ENVIRONMENTAL ASSESSMENT

Sherman Creek Wildlife Area 5-Year Habitat Improvement Project

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SUMMARY

The U.S. Fish and Wildlife Service (Service, we) proposes to authorize federal funding through the Wildlife Restoration Grants Program (Pittman-Robertson) for the Washington Department of Fish and Wildlife's (WDFW) Lands Division, Wildlife Program, to thin approximately 4,000 acres of trees to improve the wildlife habitat on the Sherman Creek Wildlife Area.

Commercial thinning and noncommercial treatments, such as prescribed fire, are being proposed to improve wildlife habitat to further accomplish goals consistent with the Sherman Creek Wildlife Area Management Plan (WDFW 2006). The project area is located in the northeast corner of Washington State, adjacent to the Colville National Forest, approximately 6 miles west of Kettle Falls, Washington. The Sherman Creek Wildlife Area lies entirely within Ferry County, and is approximately 8,782 acres in size; the wildlife area falls within the lower Sherman Creek Watershed and extends into one other drainage. This Proposed Action is primarily needed to improve wildlife habitat for mule deer, white-tailed deer, wild turkey, ruffed and blue grouse, cavity nesters, black bear, moose and elk, with added benefits that will also improve forest health conditions and reduce hazardous fuels.

Under the Proposed Action (Alternative 2), WDFW would remove trees through a cut-to-length ground-based logging system from approximately 4,000 acres. Approximately 600-1,200 acres of prescribed fire is proposed to reduce accumulations of forest fuels. Implementation of the Proposed Action would necessitate the reopening of 3.77 miles of orphaned roads, which may require road reconstruction. In addition, 2.03 miles of temporary roads would need to be established. Existing roads would primarily be used without the need to construct new permanent roads. Program income generated from this Proposed Action would be used to acquire perpetual timbers rights (PTRs) owned by the Western Pacific Timber Company, which occur on the Oak Creek and LT Murray/Wenas Wildlife Areas. This full fee title ownership would facilitate management of the wildlife areas, as well as public access.

Ultimately, some land and PTRs may be traded to the Washington Department of Natural Resources (DNR) as part of an upcoming land exchange, in order for WDFW to acquire some of the last remaining critical shrub-steppe habitat in Eastern Washington. This exchange is still being negotiated between WDFW and WDNR and it is unclear exactly what lands would be involved. As the details of this proposed land exchange become available, it will undergo a separate analysis under the National and State Environmental Policy Acts (NEPA/SEPA).

In addition to the Proposed Action (Alternative 2), the Service also evaluated the following alternative:
• No Action – There would be no change in current management direction. See Chapter 2, Page 17 for more details.

Based upon the effects of the alternatives and feedback received from the public, other agencies, and tribes, the responsible official for the Service will decide:

- The specific areas, if any, that would be treated to improve wildlife habitat with funding under the Wildlife Restoration Grants Program.
- The specific activities that would occur on areas selected for treatment with federal funding. These specific activities include, but would not be limited to, commercial thinning with cut-to-length ground-based logging systems consisting of feller processors and self loading forwarders, and noncommercial treatment, such as prescribed fire.
- The specific Best Management Practices included with the selected alternative.
- The specific monitoring and mitigation (best management practices) included with the selected alternative.
- The activities to be funded with program income generated from timber harvest.
- If a Finding of No Significant Impact is warranted or if an Environmental Impact Statement will be prepared.

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CHAPTER 1 INTRODUCTION

On behalf of the U.S. Fish and Wildlife Service (Service, we), the Washington Department of Fish and Wildlife (WDFW) has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws (including the State Environmental Policy Act (SEPA)) and regulations. The Service maintains the ultimate responsibility for NEPA compliance and resulting decisions. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the Proposed Action and alternatives. The document is organized into four chapters.

Chapter 1

Introduction: This section includes information on the history of the project proposal, the Purpose of and Need for Action; a brief description of the Service's proposal for achieving that purpose and need, the Proposed Action; and provides details as to how the Service and WDFW informed the public, other agencies, and tribes of this Environmental Assessment and the their responses.

Chapter 2

Comparison of Alternatives, including the No Action and Proposed Action Alternatives: This section provides a more detailed description of the agency's Proposed Action as well as alternative methods for achieving the stated purpose and need. These alternatives were developed based on key issues raised by the Service. This discussion also includes possible best management practices.

Chapter 3

Affected Environment and Environmental Consequences: This section describes the environmental effects of implementing the Proposed Action and other alternatives. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative that provides a baseline for evaluation and comparison of the Proposed Action (Alternative 2).

Chapter 4

List of preparers, of individuals and agencies consulted and coordinated with during the development of this Environmental Assessment, and the bibliography.

