analyzed to evaluate the effects of log hauling at the sub-watershed level. Of the 17 total crossings ten are in Dry Creek, five are in Nile Creek, and two are in Lower Rattlesnake Creek watersheds.

The calculated road crossing derived sediment yield during log hauling activities for the three watersheds increased from a pre-project level of 6.285 tons per year to 6.413 tons per year in Nile Creek, from 1.230 tons per year to 1.487 tons per year in Dry Creek, and from 3.689 tons per year to 3.740 tons per year in Lower Rattlesnake Creek. This increase is expected to remain at this level for the planned two year harvest period and then would be reduced to pre-project amounts after post haul maintenance is completed. Modelled sediment increases would occur as a result of storms during the season of hauling operations. After completion of hauling, contract provisions require maintenance to restore road surfaces to pre-activity conditions (or better). Baseline sediment yields would be expected to return within one year of project completion.

This estimated total project increase of 0.438 tons of sediment or approximately 0.53 cubic yards would be the total delivery from the 17 crossings spread throughout the haul routes. Each crossing would contribute approximately 0.026 tons (52 pounds) or 0.031 cubic yards of sediment. This estimated total annual sediment delivery would also be distributed amongst the seven storm events modeled in the representative average year. Average increased sediment delivery per storm event at each crossing is approximately 0.0037 tons (7.4 pounds) or 0.0045 cubic yards. The 17 crossings are also distributed along the 10 miles of haul route roads. Because of this timing and spatial distribution, the modeled increase in sediment due to log hauling operations is not expected to result in any measurable change in fine sediment levels in downstream spawning reaches of Nile Creek or Rattlesnake Creek.

Harvest Activities on Hydrologic Timing and Flow Levels

Hydrologic timing of water flows can be impacted by changes in forest canopy levels and increases in road densities as described in the Nelli EA. The Refined Proposed Action would decrease the area weighted percent tree crown canopy closure from 56.47 percent down to 54.53 percent for the planning area as a whole. This would be a 1.94 percent marginal change and at this level any change in hydrologic timing or flows is not expected to be measurable at the sub-watershed level or at the larger 5th field HUC level where the percent change would be even less for the entire watershed. The current highest level of precision in streamflow measuring techniques at best has a five to ten percent margin of error and any potential changes in hydrologic flow regimes are not expected to be measurable at a level greater than this accuracy.

Hazardous Materials and Water Quality

Fueling and operation of chainsaws and logging equipment used in implementing this project could result in petroleum product spills or fluid leaks. Soil contamination and possible surface water pollution could result from spills. Locations of refueling sites will be approved by Forest Service contract administrators and spill prevention and management plans will be required which will minimize the risk of potential detrimental effects.

Dust Abatement and Water Quality

Dust abatement on forest roads during log hauling operations could include applications of water, lignin sulfate or vegetable oil compounds. Application rates and timing would reduce the risk of chemical contaminates or fine sediments entering surface waters to non-measurable levels. Water sources have been designated and approved for this project. Pumping rates for water truck filing would not exceed ten percent of the streamflow at a given site and thus not have a measurable effect on streamflows.

Prescribed Burning and Soils

Pile burning on landings is a connected action of logging on the commercial harvest units within the project area (Chapter II, page 2-3). Pile burning on landings within the proposed Dry Project units would cover approximately five to eight total acres. Effects of landscape level prescribed burning, also known as underburning, over the entire Dry Ridge area were described in the Nelli EA. The additional area of severely burned soils due to landing piles from the Dry Project (5 to 8 acres) was included in the analysis of detrimental soil conditions and forest plan standards are expected to be met. Landings will be located outside of riparian reserves which will reduce the risk of erosion of soil offsite into surface waters.

Summary of Soil Disturbance

Soil disturbance with current condition and estimated effects of the commercial timber sale and firewood portion of project implementation for each proposed Dry Project unit was evaluated. Forest Plan standards for soil disturbance (less than 20 percent detrimental soil conditions) are expected to be met on all treatment units with expected implementation of mitigation measures and restoration actions. Estimated final detrimental soil conditions ranged from 10 to 16 percent of project unit areas (see Soil and Watershed Resources Specialist Report).

Effects of Temporary Road Construction

Temporary road construction and reconstruction associated with logging activities can affect soil stability and water quality by increasing the area of soil disturbance, increasing rates of runoff and routing of sediment into stream channels, and increasing peak stream flows. Temporary roads are considered a connected action; however, their impacts will be described in detail separately. Road cut and fills on steep slopes can result in increased risk of mass failures especially in the headwater catch basin areas. Rehabilitation of temporary roads and landings would benefit soil stability by restoring natural drainage patterns and re-vegetating disturbed areas. Road density is an overall indicator of watershed health and levels were evaluated for the

proposed action. Changes in channel network due to stream and road intersections (Wemple, 1994) were also evaluated because this is an indicator of the potential for sediment input to surface waters and the potential for increased rates of streamflow due to more rapid delivery of precipitation into the stream system. The proposed action would not increase the channel network percentage because no new crossings would be built.

Approximately 1.3 miles of new temporary roads would be constructed and a total of approximately 1.7 miles of existing unauthorized roads would be utilized/constructed for harvest activities under the action alternative. The temporary road construction would increase the road density temporarily in the Nile-Dry watershed from 4.38 up to 4.45 miles per square mile for the Proposed Action (does not include either the Nelli or Glass Angel project actions). This increase in road density would be reduced in one to three years once post sale restoration activities were completed by hydrological stabilizing and effectively closing temporary roads. Road closures by themselves would not reduce the overall road densities from a hydrologic perspective but would result in reduced risk of damage to drainage systems during wet season use.

At the completion of harvest and post-harvest activities (treatment of residual slash), all temporary roads would be barricaded to eliminate motor vehicle access and would be ripped and/or recontoured as part of post-harvest soil remediation activities to facilitate their return to vegetative productivity. Temporary roads would be seeded unless the adjacent plant community will provide a sufficient seed source for vegetative recovery.

Erosion modeling has shown that the majority of fine sediment input occurs at road crossings on streams and that riparian stream buffers are effective in filtering any upslope sources of soil erosion. None of the temporary roads are located on soils with a severe erosion hazard rating. Under the Refined Proposed Action there would be, over time, a baseline of untreated temporary roads having been constructed within the PLTA as individual units were harvested by various timber sales with a certain degree of erosion potential and reduced vegetative productivity. As both temporary and unauthorized roads were treated by recontouring, erosion potential would decline. The productive capability would increase over time subsequent to recontouring as subsidence returned the soil profile to a more natural ratio of macroporosity and microporosity.

Best Management Practices and Design Criteria Effectiveness

Best Management Practices (BMPs) for the protection of water quality from nonpoint source pollution (sediment, fuel spills, etc.) would be implemented as described in Appendix A. Implementation of these BMPs would reduce the risk of the Proposed Action affecting local and downstream beneficial uses of waters flowing from the project area. When BMPs are implemented and effective, past monitoring has shown that the State water quality standards will be met (USDA Forest Service, 2000). Water diversions for domestic and irrigation use at private homes downstream from the project area would be protected. Mitigation measures and design criteria for stream protection identified in Appendix A would be implemented and are expected to be successful in protecting downstream diversions from any measurable change in water quality or quantity. Mitigation measures include a combination of unit layout and timing of operations that are expected to have an effectiveness of 90 percent or greater. Water diversions for dust abatement would be only from Forest Service approved locations. If chemical dust

abatement materials are used, standard application methods have been successful in reducing the risk of contaminants entering surface waters to non-measurable levels.

Best Management Practices would be fully implemented; therefore, water quality standards and the anti-degradation policy (Chapter 173-201A WAC) are expected to be met with the Refined Proposed Action. The Refined Proposed Action is not expected to substantially alter water quality. Full implementation of BMP's has been shown to be an effective (90 percent or greater) method in preventing and controlling non-point source water pollution (Rashin, 2006), (USDA Forest Service, 2000). Monitoring would be conducted during the project in order to validate implementation and effectiveness of BMPs.

Water Temperatures

The proposed harvest activities will not remove streamside overstory vegetation or reduce shading and therefore treatments will not affect this parameter or exacerbate the 303(d) listing. If fire naturally occurs into riparian reserves, only ground cover and possibly some shrub or forbs would be burned with no changes to shading from overstory canopy expected. The current TMDL allocation of 58 percent effective shade is expected to be met with the proposed action alternative.

Effects of Stream Restoration Actions

The hand felling and placement of large woody debris in approximately two miles of Dry Creek would improve stream channel stability. The increased levels of wood in the stream system would help restore natural routing and movement of sediment downstream. The minor amount of thinning planned along riparian reserves associated with the stream stabilization project is not expected to remove enough overstory canopy to result in measurable effects on stream temperatures on-site or downstream. Improved floodplain inundation at higher flow periods would help restore riparian conditions and result in benefits to water quality and timing of streamflows. Risk of placed trees causing damage to downstream facilities would be minimal due to the low transport capacity of Dry Creek.

Cumulative Effects

Cumulative effects from past, current and foreseeable future activities are an important concern in the Naches Watershed and can be affected by actions on private lands as well as National Forest System lands. For the Dry Project there are private or state lands adjacent to the analysis area to the east of the project boundary. The cumulative effects analysis boundary for this project is the 5th field watershed scale. Within the 5th field watershed smaller sub-watersheds were analyzed in order to address affects that might be masked at the larger scale. The time scale for cumulative watershed effects is considered the time required for vegetation to achieve hydrologic recovery. For conifer stands this is achieved when greater than 70 percent canopy closure occurs typically in 20 to 30 years for a regeneration unit. For soil compaction recovery by natural processes, generally a 30 to 40 year period is necessary.

Cumulative watershed effects are generally manifested by increased rates of runoff which result in increased surface erosion, stream channel scouring, and changes in timing and volume of

streamflows. Increased levels of soil compaction can lead to faster rates of surface water runoff. Reductions in canopy cover can lead to changes in snow deposition and melt rates with resulting changes in streamflow and groundwater recharge. Increased road construction can lead to faster rates of surface water runoff, interception of groundwater, and routing to stream channels.

Harvest and fuel treatment activities which are designed to restore historic fire regimes can benefit soil productivity and water quality in the long-term (10–15 years or more) by reducing the risk of uncharacteristic high intensity wildfires and reducing the resulting risk of erosion and loss of site productivity (Harvey, 1994). Short-term (one to five years) increases in available nitrogen can help in establishment of vegetation (Debano, 1991).

Most of the acres within the Dry Project area have been subject to timber harvest activity, heavy recreation use, and impacts from grazing by elk and domestic range animals. Past harvest entries have occurred on approximately 75 percent of the forested lands within the project area. Soil compaction from repeated timber harvest operations and tractor piling for fuels treatment on some of these areas has resulted in levels of soil compaction that exceed WFP Standards and Guidelines. This soil compaction concern is highest in the old clearcut harvest areas where skid trail patterns are more concentrated than would be allowed under current standard operating procedures, particularly on the Xeralfs soil series (soil mapping unit 138). Based on field assessments and past monitoring, approximately 50 acres of the project area have detrimental soil disturbance levels ranging from 20 to 45 percent, exceeding the WFP Standards & Guidelines, as a result of past harvest activity (USDA Forest Service, 2000). Because these old harvest units were logged 30 or more years ago, natural processes and re-vegetation with deep rooted perennial grasses has reduced the compaction level by approximately 50 percent. These compacted soil areas occur outside of proposed harvest treatment areas for the Dry Project but would add incrementally to the cumulative effect of increased rates of surface water runoff within the 5th field watershed.

The potential for additional soil compaction from tractor yarding and fuels reduction operations is expected to be reduced by implementation of the design standards described in Appendix C and standards and guidelines for soil disturbance are expected to be met (see direct and indirect effects above). Soil restoration activities are expected to reduce the effects from past harvest entries and improve soil conditions in the long-term. The overall area in detrimental soil conditions (compaction, displacement, and severely burned) is expected to meet standards when post sale restoration of skid trails, landings, and temporary roads is completed (see above table III-X). Implementation and effectiveness monitoring from past projects has shown that the proposed design standards are successful in meeting Forest Plan requirements (USDA Forest Service, 2000).

Cumulative watershed effects are influenced by past impacts, proposed future impacts and susceptibility to high intensity rain-on-snow storm events. As mentioned above, past timber harvest operations have occurred over approximately 75 percent of the project area. The last sales within the Dry 6th field HUC area occurred over 30 years ago and recovery of compacted areas by natural processes has begun to occur as deep-rooted vegetation is re-established. Existing clearcut harvest units have recovered to the level that crown closures exceed 70 percent and are considered to be fully recovered hydrologically in terms of water yield and evapotranspiration rates (Troendle, 1980). The project area as a whole currently has 28 percent

of the acreage in crown closures greater than 70 percent and this would be reduced to 15 percent after completion of the Dry and Nelli Projects.

The Refined Proposed Action would decrease the area weighted percent tree crown canopy closure from 46.57 percent down to 45.70 percent for the Dry Creek sub-watershed. This would be a 0.87 percent marginal change. This level of change is well within the planning goal of not reducing the canopy closure for any individual sub-watershed by more than 25 percent. At this level of tree crown canopy removal, changes in hydrologic timing and flows are not expected to be measurable at the watershed scale (Troendle, 1980). Any increases in soil moisture and groundwater levels that result from increases in snow deposition after thinning would most likely be utilized by increases in vigor and rates of evapotranspiration of the remaining vegetation.

Harvest and fuels management effects would also be mitigated by the fact that the proposed activities would be dispersed in time over a span of two to three years. Harvest and fuels activities would occur within three separate sub-watersheds of the Dry Project area which would further disperse and reduce the effects of treatments in any single sub-watershed and the much larger two 5th field watersheds. The maximum percentage area of the Nile sub-watershed treated by commercial thinning is 6 percent. Any potential changes in hydrologic flow regimes are not expected to be measurable at a level greater than the current highest level of precision in streamflow measuring techniques which at best has a five to ten percent margin of error. Since changes are not expected to be measurable at the smaller sub-watershed level they would also not be measurable at the larger 5th field HUC level.

Other harvest activities have occurred within the 5th field watersheds that the Dry Project lies in. Harvest activities within the last 30 years on National Forest lands have been designed to meet standards which protect soil and water resources similarly to current practices. A minor amount of harvest has occurred on state and private lands in the lower portions of the Rattlesnake Creek and Naches River 5th field watersheds. These activities may have led to small incremental increases in rates on surface erosion runoff but these changes are not expected to be measurable at the 5th field watershed level.

The cumulative effects from the Dry, Nelli, and Glass Angel Projects all potentially occurring in close proximity both spatially and temporally was analyzed. The total canopy closure reduction from all these projects at the watershed scale will be less than five percent. At this level of harvest, changes in hydrologic timing and flows are not expected to be measurable at the watershed scale. Potential sediment increases due to log haul on forest roads would also be separated spatially and temporally so that resulting cumulative effects would not be measurable downstream in spawning reaches of surface waters. The calculated sediment yield from log haul if all three projects were implemented concurrently would increase a total of 0.514 tons per year (0.62 cubic yards) above baseline conditions for Nile Creek, 0.257 tons per year (0.30 cubic yards) for Dry Creek, and 0.051 tons per year (0.006 cubic yards) for Rattlesnake Creek. Modelled sediment increases would occur as a result of storms during the season of hauling operations. After completion of hauling, contract provisions require maintenance to restore road surfaces to pre-activity conditions (or better). Baseline sediment yields would be expected to return within one year of project completion.

After the road obliteration actions in the Nelli and Glass Angel Projects are accomplished, 29 total stream crossings will be removed and restored. This will result in a net reduction in sediment yields of 0.889 tons per year (1.07 cubic yards) below current baseline conditions for Nile Creek, 0.446 tons per year (0.54 cubic yards) for Dry Creek, and 0.547 tons per year (0.66 cubic yards) for Rattlesnake Creek.

Total road densities if the three projects occurred at the same time would increase from 4.38 up to 4.74 with temporary road construction. After planned road obliteration with these projects is completed the density would be reduced to 3.73 miles per square mile.

The area has also received soil compaction and displacement from cross country motorized vehicle use, wild ungulates, and sheep grazed on the Nile Allotment but these activities are not expected to contribute to levels that would exceed Forest Plan standards. Minor amounts of hazard tree removal have occurred by Washington State DOT along Highway 410 and within summer home residence areas.

Hazard tree removal will continue along Highway 410 and within summer home residence areas which will add incrementally to the lowering of canopy closure within the 5th field watersheds. Continued soil compaction and displacement from cross country motorized vehicle use, wild ungulates, and sheep grazing will add incrementally to the disturbed soil conditions within the 5th field watersheds.

These activities have been evaluated with the proposed actions and a determination has been made that their effects combined with those of the proposed actions would contribute incrementally to cumulative effects in the project analysis area but the increase would not be measurable in terms of streamflow, site productivity or sediment yield at the 5th field watershed level or the smaller sub-watershed level. Best Management Practices (BMP's) are expected to be fully implemented and cumulative effects as a result of this project and anticipated similar types of activities on nearby State and private lands are expected to be insignificant.

Evaluation Summary

Soil stability and watershed condition are closely tied to water quality and aquatic habitat. Most of the actions and effects described for upland soils interact and lead to effects on water quality and downstream aquatic habitat. Generally, the risk of negative impacts to soil productivity, water quality and watershed condition would increase proportional to the proposed acres of timber harvest, acres of fuel treatment, miles of new road construction, acres of commercial harvest or underburning on high sediment delivery risk soils, and acres of ground based timber harvest on soils rated severe for soil compaction hazard. Table III.6 summarizes the indicators for soil and watershed effects. Taking no management action would have less risk of short-term adverse effects to watershed resources but less benefit for reduction in watershed susceptibility to potential damage from uncharacteristic wildfires in the long-term.

The Refined Proposed Action would reduce the total area weighted canopy closure change due to harvest and fuels activities for the entire project area from 56.47 percent down to 54.53 percent. Approximately 134 acres of timber harvest or fuels treatments would occur on soils with a high sediment delivery risk rating. None of the commercial harvest acres would occur on soils with a

severe compaction hazard rating. Approximately 134 acres of prescribed burning in the planning area would occur on soils with a high sediment delivery risk rating. Potential effects would include increased rates of runoff, increased stream sedimentation, and loss of site productivity but with design criteria and mitigation measures these effects are not expected to be measurable. Increased rates of surface runoff and soil erosion could be expected from landings and skid trails or severely burned areas where the soil surface organic layer was removed but any increases due to this project are not expected to be measurable at the smaller 6th field sub-watershed level or larger 5th field HUC watershed level. Proposed mitigation measures would limit the amount of area subject to increased rates of runoff and Riparian Reserves are expected to filter and trap any eroded soils before being transported to surface waters.

No measurable change in streamflow timing or amounts is expected and no change in on-site or off-site groundwater supplies is expected. Disturbances on steep slopes (greater than 35 percent) are more susceptible to surface erosion because of higher velocities of surface runoff as gradients increase. In the Refined Proposed Action, use of skyline yarding methods on all sustained unit slopes greater than 35 percent will mitigate any risk of increased erosion rates by reducing the amount of surface disturbance. The implementation of BMP's is expected to mitigate any potential adverse effects from these alternatives to levels which are not measurable. WFP standard and guideline requirements for ground cover retention following logging and fuels treatment operations require higher levels of protection on severe erosion hazard soils which will reduce any potential risk of increased surface erosion in these areas.

The overall area in detrimental soil conditions (compaction, displacement, and severely burned) is expected to meet standards when post sale restoration of skid trails, landings, and temporary roads is completed (see Soil and Watershed Resources Specialist Report). In order to minimize soil disturbance, design standards are proposed which are expected to result in tractor harvesting methods meeting the WFP standards (WFP, Table IV-20, pg. IV-97). Designated skid trails, utilization of existing skid trails when in desirable locations, and winter logging when sufficient snow cover or frozen ground conditions to prevent compaction, are some of the design standards that would be implemented in order to meet soil standards. Past monitoring of harvest activities has shown that these mitigation measures are greater than 90 percent effective when implemented as designed (USDA Forest Service, 2000).

Proposed harvest activities would occur within three separate 6th field sub-watersheds of the Dry Project area which would disperse and reduce the effects of treatments in any single watershed. The percentage area of the Nile and Dry sub-watersheds treated by commercial thinning with this proposed action is approximately 6 percent and the area weighted reduction in canopy closure is only 0.87 percent. Any potential changes in hydrologic flow regimes are not expected to be measurable at a level greater than the current highest level of precision in streamflow measuring techniques which at best has a five to ten percent margin of error. Any additional canopy removal due to prescribed fire is not expected to result in any measurable changes in streamflows.

The differences in treatment acreage and roads between the No Action and the Refined Proposed Action are summarized below in Table III.XX. The Refined Proposed Action would treat approximately 548 total acres by commercial harvest and prescribed fire.

Table III.6: Evaluation Summary -- Soil and Watershed Resources.

Watershed Resource Evaluation Criteria	No Action	Refined Proposed Action
Total Acres of commercial timber harvest with underburning	0	548
Acres Treated by Ground Based Yarding Systems	0	304
Acres Treated by Ground Based Yarding on Severe Compaction Soils	0	0
Acres of Activity Slash Treatment	0	548
Acres Commercial Timber Harvest on High Sediment Delivery Risk Soils	0	134
Acres of Activity Slash Treatment on High Sediment Delivery Risk Soils	0	134
Area Weighted Canopy Closure Percent (total planning area) and (Marginal Change)	56.47% (0%)	54.53 % (-1.94 %)
Dry Creek Watershed Canopy Closure Percent and (Marginal Change)	46.57% (0%)	45.70 % (-0.87 %)
Miles New Temporary Road Construction	0	1.30
Miles Temporary Road Re-Construction	0	1.70
Hydrologic Road Density for Nile-Dry Watershed Area (not including Nelli or Glass Angel Projects)	4.38	4.45

Note: The treatment alternative shows weighted canopy closure percent will decrease 1.94 percent marginal change for the Dry Project. Most all of the harvest activity occurs in stands within the 40 to 69 percent canopy closure category which are reduced into the 10 to 39 percent category. The actual percentage of canopy closure being removed by timber harvest in the proposed action is approximately 25 to 35 percent on the commercially thinned treatment acreage (Chapter II). At the proposed level of tree crown canopy removal, changes in hydrologic timing and flows are not expected to be measurable at the watershed scale (Troendle, 1980).

Consistency Findings

The Nile Creek, Rattlesnake Creek and the Naches River downstream of the planning area have all exceeded the state temperature standard of 61 degrees F daily maximum for several days during the summer sampling period. All of the streams have been designated as water quality limited (category 5) for temperature on the current Washington State 303(d) list. This project would have no effect on the stream temperatures within the planning area or the downstream segments of Nile Creek, Rattlesnake Creek and the Naches Rivers. With the integrated design criteria of the Refined Proposed Action for limited harvest in riparian reserves and by only allowing fire to creep into riparian reserves without active lighting, none of the treatments will effect streamside vegetation or shading to measurable levels and therefore treatments will not affect this parameter or exacerbate the 303(d) listings downstream. TMDL shading levels would be met.

Integrated project design criteria and BMP implementation will ensure that water quality standards and the anti-degradation policy (Chapter 173-201A WAC) are expected to be met with the Refined Proposed Action. The Refined Proposed Action is not expected to substantially alter

the water quality. Full implementation of BMPs has been shown to be an effective method in preventing and controlling nonpoint source water pollution (Rashin, 2006), (USDA Forest Service, 2000). Monitoring would be conducted during the project in order to validate implementation and effectiveness of BMP's and assure compliance with the Clean Water Act, State water quality regulations and forest plan standards.

The project design criteria and implementation of mitigation measures for Riparian Reserves will ensure compliance with EO 11988 Floodplain Management (11988, 1977), and EO 11990 Wetland Protection (11990, 1977). Proposed unit boundaries have been located to avoid floodplains and wetlands. Vegetation and fuels management prescriptions were developed which will not affect stream shading or ground cover levels within riparian floodplain or wetland areas. These actions will provide protection and reduce the risk of detrimental effects to riparian areas and wetlands.

FISHERIES AND AQUATIC HABITAT

Refer to the Fisheries Specialist Report and Biological Evaluation (in project analysis file) for a comprehensive description of aquatic habitat, fishery populations and potential effects to these resources from this project. Additional information on the Dry Ridge PLTA in regards to fisheries and aquatic habitats can be found within the Nelli Restoration EA pages III-146-157.

AFFECTED ENVIRONMENT

Project Area Fish Species and Distribution

Fish distributions within sub-watersheds potentially affected by the project are shown in the following table.

Table III.3: Selected Fish Species Distribution on National Forest within project sub-watersheds

6th Field Sub-Watershed	Miles of Occupied Habitat				
	Steelhead	**Rainbow Trout**	**Cutthroat Trout**	**Bull Trout**	**Chinook Salmon**
Dry Creek-Naches River	0	0	3.2	0	0
Lower Rattlesnake	9.6	14.7	18.9	11.6	8.9
Nile Creek	4.6	4.6	10.3	4.6	0
Total Miles	**14.2**	**19.3**	**32.4**	**16.2**	**8.9**

Aquatic Habitat

Aquatic habitat conditions in the affected sub-watersheds were evaluated from District stream survey data and recent field observations. Stream surveys completed followed the Forest Service Region 6 stream inventory protocol. Stream survey data can be used to evaluate if WFP riparian area standards are being achieved in distinct stream reaches. The National Marine Fisheries Service (NMFS) Matrix of Watershed Condition Indicators for evaluating properly functioning conditions of habitat indicators will also be used in this document to evaluate current habitat conditions to properly functioning conditions. The NMFS matrix evaluation process will be used when the data format from stream surveys do not compare to WFP Standards. Refer to the Fisheries Specialist Report and Biological Evaluation, available in the project analysis file, for specific habitat data by stream survey reaches in the mainstem Naches River and Rattlesnake Creek watersheds.

In general, habitat in Dry Creek is considered in poor condition, due to disrupted perennial flows, deficient instream large wood, and channel incision.

Temperature

Wenatchee Forest Plan water temperature standards are as follows: The maximum water temperature will be $\leq$ 61 degrees F on any day and/or the average 7-day maximum temperature will be $\leq$ 58 degrees F. There has been a limited amount of water temperature data collected using continuously recording thermographs placed in streams during the summer months in the Naches mainstem and Rattlesnake Creek watersheds. Refer to the Soil and Watershed Resources analysis and specialist report for a complete discussion on water temperature baseline conditions and potential project affects.

Large Woody Debris (LWD)

Only one reach (Nile Creek reach 1) of the 17 stream survey reaches within the affected sub-watersheds was surveyed in 1995 or later. Therefore, LWD wood habitat data is inflated, and also dated because many surveys are 20 plus years old. Based on field observations during steelhead spawning surveys and project review, many stream segments (including Dry Creek) in the affected sub-watershed are considered to be deficient in LWD, compared to natural or reference conditions.

Pool Habitat

To evaluate pool habitat conditions by stream reach, the NMFS Matrix rates pools per mile scaled by the average wetted channel width. Only one of the 17stream reaches in the affected sub-watersheds is properly functioning by the NMFS Matrix pool density standard. Average residual pool depths appear to be within the range of natural variability, in relation to average bankfull channel widths.

Riparian Reserves

Riparian Reserve areas are functioning at risk, because there is a moderate loss of connectivity and function on first-third order stream channels. The loss of function is caused by past riparian timber harvest, recreation impacts, existing stream crossings and high road densities within Riparian Reserves.

Table III.4: Existing condition metrics of system roads and system OHV trails in proximity to Riparian Reserves and stream channels.

Sub-watershed (HUC 12) and Riparian Reserves road densities within National Forest boundary									
HUC 12 Sub-Watershed	**Watershed Size within NF (mi^2/acres)**	**Road and OHV trail stream crossings**	**Stream Miles**	**Percent Increase in Drainage Network***	**System Road/OHV trail Density (mi/mi^2)**	**Acres Riparian Reserves (RR)**	**Miles System Road in RR**	**Miles System OHV Trail in RR**	**System Road/OHV trail densities in RR (mi/mi^2)**
Dry Creek-Naches River	12.1 / 7,715	47	36.7	14.6	4.84	774.2	9.19	0	7.6
Lower Rattlesnake Creek	50.8 / 32,496	47	110.8	4.8	1.58	1,988.4	4.64	1.5	1.97
Nile Creek	30.03 / 19,220	96	79.2	13.8	3.73	2,410	9.08	1.62	2.84

*** Assuming 600 feet of drainage network connection at each system road/OHV trail stream crossing**

Streambank Stability

The WFP standard states that >90% ground cover should be provided by trees, shrubs, grasses, sedges, and duff within the floodplain and true riparian zone. Older stream surveys estimated streambank ground cover into four classes; Poor (0-25%), Fair (26-50%), Good (51-75%), and Excellent (>75%). More recent stream surveys measured lineal feet of unstable streambanks. Streambank ground cover conditions were rated fair to good for almost all stream reaches in the affected sub-watersheds.

Fine Sediment

Erosion and sedimentation within streams are natural processes influenced by streamflow, channel structure and stability, streambed composition and by disturbances within watersheds such as fire and landslides. Fine sediment from a fishery standpoint is generally defined as fine inorganic waterborne material below a certain specified diameter (Everest et. al. 1987). The WFP standard is to maintain < 20% fines ($\leq$ 1.0 mm) as the area weighted average in spawning habitat. The NMFS matrix identifies properly functioning sediment levels as < 12% fines (< 0.85 mm) in gravels.

Recent monitoring of fine sediment levels in the affected sub-watersheds has occurred. Gravel samples were collected to measure fine sediment (percent fines $\leq$ 1.0 mm in spawning gravels) using the McNeil bulk gravel core sampling method. Sampled reaches have met Forest standards, however one reach has approached the 20 percent threshold standard.

Table III.5: Fine sediment monitoring in the mainstem Naches River and Rattlesnake Creek watersheds.*

Stream	Reach[1]	Average Percent Fine Sediment* ≤ 1.0 mm by Reach				
		1997	2002	2009	2011	2012
Nile Creek	1	-	-	14.8	11.6	14.5
	2	-	-	***17.6***	12.6	16.6
Rattlesnake	1	-	12.1	-	-	-
	2	12.9	12.9	-	-	-

* Percent fine sediment ≤ 1.0 mm as the area weighted average in spawning gravels
*Numbers in **bold italic** are reaches approaching Forest standards*

Log Hauling

Reid and Dunne (1984) reported that sediment production within a watershed is positively correlated with road length and that road surface (gravel) erosion is very sensitive to traffic levels (particularly during wet conditions). Heavy truck traffic on wet road conditions was found to contribute sediment at 7.5 times the rate of the same roads on days of no use (Reid and Dunne, 1984). Design criteria restricts haul during wet periods so we do not expect greatly accelerated erosion to occur from log hauling. Most roads used for haul routes are surfaced with durable crushed rock. Even though surface rock minimizes sediment generation, heavy traffic breaks down surfacing material resulting in finer surface graduation and increased sediment transport from the road surface.

ENVIRONMENTAL CONSEQUENCES

Introduction

Proposed actions related to commercial timber harvesting, temporary road construction, log hauling on Forest roads, water drafting, and stream restoration treatments have the potential to directly or indirectly affect aquatic habitat or fishery populations.

Scale of Analysis

Project actions would occur within the Dry Creek-Naches River, Nile Creek, and Lower Rattlesnake Creek 6th field sub-watersheds. These sub-watersheds lie within the old Naches mainstem and Rattlesnake Creek 5th field watersheds. The action area determined to potentially affect fish species or aquatic habitat includes:

- Nile Creek at FSR 1601 crossing to its confluence with the Naches River
- Dry Creek down to its confluence with the Naches River
- Rattlesnake Creek from river mile 7, downstream to the National Forest boundary at river mile 5.2.

No Action

Taking no management action would result in no direct or indirect effects to aquatic habitat of fish populations. No beneficial effects to water temperatures, base flows, sediment regime, floodplain connectivity, instream large wood, and pool habitat would occur in Dry Creek

because floodplain habitat restoration would not occur. No watershed benefits from reducing tree densities in 25 acres of over stocked Riparian Reserves would occur. Tree growth and vigor would continue to be repressed due to competition and insect damage, limiting the production of large diameter trees in Riparian Reserves.

Water quality (fine sediment and chemical contamination) would not be affected, because timber hauling and dust abatement actions (water drafting from Nile Creek or non-water dust abatement application) would not occur.

There would be no potential watershed benefits from reducing the risk of stand replacing wildfires. Risk of wildfire occurrence and severe burn intensities could increase due to the cumulative increase of fuel densities. Without the proposed commercial thinning, fuel loadings would continue to increase. Watersheds subject to stand replacement wildfire with severe burn intensities may experience increased sediment delivery to streams.

Effects of the Refined Proposed Action

Commercial Timber Harvest, Activity Fuels, Temporary Roads, Firewood Harvest Units

Approximately 548 acres of commercial thinning acres is proposed, and approximately 3.0 miles of temporary roads would be constructed for log hauling. An additional 200 acres is proposed for firewood cutting (see Chapter II).

With project design criteria and the implementation of timber harvest and temporary road closure and decommissioning BMPs, no direct, indirect, or cumulative effects to fish habitat would occur from commercial thinning actions in the project area. Timber harvest units, temporary roads, and firewood harvest area are not within Riparian Reserves and are at least 300 feet distant of fish bearing streams. This would adequately buffer stream channels, preventing potential sediment delivery to the stream network. Timber sale units and temporary roads would are not in proximity to affect streambank stability, pool habitat, stream canopy shade, or potential LWD supply to stream channels.

Changes to forest canopy levels at the sub-watershed scale is minor (< 2%), so no measurable changes to hydrologic timing or stream flow is expected (Soil and Watershed Specialist Report). Concentrations of inorganic nutrients (e.g., N, P, K, Ca) in streams may increase after logging, but usually by moderate amounts and for short periods. The mobilization of nutrients is tempered by their adsorption onto soil particles and by their uptake by microorganisms that decompose stream detritus (Chamberlin et al., 1991). Implementing project design criteria and riparian buffer BMP's should prevent any measurable effects to instream dissolved oxygen levels.

Commercial timber or firewood harvest and temporary road construction would cause no direct or indirect to fishery populations or EFH because Dry Restoration activities:

- are not within Riparian Reserves
- do not construct temporary road stream crossings

- are adequately distanced from stream channels to prevent potential site scale soil erosion from connecting and delivering sediment to the stream network
- would not affect the large wood supply to stream channels
- would not affect canopy closure on perennial streams
- would not alter the peak/base flow regime
- would not involve instream disturbance that could harm fish directly

Log Hauling on System Roads

No directs effects to fish habitat is expected from log hauling. Indirectly, fine sediment runoff from road surfaces may increase because of log hauling traffic (Soil and Watershed Resources effects II-15). Some of this sediment would likely be washed from the road surface in the first precipitation event that is sufficient enough to cause runoff from the road surface. Most of the sediment washed from haul roads would probably be captured by vegetation in road ditches between the road and stream channels, or on the forest floor downhill from ditch relief pipes (not connected to stream networks). Fine sediments may reach fish bearing streams as either bedload or suspended sediment, depending on the particle size and the distance it must travel between the road and occupied habitat.

Because of the timing and spatial distribution, the potential increase in sediment from log hauling operations is not expected to cause any measurable change (indirect effect) in fine sediment levels within fish habitat in Nile Creek, Rattlesnake Creek or Dry Creek (See Soil and Watershed discussion and Specialist Report).

Dust Abatement and Road Maintenance

Approximately 20.53 miles of the haul roads may need periodic dust abatement to maintain the gravel road surface (prevent loss of fines in the gravel composition). Water is the most likely compound to be used for dust abatement. The proposed water drafting site is from Nile Creek, which is a fish bearing stream occupied by steelhead and bull trout. Steelhead and bull trout could be directly affected during water drafting for dust abatement or road maintenance, because stream flows could diminish, and shoreline water levels could drop if drafting occurs during summer low flow. This could strand juvenile fish that inhabit shallow stream margin areas, or disrupt normal feeding and holding activity, when workers position the drafting hose into the stream. By implementing project design criteria that limits water withdrawal to no more than 10 percent of the current stream flow, changes to water levels would be gradual, so there would be negligible potential for fish to be stranded along receding shoreline areas. Drafting hoses must be equipped with fish screens mesh size (3/32”) to prevent small fish from being sucked into the tanker truck. Disturbance to fish feeding and holding activity would be short term. The magnitude of these effects to fish in Nile Creek is considered to be discountable.

Proposed dust abatement (Chapter II) may also use new vegetable oil (soybean or canola) or lignosulfonates. Dust abatement on FSR 1600 would cross four intermittent streams that are within 800-1000 feet of Nile Creek, and FSR 1601 has one stream crossing over Nile Creek (MCR steelhead and bull trout habitat). Dust abatement treatments on roads in the Dry Creek

and Rattlesnake Creek sub-watersheds have cross two fish bearing streams and 10 intermittent stream channels.

Road segments potentially treated with dust abatement compounds have 17 stream crossings, three of which are fish bearing. Therefore dust abatement treatments (lignin and vegetable oil) are within proximity to affect listed and MIS fish and EFH. The probability of chemicals being indirectly delivered to fish bearing streams is greater than discountable. By implementing BMPs (Appendix A), such as no lignin or oil application within 25 feet of stream crossings of fish bearing streams, the effects of dust abatement with lignin (or vegetable oil) would be of discountable *magnitude*, because this would prevent delivery of dust abatement compounds to stream channels in measurable concentrations. Indirects affects to fishery populations would therefore be negligible.

Large Wood Supplementation to Dry Creek Floodplain

Cutthroat trout are the only fish species verified to occur within the treatment area of Dry Creek. Most of the stream channel is dry during low flows and fish survive base flow periods within isolated surface pools, which are disconnected by long segments of dry channel.

Figure III.5: Example of floodplain site after tree replenishment

During placement of instream large wood structures, fish may be directly affected in the short term when hand crews are working in the stream channel. Fish could be displaced temporarily from foraging activity to hiding cover during placement of large wood. Because most of the affected stream reach will likely be dry, few fish will potentially be disturbed during project implementation. Long term benefits to habitat conditions would exceed the short term negative effects to individuals.

Supplementing the wood deficient floodplain of the Dry Creek floodplain will indirectly benefit cutthroat trout at the site scale by improving habitat conditions. Fish habitat could improve by spawning gravel deposits; increased floodplain water storage and increased summer stream flows after the large wood structures capture bedload and organic debris. Pool habitat may increase within 2-5 years of wood supplementation, when the stream adjusts to the added structure. Large wood replenishment would help restore natural sediment routing and movement or deposition of bedload and organic debris. Currently the channel is downcut, and lacking needed structural roughness to capture gravels and fines, or recharge the floodplain water table. Increasing channel roughness and structure complexity would increase floodplain inundation during higher flow periods and help restore riparian conditions. This could improve water quality and timing of streamflows (Soil and Watershed Specialist Report).

Hand crews working on the streambanks to maneuver trees into the floodplain would likely cause some streambank disturbance. This could increase sediment recruitment to the stream channel at the project scale. These affects would be short term, and minimized by selecting stable areas to cross.

There is discountable probability that this project element would affect steelhead and bull trout habitat, which is 3.5 to 5.5 miles downstream in the Naches River. Minor amounts of sediment from the project area would not be delivered to the Naches River in measurable quantities. Dry Creek is too small to transport placed LWD off site and changes to base flows would not be measurable in the Naches River.

Approximately 200 trees (7”-15” dbh) would be cut within approximately 25 acres of Riparian Reserves. Trees selected for removal/placement would include fire intolerant species, diseased trees, and trees that are competing for space in the immediate vicinity of large ponderosa pine. Restoring large ponderosa pine stands is a key component of vegetation composition restoration in dry forest habitats. This would slightly move the thinning area (approximately 25 acres) towards fire regime restoration, and increase the vigor and health of large, fire resistant overstory tree species. As the trees would be placed in the flood prone area of Dry Creek, they would remain within Riparian Reserves. Because the action is expected to benefit aquatic organism habitat and hydrologic function at the site scale, Riparian Reserves would also be improved at the site scale.

Cumulative Effects

This analysis considers National Forest, State and private lands in the Naches mainstem and Rattlesnake Creek 5th field watersheds as the cumulative effects area.

The proposed action would contribute incrementally to cumulative watershed effects in the mainstem Naches River and Rattlesnake Creek watersheds. Short term effects to soil compaction and soil erosion of upland forest habitat from timber harvesting and use of temporary logging roads and landings, is expected. These effects are expected to abated after temporary roads and skid trails undergo soil restoration treatments (soil de-compaction) as required by BMP’s. Potential short term soil erosion is expected to be effectively captured and contained within stream buffer areas, preventing any sediment delivery to stream channels. These watershed effects occur across the project area and contribute cumulatively to other watershed disturbances, including high road and OHV trail densities.

Reducing vegetative fuel loading through 548 acres of commercial timber harvest and 200 acres of firewood removal should continue to move both watersheds towards a restored fire regime, and reduce the risk of stand replacing wildfire. Other National Forest projects (Nile, Canteen, and Rattle timber sales) in these watersheds and private logging (mostly in the Rock, Gold, Benton, Dry, and Nile Creek drainages) have already reduced fuel loadings markedly. Pending watershed restoration projects in the Nile Creek drainage (Glass Angel and Nelli) within 5-10 years would also restore the fire regime and vegetative structure at the landscape scale by commercial thinning, TSI, and prescribed underburning.

Adjacent private landowners, both within the Forest boundary as well as outside the boundary, have harvested timber within these watersheds, with potentially less protection to stream channels. Private and WA State land management will continue on non-federal lands and conditions on these lands are expected to contribute cumulatively to impacts on riparian and aquatic health. State forest practices, the management guidance and regulations that all state and private foresters are required to follow, are the mechanism for addressing cumulative riparian and aquatic effects from logging on private lands.

Fish habitat has been degraded in these watersheds, in part due to the extensive road networks in these sub-watersheds and riparian timber harvest. Stream crossings and valley bottom roads have increased the drainage network, reduced floodplain connectivity, and reduced the supply of large wood to streams. It is likely that past timber harvest on private lands have contributed to a reduction in the supply of large wood to fish bearing streams. Future road decommissioning is planned in the mainstem Naches River and Rattlesnake Creek watersheds. Included within the Glass Angel, Gold Spring, Nelli, and Little Rattlesnake restoration projects, approximately 41 miles of system road would be decommissioned, of which approximately 5.9 miles is within Riparian Reserves, and 29 stream crossings would be removed/restored. Approximately four miles of valley bottom road on State land would be decommissioned, restoring floodplain connectivity and steelhead habitat in Little Rattlesnake Creek. Cumulatively these restoration projects will reduce watershed road densities, drainage networks, and improve floodplain function and fish habitat in these watersheds.

Summary Effects Determinations on Threatened MCR steelhead, Columbia River bull trout, Designated Critical Habitats, Essential Fish Habitat for Chinook and coho salmon

Commercial tree harvest and associated temporary road construction would cause no effect to listed fish habitat in the project area. Log haul on system roads may cause negligible, short term affects to listed fish habitat from increased sediment delivery to habitat. Water drafting from listed fish habitat may cause negligible, short term affects to listed fish from disturbance and fluctuating stream flow. Proposed activities in this project "may affect, but are not likely to adversely affect" federally listed fish species (MCR steelhead and bull trout) and their designated critical habitat. Essential Fish Habitat for chinook and coho salmon "would not be adversely affected".