Background

Organized and effective fire suppression began with the establishment of the National Forest System in the early 1900s. The most significant fire event on the Sherman Creek Wildlife Area was the Dollar Mountain Fire that burned in the summer of 1929. This devastated much of the watershed and caused significant changes in vegetation. Smaller fires have occurred since that time but have varied in effect. In September 2006, the Bisbee Mountain fire, which was human caused, occurred on the wildlife area. . This fire consumed 500 acres of state, federal, and private forestland, of which roughly 90% of the acreage was associated with the Sherman Creek Wildlife Area. The fire was a moderately intense burn due to light winds, heavy fuel loads, steep terrain and dry forest conditions. Due to the fire suppression efforts by multiple agencies, a catastrophic fire was avoided.

Nearly 100 years of aggressive fire suppression on forested lands throughout the west have modified habitats and increased fuel loads. The effect of the reduction in fire occurrence has modified wildlife habitat to the extent that herbaceous forest openings dominated by vegetative cover consisting of grasses, legumes, and forbs are lacking. This vegetative change has resulted in increased tree competition related mortality, as well as, insect and disease related mortality. This, in turn, has contributed to increased levels of surface fuels and organic material. Today's stands no longer have historical levels of the grass and forb understory, which has reduced overall forage availability for big game. In addition, forests that are conducive to large-scale, stand replacing wildfires, have the potential to burn large expanses of forest and result in openings so large that they may be underutilized by forest edge-associated big game species due to the absence of nearby cover.

In 1948 the Sherman Creek Wildlife Area was purchased to manage deer, to protect their habitat and provide wildlife-related recreation. To improve existing habitat conditions which have been degraded through fire exclusion for nearly 100 years, a project involving timber thinning and limited prescribed burning has been designed to enhance use by and habitat for mule deer, white tailed deer, wild turkey, white headed and lewis' woodpeckers and elk by improving understory vegetation. The proposed action would stimulate forage growth and re-generate fire dependent species for browse. The activities included in this Proposed Action (Alternative 2), as described in Chapter 2, Page 17, are based upon findings of an interdisciplinary team (i.e., Conservation Planner, Wildlife Forester, Wildlife Area Manager, Assistant Manager, and District Biologists). Further, a need was identified to deal with declining forest health (i.e., beetle infestations) and increased wildfire risk. This action will also improve forest health conditions and reduce hazardous fuel loads.

Timber thinning will produce program income, revenue that, per federal aid funding requirements, will be used to further manage wildlife stewardship activities within Washington's Wildlife Area Program. A secondary benefit of this

action, will be use of this revenue to acquire perpetual timber rights (PTRs) on the Oak Creek, LT Murray/Wenas Wildlife Areas. PTRs are granted property rights that allow the removal of timber in perpetuity from the grantees' land. When these wildlife areas were purchased by WDFW, the seller retained the perpetual timber rights. WDFW owns the land, but cannot manage the timber resource. By acquiring the PTRs, more forestland can be safeguarded under public ownership, and public access for wildlife-related recreation would be improved.

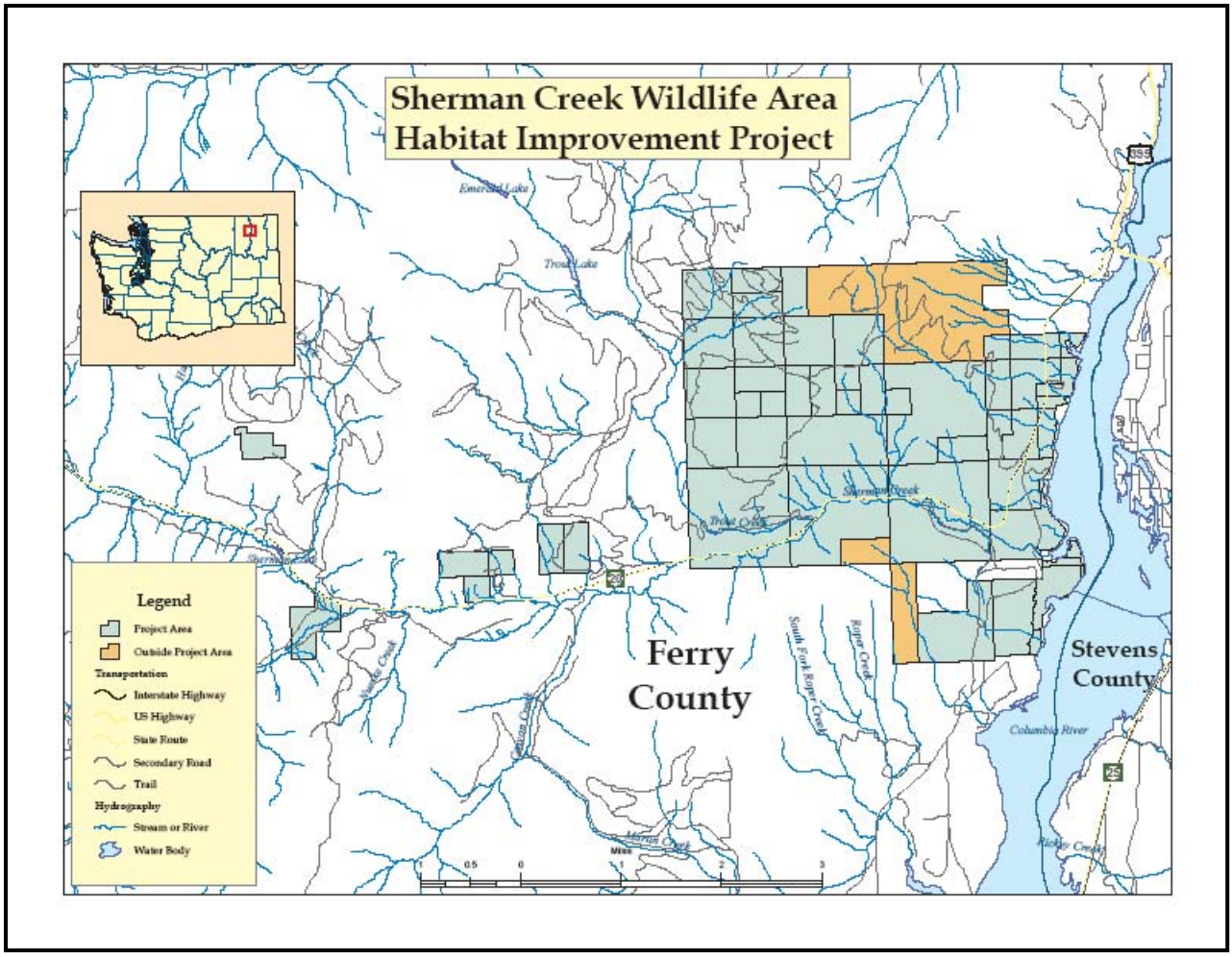
It must be noted that WDFW is currently in negotiation with WDNR regarding a proposed land exchange to consolidate each agency's land holdings, facilitate access and management, and provide WDFW with some of the last remaining critical shrub-steppe habitat in Eastern Washington. Portions of Oak Creek and LT Murray/Wenas Wildlife Areas may be a part of this exchange. When the details of this land exchange are known, it will undergo a separate NEPA/SEPA analysis.