Habitat Viability Determination for Management Indicator Fish Species

Cutthroat trout occupy approximately 1,014 miles of habitat on the entire Wenatchee National Forest, and approximately five miles of habitat potentially would be affected by the project (approximately 0.5 percent of Forest distribution). Within the affected sub-watersheds, cutthroat trout have widespread distribution, occupying approximately 32.4 miles of habitat within the National Forest.

Commercial tree harvest and associated temporary road construction would cause no effect to MIS habitat in the project area. Log haul on system roads may cause negligible, short term affects to MIS habitat from increased sediment delivery to habitat. Large wood supplementation to Dry Creek would indirectly benefit MIS habitat by restoring approximately 2.0 miles of

occupied habitat. Habitat in Dry Creek is considered in poor condition, due to disrupted perennial flows, deficient instream large wood, and channel incision.

Although individuals may be negatively affected by disturbance during LWD supplementation in the short term, this project element will improve habitat for cutthroat trout at the site scale for the long term. Therefore, this project will should improve their viability on the Wenatchee National Forest, and not contribute to a negative trend.

Consistency Findings

Aquatic Conservation Strategy

Implementation of BMP's, stream buffers and other design criteria for the various components of the proposed action show consistency with the ACS for all alternatives at the site scale and watershed scale. In the long term, aquatic habitat at the watershed scale could show improvement as the plant community aligns towards a more natural fire regime and fire frequency. Site scale thinning of overstocked stands in Riparian Reserves will favor fire resistant trees, improving their growth rates, and vigor. Thinned trees will be placed into the floodplain area of Dry Creek, improving fish habitat and floodplain connectivity. Larger, fire tolerant tree species, will eventually fall into stream channels and improve floodplain function and fish habitat. Refer to Appendix A of the Fisheries Specialist Report for the entire ACS consistency analysis.

WILDLIFE

Unlike the other resource sections in Chapter III, wildlife will be divided up by species or species group. Under each grouping, effects of each alternative will be displayed. Required consistency findings will also be disclosed in each section.

Regulatory Framework

Effects on Federally listed and proposed species and designated critical habitat are evaluated in a separate Biological Assessment (BA) and summarized here (USDI Fish and Wildlife Service, 1973 revised list April 15, 2008a). Effects to R6 sensitive species have been evaluated in the Wildlife Specialist Report (which serves as the Biological Evaluation or BE) and is also summarized here (USDA Forest Service 12/1/2011 rev). Copies of the BA and Wildlife Specialist report have been added to the Dry Restoration analysis file. In addition, the review and disclosure of impacts on other species included in this report are intended to meet the requirements of NEPA.

Analysis Method and Area of Analysis

Collectively assessments of the species habitats identified below are used to identify the scope of the proposed action and alternatives and ensure the viability of terrestrial wildlife species is maintained across the project area. Information used in this analysis includes site specific information collected during wildlife inventories of the project area; district-wide wildlife

monitoring information; GIS coverage's and data sets related to wildlife habitat, site and landscape conditions. The Gaines et al. (2003) linear analysis report was used to determine effects of roads on habitat and species; used to generating Human Influence levels and security habitat used in the cumulative effects analysis.

The scale of analysis varied according to species and often extended well beyond the Dry Project Area. Analysis area used for cumulative effects consists of Dry Orr Landscape Analysis Area (approximately 70,000 acres), the Rattlesnake Creek and Naches Mainstem 5th field Watersheds (approximately 171,869 acres); and the Haystack Managed Late Successional Area (approximately 24,644 acres).

The analysis area used for direct and indirect effects for wildlife is a defined area referred to as the Dry Ridge PLTA (approximately 11,769 acres) described in Chapter I. Dry Restoration Project is part two of a two part treatment program within the Dry Ridge PLTA Boundary Effects of commercial vegetation treatment, temporary roads and log-haul routes will be the primary analysis discussed for the Dry Restoration Project. In this report, Dry treatment areas refer to the commercial logging units, firewood cutting units, and the stream restoration area.

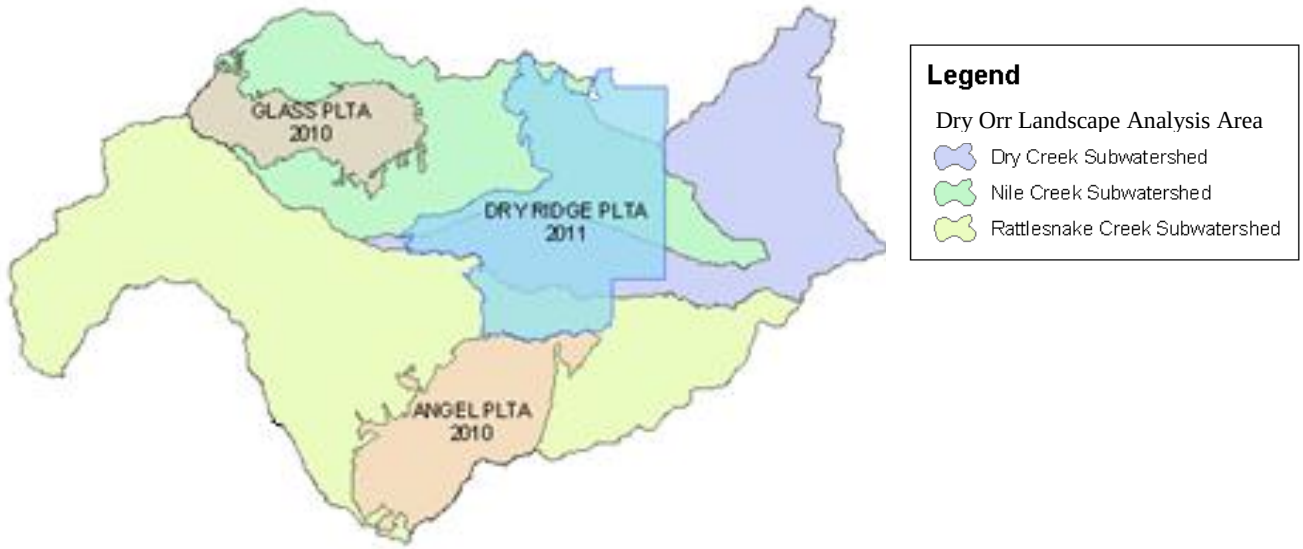


Figure III.6: Dry Orr Landscape Analysis Area showing each Potential Landscape Treatment Area and Subwatersheds.

Environmental Setting

The Dry Ridge PLTA provides habitat for wildlife, ranging from dry meadow to talus, and from shrubland to eastside mix confer forest habitat. These varied habitats provide for a diverse array of wildlife species. Approximately 80% of the Dry Ridge PLTA is classified as ponderosa pine and Douglas-fir forest (dry forest). It provides important habitat for several rare species including federally listed and several species included on the Regional Forester's Sensitive Animal List (USDA Forest Service 2011). The Forest has identified several animals as Management Indicator Species in Wenatchee Land and Resource Management Plan (WFP) and the project area provides habitat for neotropical migratory birds of concern.

Federally Listed and Sensitive Wildlife Species

Table III.42 Displays federally listed threatened, endangered, and designated critical habitat as well as state candidate species, Wenatchee NF management indicator species (MIS) and NWFP survey and manage (S&M) species thought to occur presently or historically on the Okanogan-Wenatchee National Forest (USDI Fish and Wildlife Service (USDI Fish and Wildlife Service, 1973 revised list April 15, 2008). This table also displays Regional Forester Sensitive Terrestrial Wildlife Species (USDA Forest Service 12/1/2011 rev) on the Okanogan-Wenatchee National Forest. Each species status and know occurrence in the Dry Ridge PLTA as well as a potential for impacts to species resulting from the proposed Dry Restoration Project are displayed.

Table III.7 Federally listed threatened and endangered species, designated critical habitat, candidate species; Regional Forester Sensitive Species & S&M Species on the Okanogan-Wenatchee National Forest.

Species	Status	Habitat in the PLTA	Presence in the PLTA	Potential Risk from Dry Project
Gray wolf	FE	Yes	No	**Potential**
Canada lynx	FT	No	No	None
Critical Habitat for the Canada lynx	Designated	No	No	None
Grizzly Bear	FT	No	No	None
Northern spotted owl	FT	Yes	Yes	**Potential**
Critical Habitat for the Northern spotted owl	Designated 2012	Yes	yes	**Potential**
Marbled murrelet	FT	No	No	None
North American wolverine	FC/SC/SEN	Yes	No	**Potential**
Pacific fisher	FC/SE/SEN	No	No	None
Townsend's big-eared bat	SC/SEN	Yes	No	**Potential**
Pallid bat	SM/SEN	Yes	No	None
Western gray squirrel	ST/SEN	Yes	Yes[1]	None[1]
Mountain goat	SEN/MIS	No	No	None
Moose	SEN	No	No	None
Ferruginous hawk	SEN	No	No	None
American peregrine falcon	SS/SEN	No	Yes[1]	None[1]
Bald eagle	SS/SEN	Yes	Yes[1]	None[1]
Blackswift	SEN	No	No	None
Columbia sharp-tailed grouse	SC/SEN	No	No	None
Common loon	SS/SEN	No	No	None
Gray flycatcher	SEN	Yes	No	**Potential**
Great gray owl	SEN/S&M	No	No	None
Harlequin duck	SEN	No	No	None
Ash-throated flycatcher	SEN	No	No	None
Sandhill crane	SE/SEN	No	No	None
White-headed woodpecker	SC/SEN	Yes	Yes	**Potential**
Lewis' woodpecker	SEN	No	No	None
Larch Mountain salamander	SS/SEN/S&M	No	No	None
Pacific pond turtle	SE/SEN	No	No	None
California Mountain kingsnake	SC/SEN	No	No	None
Striped whipsnake	SC/SEN	No	No	None
Blue-gray taildropper	SEN/S&M	No	No	None
Chelan mountainsnail	SEN/S&M	No	No	None
Grand Coulee mountainsnail	SEN	No	No	None
Shiny tightcoil	SEN/S&M	Yes[1]	No	None[1]
Puget Oregonian	SEN/S&M	No	No	None
Masked duskysnail	SEN/S&M	No	No	None
Astarte fritillary	SEN	No	No	None
Freija fritillary	SEN	No	No	None
Great Basin fritillary	SEN	No	No	None
Meadow fritillary	SEN	No	No	None
Labrador sulphur	SEN	No	No	None
Lustrous copper	SEN	No	No	None

Melissa arctic	SEN	No	No	None
Mardon skipper	SEN	No	No	None
Peck's skipper	SEN	No	No	None
Tawny-edged skipper	SEN	No	No	None
Subarctic darner	SEN	No	No	None
Zigzag darner	SEN	No	No	None
Subactic bluet	SEN	No	No	None

SEN=Regional Forester's Sensitive Species SC=State Candidate; SM=State monitor; SS=State Sensitive
FC=Federal Candidate; FT=Federal Threatened; FE=Federal Endangered; Designated=Federal Designated
S&M=Forest Service Survey and Manage species MIS=Wenatchee National Forest Management Indicator Species
[1]Habitat and/or species may occur within the Dry Ridge PLTA but not found within the Dry Restoration treatment area.

Regarding federally listed species; the project area does not occur within the documented range for the marbled murrelet and is located outside of the Grizzly Bear Recovery Zone. Although the project area exists within approximately 2,339 acres of the Rattlesnake LAU (Lynx Analysis Unit) it does not occur within mapped potential lynx habitat. Habitat for the fisher exists within the project area, however populations in Washington are thought to be extirpated, or contain only remnant scattered individuals (Hayes and Lewis 2006). No risk factors for fisher exist in the project area since this species is highly unlikely to occur. This project will not affect species that do not occur and habitat that is not present within or adjacent to the project area. Therefore the grizzly bear, Canada lynx, marbled murrelet, and Pacific fisher will not be discussed further. The project will have "no impact" on sensitive species that do not occur or where habitat does not exist within the project area. They will not be discussed further within this analysis.

Although habitat and sightings have occurred within the Dry Ridge PLTA, a no risk factor was concluded for the shiny tightcoil, western gray squirrel, pallid bat, bald eagle, and peregrine falcon as these species are highly unlikely to occur within the Dry treatment area. None of these species have been documented within the Dry treatment area and nesting habitat for the bald eagle and American peregrine falcon does not exist within the Dry Ridge PLTA. No further discussion will occur for the shiny tightcoil, western gray squirrel, pallid bat, bald eagle or peregrine falcon.

Effects to the following threatened, endangered, and sensitive species will be discussed further in this analysis: gray wolf, northern spotted owl, critical habitat for the northern spotted owl, North American wolverine, Townsend's big-eared bat, gray flycatcher and white-headed woodpecker.

WHITE-HEADED WOODPECKER, GRAY FLYCATCHER, AND TOWNSEND'S BIG-EARED BAT AND FLAMMULATED OWL (PONDEROSA PINE/DOUGLAS-FIR LATE- SUCCESSIONAL ASSOCIATED SPECIES)

The white-headed woodpecker, gray flycatcher, flammulated owl, and Townsend's big-eared bat prefer open ponderosa pine stands (USDA Forest Service, Okanogan-Wenatchee National Forest 2010; Christy, R. E., and S. D. West. 1993; Marshall et al. 2003). Effects to these species will be discussed together. Management consideration for the white-headed woodpecker will also apply to other late-successional pine dependent species such as the white-breasted nuthatch and pygmy nuthatch. The flammulated owl is a Bird of Conservation Concern (BCC); listed as a species of management concern. This owl is associated within a mosaic of grassy openings, open understories, dense thickets within mixed fir, and mature forests with sufficient quantities of snags (Altman 2000). Old forests consisting of ponderosa pine and Douglas-fir seem to be a key component of flammulated owl home ranges (Wisdom et al. 2000). Although the

flammulated owl uses both ponderosa pine/Douglas-fir and mixed fir forest types, effects to this species will be included in this ponderosa pine/Douglas-fir late-successional section.

Through the EMDS landscape analysis (Chapter I), a need was identified to increase white-headed woodpecker habitat within the Dry Orr Landscape. The amount of current white-headed woodpecker habitat was determined to be at the lower end of the historic and future range conditions within the Dry Orr Landscape Analysis area, indicating an opportunity to restore white-headed woodpecker habitat to the Dry Orr Landscape. A need to increase patch size for white-headed woodpecker habitat was also identified. Several stands within the Dry Ridge PLTA were identified as potential areas to restore white-headed woodpecker habitat; with the potential of providing higher quality habitat within 10 years post treatment.
One of the key Desired Future Conditions identified for the Dry Restoration Project is to restore proper forest composition, structure, function, and pattern within the inherent range of variability. Since the majority (80%) of the Dry Ridge PLTA is made up of dry forest habitat (ponderosa pine), the white-headed woodpecker, gray flycatcher, Townsend's big-eared bat and late-successional species dependent on ponderosa pine/Douglas-fir habitat have the greatest potential to benefit from the proposed Dry Restoration Project.

AFFECTED ENVIRONMENT

White-headed Woodpecker (Sensitive Species)

According to Wisdom et al. (2000) broad-scale trends in habitat for white-headed woodpeckers have declined by >60% from historical to current periods and been completely eliminated in >40% of the watersheds within the Interior Columbia Basin Ecosystem Management Project. Within its core of historical habitat, declines in source habitats were extensive in the Northern Cascades (89%) and Southern Cascades (66%) from Ecological Reporting Units or ERUs (Altman 2000). White-headed woodpecker habitat was obtained from the Forest Plan Revision data layer 2011 and from the Naches Ranger District vegetation layer. Approximately 2,375 acres of marginal white-headed woodpecker habitat occurs in the Dry Orr Landscape Analysis area; 556 acres within the Dry Ridge PLTA and approximately 199 of these acres occur within the Dry commercial harvest units or firewood cutting units.

White-headed woodpecker habitat within the Dry Orr Landscape Analysis area is considered to be marginal due to the lack of medium and large diameter ponderosa pines trees, limited seed source, lack of late-seral conditions(including the lack of snags), and the presence of an understory component comprised of fir encroachment with limited ponderosa pine regeneration. Ponderosa pine seed production is predominantly by large, dominant trees in open situations (Oliver and Ryker 1990, Altman 2000 p. 36-39 & Wisdom et al 2000 p. 165,166). The DecAID analysis for the Dry Orr Landscape Analysis area indicated a more than adequate amount of structure (such as snags and down wood) to support white-headed woodpecker in the ponderosa pine and Douglas-fire habitat type. The current stand condition of closed canopy, multi-story and densely stocked is not a desired condition for white-headed woodpecker habitat. White-headed woodpeckers require mature old-growth ponderosa pine forest with an open canopy, gaps and clump configuration. Refer to the wildlife specialist report for detailed analysis of DecAID.

The white-headed woodpecker was chosen as focal species under the Okanogan-Wenatchee National Forest Restoration Strategy (USDA Forest Service 2010). Focal species are closely associated with forested habitats and their populations are highly influenced by changes to forest structure. The white-headed woodpecker was selected as one of the focal species in the Dry Orr Landscape Analysis to represent old-forest structural class in the ponderosa pine cover type.

Limited surveys and studies of white-headed woodpeckers have occurred throughout the Okanogan-Wenatchee National Forest. The Forest Service began baseline monitoring surveys for white-headed woodpeckers within the PLTA spring 2011. The Yakama Nation has been studying white-headed woodpeckers within the PLTA for over ten years (Kozma and Kroll 2012). They have been found in second growth with remnant large pine and mature stands of ponderosa pine and dry mixed conifer forests with fairly open crowns; 40% or less canopy closure (Kozma 2010). Approximately eight known nest sites have been documented within the PLTA. Four incidental observations with no known nests have been documented within the Dry commercial harvest and firewood treatment units.

Gray Flycatcher (Sensitive Species)

Approximately 127 acres of gray flycatcher habitat exists in the Dry Ridge PLTA. Habitat within the project exists in the form of ponderosa pine overstory with a bitterbrush understory and approximately two acres exist within the Dry treatment area. This habitat occurs along the eastern edge of the Dry Ridge PLTA. No gray flycatcher sightings have been documented within the Dry Ridge PLTA, however no surveys have occurred for them.

Townsend's Big-eared Bat (Sensitive Species)

Townsend's big-eared bats feed primarily on moths, and foraging habitat consists of open dry forests, meadows, and grasslands (Christy and West 1993). A Townsend's big-eared bat maternity roost site was found within four miles of the Dry treatment area, well within foraging distances recorded from day roost sites (Hayes and Wiles 2013). Suitable foraging habitat is located throughout the Dry treatment area.

Flammulated Owl (Birds of Conservation Concern)

According to Wisdom et al. (2000) broad-scale trends in habitat for flammulated owl have declined by >60% from historical to current periods and been completely eliminated in >40% of the watersheds within the Interior Columbia Basin Ecosystem Management Project (ICBEMP).

Figure III.7: Flammulated Owl. Rich and Nora Bowers 2014, BowersPhoto.com

Within its core of historical habitat, declines in source habitats were extensive in the Northern Cascades (72%) and moderate in the Southern Cascades (29%) from Ecological Reporting Units (ERUs) (Altman 2000).

Through the years the Naches District wildlife staff has documented numerous flammulated owl detections within the Dry treatment area. These detections have been associated with dense thickets and open, mature mixed fir stands. Although past timber practices created flammulated owl foraging habitat in the form of openings and open understories, this habitat is currently compromised by encroaching conifers (refer to Vegetation Affected Environment section in Chapter 3). Approximately 431 acres of flammulated owl nesting and roosting habitat occurs within the Dry Ridge PLTA.

ENVIRONMENTAL CONSEQUENCES

No Action

If the Dry Restoration Project does not occur, there is the potential for large scale removal of habitat and reduced foraging opportunities. Left in its present condition, dense, overstocked stands with closed tree canopies would continue to result in increased risk for insect and disease epidemics, leading to increases in tree mortality, fuel loading and risk for large, high-severity wildland fires outside of the normal (historic) range of variability (Rippy, et al., 2005).

Under the No Action scenarios, the Townsend's big-eared bat would benefit in the short term from the increase in insects. Snags would most likely be small and medium in size, not favoring white-headed woodpecker needs. Tree growth would continue to be stunted, giving little opportunity for large tree or snag development and preventing the development of quality white-headed woodpecker habitat in the dry forest types (refer to Vegetation Affected Environment in Chapter 3). Dense, overstocked stands would continue to increase; resulting in limited habitat within the Dry Ridge PLTA for the gray flycatcher and Townsend's big-eared bat. Flammulated owl roosting habitat would abound but it would lack functionality due to limited available nesting and foraging habitat nearby (Altman 2000).

Under the no action scenario there is a high risk of loss to the remaining ponderosa pine and mixed-conifer overstory from stand replacing fires due to the high fuel loads in the densely stocked understory (Harrod et al. 2007). A stand replacing fire is highly likely within the near future (refer to fuels discussion in Chapter 3). A stand replacing fire would greatly reduce foraging opportunities for the white-headed woodpecker (Rapheal & White, 1984) (Wightman, Saab, Forristal, Mellen-Mclean, & Markus, 2010), gray flycatcher, flammulated owl and Townsend's big-eared bat. Nesting habitat for the flammulated owl, white-headed woodpecker and gray flycatcher would be removed at a landscape level; potentially impacting local populations of flammulated owls and white-headed woodpeckers.

Effects of Refined Proposed Action

Direct and Indirect Effects

The Refined Proposed Action has the potential to directly affect ponderosa pine associated species through disturbance and habitat alteration. Additionally, the white-headed woodpecker could potentially be affected indirectly through impacts to its food source. Acres of habitat modified, potential for disturbance at active known nest sites, alteration of key structures such as snags, large trees, and changes to the Habitat Influence Index in regards to roads will be used to evaluate effects.