Location

The project analysis area encompasses approximately 6,900 acres of WDFW forestlands, of which most fall within the Sherman Creek drainage, with the remainder in the Trout Creek drainage. Bordered on three sides by the Colville National Forest and the Columbia River to the east, the Sherman Creek Wildlife Area is comprised of five parcels totaling 8,782 managed acres. Elevations within the project area range from approximately 1,289 to 4,600 feet.

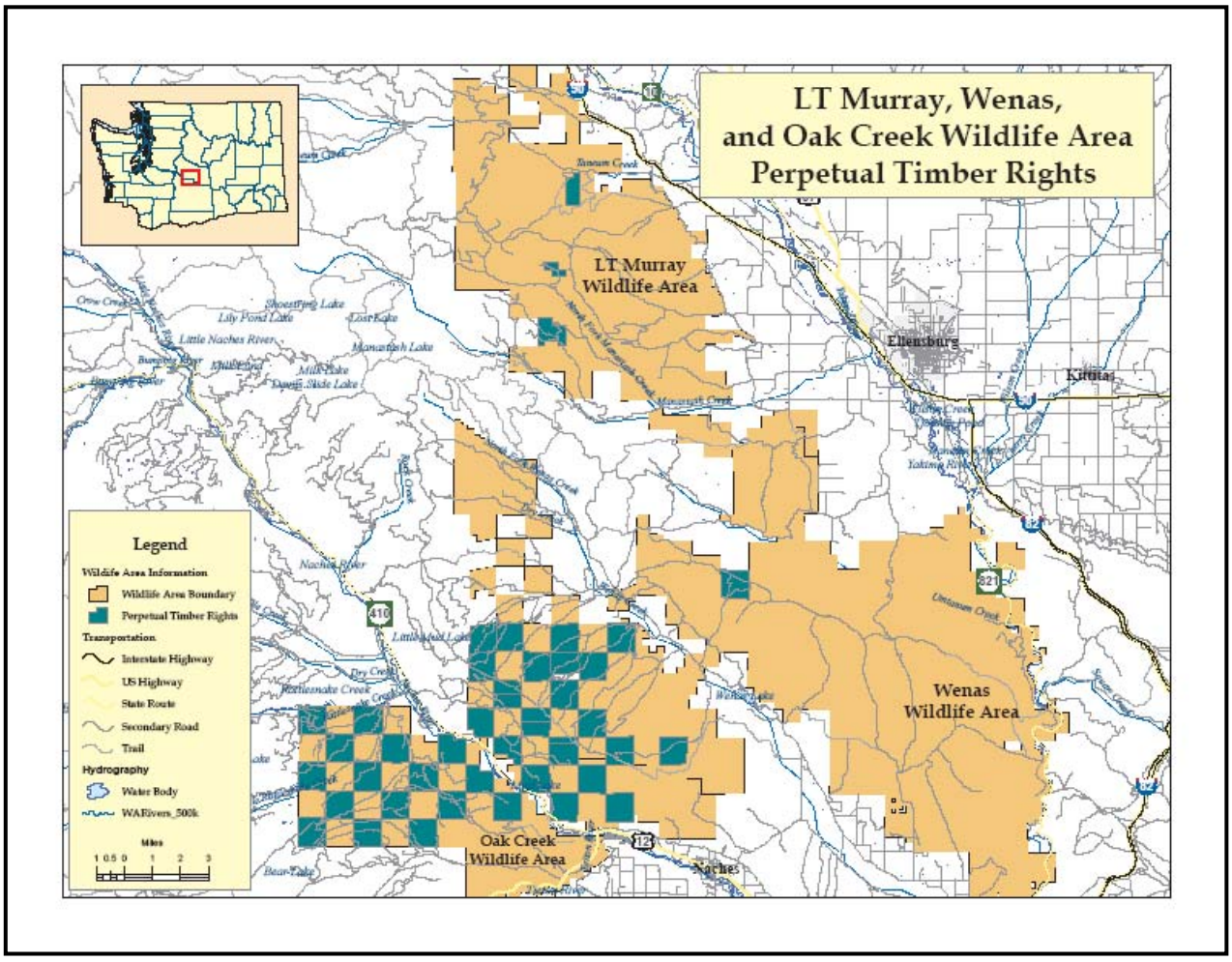
The proposed wildlife habitat improvement project lies within the forested portions of the Sherman Creek Wildlife Area in Ferry County, Washington, approximately 3.3 miles west of Kettle Falls on Highway 20. Legal description: The proposed project lies within portions of Sections 20, 26, 27, 33 and 34, in Township 36 North, Range 36 East, Williamette Meridian (W.M.); and Sections 17, 18, 19, 20, 21, 22, 27, 28, 29, 30, 33 and 34 in Township 36 North, Range 37 East, W.M. (Figure 1).