Disturbance is expected to be negligible as a result of project design criteria and implementing mitigation measures. Disturbance to individuals could result when human presence and machinery are located near the nest for an extended time period. Although no known white-headed woodpecker, flammulated owl or gray flycatcher nests have been documented within or near the Dry treatment area, timing restrictions are in place to restrict vegetation treatment activities near active nest sites for these species if nests are found (refer to Appendix A for specific mitigation measures). The implementation of these mitigations will greatly reduce the potential impacts to nesting white-headed woodpeckers, flammulated owls and gray flycatchers. Disturbance resulting from proposed temporary road construction, dust abatement and log hauling are expected to be negligible as activities are generally short term.

Effects to food source are expected to be negligible. For the white-headed woodpecker, large and very large and old trees as well as all trees >25" dbh will be retained-Chapter II (important source of insects and seeds for the white-headed woodpecker) (Bull et al 1986). Incidental large trees may be removed as hazard trees, but the amount removed on the landscape will be undetectable. Refer to MIS (primary cavity nesters) discussion for additional assessment of impacts to snags and down wood.

Overall the proposed vegetation treatment is expected to improve habitat conditions for the white-headed woodpecker, Townsend's big-eared bat, gray flycatcher, flammulated owl and ponderosa pine/Douglas-fir late-successional dependent species. The main impacts vegetation treatment would have on the white-headed woodpecker, gray flycatcher, flammulated owl and Townsend's big-eared bat is habitat alteration. One of the purposes and needs identified for the Dry Restoration Project is to improve and protect existing habitat and develop future white-headed woodpecker and flammulated owl habitat. For the white-headed woodpecker, the proposed vegetation treatment would improve the existing 199 acres of marginal habitat to quality habitat within 10 years post treatment and potential create an additional 1,486 acres of white-headed woodpecker habitat 5 to 15 years post treatment within the Dry treatment area (refer to vegetation discussion Chapter III). The created habitat is strategically placed to connect existing small patches of habitat with the objective to create large contiguous patches of high quality white-headed woodpecker habitat. Creating this quantity of contiguous habitat has the potential to benefit local populations of white-headed woodpeckers. For the flammulated owl, the proposed vegetation treatment is designed to create a mosaic of open forests (grassy openings and open understories) among existing patches of dense thickets and mature forest which currently serve as occupied roosting and nesting habitat. Approximately 176 acres of flammulated foraging nesting habitat would be improved or created while protecting the existing

occupied nesting and roosting habitat. The existing flammulated roosting and nesting habitat occurs primarily outside of the Dry commercial thinning units.

Overall habitat quality for the Townsend's big-eared bat, gray flycatcher, white-headed woodpecker, flammulated owl and other species dependent on late-successional ponderosa pine forests would improve with the proposed vegetation treatments. Commercial harvest and firewood area treatments are designed to thin from below; removing younger grand fir and Douglas-fir which would result in more open ponderosa pine stands favored by the white-headed woodpecker and flammulated owl. The proposed vegetation treatment will create gaps that mimic historic spatial patterns. These gaps are important as white-headed woodpeckers typically locate their nests on the edges of openings (Frederick and Moore 1991). Gaps would also provide foraging opportunities for the flammulated owl, gray flycatcher and Townsend's big-eared bat. Snag numbers will be monitored after prescribed burning to determine if snag requirements were met. Pile burning within the units would have minimal short term impacts on flammulated owl and gray flycatcher foraging habitat. Pile burning may alter or remove some shrubs in the short term (five years), but in the long term (10+ years) it could encourage shrub growth as what was observed in the Nile Timber Sale (antidotal l observation).

Overall shrub growth would improve foraging habitat for the gray flycatcher and flammulated owl but not for the white-headed woodpecker. Restoration of vegetative structure, composition, and pattern will allow natural processes to function and provide resilience to uncharacteristic wildfires, insect infestations, and disease. If ponderosa pine is unsuccessful at establishing through natural regeneration, ponderosa pine seedlings will be planted. White-headed woodpecker and flammulated owl presence will be monitored in the treated stands to determine if treatment was effective at creating and or improving white-headed woodpecker and flammulated owl habitat.

Cumulative Effects

The geographic boundary of the area for cumulative effects is the Naches Mainstem and Rattlesnake Creek 5th field HUCs. The temporal boundary is approximately 80 years in the past, when timber harvest in the Nile area began to 15 years in the future, the estimated time when additional restoration projects such as fuels treatment will once again be applied to the landscape. Effects of past vegetation management activities (logging, piling and burning) and woodcutting have had major impacts on historic snag and down wood levels within the project area as well as the Dry Orr Analysis area. Widespread removal of large ponderosa pine trees occurred on the Naches District in the early to mid-1900s. Large and very large snags have also been removed as firewood in the Dry Ridge PLTA. Approximately 84 percent of the Dry Ridge PLTA has been harvested in the past, mostly between 1930 and 1994 and mostly in stands with old, large and very large trees relatively abundant. Prior logging has included individual tree selection and clear cutting. Many large and very large larch snags were removed as firewood from both logged and unlogged stands on flat ground. The cumulative effect at the scale of the project area and its component stands is that old, large/very large trees occur at much lower levels than historically (refer to Vegetation Effects Analysis in Chapter 3). Ninety five percent of the forested acres in the Dry Ridge PLTA are of mid or small size classes with very little in the large size class on the landscape. This condition lacks the current availability of large snags and logs and large green trees on the landscape and the recruitment of future large snags and

down logs. Gaps created from the overstory removal have regenerated with Douglas-fir and grand fir; creating a multi-story, dense canopy. This is uncharacteristic of ponderosa pine stands; an unfavorable condition for white-headed woodpeckers.

Cumulative restoration treatments are expected to improve habitat conditions (quantity and quality) at a landscape level for the white-headed woodpecker, Townsend's big-eared bat, gray flycatcher, flammulated owl and ponderosa pine/Douglas-fir late-successional dependent species. The additional white-headed woodpecker habitat created within the Dry Orr Landscape Analysis Area has the potential of greatly improving conditions for ponderosa pine and Douglas-fir late-successional dependent species.

The Dry Restoration Project would potentially develop 1,486 acres, Nelli Restoration Project 1,043 acres, and Glass Angel Restoration Project 7,076 acres for a total of approximately 9,605 acres. This is an increase of 7,230 acres from what currently exist in the Dry Orr Landscape Analysis Area. Creating the open pine stands for the white-headed woodpecker would improve foraging habitat for the Townsend's big-eared bat, flammulated owl and gray flycatcher as well. Silvicultural and fuels treatments from past, ongoing and foreseeable future fuels and vegetation treatments in the Naches Mainstem and Rattlesnake Creek Watersheds have and will focus on implementing dry forest restoration treatments; potentially creating additional white-headed woodpecker habitat. More than 50% of these 5th field watersheds will be treated within the next five years. Mitigations are in place to reduce impacts to the flammulated owl as a result of broadcast burning treatments in the Dry Ridge PLTA. Approximately 431 acres of flammulated owl nesting and roosting habitat within the Dry treatment area will be degraded but not downgraded as a result of broadcast burning (refer to Appendix A for specific mitigation measures). For the most part, broadcast burning would not affect crown closure.

Treating high risk vegetation would reduce fuel loading, creating effective fuel breaks for primary cavity excavators and nester habitat. Since more than 50% of the two 5th field watersheds will be treated with the forest restoration and dry site strategy, the proposed project in conjunction with the surrounding silvicultural and fuels treatment projects will add to past, present, or future actions to create substantial cumulative effects that would benefit the white-headed woodpecker, flammulated owl, gray flycatcher, and Townsend's big-eared bat.
The past and foreseeable road and trail closures within the Dry Orr Analysis area will generally improve habitat conditions for the white-headed woodpecker by the reduction of open roads. Reducing open roads will reduce the opportunity for snags and down wood removal from firewood cutting. The Forest Motorized Vehicle Use program proposes less than 5 miles of additional OHV trails within the Dry Orr Analysis area. These trails would add to the existing human use but not detectable at a landscape level. There are negative factors associated with roads such as snag and log removal from firewood cutting and hazard tree management and the creation of edge (Gaines et al. 2003), however, these factors are minor within the Dry Orr Landscape Analysis Area as indicated by the low level of human influence on primary cavity excavators determined from the Gaines et al. (2003) linear analysis report. For detailed description of human influence on primary cavity excavators refer to the primary cavity excavator discussion in the Management Indicator Species (MIS) section of this effects analysis.

No substantial cumulative effects to the white-headed woodpecker, gray flycatcher, flammulated owl or Townsend's big-eared bat would result as the travel management associated with the past

and foreseeable future projects in the Naches Mainstem and Rattlesnake Creek Watersheds along with the future Motorized Vehicle Use proposal. No measureable amount of habitat alteration or removal is anticipated to occur or has resulted from past travel management actions.

Overall the Dry Restoration Project combined with foreseeable cumulative effects will benefit species dependent on late-successional ponderosa pine, such as the white-headed woodpecker, flammulated owl, Townsend's big-eared bat and gray flycatcher. This would result through the reduction of disturbance (reduced road density), reduction of stand replacing fire risk and the restoration of late-successional ponderosa pine habitat. The Refined Proposed Action alternative "may impact individual" white-headed woodpeckers, gray flycatchers, Townsend's big-eared bat, flammulated owls and other late-successional ponderosa pine associated species during project implementation, but it is not likely to lead to a trend towards Federal listing or a loss of population viability". This is based on alteration of habitat and potential for minimal disturbance.

NORTHERN SPOTTED OWL, DESIGNATED CRITICAL HABITAT FOR THE NORTHERN SPOTTED OWL, NORTHERN GOSHAWK AND EASTSIDE-MIXED CONIFER LATE-SUCCESSIONAL DEPENDENT SPECIES (LSR/MLSA)

The northern spotted owl and northern goshawk inhabit similar habitat which is eastside-mixed conifer, late-successional habitat. Therefore, effects to these two species and late-successional associated species (such as the brown creeper, American marten, and northern flying squirrel), will be discussed together. Discussion of effects to northern spotted owl habitat can be applied to the northern goshawk and other late-successional associated species.

Figure III.8: Pair of northern spotted owls, Phillps 2010.

The Dry Restoration Project did not identify the development of spotted owl habitat as a "Purpose and Need", but did identify the protection of existing high-quality habitat as a high priority. The location and amount of current Nesting Roosting Foraging (NRF) habitat was evaluated at a landscape level and compared to historic and future reference conditions using the Ecosystem Management Decision Support (EMDS) process (USDA Forest Service 2010). The amount of existing NRF habitat was determined to be within the middle of range for historic and future conditions within the Dry Orr Landscape Analysis area. An opportunity to create additional suitable habitat within the Dry Orr Landscape Analysis area surfaced as a result of using EMDS. The location to create high-quality suitable habitat was identified outside of the Dry Ridge PLTA; in the more mesic forest habitats to the west. Creating high-quality suitable spotted owl habitat in mesic forest types is likely to be more sustainable over time than in dry forest habitat; pertinent when considering climate change. The Dry Ridge PLTA primarily occurs in dry forest habitats where NRF habitat is of low-quality.

AFFECTED ENVIRONMENT

Northern Spotted Owl (Threatened Species) and Northern Goshawk (Species of Concern)

Approximately 510 acres of NRF and 7,090 acres of dispersal habitat occur within the Dry Ridge PLTA. The Dry Ridge PLTA consists primarily of dry forest types with low-quality suitable habitat. Suitable habitat within the Dry Ridge PLTA primarily functions as place holders for dispersing sub-adults, much like what was described in the Revised Northern Spotted Owl Recovery Plan (USDI Fish and Wildlife Service 2011). Refer to the Nelli Restoration EA for additional discussion of northern spotted owl Affected Environment for the Dry Ridge PLTA.

ENVIRONMENTAL CONSEQUENCES

No Action

Reduction in NRF and dispersal habitat and impacts to prey are expected (Future Condition) under the no action. Left in its present condition, dense, overstocked stands with closed tree canopies would continue to result in increased risk for insect and disease epidemics, leading to increases in tree mortality, fuel loading and risk for large, high-severity wildland fires outside of the normal (historic) range of variability (Rippy, et al., 2005). In the short term, this increase in tree mortality would be favorable for the northern spotted owl, adding diversity to forest structure and improving prey species availability. Long term as numerous trees die and canopy closure drops below 70%, suitable owl habitat would downgrade to dispersal habitat. Existing habitat is at different stages of this process.

The risk of stand replacing fires within and adjacent to the project area, including the Naches Mainstem, Wenas and Rattlesnake watersheds, would remain high (Harrod et al. 2007). Stand replacing fires are highly likely within the near future (see "expected future condition" in Fuels section earlier in this chapter); resulting in measureable removal of NRF habitat at a landscape scale. This would result in substantial adverse effects to the northern spotted owl.

Effects of the Refined Proposed Action

Direct and Indirect Effects

The Refined Proposed Action has the potential to affect the northern spotted owl and northern goshawk directly through disturbance and habitat alteration and removal and indirect through impacts to prey. Key metrics used to assess the risk of effects to the northern spotted owl and its critical habitat includes acres of NRF and dispersal habitat modified or removed, as well as potential for disturbance during nesting and impacts to prey. To evaluate the cumulative effects on late-successional associated species, changes to human influence index within the in the MLSA (within Naches Mainstem and Rattlesnake Creek Watersheds) will be used. Consistency with MLSA objectives will also be evaluated.

Disturbance resulting from implementing the Refined Proposed Action alternative is highly unlikely. Direct effects can result from implementing vegetation treatment include disturbance during breeding and nesting period to the northern spotted owl and northern goshawk. These effects are caused by noise created from chainsaws, vehicles, and large equipment which are activities common to vegetation treatment, log hauling and temporary road construction. The proposed Dry Restoration project has little potential to disturb nesting spotted owls as no known spotted owl activity centers occur within 0.25 miles of the treatment area; including proposed temporary road locations and haul routes. Mitigations addressing timing restrictions are in place for the northern spotted owl and northern goshawk if active nest sites are discovered during implementation (refer to Appendix A for specific mitigation measures). With the absence of nesting spotted owls and goshawks within 0.25 miles of the treatment area and mitigations in place, potential for disturbance to nesting spotted owls and goshawks are highly unlikely.

Effects to prey are expected to be minimal from implementing the Refined Proposed Action. The removal of canopy cover will not likely affect wood rat populations as long as snags, downed wood, and mistletoe persist following treatments (Lehmkuhl, Kistler, Beglery, & Boulanger, 2006). Project designs are in place that assures large snag structure and eventually large downed wood which will provide habitat for spotted owl prey (Chapter II). Mistletoe is an important component of habitat for flying squirrels. The treatment prescribed for this project would reduce the amount of mistletoe within stands, but would not eliminate it. Efforts made to retain clumps of mistletoe trees were incorporated in this project (Chapter II). Buffers consisting of complex patches will serve as protection to retain snags during timber harvest. The clumps, patches and retention protection of biological legacies such as large, old trees and snags, down logs and diseased trees will assure prey habitat is maintained in the Dry treatment area.

The Refined Proposed Action would have minimal effects to habitat (NRF) and dispersal habitat. The primary effect the proposed vegetation treatment would have the northern spotted owl, goshawk and late-successional dependent species is directly through alteration of habitat. However the proposed Dry Restoration Project is designed to minimize impacts to spotted owls and to protect existing NRF habitat, per the Northwest Forest Plan, WFP, and Forest Restoration Strategy, Revised Northern Spotted Owl Recovery Plan (USDI Fish and Wildlife Service 2011) and designated revised critical habitat (USDI Fish and Wildlife Service 2012).

The proposed vegetation treatment will not alter nesting, roosting, and foraging (NRF) habitat. The Dry restoration project will degrade and downgrade dispersal habitat. Treating dispersal habitat within the Dry restoration project will allow an effective fuel break to be established; protecting high-quality spotted owl habitat located outside the Dry Ridge PLTA. One of the projects "Purpose and Need" is to restore vegetative structure, composition, and pattern, and allow natural processes to function that will provide resilience to uncharacteristic wildfire and climate change. The Dry Restoration Project is consistent with the Revised Northern Spotted Owl Recovery Plan (USDI Fish and Wildlife Service 2011a) and designated revised critical habitat objectives (USDI Fish and Wildlife Service 2012) which are:

1) Emphasize vegetation management treatments outside of the northern spotted owl core areas or high-value habitat where consistent with overall landscape project goals
2) Design and implement restoration treatments at the landscape level
3) Retain and restore key structural components, including large and old trees, large snags, and downed logs
4) Retain and restore heterogeneity within and among stands
5) Manage roads to address fire risk; and 6) use wildfires to meet vegetation management objectives where appropriate.

The Dry Restoration Project area will degrade approximately 83 acres of spotted owl dispersal habitat; 52 acres from commercial treatment, two acres from the firewood treatment and 25 acres from Dry Creek stream channel restoration. It will also downgrade 480 acres of dispersal habitat; 441 acres from commercial treatment, 37 acres from the firewood treatment and two acres from new temporary road construction. Hazard tree removal along haul routes will not exceed two trees/ac; resulting in an incidental amount of degraded NRF and dispersal depending along the haul routes (refer to Table III.8).

Throughout the project area, treatment would retain the following stand level structural characteristics: large overstory trees, large snags and large downed woody debris at levels recommended in the Wenatchee National Forest Late-Successional Reserve Assessment (USDA Forest Service, Wenatchee National Forest, 1997). Vegetation treatments will also retain and restore key structural components at a landscape level:

- Existing large and very large, and old trees will be retained and protected
- All trees >25" dbh will be retained; Retain 20-25" dbh Douglas-fir except to meet white-headed woodpecker objectives
- Some dwarf mistletoe infected trees will be retained (refer to Chapter II)
- Snags with dead, broken and forked tope or Douglas-fir with mistletoe brooms will be retained
- Complex patches will be left in some of the commercial harvest treatment units. In these units approximately 10 to 15% of the unit would be left as complex patches.

These design features, mitigations and monitoring strategies would insure some of the features of dispersal habitat continue to function upon completion of vegetation treatments.

Table III.8: Changes to northern spotted owl habitat by Northwest Forest Plan land allocations and spotted owl Critical Habitat Unit (ECN-5) within the Dry Ridge PLTA resulting from the Dry Restoration Project. Existing acres incorporate past projects (including Nelli) that have occurred within the project area. This does not include future projects.

NWFP ALLOCATION	Existing HABITAT w/in DRY RIDGE PLTA		Degraded acres		Downgraded acres	
	NRF	Dispersal	NRF	Dispersal	NRF	Dispersal
Matrix w/in CHU	23	2,013	0	11	0	31
outside CHU	0	10	0	0	0	0
Haystack MLSA DM-10 w/in CHU	487	5,977	0	72	0	449
outside CHU		4	0	0		0
FS PEN w/in CHU	0	39	0	0	0	0
Total acres w/in CHU	510	7,076	0	83	0	480
Total acres outside CHU	0	14	0	0	0	0
Total Acres	510	7,090	0	83[1]	0	480[1]

[1]There is an overlap of 563 acres of dispersal habitat altered between the Nelli and Dry Restoration projects. The 563 acres were consulted on in the Nelli Restoration Project as degraded dispersal habitat resulting from the underburn treatment

Effects to late-successional associated species are expected to be minimal. The Refined Proposed Action will not treat NRF habitat. Treatment within dispersal habitat was designed to reduce the risk of habitat loss from high severity wildfires that would remove the forest canopy and to reduce the landscape level risk of high-severity wildfire that could result in substantial loss of old-forest habitats. Along with the fuels treatments in the Nelli Restoration Project, vegetation treatments proposed in Dry Restoration Project are strategically located to reduce the spread of wildfire in the remaining portions of the MLSA and adjacent MLSAs and LSRs. The proposed temp roads (new and existing) do not occur in late successional habitat. No late-successional habitat within the Haystack MLSA (number DM-10) will be altered under the Dry Restoration project, including commercial thinning and temp road construction. Based upon the available information, it has been determined through the Neutral and Beneficial Analysis that the Dry Restoration Project meets LSR/MLSA objectives and will have long-term beneficial effects to the development of late-successional habitat; benefiting the northern spotted owl and late-successional dependent species.

Cumulative Effects

Past, ongoing and future restoration projects are expected to effectively help sustain existing Northern spotted owl NRF and dispersal habitat. The Naches Mainstem and Rattlesnake Creek 5th field HUCs were used as the analysis areas to determine cumulative effects on late-successional species. The temporal boundary is approximately 80 years in the past, when timber harvest in the Nile area began, to 15 years in the future, the estimated time when additional restoration projects such as fuels treatment will once again be applied to the landscape. The vegetation treatments proposed in the Dry Restoration project along with the past, ongoing and future projects in the Naches Mainstem and Rattlesnake Creek Watersheds will make substantial progress at restoring ecological processes and functions and reducing the potential for substantial losses by uncharacteristic fires, insects and disease at a landscape scale.

Conditions for late-successional associated species are expected to improve. Generally, the past and foreseeable road and trail closures within the Naches Mainstem and Rattlesnake Creek Watershed will improve the security habitat for late-successional habitat.

The Forest Motorized Vehicle Use program proposes less than five miles of additional OHV trails within the Rattlesnake Creek and Naches Mainstem Watersheds. These trails would add to the existing human use, although not detectable at a landscape level. The LSR/MLSAs within the Naches Mainstem and Rattlesnake 5th field watersheds would remain at a low level of human influence on late-successional nonwinter habitat and a moderate level of human influence for late-successional nonwinter security habitat. Therefore, the late-successional species would continue to use the LSR/MLSAs within the Naches Mainstem and Rattlesnake Creek Watersheds upon completion of past, ongoing and foreseeable projects. The effects of public firewood collection and hazard tree maintenance associated with roads have been analyzed for within the "human influence on late-successional nonwinter habitat model". The habitat influence index is designed to address edge effects, snag and downed log reduction, and habitat loss and fragmentation resulting from road-associated factors such as firewood cutting and hazard tree removal. The Dry, Nelli and Glass Angel Restoration Projects will have beneficial effects on late-successional associated species by slightly increasing security habitat and effectively reducing stand replacing fire risks.

The proposed Dry Restoration Project combined with the foreseeable cumulative effects will "may affect, not likely to adversely affect" the northern spotted owl and a "may Impact individual" northern goshawks and other late-successional associated species, but is not likely to lead a trend towards Federal listing or loss of population viability". This determination is based on the potential for minimal disturbance and alteration of low-quality, northern spotted owl suitable habitat. The proposed Dry Restoration Project "may affect, likely to adversely affect" proposed critical habitat for the northern spotted owl based on the downgrading of 480 acres of dispersal habitat within the Eastern Cascades North (ECN) Critical Habitat Unit (7) and Subunit 5 (ECN-5).

GRAY WOLF AND NORTH AMERICAN WOLVERINE

AFFECTED ENVIRONMENT

As wolf and wolverine share important prey (elk and deer) and carrion sources within the Dry Ridge PLTA and both are tied to security habitat, the effects analysis for these two species has been combined under one discussion. Approximately 73% of the Dry Ridge PLTA falls in key deer and elk winter range (EW-1). The Washington Department of Fish and Wildlife Nile elk feeding area is located adjacent to the Dry Ridge PLTA. Approximately 300 elk concentrate in this feeding area as well as the northeast portion of the Dry Ridge PLTA mid-December through late March (Ross Huffman, personal communication). The most likely time period wolves and wolverines would use the project area is during the winter period, when large concentrations of elk and deer gather on the winter range.

Gray Wolf (Endangered Species)

Wolf surveys were conducted adjacent to the Dry Ridge PLTA, but not specifically for the Dry Restoration project. To date, no wolf dens or rendezvous sites have been located on the Naches Ranger District. No confirmed reports of wolves have occurred in or near the PLTA; however several un-confirmed reports have occurred within 20 miles of the PLTA and due to their wide-ranging behaviors, the project area is considered potential habitat. Refer to Nelli Restoration EA for additional discussion regarding Affected Environment for the gray wolf.

North American Wolverine (Federal Candidate and Sensitive Species)

Refer to Nelli Restoration EA for discussion regarding Affected Environment for the North American Wolverine.

ENVIRONMENTAL CONSEQUENCES

There are no designated recovery areas for gray wolves in the state of Washington, but there are recovery regulations requiring consideration of potential impacts to known denning habitat or rendezvous sites. While no official management guidance for gray wolves currently exists, key metrics used to assess the risk of effects to wolves and wolverines include potential for disturbance or displacement, effects to security habitat and effects to prey. Since no wolverine denning habitat or wolf dens occurs within the Dry Ridge PLTA, potential for disturbance to denning animals will not be evaluated; only potential for displacement to dispersing individuals.

No Action

Security habitat would not change under the No Action alternative. The project proposes adding 3 miles of temporary road which will not occur within existing security habitat. Therefore the level of human influence would remain high within the project area as well as the Naches Mainstem and Rattlesnake Creek Watersheds, road density would remain high and there would be no change to the exiting low level of security habitat. Because of the high human influence, wolves and wolverine use of the Dry Ridge PLTA would remain highly unlikely. The increase risk of stand replacing fires has the potential has the potential to result in far less hiding cover or screening along roads; compounding the impacts of low security habitat.

Reduction in deer and elk (prey species) habitat is expected under the no action. Not treating vegetation would reduce the quality and quantity of forage for prey indirectly affecting wolves and wolverine. Cover-to-forage rations were used to measure effect. Cover and forage added together equates to 100 percent of an area. Short-term cover would remain high and forage low for elk and deer (52/48 summer range and 53/47 winter range). These ratios exceed the optimum cover-to-forage levels recommended in the WFP of 40/60. In the long-term if a large scale wildfire were to occur, the cover has the potential to decrease and forage increase dramatically. These results could continue 15 to 20 years post wildfire activity; potentially improving the quantity of deer and elk forage. However, these disturbed sites also have the potential to establish new invasive plant sites and increase the spread of existing sites; reducing the quality of deer and elk forage. Large scale fires also have the potential to decrease cover on the summer and winter range below WFP optimum cover standard of 60 percent. Large portions of the deer

and elk summer range could potentially be unusable due to the absence of nearby hiding cover coupled with the Dry Ridge PLTA's high road density (5.97 mi^2). If wildfires did not occur, the quantity of prey forage is expected to continue to decrease as dense overstocked stand continue to fill in the landscape. Reduction in the forage for prey would result in lower herd production and ultimately less forage for wolves and wolverine. For a detailed discussion of effects to deer and elk refer to the Management Indicator Species (MIS) section.

Effects of Refined Proposed Action

Direct and Indirect Effects

Implementing the Refined Propose Action would result in minimal displacement. Direct effects from the proposed action include displacement to wolves and wolverines caused from noise, people and chainsaws, vehicles, logging trucks, and large equipment which are activities commonly associated with vegetation treatments. Displacement resulting from spring through fall vegetation treatment period (including hazard tree removal along haul routes and temporary road construction) may result in localized displacement of wolves and wolverine and their prey. However this is expected to have minimal effects to the wolf and wolverine since these species are highly unlikely to be present within the project area during the non-winter period as majority of the project area occurs on deer and elk winter range. Mitigation allows the proposed project to meet WFP Standards and Guidelines (IV-114). Implementing a winter timing restriction in EW-1 (deer and elk winter range) would greatly reduce the risk of potential displacement to wolves and wolverine.

Security habitat would not change. The primary effects the proposed road work could have on wolves and wolverine is directly through change in security habitat. Effects would be minimal and short term as temporary roads would be closed to public use, and closed within one week of completing harvest activities and product removal. The proposal for approximately three miles of temporary roads would increase motorized activity to a localized area but it would not be detected at a landscape level. The high level of human influence within the Dry Orr Analysis area would remain in the Naches Mainstem and Rattlesnake Creek Watersheds upon completion of the Refined Proposed Action (46% of watersheds is considered security habitat).

The Refined Proposed Action is expected to improve deer and elk habitat. Overall the proposed vegetation treatment is expected to improve conditions for the deer and elk. Refer to "deer and elk" discussion in the Wildlife MIS section for details. Improving habitat for deer and elk would most likely result in increased production of local deer and elk herds; ultimately increasing predaceous forage for the wolf and wolverine. Proposed vegetation treatments would however reduce or eliminate some vegetative screening short term (5 year period) along roads, resulting in a short term (5 years) displacement from "seen" areas by the wolf and wolverine and their prey (deer and elk). Plans for retention of cover along streams, upland area (complex patches) and travel corridors would help to minimize these effects. Travel corridors would remain intact and functional upon completion of vegetation treatments.

Cumulative Effects

Generally, the past and foreseeable road and trail closures within the Naches Mainstem and Rattlesnake Creek Watersheds will improve conditions for the gray wolf and wolverine. When considering the ongoing road management projects, roads density within the Dry Ridge and Glass Angel PLTA (Dry Ridge PLTA would reduce from 5.97 mi/sq. mi to 4.09 mi/sq. mi and the Glass Angel PLTAs would reduce from 2.4 mi/mi² to 1.9 mi/mi). Refer to Figure III.6 for proximity of PLTAs to one another. Although the combined road closures of Glass Angel and the Nelli Restoration Projects would improve conditions at the local scale, the overall level of human use at the landscape level (Naches Mainstem and Rattlesnake Creek 5th field Watersheds) would remain high (46% of the watershed considered security habitat). The Forest Motorized Vehicle Use program proposes less than 5 miles of additional OHV trails within the Rattlesnake Creek and Naches Mainstem Watersheds. These trails would add to the existing high level of human influence on wolf habitat in the Naches Mainstem and Rattlesnake Creek Watersheds. Therefore, the low probability of wolf and wolverine use in the Naches Mainstem and Rattlesnake Creek Watersheds as well as the project area would continue upon completion of past, ongoing and foreseeable projects.

Deer and elk habitat is expected to measurably improve as a result of other past and foreseeable future vegetation treatments. The two 5th field watersheds (Naches Mainstem and Rattlesnake Creek), were used as the analysis areas to address cumulative effects on the gray wolf and wolverine. The temporal boundary is approximately 80 years in the past, when timber harvest in the Nile area began to 15 years in the future, the estimated time when additional restoration projects such as fuels treatment will once again be applied to the landscape. Cumulative effects on the wolves and wolverine resulting from implementation of the proposed vegetation treatment and other past and foreseeable future vegetation treatments in the Naches Mainstem and Rattlesnake Creek Watersheds are based largely through their effects on important prey species. More than 50% of the Naches Mainstem and Rattlesnake Creek Watersheds will be treated in the next five years. For a list of past and foreseeable projects refer to Table III.1. Treating over 50% of these two 5th field watersheds will substantially improve forage quantity and quality for deer and elk at a landscape level. The amount and quality of forage created is difficult to determine as it depends on vegetation prescriptions and site potential. However improving forage at this scale would undoubtedly have a positive impact on the health and production of the deer and elk herds. Wolves and wolverine would benefit from the increased predaceous foraging opportunities resulting from these past, ongoing and planned projects.

The proposed treatment in combination with past and future vegetation treatment in the Naches Mainstem and Rattlesnake Creek Watersheds have the potential to allow natural processes to function that would provide resilience to uncharacteristic wildfire and climate change; reducing the risk of landscape level removal of hiding cover (screening) for wolves, wolverine and their prey. Refer to “Deer and Elk” discussion in the “MIS” section for details on prey habitat improvement.

In the long term (15 years), the Refined Proposed Action along with other past and foreseeable restoration projects within the Dry Orr Landscape Analysis Area would benefit the gray wolf and wolverine as a result of decreased road density, and providing a functioning, resilient ecosystem. Implementing the Refined Proposed Action alternative “may affect but not likely to adversely

affect" the gray wolf; and "not likely to jeopardize the continued existence of" the North America Wolverine based on the potential for short term (five years) minimal displacement to the gray wolf and wolverine and their prey during project implementation.

MANAGEMENT INDICATOR SPECIES (MIS)

Management Indicator Species (MIS) are selected species whose welfare is believed to be an indicator of the welfare of other species using the same habitat, or a species whose condition can be used to assess the impacts of management actions on a particular area (Thomas et al. 1979). The MIS approach is used in concert with other indicators to gauge the effects of management on wildlife. Management requirements addressed in the WFP were that "fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area". Table III.9 below lists the MIS species and their habitats identified in the Wenatchee Land and Resource Management Plan (USDA Forest Service 1990). In 2011 a status review was completed for MIS of the Wenatchee National Forest (Status of Management Indicator Species on the Okanogan and Wenatchee National Forests, April 2011, unpublished document, 78pp). This document is incorporated in this section by reference. The 2011 status review used viability outcomes to describe the probability of the planning unit (Wenatchee portion of the Okanogan-Wenatchee National Forest) to support a population of each MIS based on current habitat and risk factors. It also included an estimate of the amount of habitat available at the Forest scale. Table III.45 below includes the viability outcome of each MIS and a description of those viability outcomes.

The Dry Ridge PLTA is located at the south end of the Okanogan-Wenatchee Forest, at the edge of all MIS habitat on the Wenatchee National Forest.

Table III.9: Management Indicator Species and their associated habitat for the Wenatchee National Forest (habitat acres within this table were from USDA Forest Service 2011a)

Species	Indicators for:	Available Habitat (acres)		Forest Level Viability Outcome[3]	Species present in the Project Area DRY RIDGE PLTA
		Acres of Habitat on the Wenatchee NF	5th field HUC and PLTA		
Rocky Mountain elk & Mule Deer	Big game species; with winter range identified as its limiting habitat	152,581	Dry Ridge PLTA contains 8,649 acres of designated deer/elk winter range (EW-1) Overall cover/forage ratio in the Dry Orr Landscape in EW-1 is 53/47 & summer range is 52/48 **PLTA consists of < 1% of available winter range on the Forest**	A	Documented
Mountain Goat	Rockland, alpine, high elevation old- growth conifer habitat	213,919	**0 acres of habitat in the DRY RIDGE PLTA**	B	NO
Northern Spotted Owl	Mixed conifer mature and old-growth habitat (western hemlock, grand fir, Douglas-fir, forests)	621,105	Naches Mainstem & Rattlesnake Cr 5th field HUC contains 43,521 acres Approximately 382 acres of mixed conifer w/ medium size class and greater in DRY RIDGE PLTA **PLTA consists of < 1% of available habitat on the Forest**	C	Documented
Pileated Woodpecker	Mixed conifer mature and old-growth habitat (medium-large trees, cool moist forests; montane & eastside-	58,861	**0 acres of habitat in the DRY RIDGE PLTA**	C	NO

Species	Indicators for:	Available Habitat (acres)		Forest Level Viability Outcome[3]	Species present in the Project Area DRY RIDGE PLTA
		Acres of Habitat on the Wenatchee NF	5th field HUC and PLTA		
	mesic forest type)				
Three-toed Woodpecker	Mixed conifer mature and old-growth habitat (subalpine & montane forest)	973,135	**0 acres of habitat in DRY RIDGE PLTA**	B/C	NO
American Marten[2]	Mixed conifer mature and old-growth habitat (cold moist and cold dry forests)	166,310	**0 acres of habitat in DRY RIDGE PLTA**	B/C	NO
Beaver	Riparian/deciduous forest habitat	177,118	Naches Mainstem & Rattlesnake Cr 5th field HUC contains 13,058 ac **PLTA consists of <20 acres of beaver habitat within the DRY RIDGE PLTA. PLTA consists of < 1% of available habitat on the Forest**	B/C	Documented
Ruffed Grouse	Riparian/deciduous forest habitat	276,457	Naches Mainstem & Rattlesnake Cr 5th field HUC contains 19,255 acres **151 acres riparian habitat within the DRY RIDGE PLTA. PLTA consists of < 1% of available habitat on the Forest**	A	Documented
Primary cavity excavators (PCE) (summary)	Dead & live defective standing trees/ dead & down tree habitat structure	No estimate	According to DecAID Naches Mainstem & Rattlesnake Cr 5th field HUC are w/in historic condition for snag densities in PPDF & EMC habitat for snags >10" and >20" diameter (meet LSRA snag density direction) **9,004 acres PPDF and 2,307 EMC habitat within the DRY RIDGE PLTA**	See expanded version of PCEs below	Dead & live defective standing trees/ dead & down tree habitat structure
Primary Cavity Excavators (by species)	Pileated Woodpecker	58,861	**0 acres of habitat in DRY RIDGE PLTA**	C	NO
	Three-toed woodpecker	973,135	**0 acres of habitat in DRY RIDGE PLTA**	B/C	NO
	Black-backed woodpecker	No estimate	**0 acres of habitat in DRY RIDGE PLTA**	B/C	NO
	Downy woodpecker	No estimate	See Primary Cavity Excavators above	A	Documented
	Hairy woodpecker	No estimate	See Primary Cavity Excavators above	A	Documented
	Lewis' woodpecker	No estimate	**0 acres of habitat in DRY RIDGE PLTA**	C	NO
	White-headed woodpecker	No estimate	Dry Ridge DRY RIDGE PLTA contains 2,375 ac **DRY RIDGE PLTA contains 556 ac Potential to create 1,486 additional acres with Dry Restoration Project**	C	Documented
	Williamson's sapsucker	No estimate	See Primary Cavity Excavators above	B/C	Documented
	Red-naped sapsucker[1]	No estimate	**Approximately 10 acres of aspen in the DRY RIDGE PLTA** Most likely **PLTA consists of** <1% of available habitat on the Forest	B	NO
	Northern flicker	No estimate	See PCE above	A	Documented

[1]The yellow-bellied sapsucker listed in the Wenatchee Forest Plan (USFS 1990), was taxonomically split into three species in 1983; red-naped, red-breasted, and yellow-bellied sapsucker (AOU 1983, Walters et al 2002); only the red-naped sapsucker occurs in Eastern Washington.

[2]Listed as Pine Marten in the Wenatchee Forest Plan

[3]**Outcome A** – Suitable environments are broadly distributed and of high abundance. The combination of distribution and abundance of environmental conditions provides opportunity for continuous or nearly continuous intra-specific interactions for the MIS species. MIS species with this outcome are likely well-distributed throughout the planning area.

Outcome B – Suitable environments are broadly distributed and of high abundance, but there are gaps where suitable environments are absent or only present in low abundance. However, the disjunct areas of suitable environments are typically large enough and close enough to permit dispersal among subpopulations and to allow the species to potentially interact as a meta-population. Species with this outcome are likely well-distributed throughout most of the planning area.

Outcome C – Suitable environments are distributed frequently as patches and/or exist at low abundance. Gaps where suitable environments are either absent or present in low abundance are large enough such that some subpopulations are isolated, limiting opportunity for intra-specific interactions. There is opportunity for subpopulations in most of the planning area to interact, but some subpopulations are so disjunct or of such low density that they are essentially isolated from other populations. For species for which this is not the historical condition, reduction in the species' range in the planning area may have resulted. Species with this outcome are likely well-distributed in

Species	Indicators for:	Available Habitat (acres)		Forest Level Viability Outcome[3]	Species present in the Project Area DRY RIDGE PLTA
		Acres of Habitat on the Wenatchee NF	5th field HUC and PLTA		
only a portion of the planning area.					

The Dry Restoration projects will not affect the mountain goat, three-toed woodpecker or American marten; no habitat or sightings exist within the Dry Ridge PLTA. Therefore, the Dry Restoration Projects will not contribute to negative trend in viability on the Wenatchee National Forest for the mountain goat, three-toed woodpecker or American marten. No further discussion will occur regarding the mountain goat, three-toed woodpecker or American marten.

Figure III.9: Blue Grouse, Middleton 2013.

ROCKY MOUNTAIN ELK AND MULE DEER

AFFECTED ENVIRONMENT

Refer to Nelli Restoration EA for Rocky Mountain elk and mule deer Affected Environment in the Dry Ridge PLTA.

ENVIRONMENTAL CONSEQUENCES

No Action

Left in its current condition the quality and quantity of forage for deer and elk would continue to decrease. Short-term, the cover would remain high and forage low (52/48 summer range and 53/47 winter range). These ratios exceed the optimum cover-to-forage levels recommended in the WFP of 40/60. Cover-to-forage equals 100 percent of the area analyzed. The quantity of

forage would continue to decline as conifer growth continues to increase. Long-term if wildland fires were to occur, cover has the potential to decrease and forage increase dramatically. These results could continue 15 to 20 years post wildfire activity; potentially improving the quantity of forage. However, these disturbed sites also have the potential to establish new invasive plant sites and increase the spread on existing sites; reducing the quality of deer and elk forage. Large scale fires also have the potential to decrease cover on the summer and winter range below WFP optimum cover standard of 60 percent. Large portions of elk and deer summer range would be unusable due to the absence of nearby hiding cover; which is critical with the existing high road density.

Effects of Refined Proposed Action

Identified risk factors include habitat degradation and disturbance. Key metrics used to analyze risk factors to deer and elk will be changes in road density (including temporary roads), the summer habitat disturbance index (human influence), winter habitat disturbance index described in (Gaines et al. 2003), and change to travel corridor condition. Meeting WFP standards and guidelines for cover and forage, and HEI will be discussed. A qualitative evaluation of the effects on forage availability was completed.

Direct and Indirect Effects

Direct effects from the proposed action include disturbance caused from people, vehicles and machinery which are activities commonly associated with vegetation treatments. Vegetation treatment also has the potential of altering hiding cover; influencing the habitat effectiveness. Disturbance is expected to be minimal. Restricting human activity associated with the restoration project within EW-1 from December 1st through March 31 would greatly reduce the risk of disturbance to wintering deer and elk.

Habitat is expected to improve with the implementation of the Refined Proposed Action. Implementing the silvicultural and fuels treatments would slightly change the cover-to-forage ratio within the Dry Orr Landscape Analysis Area: summer range would not change (52/48) but winter range would change to 51/49 (this includes treatment from the Nelli and Glass Angel Restoration Projects). These changes would move the analysis area towards the optimum cover-to-forage ratio of 40/60 (WFP S&G).

Two important travel corridors would be retained within the Dry Ridge PLTA Area. Proposed treatments would reduce or eliminate some vegetative screening along roads and may increase distance-to-hiding cover for deer and elk, resulting in brief local displacement from “seen” areas. Plans for retention of cover along streams, in upland areas and travel corridors would reduce some of this effect. No silvicultural treatments are proposed within the travel corridors. Travel corridors would remain intact and functional upon completion of silvicultural and fuels treatments.
The 3.0 miles of temporary road will result in a minor increase in road density and a slight increase in disturbance potential to elk and deer during project implementation. However, this would be short term as these temporary roads will be decommissioned after timber harvest activities. No known fawning or calving areas are known to occur in the Dry Restoration

treatment area. Therefore potential for disturbance during these critical time periods resulting from road construction is highly unlikely.

Cumulative Effects

Elk and deer summer and winter ranges and the Naches Mainstem and Rattlesnake 5th field watersheds were used as the analysis areas to address cumulative effect on deer and elk. The temporal boundary is approximately 80 years in the past, when timber harvest in the Nile area began to 15 years in the future, the estimated time when additional restoration projects such as fuels treatment will once again be applied to the landscape. Cumulative effects on elk resulting from implementing the action alternative along with past and foreseeable future fuels and vegetation treatment in the Naches Mainstem and Rattlesnake Creek Watersheds are as follows: More than 50% of the Naches Mainstem and Rattlesnake Creek Watersheds will have fuels and vegetation treatments completed within the next 5 years.

Treating over 50% of these two 5th field watersheds would reduce cover to varying degrees and encourage the growth of forage at a landscape level. The amount and quality of forage created is difficult to determine as it depends on vegetation prescriptions and site potential. Research has indicated that the availability of quality forage during non-winter periods is very important to the winter survival and productivity of elk herds (Cook J. , 2002), (Cook, Johnson, Cook, Riggs, Bryant, & Irwin, 2004), more important than thermal cover (Cook, Irwin, Bryant, Riggs, & Thomas, 1998). The potential effects of the Dry Project on available forage for elk are based on results from studies of thinning and prescribed fires in similar environments. Studies have shown an increase in forage production in ponderosa pine forest following thinning and prescribed fire due to reducing competition for light, moisture and soil nutrients (Leege & Godbolt, 1985), (Gibbs, Jenks, & Sowell, 2004). While forage production is one aspect of forage availability for elk, changes in species composition is also important, as only some species are highly palatable to elk. However, Harrod et al., (1998) showed little change in composition of the understory plant community following thinning and burning.