Figure 1. Sherman Creek Wildlife Area



The proposed PTR acquisition consists of approximately 24,042 acres within the forested portions of the Oak Creek and LT Murray/Wenas Wildlife Areas located in Yakima and Kittitas Counties, respectively, approximately 250 miles southwest of the analysis area. Legal Description: The proposal lies within portions of Sections 7, 9,13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, and 35, in Township 15 North, Range 15 East, WM; Sections 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, and 29, in Township 15 North, Range 16 East, WM; Sections 25, 27, 29, 30, 31, 33, 34, and 35, in Township 16 North, Range 16 East, WM; Section 17 in Township 16 North, Range 17 East, WM; and Sections 2, 22, and 34 in Township 18 North, Range 16 East, WM. (Figure 2).

Figure 2 Perpetual Timber Rights



PURPOSE AND NEED

The Service has received an Application for Federal Assistance from the Washington Department of Fish and Wildlife (WDFW) for funding under the Wildlife Restoration Program (WRP) Grant W-94-D. The purpose of the Proposed Action is to implement a habitat improvement project over a 5-year

period to ensure continued consistency with and eligibility under the WRP and fulfill WDFW's mandates for wildlife and recreation.

The WRP mandates that lands purchased with grant funding benefit wildlife as their primary purpose. The Proposed Action involves using a variable density thinning prescription, along with providing pockets of hiding/security and thermal cover and travel corridors for big game species. In addition, prescribed fire would be used to improve the health of remaining timber stands. These activities would provide forest openings, increase light to the forest floor, and improve forage quality. Other improvement practices, such as topping trees to create snags would be implemented. This Proposed Action would benefit wildlife habitat for mule deer, white-tailed deer, wild turkey, cavity nesters, and elk.

While this project would improve habitat conditions, the timber harvest would also produce revenue and consistent with the rules (43 CFR 12.65 and the Service's Timber Policy) governing such "program income," this revenue will be used to acquire perpetual timber rights (PTRs) on the Oak Creek, LT Murray/Wenas Wildlife Areas. Acquiring timber rights on wildlife areas will allow the department to manage these forest habitats for wildlife and recreation, rather than to produce timber revenues.

WRP funds have been instrumental in acquiring, operating, and/or maintaining over 800,000 acres for wildlife throughout Washington for half a century. These lands, managed primarily for big game winter range, waterfowl production or wintering, and upland game, provide vital wildlife habitat and important outdoor recreation within easy travel distance of all residents of Washington State. These lands also provide critical habitat for a number of species considered endangered, threatened, or sensitive, as well as populations of almost every wildlife and fish species in the state.

WDFW is governed by a dual mandate. Its paramount responsibility is to preserve, protect, perpetuate, and manage the fish and wildlife species of the state (RCW 77.04.012). At the same time, the Department must attempt to maximize opportunities for people to hunt, fish, and appreciate fish and wildlife (RCWs 77.04.012 and 77.04.020). A portfolio of lands helps the Department accomplish these goals. The Department lands portfolio includes Wildlife Areas encompassing approximately 800,000 acres of owned and managed land, as well as hundreds of public access sites (WDFW 2005).

Although the lands portfolio is one of the Department's most important tools for accomplishing its dual mandate, other strategies are also used (WDFW 2005). For example, the goal of the Wildlife Area Program is to manage lands in order to meet one or more of the following needs: 1) to protect or increase particular wildlife species; 2) to protect or improve existing habitat conditions or replace lost habitats; and 3) to increase wildlife-related recreational opportunities. Properly

managing these lands and ensuring their availability for future generations provides benefits for all citizens.

Summary of Needs

The Service's needs are that the activities chosen for implementation under the selected alternative be eligible under the Wildlife Restoration Program, substantial in character and design, as mandated for all Federal Assistance projects, and provide a direct benefit to the wildlife for which these properties were originally purchased; specifically the Sherman Creek Wildlife Area lands were purchased to protect deer on the winter range and provide for wildlife related recreation. Additionally, the Service needs to ensure that any program income generated by the alternative ultimately selected for implementation is utilized in a manner consistent with federal regulations.

Based on WDFW's management guidelines for the Sherman Creek Wildlife Area (Sherman Creek Wildlife Area Management Plan, 2006), the following needs (Goals and Objectives) have been identified:

1. Improve big game habitat by providing a well-distributed patchy mosaic of big game hiding/security and thermal cover, travel corridors and foraging habitat. Manage for cover/forage ratios approaching 40:60, dispersed to provide for maximum utilization of forage. Cover includes hiding/security and thermal cover types.
    a. Open up the Ponderosa pine stands using a variety of spacing prescriptions to improve understory growth such as ceanothus and bitterbrush for wildlife forage.
    b. Reduce the density of Douglas fir, which have invaded as a result of fire suppression, by removing trees to allow native grasses, forbs and herbaceous plants to grow and produce forage for wildlife.
    c. Retard conifer encroachment into Aspen stands.
2. Remove timber to enhance deer habitat, reduce the fuel load, and improve forest health.
3. Reintroduce fire as part of the ecosystem function.
4. Burn the resulting slash to improve regeneration of fire-dependent species for browse.
5. Create additional snags with the feller processor for cavity nesters.
6. Leave a few varieties of diseased trees (dependent on disease) standing for wildlife for nest building or winter food sources (i.e., witches brooms or mistletoe).
7. Reestablish native vegetation on areas disturbed during the timber harvest, and replant native grasses, forbs and shrub species, where necessary.
8. To protect forestlands and safeguard public access for future generations by acquiring perpetual timber rights (PTRs) owned by Western Pacific Timber, reducing the chance that, for economic reasons, these PTRs could be transferred or exchanged to another private timber company or

developer whose activities would potentially impact the existing lands and public access.

9. To protect some of the last remaining critical shrub-steppe habitat in Eastern Washington.

SCOPING AND PUBLIC INVOLVEMENT

For WDFW, this proposal for habitat improvements through commercial thinning and prescribed fire was identified in the WDFW, 2006 Draft Sherman Creek Wildlife Area Management Plan and was made available in 2007 for public review and comment during a 30-day period. No comments were received. The use of revenue resulting from the timber sale to purchase perpetual timber rights on the Oak Creek and LT Murray/Wenas Wildlife Areas has not been vetted through the public, other agencies, or tribes. In addition, the Department is considering a land exchange with WDNR to consolidate each agency's land holdings. A portion of the PTRs acquired with these funds could be included in an exchange. As stated earlier, when the details of this land exchange are known, it will undergo a separate NEPA/SEPA analysis.

Public notification and involvement for the Sherman Creek EA was initiated in March 2008. A formal public comment period for the EA was held March 28 through April 28, 2008, concurrently with the comment period for the WA SEPA Determination of Non-Significance for the project was held March 28 through April 14, 2008. A scoping letter, with the associated documents on cd-rom, was sent soliciting comments and concerns/issues related to the project and was distributed to agencies, tribes, interest groups, adjacent landowners, citizens, and other parties who might have interest in the project. The comments and concerns/issues that were received from interested parties were evaluated. The concerns/issues identified through the public scoping are summarized below (see Appendix A for the full text of the letters) and were used to further refine the EA. The sections referred to below are those where information relevant to each comment is located or was incorporated. Scoping issues that were considered, but not further evaluated, are addressed as well.

Retention Levels: A primary concern was the lack of retention of untreated patches. Variable-density thinning, an approach that leaves somewhere between 15 and 20 percent of each harvest unit in untreated patches, was advocated. *See: Alternatives Considered in Detail, page 17.*

Natural Fire Regime: Need clarification on the Fire Regimes and Class Conditions analysis. *See: Fire and Fuels, page 60.*

Prescribed Fire and Slash: If CTL, ground-based logging will occur on 4,000 acres and prescribed fire will occur on only 600-1200 acres, how will slash be treated on the commercially thinned acres that are not burned following treatment?

Will slash be piled before burning, or lopped and scattered and then underburned. If it is the former, the stands will not be receive the benefits of mimicked natural fire as described in the EA.

Does the 4-foot flame to stands burned following treatment, or to unthinned stands? Would flame lengths be this short even if slash resulting from CTL logging are underburned following treatment?