The Dry Project is likely to increase forage production but not dramatically alter the understory community composition which might eliminate or reduce elk forage species. The vegetation and fuels treatment will likely have a positive effect on the availability of elk forage. Improving forage at the landscape scale would undoubtedly have a positive effect on the health and production of the deer and elk herds.

The past and foreseeable road and trail closures from district projects within the Naches Mainstem and Rattlesnake Creek Watershed will generally improve conditions for elk and deer. The Forest Motorized Vehicle Use program proposes less than five miles of additional OHV trails within the Dry Orr Analysis area. Overall, the combined effects of these actions would result in minor benefits to localized populations of deer and elk. The Glass Angel, Nelli and Dry Restoration projects make up one third of the summer range analysis area. Although these projects would reduce road density within the Dry Ridge and Glass Angel PLTAs (Dry Ridge PLTA would reduce from 5.97 mi/sq. mi to 4.09 mi/sq. mi and the Glass Angel PLTA would reduce from 2.4 mi/mi² to 1.9 mi/mi) it would not be noticeable at a landscape level; a high level of human influence on summering deer and elk within the Dry Orr Landscape Analysis Area would continue and human influence within winter range would remain low. The HEI value

within EW-1 would improve from 67 to 72. This restoration project along with the Nelli and Glass Angel Restoration Projects will have moved the Dry Orr Landscape Analysis Area near optimum HEI value for EW-1 (WNF LRMP S&G) which is 80. Although disturbance would increase during project implementation, these impacts would be minor; short term and localized.

Overall the Dry Restoration Project will improve conditions for the Rocky Mountain elk and mule deer in their summer and winter ranges. The Refined Proposed Action would not contribute to negative trend in viability on the Wenatchee National Forest for Rocky Mountain elk or mule deer. It would not change the viability outcome listed in Table III.9.

PRIMARY CAVITY EXCAVATORS (PCE) AND COARSE WOODY DEBRIS (CWD)

AFFECTED ENVIRONMENT

Refer to Nelli Restoration EA for Primary Cavity Excavators (PCE) Affected Environment in the Dry Ridge PLTA

ENVIRONMENTAL CONSEQUENCES

No Action

Left in its present condition, dense, overstocked stands with closed tree canopies would continue to result in increased risk for insect and disease epidemics, leading to increases in tree mortality, fuel loading and risk for large, high-severity wildland fires outside of the normal (historic) range of variability (Rippy, et al., 2005). The risk of stand replacing fires within the near future would remain high within the Naches Mainstem and Wenas Watersheds (USDA 1995). Initially wildfires would create large amounts of foraging and nesting habitat for numerous woodpecker species and secondary cavity nesters that are attracted to recent burns in ponderosa pine/Douglas-fir habitat such as the Lewis's woodpecker, black-backed woodpecker, hairy woodpecker, Northern flicker, mountain bluebird and Western bluebird (Saab et al. 2003).

Some additional large diameter snags would be created, however, since most of the existing forested stands are made up of medium and smaller size trees, medium and smaller size snags are expected to result from a wildland fire. Ponderosa pine is the most common species in the Dry Ridge PLTA. Since ponderosa pine snags don't stay standing long, it is expected that the majority of snags created from wildfires would fall in the next 30 years with no large green trees left for recruitment snags (Harrod et al. 1998, USDA 2006).

Effects of Refined Proposed Action

Identified risk factors for Primary Cavity Excavators include habitat alteration. The metric used to analyze risks factors for the PCE will be determining if the WFP Standards and Guides for coarse woody debris (CWD) and snag levels are met and through evaluating road influence on PCE habitat (Gaines, et al. 2003). Since PCE are generally not susceptible to noises or disturbance caused by proposed actions, potential for disturbance will not be evaluated.

Direct and Indirect Effects

Habitat is expected to improve with the implementation of the Refined Proposed Action. With the planned retention of green trees, snags and logs at levels consistent with the LSRA (USDA Forest Service, Wenatchee National Forest, 1997) and Forest Restoration Strategy (USDA Forest Service, Okanogan-Wenatchee National Forest, 2010), treated acres would continue to provide habitat for snag- and log-dependent wildlife over the short and long term. Accelerated development of large tree structure would develop future quality habitat for primary cavity excavator species.

The following measures included in the Dry Restoration design criteria will ensure that large snag structure and eventually large downed wood are restored to the forest within the project area in amounts and size classes that approximate the historical range of variation (Harrod, Gaines, Hartl, & Camp, 1998) and meet NWFP recommended levels: 1) treatment prescriptions will retain large, very large and old trees and promote the development of future large tree structures (both of which are necessary for future large snag and downed wood recruitment); 2) existing large snags will be protected (to the extent that safety allows), clumps of live trees will be left to act as a buffer of protection around large snags (Table III.28) (Harrod et al. 2007, Saab et al. 2006); 3) where large snag structure is lacking, medium sized snags will be substituted and marked as wildlife trees to protect; 4) Snags will be retained in clumps and complex patches; 5) Prescription guides are be written to incorporate the down wood levels (CWD) stated in the NWFP LSRA and the Forest Restoration Strategy. Wightman et al., (2010) found that a mosaic of burn severity across the landscape improved white-headed woodpecker habitat by opening forest canopies in the higher severity burn areas, while retaining decayed snags created before wildfire and live, cone-producing trees in unburned or low-severity burn areas.

The vegetation treatment has the potential to accelerate the development of large diameter dominant and co-dominant trees, including snag recruitment. Retention of the following will occur in all units treated: All trees greater than 150 years old, as defined by Van Pelt (2008); trees >25”dbh; and most trees 21-25” dbh. Young trees up to 15-30 feet from the bole of old ponderosa pine trees will be removed to reduce competition and allow growth.

It is expected that individual snags and pieces of downed wood would be lost through fuels treatment, felling of snags that pose a hazard to workers and equipment during logging operations and construction of temporary roads. Generally, snags will be avoided during logging operations; however it is assumed that a low level of direct impact would occur. OSHA regulations and the realities of ground based operations and activities will inevitably result in snag loss. Mechanical treatment is expected to decrease mean snag density and percent of down wood (refer to Table III.10). Monitoring and project design described above will be implemented to assure snag and down wood will meet levels specified in the LSRA (USDA Forest Service, Wenatchee National Forest, 1997) and the Forest Restoration Strategy (USDA Forest Service, Okanogan-Wenatchee National Forest, 2010). Approximately three miles of temporary road will be constructed to facilitate timber harvest operation in the Dry treatment area. This increase of three miles (or five acres) of temporary roads will result in the limited removal of snags. Five acres of snag reduction would result in minor impacts that would be dissipated along a linear route, rather than concentrated to a single area.

The vegetation restoration treatments (including the treatment of activity fuels by pile burning) would effectively provide long term protection to the future development of late successional habitat. This alternative would treat a large amount of vegetation at risk of stand replacing fires and destruction of stands from disease and insect. Treating high risk vegetation would reduce fuel loading, creating effective fuel breaks for primary cavity excavators/nesters habitat that exists within the project area as well as the Dry Orr Landscape Analysis area. This is particularly crucial due to the numerous potential fire starts resulting from private and state land holdings located east of the Dry Orr Landscape Analysis area. Future snag recruitment would remain intact with the development of large trees.

Table III.10: Changes to snag densities after vegetation treatments. This is an estimate of what results from logging operations as determined by the Forest Restoration Team (see previous paragraph).

	Change in Snag Density resulting from the following Treatment		
Snag Size (dbh)	mechanical treatments	activity fuel treatment	mechanical and activity fuel treatment
6-10	-48.1%	+14%	+55%
10-20	-34.2%	+10%	+45%
>20	-30.0%	0%	+100%

Table was developed by the Forest Plan Revision team

Commercial treatments would modify tree species composition, reduce stocking levels and potentially lead to the decrease in vulnerability to insects and pathogens. This would also result in an increase in tree vigor and a decrease in tree mortality. In the short term this would reduce the number of small & medium size snags that are currently being added to the landscape. In the long term, as large trees develop, this area would be able to provide large diameter snags on the landscape. Not all of the forested stands within the project area would be commercially treated. There will be clumps and complex patches (ranging in size from 0.5 to two acres) that will be left within the large treatment blocks. These patches would have a slightly increased risk of tree mortality from insects, disease or fire, would and also add diversity. Patches rather than landscapes would be susceptible to defoliators and bark beetle outbreaks, the extent and severity would be reduced due to the reduction in uniformity and continuity of habitat for the host species. This added diversity would benefit cavity excavators. Treatment prescribed in this alternative would reduce the amount of mistletoe within stands, but would not eliminate it. An extensive effort was made to identify clumps of mistletoe trees that would be retained in units. This again would add diversity; benefiting species that use mistletoe brooms such as blue grouse, spotted owls and flying squirrels. Mistletoe would eventually kill trees, adding snags to the landscape which would be beneficial to numerous cavity excavator species.

Cumulative Effects

The Dry Orr Landscape Analysis Area was used as the analysis areas to address cumulative effect on primary cavity excavators. The temporal boundary is approximately 80 years in the past, when timber harvest in the Nile area began, to 15 years in the future, the estimated time when additional restoration projects such as fuels treatment will once again be applied to the landscape. Effects of past vegetation management activities (logging, and burning) and

woodcutting have had major impacts on historic snag and down wood levels within the project area as well as the Dry Orr Landscape Analysis area. Widespread removal of large ponderosa pine trees occurred on the District in the early to mid-1900s. Eighty four percent of the Dry Ridge PLTA has been harvested in the past, mostly between 19301990 and mostly in stands with relatively abundant old, large and very large trees. Prior logging has included individual tree selection (approximately 57 percent of the logged area) and clear cutting (approximately 33 percent). Many large and very large larch snags were removed as firewood from both logged and non-logged stands on flat ground. The cumulative effect at the scale of the project area and its component stands is that old, large/very large trees occur at much lower levels than historically. The majority of the forested acres in the Dry Ridge PLTA (95%) are in the middle or small size class with very little in the large size class currently present on the landscape; lacking the current availability of large snags and logs and large green trees on the landscape and the recruitment of future large snags and down logs.

The Dry Ridge PLTA makes up a small percentage of the Dry Orr Landscape Analysis area (17%). The Dry Restoration project in itself will have little change on cavity excavator habitat at a landscape scale. However, silvicultural and fuels treatments from past, ongoing and foreseeable future fuels and vegetation treatments in the Naches Mainstem and Rattlesnake Creek 5th field Watersheds have and will focus on implementing dry forest restoration treatments; creating white-headed woodpecker habitat. More than 50% of these 5th field watersheds will be treated within the next five years. Treating high risk vegetation would reduce fuel loading, creating effective fuel breaks for primary cavity excavators and nester habitat. Since more than 50% of the two 5th field watersheds will be treated with the forest restoration and dry site strategy, the proposed project in conjunction with the surrounding silvicultural and fuels treatment projects will add to past, present, or future impacts to create substantial cumulative effects that would benefit primary cavity excavators.

The past and foreseeable road and trail closures within the Dry Orr Landscape Analysis area will improve habitat for PCE by the reduction of open roads. The Forest Motorized Vehicle Use program proposes less than five miles of additional OHV trails within the Dry Orr Landscape Analysis area. These trails would add to the existing human use but not detectable at a landscape level. The habitat influence index is designed to address edge effects, snag and downed log reduction, and habitat loss and fragmentation resulting from road-associated factors such as firewood cutting and hazard tree removal. Although there are negative factors associated with roads, these effects are minor as indicated by the current low level of human influence on primary cavity excavators within the Dry Orr Landscape Analysis Area (Gaines et al 2003). Following mechanical and fuels treatments in the Nelli Restoration Project approximately 3.0 miles of system road will be closed and another 26.4 miles of system road will be decommissioned and 5.16 miles of system road will be put in storage. In the Glass Angel Restoration Project approximately 4.42 miles of system road will be closed and another 4.71 miles of system road will be decommissioned. Overall this would result in 43.69 miles of system roads no longer in need of hazard tree maintenance and reduced woodcutting access; greatly benefiting snag dependent wildlife species at the project level.

Figure III.10: Pika, Middleton 2014.

In summary the Dry, Nelli and Glass Angel Restoration Projects would improve conditions for primary cavity excavators in the Dry Orr Landscape Analysis Area. The refined proposed action would not contribute to negative trend in viability on the Wenatchee National Forest for primary cavity excavators. It would not change the viability outcome listed in Table III.45.

NORTHERN SPOTTED OWL (AS AN MIS SPECIES)

AFFECTED ENVIRONMENT

Wenatchee National Forest LRMP uses the northern spotted owl as a management indicator of mixed conifer mature and old-growth habitat within western hemlock, grand fir, or Douglas-fir forests. Habitat on the Forest was determined using the Forest vegetation layer and amount of habitat within the Dry Ridge PLTA was determined using the District vegetation layer. Details on habitat use, ecology, and amount of this type of habitat on the Forest are in Wildlife MIS Status Report (2011). Acres of mixed conifer mature and old-growth habitat on the Forest are also listed in Table III.45. Approximately 382 acres of mixed conifer mature and old-growth habitat exists in the Dry Ridge PLTA; less than 1 percent of the available habitat on the Wenatchee National Forest. Mixed conifer forest occurs primarily along the north-facing aspects

and in concave landforms resulting in ribbon-like bands and discrete patches within the Dry Ridge PLTA.

ENVIRONMENTAL CONSEQUENCES

No Action

Left in its present condition, dense, overstocked stands with closed tree canopies would continue to result in increased risk for insect and disease epidemics, leading to increases in tree mortality, fuel loading and risk for large, high-severity wildland fires outside of the normal (historic) range of variability (Rippy, et al., 2005). Short term this increase in tree mortality would be favorable for the northern spotted owl and other species dependent on mixed conifer mature and old-growth habitat, adding diversity to forest structure and improving prey species availability. Long term as numerous trees die and canopy closure drops below 70%, the old-growth and mature stand characteristics would diminish. Existing habitat is at different stages of this process. The risk of stand replacing fires within and adjacent to the project area, within the Naches Mainstem, Wenas and Rattlesnake watersheds would remain high (USDA Forest Service, Naches Ranger District, 2007). Stand replacing fires are highly likely within the near future (see expected future condition in fuels section earlier in this chapter); resulting in substantial removal of mixed conifer mature and old-growth habitat. Potentially changing the viability outcome depending on the amount of area impacted.

Effects of Refined Proposed Action

Identified risk factors include habitat alteration. Metric used to analyze risks factors for the northern spotted owl will be acres treated.

Direct and Indirect Effects

Effects to mixed conifer mature and old-growth habitat are expected to be minimal. The Dry Restoration Project did not identify the development of spotted owl habitat as a “Purpose and Need”, but identified the protection of existing habitat as high priority. The Dry Restoration Project does not intend to develop or increase mature or old-growth habitat in mixed conifer in the Dry Ridge PLTA as it is primarily made up of the ponderosa pine/Douglas-fir forest type.

The proposed Dry Restoration Project has the potential to alter or remove approximately two acres of mixed conifer mature and old-growth habitat; resulting in an incidental amount of habitat degraded or removed. Throughout the project area, treatment would retain the following stand level structural characteristics: large overstory trees, large snags and large downed woody debris at levels recommended in the Wenatchee National Forest Late-Successional Reserve Assessment (USDA Forest Service, Wenatchee National Forest, 1997). Vegetation treatments will also retain and restore key structural components at a landscape level: Existing large and very large, and old trees will be retained and protected; All trees >25” dbh will be retained; Retain 20-25” dbh Douglas-fir except to meet white-headed woodpecker objectives; Some dwarf mistletoe infected trees will be retained (refer to Chapter II for details); snags with dead, broken and forked top or Douglas-fir with mistletoe brooms will be retained; in snag-deficient area snags will be created; and complex patches will be left on 20% of the commercial harvest

treatment area. These design features, mitigations and monitoring strategies would insure some of the features of mature or old-growth habitat components remain on the landscape.

Cumulative Effects

The Dry Restoration project in itself will have little change on mixed conifer mature or old-growth habitat at a landscape scale. However, since more than 50% of the two 5th field watersheds will be treated with forest restoration and dry site strategy, the proposed project in conjunction with the surrounding silvicultural and fuels treatment projects will add to past, present, or future impacts to create substantial cumulative effects that would benefit the northern spotted owl. Treating high risk vegetation would reduce fuel loading, creating effective fuel breaks for mixed conifer mature and old-growth dependent species at a landscape scale. Overall the Dry Restoration Project will improve conditions for the northern spotted owl and other mixed conifer mature and old-growth dependent species in the Dry Ridge PLTA primarily thought the reduction of wildland fire risk. The refined proposed action would not contribute to negative trend in viability on the Wenatchee National Forest for the northern spotted owl. It would not change the viability outcome listed in Table III.9.

BEAVER AND RUFFED GROUSE

AFFECTED ENVIRONMENT

Refer to Nelli Restoration EA for beaver and ruffed grouse Affected Environment in the Dry Ridge PLTA

ENVIRONMENTAL CONSEQUENCES

No Action

Left in its present condition, riparian-associated species would continue receiving low levels of human disturbance within the Dry Orr Analysis Area and riparian habitat would remain intact short term. Long term, major riparian habitat removal and alteration are expected resulting from stand replacing fires. Riparian reserves typically have high levels of fuel loading and burn hotter than the surrounding uplands. Reestablishment of riparian habitat could take several years without human intervention. This has the potential to result in measureable negative impacts on riparian dependent wildlife species.

Effects of Refined Proposed Action

Identified risk factors include habitat degradation. The key metric used to analyze risks factors for beaver and ruffed grouse will be road influence (Habitat Influence Index), riparian habitat treated, and meeting NWFP Standard and Guidelines for riparian reserves. Dry Orr Landscape Analysis Area was used to address cumulative effects on riparian associated species.

Direct and Indirect Effects

Habitat is expected to improve with the implementation of the Refined Proposed Action. No commercial treatment or firewood units will occur within riparian reserves. No new system roads are proposed for this project. Approximately 3 miles of temporary roads are proposed in which none occur within the riparian reserves. Therefore, temporary road actions are expected to have "no impact" to riparian dependent species and their habitat.

Cumulative Effects

The Dry Restoration project in itself will have little change on riparian habitat at a landscape scale. However, since more than 50% of the two 5th field watersheds will be treated with the forest restoration and dry site strategy, the proposed project in conjunction with the surrounding silvicultural and fuels treatment projects will add to past, present, or future impacts to create substantial cumulative effects that would benefit primary cavity excavators. Treating high risk vegetation would reduce fuel loading, creating effective fuel breaks for riparian dependent species and promote healthy riparian reserve systems at a landscape scale.

The past and foreseeable road and trail closures from district projects within the Naches Mainstem and Rattlesnake Creek Watershed will generally improve habitat for riparian dependent species. Decommissioning 31 miles, putting in storage 5.16 miles and closing 7.42 miles of Forest Service system roads in the Dry Orr Landscape Analysis Area would improve conditions for ruffed grouse and beaver and other riparian dependent species. Approximately 8.2 miles of these Forest Service system roads scheduled for closure, decommissioning or storage exist within riparian reserves. These road estimates include Glass Angel and Nelli Restoration Projects. This would improve approximately 14 acres of riparian reserve habitat. Reducing roads within riparian reserves would result in reduced human influence in riparian habitat at the project level, with little to no measureable change to riparian habitat at the landscape scale (Dry Orr Landscape Analysis area). The existing low level of human influence on riparian habitat within the Dry Orr Analysis area would continue to remain low; benefiting riparian dependent wildlife species following completion of the Dry Restoration Project.

Overall the Dry, Nelli, and Glass Angel Restoration Projects will improve conditions for ruffed grouse and beaver in the Dry Orr Landscape Analysis Area through the reduction of roads in riparian reserves and reduced wildfire risk. The refined proposed action would not contribute to negative trend in viability on the Wenatchee National Forest for the ruffed grouse or beaver. It would not change the viability outcome listed in Table III.9.

BIRDS OF CONSERVATION CONCERN & LANDBIRDS

Birds of Conservation Concern

In January 2001, President Clinton issued an executive order directing federal agencies to avoid or minimize the negative impact of their actions on migratory birds, and to take active steps to protect birds and their habitat. The USFWS developed the "Birds of Conservation Concern 2008" (BCC 2008) as the most recent means of implementing the order (USDI Fish and Wildlife 2008c). These are species, subspecies, and populations of migratory non-game birds that without

additional conservation actions will possibly become candidates for listing under the Endangered Species Act. Bird Conservation Regions (BCRs) were developed based on similar geographic parameters. The Dry Ridge PLTA falls in BCR 9 (Great Basin). The following table (Table III.11) lists bird species in this BCR that are known or likely to occur within the Dry Ridge PLTA.

AFFECTED ENVIRONMENT

Refer to Table III.11 below "Habitat" column.

ENVIRONMENTAL CONSEQUENCES

Refer to Table III.11 below "Impacts to Habitat" column.

Table III.11: The following table lists Bird of Conservation Concern species with their habitat and diet needs and potential impacts to habitat resulting from the Dry Restoration Project.