It is not possible to leave the slash on site for erosion control and burn it at the same time. What is the breakdown between acres to be treated for erosion control and acres to be treated as slash? To what extent and for what period of time will the risk of uncharacteristically intense fire actually increase? *See: Alternatives Considered in Detail, page 17*

Agricultural Use: The EA mentions the existence of the agricultural use within the Wildlife Area but does not adequately describe it as a determining factor in deer and elk migration patterns. The Deer and Elk are drawn to the fields each night and return home each morning. The routes they use are well identified by trails through ravines and dense brush cover. These are the routes that should be preserved to provide adequate cover to protect them from poachers on the Inchelium Highway. *See: Mule Deer/Elk, Existing Conditions, page 33.*

Other Wildlife Concerns: Logging and burning operations will impact nighhawks and marmots that are not listed in the EA. The nighthawks are only on the site during the spring and summer but do not nest on the ground. The marmots live in the rocks and are not very mobile. *See: Wildlife—Other Concerns, page 46.*

Cultural Resources: The cultural resources do not list the irrigation flume that cuts through the southern part of the Wildlife Area. This flume is believed to be agricultural and dates back to the early part of the previous century. In many places the original boards can be found lying on the ground. This flume was undoubtedly a major part of the early development of the area for non-native settlers. There are also two old spring structures that were used by early farmers. *See: Cultural Resources, page 74.*

Landowner Notification: Adjacent private landowner lives within (in-holding) the project area along with occupants of the Sherman Creek Orchards. What efforts will be made to keep them informed of the logging and burning operations? *See: Fuels and Fires BMPs, page 23.*

Air Quality: Will air quality be an issue and should adjacent private landowners be concerned? What impact, if any, will these operations have on the Orchard? *See: Air Quality, page 71.*

Hydrology: It is difficult to accept the cumulative effects conclusion for Affected Environment: Water Resources. Response: *Additional language has been added to this section for further clarification. By and large, the conclusion remains the same. See: Water Resources, Cumulative Effects, page 69.*

Concerns/Issues Responded to But Not Incorporated

Sediment Modeling and Equivalent Clearcut Area (ECA) Ratings: The EA makes no indication that sediment modeling was conducted, nor is there any reference to current *Equivalent Clearcut Area* (ECA) ratings, or current cutover ratings in the project area, in spite of the acknowledgement that the watershed has been significantly altered by both human and natural disturbances. Response: *Given that existing detrimental soil conditions from past and present land management actions are generally low to none existent, sediment modeling was not considered. Instead, the best available science (North Ferry Area, Washington (WA619) Soil Survey Report) was used for the analysis. ECA ratings are primarily associated with clearcut practices and road developments. Therefore, given that this project does not involve clearcutting or new permanent road construction, ECA ratings were not considered.*

Climate Change Models: The EA makes no reference to climate change models that predict peak flows in Northeastern Washington will come earlier and be higher in the future, particularly in the rain-on-snow zone, and the extent to which this change will affect hydrology. Response: *Given the short-term duration of the project (5 years), BMPs, and Conservation Measures, climate change impacts were not considered.*

ISSUES

We have identified the following concerns and will discuss them in the analysis in Chapter 3:

- Wildlife benefit
- Protection of soil and water resources
- Spreading of noxious weeds
- Protection of cultural resources

Chapter 3 has been augmented with the feedback received from the comment period for the Draft EA.

DECISION NEEDED

The purpose of this document is to disclose the effects of the alternatives and to solicit input from the public, other agencies, and tribes. The Service's responsible official will make a decision based on consideration of the purpose and need for the project, the effects of the alternatives, and public involvement.

The decision needed from the Service's responsible official, the Assistant Regional Director of Migratory Birds and State Programs, working with the WDFW Lands Division Manager, WDFW's responsible official, is whether to authorize federal funding to implement a project, and if so, which alternative will best address the relevant mandates and site-specific issues while meeting the management direction stated in the Sherman Creek Wildlife Area Management Plan (WDFW 2006). The Service's responsible official will also determine if the effects analyses and feedback received on this EA direct preparation of a Finding

of No Significant Impact (FONSI) or preparation of an Environmental Impact Statement.

CHAPTER 2 ALTERNATIVES

Alternatives

This chapter describes and compares the alternatives considered for funding for the Sherman Creek Wildlife Area Habitat Improvement Project. This section also presents the alternatives in comparative form, describing the differences between each alternative and providing a clear basis for choice among options by the responsible official and the public, other agencies, and tribes.

Alternatives Considered But Eliminated From Detailed Study

An alternative was considered that decreased the habitat improvement project from 4,000 acres to 3,000 acres. This alternative, however, would not have fully met the purposes and needs because it would not have addressed forage availability and forest stand density issues throughout the wildlife area. In addition, this alternative would not address all insect infestations and high fuel load risk on the area.

An alternative was considered that increased the habitat improvement project from 4,000 acres to 5,000 acres. However, this alternative would not have fully met the purpose and need of this project because stand densities would be reduced below target levels. Since thinning and prescribed fire treatments were designed with a target cover/forage ratio of 40:60, they are considered the maximum necessary to meet the wildlife improvement objectives.

An alternative that utilized only state funds was also considered but eliminated due to the lack of available funding to implement the project. No other options, such as grant proposals or legislative budget requests, are available to implement this project within the desired timeframe by Summer 2008.

Alternatives Considered In Detail

Alternative 1 is the No Action Alternative. This alternative serves as a baseline for comparison of the effects of the Proposed Action, Alternative 2. There would be no change in current management direction. There would be no habitat improvement, stand density management, or fuels reduction treatments. The wildlife area would continue to accumulate fuels with the potential for a wildfire. Routine activities, such as road maintenance, weed control (according to the Weed Control Plan), and suppression of unplanned fires would continue. Recreational use of the area would also continue, including camping, hunting, wildlife watching, hiking, etc. As no timber harvest would occur, funds would not be available to purchase the PTRs on Oak Creek and LT Murray/Wenas Wildlife Areas.

Alternative 2 is the Proposed Action. The Proposed Action is designed to primarily improve wildlife habitat with added benefits of reducing hazardous fuels, improving forest health and further accomplishing goals consistent with the Sherman Creek Wildlife Area Management Plan (WDFW 2006). Commercial

thinning (not exceeding 4,000 acres) and prescribed fire (not exceeding 30% of the project area) are proposed to meet the goals and objectives of this project as described on page 10 under the Summary of Needs section. Prescribed fire would be used to remove decadent vegetation to allow regeneration of understory and to slow down forest succession. Secondarily, funding resulting from the timber harvest would be utilized to purchase the 24,042 acres of PTRs on Oak Creek and LT Murray/Wenas Wildlife Areas.

Implementation of the Proposed Action would require the construction of approximately 2.03 miles of new temporary roads and the use of approximately 3.77 miles of an orphaned road. Following project completion, all temporary and orphaned roads would be obliterated. Approximately 13.8 miles of existing roads within or accessing project area would be utilized.

The project would use a combination of thinning and prescribed fire. Thinning would be performed with a cut-to-length (CTL on site to a 2.5" top (that will make a 16.5' log), ground-based system that includes feller processors and self-loading forwarders/loaders. Equipment will drive over the 2.5" tops to reduce the height and to minimize soil disturbance. All pulp/chipwood/chip-n-saw material that is greater or equal to a 2.5" top diameter inside bark (dib) at 16.5' shall be harvested. Thinning would maintain and create an additional mix of forage interspersed with hiding/security and thermal cover in order to maintain or improve the current habitat for mule deer on Sherman Creek Wildlife Area. Openings would be created within the older/mature forest stands for deer, dense forest stands would be managed to produce multiple-age classes for white-tailed deer, and winter road closures would be maintained throughout the project area to minimize overall disturbance to deer populations. Prescribed fire would be used to rejuvenate decadent understory vegetation and set back forest succession by removing conifers at selected sites, such as aspen stands, to keep these sites in an open condition, consistent with habitat needs of the big game species on the wildlife area.

Annually, the project would be conducted where up to 1,000 acres would be treated, not exceeding 4,000 total acres over the course of 5 years. Harvest units may include set aside areas, such as riparian management zones (RMZs), areas exceeding 45% slope, areas withdrawn to protect nesting wildlife, such as bald and golden eagles, etc. These areas would not be entered and can include some mistletoe or witches broom, which are important habitat features for northern flying squirrels and ruffed and blue grouse. Aspen stands are of limited availability on the wildlife area and consist of mixed stands greater than 2 acres, with high fish and wildlife species diversity. WDFW may choose to enter these aspen stands to take out conifers or top them to leave as snags, a valuable habitat feature for cavity nesting species. In areas lacking in snags or suitable wildlife reserve trees, the contractor would top trees to create snags of up to 6-8 per acre (ac), with a minimum of 10"diameter breast height (dbh) and 10' tall. Larger wildlife reserve trees are preferable, but due to the variable density

thinning prescription, large trees may not always fall within the harvest area. Further, an abundant number of cull logs would remain. Cull logs are logs that are cut down and left in place to enhance wildlife habitat for reptiles, amphibians, small non-game species, etc.

Trees would be cut to length on site with the limbs and tops left on site to stabilize soils and reduce runoff. The project prescription consists of a variety of spacing, such as 30' x 30' spacing leaving 50 trees per acre (tpa), 35' x 35' spacing leaving 37 tpa, and 40' x 40' spacing leaving 27 tpa. The number of trees per acre for a given spacing prescription influences the level of light that penetrates through the forest canopy. WDFW would attempt to average 35' x 35' spacing in the areas treated. After trial projects on the L.T. Murray and Colockum Wildlife Areas, where WDFW did experimental spacing from 25' out to 40', WDFW found that the 35' spacing allowed enough light and still provided shade and cover to grow browse species, like ceanothus and bitterbrush for mule deer winter range. So, given the set aside areas (e.g., RMZ buffers, nesting requirements, wetlands, and slopes > than 45%), snag creation, cull logs, wildlife reserve trees and variable thinning prescription as described above, approximately 20% of the treatment areas would be retained as untreated fish and wildlife habitat.