Species	Habitat	Impacts to Habitat	
		No Action	Refined Proposed Action
Williamson's sapsucker	E. Cascades, mid to high elevation, mature open and mixed coniferous-deciduous forest. Prefers low to intermediate percent canopy cover. Snags are a critical component. Feed on sap and sapwood of conifers, ants and wood-boring insects.	Stands will continue to be in overstocked conditions; snags and trees sizes will remain small and medium diameter with little opportunity to develop into large tree/snags. Cumulatively resulting in increased fuel loads and risk of high-severity wildland fires	Treatment will retaining existing habitat (untreated riparian habitat) while developing vegetation structure, composition, and pattern that is more resilience to uncharacteristic wildfires and climate change. Providing opportunities for the development of large trees & snags
White-headed woodpecker	Mixed conifer forest (<40% CC) dominated by mature and old growth ponderosa pine and open habitats where standing snags and scattered tall trees remain. Feed on pine tree sap, insects and pine seeds	Stands will continue to be unsuitable because of the overstocked stand conditions and lack of open understory development & mature PP overstory. Cumulatively resulting in increased risk of high-severity wildland fires	Treatments will open up the understory and overstory components of the forest resulting in more open PP stands. Treatment will mimic historic spatial gap patterns which will improve opportunities for nest site locations. Treatment will restore vegetative structure, composition, and pattern allowing natural processes to function and provide resilience to uncharacteristic wildfires and climate change.
Flammulated owl	Associated with ponderosa pine forests and mixed conifer stands with a mean 67% canopy closure, open understory with dense patches of saplings or shrubs. Special habitat considerations: soft snags, forest openings for foraging. Feed on crickets, grasshoppers, moths, spiders and beetles	A lack of sufficient foraging and nesting habitat will continue throughout the project area due to the overstocked stand conditions and lack of open understory development. Cumulatively resulting in increased risk of high-severity wildland fires	The treatments will open up the understory component of the forest while maintaining untreated patches of thickets throughout. Untreated roosting habitat will remain dispersed throughout the area yet the treatments will have the potential to improve foraging and nesting habitat intermixed with the overstocked thicket areas.
Willow Flycatcher	Associated with riparian shrub dominated habitats, especially brushy deciduous thickets, wet meadows with shrubby	Stands adjacent to riparian habitat will continue to be in overstocked condition; increased fuel loads	Treatment will retain existing riparian habitat (not treat RR). It will develop vegetation structure, composition, and pattern in adjacent nonriparian

Species	Habitat	Impacts to Habitat	
		No Action	Refined Proposed Action
	component. Special habitat consideration: willow or alder thickets along streams, riparian habitat. Feed on flying insects including flies, mosquitos, small moths, ants, beetles etc.	resulting in risk of high-severity wildland fires and potential removal of habitat at a landscape scale.	habitat; resulting in more resilience stands to uncharacteristic wildfires and climate change.

Landbirds (Partners-in-Flight Conservation Strategy Species)

The Forest Service has prepared a Landbird Strategic Plan (January 2000) to maintain, restore, and protect habitats necessary to sustain healthy migratory and resident bird populations. Individuals from multiple agencies and organizations within the Oregon-Washington Chapter of Partners in Flight participated in developing publications that served as references for conserving landbirds in this region (Panjabi et al. 2005).

The Dry Ridge PLTA is covered under the Conservation Strategy for Landbirds of the East-Slope of the Cascade Mountains in Oregon and Washington (Altman 2000). The principal issues affecting bird populations listed in this plan include habitat alteration from timber harvesting; changes in historic fire regimes and grazing by livestock (Altman 2000). This strategy identifies groups of focal species and their associated habitat attributes that can be used to identify desired landscapes.

AFFECTED ENVIRONMENT

Refer to Table III.12 below.

ENVIRONMENTAL CONSEQUENCES

Refer to Table III.12 below "Impacts to Habitat" column.

Table III.12: Priority habitat for landbird conservation in the Dry Ridge PLTA, with representative focal species and key habitat features.

Focal Species that potentially occur in the Project Area	Key Habitat Feature / Conservation Focus	Impacts to Habitat	
		No Action	Refined Proposed Action
PONDEROSA PINE (~8,000 ac in DRY RIDGE PLTA)			
White-headed woodpecker	large patches of old forest with large snags	Refer to BCC discussion	Refer to BCC discussion
Pygmy nuthatch	large trees	Stands will continue to be in overstocked; snags and trees sizes will remain small and medium diameter with little opportunity to develop into large tree. Cumulatively resulting in increased fuel loads and risk of high-severity wildland fires	Treatments will open up the understory and overstory components of the forest resulting in more open stands and the opportunity for large tree development. Treatment will restore vegetative structure, composition, and pattern allowing natural processes to function and provide resilience to uncharacteristic wildfires and climate change.

Focal Species that potentially occur in the Project Area	Key Habitat Feature / Conservation Focus	Impacts to Habitat	
		No Action	Refined Proposed Action
Chipping sparrow	Open understory with regeneration pines.	Suitable habitat condition would continue to be absent until wildland fire mortality open understory; following wildfire, pine regeneration may be retarded due to the lack of nearby seed source.	Treatments will open up the understory and overstory components of the forest resulting in more open stands. Treatment will mimic historic spatial gap patterns. These gaps and open stands will allow opportunities for ponderosa pine regeneration.
MIXED CONIFER FORESTS (Late successional) (~2,200 mixed conifer forest of mixed successional stages)			
Brown creeper	Large trees	Stands will continue to be in overstocked; snags and trees sizes will remain small and medium diameter with little opportunity to develop into large tree. Cumulatively resulting in increased fuel loads and risk of high-severity wildland fires	Treatments will open up the understory and overstory components of the forest resulting in more open stands and the opportunity for large tree development. Treatment will restore vegetative structure, composition, and pattern allowing natural processes to function and provide resilience to uncharacteristic wildfires and climate change.
Williamson's sapsucker	Large snags	Refer to BCC discussion	Refer to BCC discussion
Flammulated owl	interspersion of grassy openings and dense thickets	Refer to BCC discussion	Refer to BCC discussion
Hermit thrush	multi-layered dense canopy	Suitable habitat condition would continue until wildland fires removed habitat at a landscape scale	The treatments will open the understory component of the forest while maintaining untreated patches throughout. Untreated suitable habitat will remain dispersed throughout the area while the treated stand will improve habitat sustainability.
Olive-sided flycatcher	edges and openings created by wildfire; recent burns	Suitable habitat condition would continue to be absent until suppression mortality created gaps and edge habitat.	Variable density thinning would create more diverse stand conditions and accelerate growth of larger trees that may become snags. Forest gaps would increase understory growth, contributing to increased insect production over the next 20 years. Increased forest edge habitat would also enhance foraging opportunities. Gaps created by thinning may allow foraging until the canopy eventually closes again and these opportunities are lost.
ASPEN			
Red-napped sapsucker	Large trees with regeneration	NA-aspen stands in DRY RIDGE PLTA but not in Dry treatment area	NA-aspen stands in DRY RIDGE PLTA but not in Dry treatment area

NORTHWEST FOREST PLAN SURVEY AND MANAGE SPECIES

A majority of the Okanogan-Wenatchee National Forest, including the Naches Ranger District, lies within the range of the northern spotted owl and is managed under the Northwest Forest Plan. The Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (USDA Forest Service and USDI Bureau of Land Management 2001) contains direction for mitigating effects to certain species of vertebrates and invertebrates in this area. Dry Restoration Project applies the 2001 Survey and Manage species list (USDA and USDI 2001) and thus meets the provisions of the 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines.* Using the 2001 Survey and Manage list (USDA and USDI 2001), vertebrate and invertebrate species of interest within Northwest Forest Plan lands whose range includes the Okanogan-Wenatchee National Forest are: great gray owl, Larch mountain salamander, Puget Oregonian, Columbia Oregonian, masked duskysnail, Chelan mountainsnail, and blue-gray taildropper. Pre-disturbance surveys are not required for any of these survey and manage species as the Dry Ridge PLTA is outside the range of the Chelan mountainsnail and Columbia Oregonian (USDA Forest Service 12/1/2011 rev), outside the breeding range of the great gray owl (USDA Forest Service 2005d) and their habitat or presence does not occur for the blue-gray taildropper, Puget Oregonian, masked duskysnail and Larch mountain salamander. Therefore this project will have "no impact" on any Survey and Manage species and will not be discussed further.

Figure III.11: Timber crew taking a break during winter field work

TRAVEL AND ACCESS MANAGEMENT

AFFECTED ENVIRONMENT

This project's affected environment is overlapped by the Nelli EA and is the same as that listed in the Nelli EA.

ENVIRONMENTAL CONSEQUENCES

No Action

The existing road system would experience no changes in its current status and condition. Roads that are currently in custodial status (Maintenance Level 1) would remain closed and open roads would continue to provide access for recreational, commercial, and administrative functions in the same manner that they currently do. Open roads would receive no maintenance beyond that which is normally scheduled, which is generally devoted to the higher standard roads within the project area.

Under the No Action, there would be no treatments within the project area and no temporary roads would be built. Previously constructed temporary roads and unauthorized roads that were not treated and have not naturally recovered would continue to provide some effect to vegetative productivity, surface/groundwater hydrology, and sediment production, although the nature of the surrounding soil types would localize these effects. Such effects would be slowly diminishing as these compacted roadbeds slowly decompact. There would be no additional traffic added due to hauling activities and there would be no additive need for construction, reconstruction, maintenance or haul route maintenance performed.

Effects of Refined Proposed Action

Direct and Indirect Effects

Prior to harvest activities, some roads may require reconstruction to restore proper function. During harvest activities, including road maintenance activities would be conducted on roads designated for use. Danger trees may be removed; removal is anticipated to be two trees/acre or less. There would be short term indirect effects such as an increased risk of noxious weed invasion, changes to wildlife habitat and the potential for illegal wood cutting. These risks would be mitigated by promptly seeding disturbed soil along road shoulders and berms with competitive grasses, utilizing gravel that is free of noxious weed seed and utilizing barriers to control access. Because many roads would be opened as needed and closed following either harvest or post sale activity, these impacts are expected to be temporary.

The Nelli Project Area overlaps this project area and an identified 5.16 miles of road to be placed into Maintenance Level 1. While in Maintenance Level 1 these roads are physically closed to vehicular traffic, but may be open and suitable for non-motorized use. The Nelli Project Area identified Maintenance Level 1 roads that may need to be opened during Timber Sale activity. During Timber Sale activity these Maintenance Level 1 roads, would be placed into Maintenance

Level 2 statuses and managed as such. Post-harvest these roads will be placed back into Maintenance Level 1 and effectively closed.

Table III.13: Miles of System Road by Activity

Activity	No Action Miles	Refined Proposed Action
Reconstruction	0.00	19.81
Maintenance	0.00	3.53
AS IS	38.95	10.29

As a direct effect, some roads that do not receive recurring maintenance, primarily low standard roads in the Maintenance Level (M/L) 2 category, would see some improvements in both safety and drivability including their ability to handle surface runoff and the resultant sediment. Native surface M/L 2 roads, as a result of use and infrequent blade maintenance, tend to develop shallow ruts in their wheel tracks, which can concentrate shallow flow and lead to increased sediment rates (Foltz, 1991). Post-haul maintenance that would occur on these roads would restore flat road surfaces (without ruts) that would be capable of producing less sediment than their rutted counterparts; post-haul waterbarring would also remove surface runoff from the erosive road surfaces.

Dust abatement, primarily using water as the dust palliative, would be performed as necessary to maintain safe driving conditions. This would have a secondary effect of maintaining a relatively well-bonded road surface free of the highly erosive pulverized dust “flour” that can occur on native surface roads under heavy use conditions.

Temporary road construction is sometimes required to economically harvest trees from a particular harvest unit. Within the project area, implementation of the Refined Proposed Action would result in the construction of temporary roads to aid in completing silviculture treatments and would result in the temporary commitment of acreage to use as road beds. Mileage and acres per Action are shown in the table below.

Table III.14: Temporary Road Estimate by Action

Action	Estimated Mileage	Estimated Acres
No Action	0	0
Refined Proposed Action	3	8

Temporary roads are not intended for mixed vehicle use, nor are they intended to remain as identifiable facilities after the administrative need for their use has ended. At the completion of harvest and post-harvest activities (treatment of residual slash), all temporary roads would be barricaded to eliminate motor vehicle access and would be ripped and/or recontoured as part of post-harvest soil remediation activities to facilitate their return to vegetative productivity. Temporary roads would be seeded unless the adjacent plant community will provide a sufficient seed source for vegetative recovery.

Cumulative Effects

Under the Refined Proposed Action there would be approximately three miles of untreated temporary roads having been constructed within the project area as individual units were harvested by timber sales with a certain degree of erosion potential and reduced vegetative productivity. As temporary roads were treated by recontouring, erosion potential would decline. The productive capability would increase over time subsequent to recontouring as subsidence returned the soil profile to a more natural ratio of macroporosity and microporosity.

The combination of past access management decisions to close roads in the area encompassed by the Dry project area, combined with proposed road closures, along with the anticipated new forest Travel Management Plan involving additional road closures or seasonal restrictions, would result in changes to the composition and increase in volume of vehicular traffic on roads within the project area. This would lead to a potential need for increased maintenance on those roads. During the life of implementation activities involving haul of materials under the Refined Proposed Action, there would be an additive effect from those changes and the increased traffic resulting from implementation activities on the maintenance needs of both designated trails and other open roads used as haul routes. The performance of reconstruction and haul route maintenance requirements would lessen these effects and minimize impacts resulting from the increased road use occurring during implementation of vegetative management activities.

Minimum Roads Analysis (MRA) for the entire forest is expected to be completed by 2015. It would result in recommendations for "the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands" (36CFR212.5). Although MRA is not a decision document, additional road relocations, closures or decommissioning may be recommended.

RECREATION

AFFECTED ENVIRONMENT

Additions and updates to the Dry Ridge PLTA Affected Environment for the Recreation Resource are recorded below. Refer to Nelli EA for the remainder of the recreation activities table.

Table III.15: Additional Recreation Activities Occurring within the Dry Ridge PLTA.

Activity	Location and Timing of Activity
Four Wheel Drive (OHV) System Trail 696	Approximately 4.3 miles of the 8.4 mile long Mud Springs OHV Trail 696 are located in the southern portion of the PLTA (Sections 32-34, and 1-3). This trail is classified as a Class III (design parameters for maintenance include 72"-96" tread & clearing width, native surface, 5%-18% grade, 5%-12% target cross slope, 15'-20' turning radius), although much of the trail within the PLTA is wider. It is designated as More Difficult. The trail travels through Semi Primitive

Activity	Location and Timing of Activity
	Motorized, Roaded Natural, and Roaded Modified ROS classifications. Views from the trail are both natural appearing and altered, as the trail travels through several management areas harvested at different times.
Events – Permitted and Organized Group Gatherings	The Central Washington Endurance Riders hold a permitted annual equestrian event in the PLTA. The Endurance Ride stages out of the Nile Mill Site and uses segments of the FSR 1601, FSR 1631 (and spurs), OHV Trail 696, and nonsystem trails to conduct 25, 50, and 75 mile long rides. Additional roads and trails used (north of the 1601 road system) are discussed in the Nelli EA. This permit has been ongoing for over 13 years and is held in late June to early July. The current permit expires in 2015. The Pacific Northwest 4-Wheel Drive Association holds an annual trail run on OHV Trail 696 in early to mid-July as part of a week-long event, and has been doing so for the past several years. The current permit for this event is scheduled to expire in 2015. A Competitive Mounted Orienteering organized group gathering has been held at the Nile Mill Site and on adjacent nonsystem trails annually in mid to late May since at least 2010. The Boy Scouts of America will hold a Spring Camporee in April 2013 at the Nile Mill Site. It is not known if this will become an annual event. Other small organized group events (including the EJ Bell Gentlemen on Horses event) that do not require permits are held by various chapters of the Backcountry Horsemen of Washington and other organizations. These events stage primarily at the Nile Mill Site.

ENVIRONMENTAL CONSEQUENCES

No Action

Existing recreation activities and opportunities would not change under the No Action Alternative, and the recreation experience would not be affected. In the long term, No Action may result in the increased risk of catastrophic wildfire, which could displace recreationists for several years after the fire event.

A spring 2011 flood resulted in damage to and subsequent closure of several Level III Road systems and associated spur roads in the watershed. The closures changed the availability of some recreation opportunities in the watershed, resulting in less motorized opportunities (driving for pleasure, snowmobiling on groomed routes, motorized hunting access and motorized exploration), but increased nonmotorized recreation opportunities simultaneously. Selection of the No Action Alternative would not add to the cumulative effects on recreation opportunities.

Effects of Refined Proposed Actions

Direct and Indirect

Driving for Pleasure, Exploration, and Viewing Scenery

Forest System Road 1601 is used for pleasure driving and exploration (especially by the local population) during the snow free season. The FSR 1600 below the junction of the FSR 1601 is used year round for access to the Nile Sno-Park and to view elk feeding. Other system roads in this portion of the PLTA are also used for these activities, but on a lesser scale. Changes to available recreational driving opportunities due to temporary road restrictions on 1601, 1631, 1613270, 1601242 and 1601243 during harvest of individual units adjacent to these roads activities and increased log truck traffic on primary access roads during implementation of the proposed actions would have would affect recreationists using the roads during the life of the project. Effects would change around the PLTA according to where and when activities were occurring. Encounters with log truck traffic, noise, and dust would be expected on all roads used for hauling. Public notification of proposed closures and planned activities through various media outlets would minimize effects by allowing recreationists adequate time to change plans (see Mitigations Appendix B).

Winter Use

If winter logging were to occur under this project, snowmobilers, skiers, snowshoers and jeepers wishing to recreate in the PLTA would be affected by potential encounters with log truck traffic from the Nile County Road to the Nile Sno-Park as all timber would be hauled down FSR 1600. Those winter recreationists who desire to use the ungroomed FSR 1601 and other system roads in this area would be affected by traffic as well (although winter use in this area has not been noted to be heavy). Notifying the Washington State Parks and Recreation Commission and Yakima County Snow Grooming Committee annually of planned haul activities during the snowmobiling season would increase public awareness of potential encounters with truck traffic (see Mitigations Appendix B). Activities outside the snow season would not affect winter recreationists.

Big Game Hunting

Effects to big game hunters could include physical changes to areas they've traditionally hunted as trees are removed. Increased traffic, road closures during harvest, and log hauling would affect big game hunters using the roads and camping in the area. Increased encounters with logging trucks, noise, and dust disturbance would increase during harvest activities. Hunters

may be displaced if harvest occurs in their preferred area during hunting season. Hunters may also be indirectly affected by changes in animal use patterns if their traditional hunting area undergoes vegetative treatment or if the animals are displaced by increased activity during the life of the project; they may have to change their hunting strategy or location for the first few years. Long-term, hunting success may improve as big game forage conditions would be expected to improve.

OHV Trail 696

Off-highway vehicle enthusiasts and others using OHV Trail 696 would be affected from implementation of the proposed actions. Of the approximately 4.3 miles of system OHV Trail 696 located within the PLTA, approximately 2.1 miles (total) are located within or adjacent to proposed treatment units. The view as seen from the trail in units 7,9,18,21,22 and two firewood cutting units in Sections 3 and 34 would be altered where large contiguous areas of trees were removed (refer also to Visual Resources). The altered view would occur periodically as the trail moves in and out of harvested areas. In units 7,9,14, and one firewood cutting unit in Section 3, it would probably be necessary for skid trails or other equipment to cross the trail tread to remove timber, which could negatively impact the integrity of the trail tread. Approximately 0.2—0.4 miles of trail would be used as temporary haul roads by log trucks and/or firewood trucks during harvest of units 7 and 22 and the firewood cutting unit in Section 3. Although much of the trail is currently easily negotiable by a standard pickup, some segments of the trail corridor may need to be widened, straightened, or leveled out to be used for hauling, which would cause those segments to become even more accessible without an OHV.

Most, if not all, of OHV Trail 696 from the FSR 1613270 junction in Section 34 to the FSR 1601/1601242 junction in Section 1 would probably need to be closed at some point in time during harvest activities; although all segments may not need to be closed at once.

Figure III.12: Trail ride with 4-Wheel Drive club

Project design would include directional falling away from the trail, minimizing skid trail and/or equipment crossings to protect trail tread, replacing trail markers currently on trees to be cut onto leave trees to retain the identity of the trail corridor, and outsloping/restoring drainage features into the segments used as haul roads to restore the tread toward the Class III, "More Difficult" experience when project access needs are complete.

Dispersed Camping

The Nile Mill Site is a special destination area, especially for large groups of stock users in the spring and early summer season and also for big game hunters. One additional large capacity dispersed camp area is located at the 1601/1601233 junction. All timber removed under the proposed actions would be hauled past these sites. A few other lightly used sites lie along the system roads planned for haul activities. Hauling would create noise and dust, which would be expected to affect campers during the life of the project.

There are no documented dispersed sites directly located in harvest units, although some of the existing landings may be have been used periodically in the past during hunting season. No other effects to dispersed camp sites are expected to occur from the proposed action. Additional dispersed site opportunities may be created through harvest activities if new landings are created or reopened along open system roads during project implementation.

Nonsystem Trails

No known nonsystem trails would be affected by the proposed actions.

Special Permitted Events and Organized Group Gatherings

Currently permitted events and known organized group gatherings would be affected as follows:

The Endurance Ride would be affected during the life of the project as riders would be displaced if activities were occurring adjacent to roads and trails used for the event (Roads 1601, 1631 and associated spur roads; and OHV Trail 696) during the time of the permit (late June – early July). Areas of displacement would change depending on project activities and the timing of operations (up to five years overall).

The Pacific Northwest 4 Wheel Drive Association permitted event on OHV Trail 696 would be displaced from segments of the trail during harvest or hauling activities if the trail is closed during early to mid-July (up to five years overall).

Effects to other permitted events and organized group gatherings would be similar to those described above, if the project occurred at the same time as the planned event.

Other Recreation Activities

Recreationists involved in small, organized group activities or in activities such as nature exploration, geological study, plant identification/gathering, bird watching, or miscellaneous

forest products gathering may be displaced in the short term during harvest or haul activities, and possibly for a longer term if their traditional area is heavily treated.

Firewood cutting

Effects to personal use firewood cutting (under permit) would not occur as the proposed action would occur in areas closed to this activity.

Recreation Opportunity Spectrum (ROS)

The proposed action would not affect the area's existing ROS classification as all activities would occur in areas designated as Roaded Modified.

Cumulative Effects

The analysis area for cumulative impacts to recreation is the combined Naches Mainstem and Rattlesnake watersheds for all activities except for dispersed camping and nonsystem trail riding opportunities, and OHV Trail 696 (discussed specifically below).

Activities dependent on the road system - such as driving for pleasure and viewing scenery, exploration along roads, big game hunting and dispersed site access - have been recently been affected by decisions to close parts of the 1703 and 1501 road systems (Road 1708, although closed at the time of this analysis, is anticipated to reopen in 2014).

Glass Angel Restoration Project activities will be occurring primarily in the FSR1605 area (Glass Creek) and in the Rattlesnake drainage. Temporary closures may occur at times during project implementation, but are expected to be short term in duration, and not add noticeably to additional loss of recreation opportunities. Flask timber sale project related activities will be occurring on FSR 1701 for the next year: log truck traffic could have short term effects to the recreationists using the road. Nelli Restoration Project activities (also located within the Dry Ridge PLTA) are expected to begin in 2014 and occur for the next several years. These activities include an estimated 20 day closure of the Nile Mill site and the adjacent FSR 1611/1601 during helicopter yarding during project implementation. Nelli activities (including timber harvest, haul, and fuels treatment) would most likely overlap in time with the activities proposed in this analysis. Additional impacts from the Dry Restoration Project proposed actions would occur (temporary road closures and truck traffic during timber harvest), but they would be mostly short term in duration and not add noticeably or long-term to overall effects to recreation opportunities.

When added to the expected Glass Angel and Nelli Restoration project activities short term cumulative impacts from the Dry Restoration Project proposed actions would be expected to affect traditional motorized access and area displacement for big game hunters. These projects could be occurring simultaneously for approximately the next five years during hunting season.

Cumulative impacts to other recreation activities such as nature exploration, geological study, plant identification/gathering, bird watching, fishing, miscellaneous forest products gathering and firewood gathering would be expected to occur in the watershed due to the Flask, Glass

Angel and Nelli restoration projects occurring during the same time period (during the next five years), but many of these activities can be enjoyed in other areas of the watershed as well.

Management practices within the PLTA, including the proposed and connected actions, have affected the visual resource for decades. Today the area ranges from natural appearing to be altered. The Nelli Restoration Project would be occurring within a similar time period as this project and is considered in this cumulative effects analysis. Although much of the PLTA would appear altered in the short term with the additional acreage treated in the Dry Restoration Project, long term cumulative effects to the visual resource would not be measurable as the landscape returned to more natural appearing conditions. There are no other known projects (outside projects listed on page III-1) occurring within the Dry Ridge PLTA during this same time period; however, if additional large scale projects do occur within the PLTA within the next decade, the length of time the overall area would appear visually altered would be extended.

There would be no additional cumulative impacts to snowmobilers using groomed snowmobile routes, or to dispersed sites associated with stock users from the proposed action.

There would be no additional cumulative impacts to ROS classifications in the analysis from the proposed actions.

Impacts to OHV Trails and Users

The analysis area for cumulative impacts to OHV Trails and users is the Naches District. In the short term, one OHV system trail is closed to public use and is resulting in a loss of District opportunities. The 2.3 mile long Copper City OHV Trail 654 in the Bumping Drainage, has been closed for several years. It is scheduled to reopen in late 2014. Glass Angel Restoration Project vegetation management activities are occurring for the next several years. There will be OHV trails affected under the Glass Angel Project. In the short term by closures from management activities and in the long term by changes to the trail corridor and tread from use as haul roads and/or loss of vegetation along corridors. This includes 1.3 miles of OHV Trail 696 in the Glass Creek drainage (hauling, vegetation and fuels management) and 0.6 miles of Trail 620 in the Rattlesnake drainage (fuels management). The 1.3 miles of Trail 696 affected under Glass Angel lie west of the PLTA. Up to 4.3 miles of Trail 696 within the PLTA could be affected by fuels treatments under the Nelli Restoration project. Although the Trail 696 segments affected by the Dry Restoration Project are the some of the same segments already affected under Nelli, the trail could be closed for a longer time as some segments may need to be closed twice (once for timber harvest/haul and once for fuels treatment.

VISUAL RESOURCES

AFFECTED ENVIRONMENT

The Affected Environment is the same for Dry as it was for the Nelli Restoration Project. Refer to Nelli EA, Chapter III.

ENVIRONMENTAL CONSEQUENCES OF THE DRY RESTORATION PROJECT

For more information, refer to the Recreation Environmental Consequences section.

No Action

If no management action were taken under the Dry Restoration project, the health of the stands within the Dry Ridge PLTA would continue to decline as forest pathogens persist, adding to an above-endemic level of dead and dying component. Stressed and dead trees would become more visually dominant. Fuel build up from the dead trees would lead to a higher risk of stand replacement wildfire. Effects to the visual resource from stand replacing wildfire would take many years to soften, and the area would appear altered for the next few decades.

Effects of the Refined Proposed Action

Direct and Indirect Effects

Table III.16: Effects of Dry Restoration Project Proposed Actions on Visual Quality Objectives (VQO).

Forest System Road or Trail #	Approximate length of Road or Trail Corridor Affected by Dry Restoration Project Proposed Actions	Anticipated VQO after treatment
1601	Approximately 2.3 miles – Proposed commercial harvest adjacent to 1601 in units 3,4,6,7, and 11.	Modification
Off-Highway Vehicles (OHV) Trail 696	Proposed timber harvest (commercial or firewood cutting) visible from or adjacent to up to 2.1 miles total of Trail 696 in Units 7 (0.3miles), 9 (0.3miles), 14 (0.2miles),18 (0.1mile), 21 (0.1mile), and 22 (0.1mile) and in two firewood cutting units in Sections 3 (0.9miles) and 34 (0.1mile). Anticipated or potential skid trail or equipment trail tread crossings over approximately 1.7 trail miles total in Units 7 (0.3miles), 9 (0.3miles), 14 (0.2miles) and the firewood cutting unit in Section 3 (0.9miles). 0.2-0.4 miles used as temporary road for log truck hauling from Units 7 and 22 and/or pickup truck access to two firewood cutting units in Sections 3 and 34.	Modification to Maximum Modification*

**Although Maximum Modification meets standards for the General Forest allocation along OHV Trail 696 in portions of Sections 33, 34, and 35 as described above, a change to this VQO may not reflect the scenic importance current users place on these travel routes. Therefore modification is recommended.*

Although evidence of timber harvest (stumps, ground disturbance and/or slash piles) along approximately 2.3 miles of Forest System Road (FSR) 1601 would be noticeable in the short-term (5 years or less), the Modification VQO would be met. Evidence of timber harvest (stumps, ground disturbance, equipment or skid trail crossings, and/or slash piles) would likely be visible along up to a total of 2.1 miles of OHV Trail 696 in units 7,9,14,18,21,22 and in the firewood cutting units in Sections 3 and 34. (The altered areas would be interspersed with unharvested areas as the trail passes in and out of units). In the short term (5 years or less) the VQO would probably meet Modification or possibly Maximum Modification. Use of Trail 696 as a log truck

haul road and/or for pickup truck access to fire wood could result in the appearance of a somewhat straighter and possibly wider corridor in the short term; however, most of these trail segments are currently relatively wide and do not require technical skill to travel on. They would need little additional work to allow for timber haul.

Long-term (more than five years), once the slash piles have been disposed of and the ground cover has regrown, the visual quality from both FSR 1601 and Trail 696 would be expected to improve due to the improved health of surrounding trees, a reduction in dead and dying trees, and a reduction in fuels.

No other direct or indirect effects to visually sensitive areas identified in Table III-VR1 would be expected to occur from implementation of the proposed action.

Cumulative Effects

The analysis area for cumulative effects to the visual resource is the Dry Ridge PLTA. Management practices within the PLTA, including the proposed and connected actions, have affected the visual resource for decades. Today the area ranges from natural appearing to altered. The Nelli Restoration Project would be occurring within a similar time period as this project, and has been considered in this cumulative effects analysis. Although much of the PLTA would appear altered in the short term with the additional acreage treated in the Dry Restoration Project, long term cumulative effects to the visual resource would not be measurable as the landscape returned to more natural appearing conditions. There are no other known projects (outside of Nelli) occurring within the Dry Ridge PLTA during this same time period; however, if additional large scale projects do occur within the PLTA within the next decade, the length of time the overall area would appear visually altered would be extended.

AIR QUALITY

AFFECTED ENVIRONMENT

As air quality is an issue that resonates not only with forest users and residents near the Dry Restoration Project Area, its scope is broad, affecting much larger geographic and populated areas. Air Quality measurements are collected and viewed over time to track and assess seasonal changes, trends, and human influences to name a few. Several sensitive airsheds exist near the project area. Population centers, summer home groups, roads and highways, and Class I wilderness areas are considered sensitive to smoke, dust, and other pollutants. Smoke and its associated pollutants would also affect recreation sites should fire occur nearby. Table III.17 displays the distance and direction of some notable sensitive airsheds within 50 air miles of the analysis area. For further discussion and information on affected environment in concern to Air Quality refer to the Nelli Restoration Project EA.

ENVIRONMENTAL CONSEQUENCES

No Action

The amount of emissions produced by wildfire (or prescribed fire) is highly variable. Factors influencing emissions include size of a fire, fuel loading, fuel moisture, fire duration, the amount of time spent in flaming vs. smoldering combustion, all influence the amount of emissions produced. This interacts especially with atmospheric stability, wind direction, and the amount of energy produced by a fire in determining how much emission will reach any given receptor. As described above, the amount of emissions produced from fire is highly variable, that said, in an uncontrolled wildfire when compared to a prescribed fire those variables are much harder to control. Within the Nelli Restoration Project EA (Page III-43, table III.26) a wildfire scenario with the associated emissions chart can be compared to this project area as the two share much of the same landscape characteristics.

Effects of Refined Proposed Actions

Direct and Indirect Effects

The effects of prescribed burning activities on human health and visibility in the Dry Restoration Project Area could be minimized through regulation and avoidance. By implementing prescribed burns of activity created fuels on days that take advantage of atmospheric instability, favorable wind directions, and when possible incoming precipitation and/or cold fronts, smoke can be directed away from areas of concern, diluted by mixing with clean air, and/or the amount of residual smoldering minimized. The Washington State Department of Natural Resources has governing authority to issue permits for outdoor burning by federal agencies (U.S. Environmental Protection Agency, 1998) and the Yakima Regional Clean Air Agency is a partnering agency who regulates the nearby population centers. The possibility for smoke impacts exist anytime prescribed burning occurs. As to the range (geographic location) and scope (measured pollutant) of the impacts, there are many variables to consider. Of those variables, the amount of fuel being consumed and the length of combustion can determine the range and scope of emissions. Using a biomass tonnage calculator produced by the Fire and Environmental Research Applications team, an average smoke tonnage amount from burning landing piles on the proposed harvest units could be 7.68 tons per pile, or 0.065 tons of PM 2.5 per pile. For the proposed firewood cutting area an average amount of smoke tonnage from each pile could be 3.4 or 0.02895 tons of PM 2.5. For further in-depth discussion on air quality in relation to visibility and human health, refer to the Nelli Restoration Project EA.

Cumulative Effects

The analysis area includes the project area and the possible downwind receptors; including communities, other populated areas, non-attainment areas, public travel ways, Class I Airsheds, and other nearby, smoke sensitive areas. Smoke from large prescribed burns or wildfires can have impacts tens, and even hundreds of miles downwind, depending on atmospheric stability, mixing winds, type and quantity of fuel being consumed, fuel moisture, phase of consumption (flaming or smoldering) that the majority of the fuel is consumed, and duration of the fire. In the

case of large wildland fire, these impacts can last for weeks or even months. A list of nearby airsheds of concern and there location to the project area can be seen in table (Same table). The amount of smoke an airshed sees overtime can have various impacts. These impacts could be of a physical nature as well as of a psychological nature on how fire and smoke are regarded. When considering pre-commercial thinning, harvest treatments, and prescribed burning that is to take place within the Nelli Restoration Project Area in conjunction with harvest treatments and prescribed burning in the Dry Restoration Project Area, future wildfire incidents within the entire landscape will have less fuel to promulgate smoke into the nearby air sheds. This project in combination with other past, present, and foreseeable actions could move this landscape to a desired fire tolerant, healthy forest type which would be desirable for not only the landscape ecosystems involved, but for the human interface, in consideration of wildfire and the associated smoke impacts. In 1999, the U.S. Environmental Protection Agency announced a major effort to improve air quality in national parks and wilderness areas. The Regional Haze Rule calls for state and federal agencies to work together to improve visibility in 156 national parks and wilderness areas such as the Grand Canyon, Yosemite, the Great Smokies and Shenandoah.

The rule requires the states, in coordination with the Environmental Protection Agency, the National Park Service, U.S. Fish and Wildlife Service, the U.S. Forest Service, and other interested parties, to develop and implement air quality protection plans to reduce the pollution that causes visibility impairment. Since 1972 Washington State has had a State Implementation Plan (SIP) in which it complies with the Clean Air Act set forth by the Environmental Protection Agency. By monitoring our smoke emissions with nearby nephelometers including one housed at the Naches Ranger Station, as well as daily coordination with local and/or state weather specialists we are able to monitor the effects of smoke around the region from not only prescribed fires but wildfires as well. When implementing any prescribed burns, coordination with the State Department of Natural Resources, who is charged with enforcing the SIP for silvicultural burns, takes place on a daily basis. This communication ensures that we are staying within compliance of the SIP and ultimately the federal Clean Air Act. For further discussion on Cumulative Effects in relation to Air Quality refer to the Nelli Restoration Project EA, as these two projects share the same analysis area.

Table III.17: Airsheds of concern and proximity to the Dry Restoration Project Area

Area of Concern	Type of Airshed	Direction from Analysis Area	Distance from Analysis Area
Goat Rocks Wilderness	Class I	Southwest	15 miles
Mt. Ranier National Park	Class I	West	16 miles
Alpine Lakes Wilderness	Class I	North	39 miles
Mt. Adams Wilderness	Class I	South	33 miles
Cliffdell	Community	Northeast	4 miles
State Route 410	Highway	Northeast	4 miles
Nile Valley	Populated area	Northeast	4 miles
Naches/Gleed	Town	East	18 miles
Cowiche/Tieton	Town	Southeast	17 miles

Area of Concern	Type of Airshed	Direction from Analysis Area	Distance from Analysis Area
Selah	City	East	29 miles
Wenas Valley	Populated area	East	24 miles
Yakima	City Potential $PM_{2.5}$ non-attainment area	Southeast	30 miles
Ellensburg	City	Northeast	29 miles

CULTURAL RESOURCES

The National Historic Preservation Act (NHPA: the Act) of 1966 established the Federal government's policy and programs on historic preservation, including the establishment of the National Register of Historic Places (NRHP: the National Register). Section 106 of the Act (36 CFR 800) requires Federal agencies having direct or indirect jurisdiction over a proposed Federal or Federally assisted or permitted undertaking to take into account the effect an undertaking may have on historic properties listed on or eligible for the National Register, and it affords the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on such undertakings (16 U.S.C. 470f). The Washington State Department of Archaeology and Historic Preservation (DAHP) and the ACHP are the respective state and federal agencies responsible for overseeing the management and protection of historic properties in compliance with the NHPA. Historic properties are cultural resources that are listed on or eligible for listing on the National Register. Historic properties, and cultural resources that have not been formally evaluated against National Register criteria (E.O. 11593), are given consideration in planning for licensed, approved or funded Federal undertakings.

Impacts to cultural and heritages resources are entirely covered by the Nelli Restoration Project. For more information, reference the Nelli EA pages III-183-185.

RESOURCES AREAS NOT DETAILED

Dry Restoration will have no additional impacts on Rare and Uncommon Plants, Range Management, or Invasive Species. Effects to these resource areas were previously analyzed in the Nelli Restoration Project.

Figure III.13: Bitterroot in the spring on the Naches Ranger District.

OTHER REQUIRED DISCLOSURES

Areas with Unique Characteristics or Uncertainty

It was found that no parklands, Inventoried Roadless Areas (IRAs), Potential Wilderness Areas, or Wilderness Areas were within the project area, adjacent to the project area, or would be measurably impacted by the Refined Proposed Action.

Establishment of Precedent

The Refined Proposed Action does not establish a precedent for future actions. The decisions made and analysis completed was site and temporal specific. The purpose and need are only relevant to the specific affected environment.

Social Groups and Civil Rights

The Refined Proposed Action will not disproportionately affect any social groups or civil rights. This project includes purchase work, Forest Service contracted work, and Forest Service employee accomplished work. Under Executive Order 11246 (1965), companies with the Federal contracts or subcontracts are prohibited from job discrimination on the basis of race, color, religion, sex or national origin. The U.S. Department of Agriculture prohibits discrimination in its employment practices based on race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital and family status. This project is consistent with the Civil Rights Act of 1964.

The Refined Proposed Action will not have any disparate effects on any consumers, minority groups, women, civil rights, or social/ethnic groups. All contracts would meet Equal Employment Opportunity requirements.

This project is consistent with Environmental Justice Executive Order 12898. This project will not have any disparate effects on minority populations or low-income populations. This project is site specific and will not have human health effects on these groups. Findings for air quality can be found in Chapter III of this document.

Prime Rangeland, Farmland, and Forest Land

The Refined Proposed Action complies with the federal regulations for prime land. None of the project areas is within prime forest, rangeland, or farmland; therefore there is no effect on any prime land.

Wild and Scenic Rivers

The Refined Proposed Action complies with the regulations of Wild and Scenic Rivers. This project will have no impact on designated Wild and Scenic Rivers as they are no way involved in this proposal.

Potential or Unusual Expenditures of Energy

This project has no potential or unusual expenditures of energy. All proposed activities are actions which the Forest Service routinely takes. This project does not involve energy production or storage.

Conflicts with Plans, Policies, or Other Jurisdictions

The IDT has cooperated with State and other local agencies to the fullest extent possible to reduce duplication between NEPA and State and local requirements. This action occurs entirely on Federal land and necessary coordination with state and other local agencies has occurred during scoping and project planning. This project has no inconsistences with approved State or local plan and laws.

Irretrievable or Irreversible Commitment of Resources

This project does not propose any commitments of resources that are irretrievable or irreversible. This project does not include the commitment of natural, physical, or cultural resources that would be non-renewable or non-recoverable for later use by future generations. Detailed impacts of the Refined Proposed Action can be found by resource area in Chapter III.

CHAPTER IV

Public Involvement Summary

Public Scoping

As mentioned in Chapter I, the Dry Restoration Project is a continuation of the landscape analysis in the Dry Ridge PLTA. The Interdisciplinary Team (IDT) for the landscape analysis was initiated in February of 2011. Scoping for the first project in the Dry Ridge PLTA, Nelli, began in February of 2012 (more information on page I-22 of the Nelli EA). The Nelli Restoration Project was completed and signed June 28, 2013. That same summer, IDT members began internal scoping and field reconnaissance for the second project in the analysis area, Dry Restoration.

A government-to-government consultation letter for the Dry Restoration Project was sent to Harry Smiskin, Chairman, Yakama Nation and other Yakama Nation contacts on February 4, 2014. The project proposal was then mailed to 575 individuals on the Naches mailing list (including hard copy letters and emails) February 6, 2014. The project proposal letter sent mailed out also outlined the start of the official comment period and the proposed timeline under the new 36 CFR 218 regulations. The project proposal can be found in its entirety in Appendix B of this document.

Additional public outreach included presentations and available information at:

- Forest Service Schedule of Proposed Actions (SOPA)
- Multiple (2013-2014) Trails and Wilderness Interest Group Meetings (TWIG)
- Naches Ranger District foyer

Comments

The official 30-day comment period began on February 12, 2014 after being announced in both the Wenatchee World and the Yakima Herald Republic legal notice section. The Naches Ranger district received comments and interest from 11 individuals and agencies providing valuable input to the project. Topics raised in the comments included recreational and trail impacts, commercial harvest related impacts, road status within the project area, Forest Service communication with the public, economic impacts of the project, target landscape objectives, reducing the risk of catastrophic wildfire, impacts in the firewood cutting unit, protection of tribal resources, and the protection of riparian resources. A detailed response and analysis of all comments received from the project will be available at the time of the Draft Decision Notice and start of the Objection Period within the project file.

The Naches Ranger District greatly values the site-specific comments received on the project. Additional information during the project planning process helps refine the original proposal.

CHAPTER V

Organizations, Agencies and Persons Consulted

Forest Service

Naches Ranger District Interdisciplinary Team

Dave Lucas	Team Leader, Economics
Michelle King	NEPA Planner
Gary Torretta	Fisheries
Bill Garrigues	Hydrology
Joan St. Hilaire	Wildlife
Kathryn Buchholz	Cultural Resources
Chris Ownby	Geographic Information Systems
Sue Ranger	Recreation, Visual Quality
Jason Emhoff	Fire and Fuels
Phil Monsanto	Vegetation Management
Carla Jaeger	Range
Jodi Leingang	Botany
Vince Voelker	Travel and Access Management
Nate Standish	Timber Sale Administrator

Other Participants

Irene Davidson	Naches District Ranger
Mike Balboni	Okanogan-Wenatchee National Forest, Forest Supervisor
Jodi Leingang	Senior Environmental Coordinator, Naches Ranger District

Agencies Consulted

NOAA Fisheries
US Fish and Wildlife Service
Washington State Historical Preservation Office

Agencies Notified

WA Department of Fish and Wildlife
WA Department of Natural Resources
WA Department of Ecology
WA State Parks and Recreation
Yakima County Sheriff's Office
Yakima Regional Clean Air Agency

CHAPTER VI

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