Stands would be commercially thinned using rubber tracked and tired feller processors and self-loading forwarders/loaders on slopes<45%. Winter logging would be used, as a best management practice (BMP), to reduce soil disturbance and compaction because the ground would be frozen. Further, all motorized vehicles are prohibited within wintering areas from December 1st through March 31st each year and a human presence closure for the same time frame is established to prevent further disturbance to wintering deer. During winter logging we will minimize disruptions of normal or expected wildlife activity. Annually, up to a 1,000 acres over a 5-year period would be treated, meaning that approximately 14.5% of the wildlife habitat would be affected in any given year. The remaining wildlife habitat would continue to serve as wintering areas. Summer logging would only occur under dry conditions. In both cases, equipment would drive over limbs and treetops that have been moved into place to further minimize soil disturbances. Haul routes would be located on existing state, federal, and county roads.

Existing roads, access sites, and landings (existing wide-spots along the roads and fields requiring no new ground disturbance) would be used. There would be no new permanent road construction, but the project would necessitate the reopening of approximately 3.77 miles of orphaned roads and the establishment of approximately 2.03 miles of temporary roads. Road reconstruction would include a combination of removing brush that has encroached on the roadway or that limits sight distance, constructing drainage dips, installing relief culverts, and reshaping the road surface by blading. Shaping the road surface further facilitates the management of stormwater. Spot gravelling, would also occur

where the road is prone to puddling and/or rutting. Following the completion of the project activities, these roads would be obliterated returning to pre-project road density levels.

This project would also attempt (to the extent that funding is available) to return fire to the landscape, to improve habitat for fire-dependent plant species for wildlife use, and to sustain the fire effects necessary for a functional fire-dependent habitat. The project involves prescribed fire on 600-1,200 acres (15-30% of the project area), which would be conducted at least twice within the 5-year period. The prescribed fire is intended to reduce fine fuels, litter, duff, and ladder fuels and would mainly affect the understory vegetation. The prescribed fire would primarily occur during the fall; however, a small percentage, less than 20% of the 600-1,200 acres, may be burned in the spring depending on management objectives, weather-dependent opportunities for a burning window, and consistency with Best Management Practices (BMP) identified on Pages 23-24. The areas to be burned will be determined by the amount of fuels, proximity to structures or areas to protect, and most importantly defendable space. Prescribed fire would produce a low intensity burn with typically less than 4 foot flame lengths and treat areas to move from high risk of wildfire to low risk and/or maintain those areas that are already within desirable standards for fuels accumulation. WDFW does not plan to pile any of the slash. Slash that is not burned will decompose naturally. The four foot flame height is the average goal for the fuels left with limbs and tops less than 2.5" dib for a spring or fall burn within the normal temperature range, soil moisture, desired winds, etc. Further, prescribed fire is always dependent on the local conditions, the depth of slash and goals for that particular stand on the day of implementation. We will try to leave slash for erosion control on the steeper slopes (>35% to <45%). The proposal would mimic the historical fire pattern by creating a mosaic of burned and unburned vegetation.

Reforestation would occur by natural regeneration. Where needed, based upon field review and monitoring, areas thinned may be seeded with a native herbaceous species mix to reduce erosion, provide soil stability, and provide winter browse for wildlife. The native seed mix would consist of Bluebunch wheatgrass, yarrow, Sandberg's bluegrass, Idaho fescue, wild rye, ceanothus, and bitterbrush.

Type F (2 & 3) fish bearing perennial streams and Type N (4 & 5) non-fish bearing intermittent streams all occur within the project area. No thinning would take place within the RMZs; however other treatments, such prescribed fire, may occur. Timber harvest buffers would exceed Washington Forest Practices Rules for buffers on all typed streams. WDFW would double the RMZ buffers required by WDNR Forest Practices Rule on Sherman Creek, a Type F (2) stream, to 260 feet (ft); all other Type F (2) streams would have a buffer of 200 ft. Trout Creek, a Type F (3) stream, would be set to 200 ft; all other Type F (3) streams would have a buffer of 150 ft. Type N (4) stream buffers would be doubled to 100 ft and

buffers would be set at 50 ft for Type N (5) streams. WDFW would concentrate the wildlife reserve trees close to RMZs, where possible. The riparian habitats associated with these stream types can vary in size, shape, and vegetative character. In the uplands, dominant overstory trees are ponderosa pine and Douglas fir, and in riparian zones, the dominant species are black cottonwood (*Populus nigra*), aspen (*P. tremuloides*), and white alder (*Alnus rhombifolia*). Shrub species include red-osier dogwood (*Cornus sericea*), willow (*Salix* spp.), snowberry (*Symphoricarpos* spp.), serviceberry (*Amelanchier alnifolia*), and blue elderberry (*Sambucus nigra*).

Alternative 2 (Proposed Action) Project Design: Best Management Practices

The Best Management Practices (BMP) that follow, would avoid, minimize, and mitigate many of the impacts expected to result from implementation of the Proposed Action. To ensure project compliance these BMPs will be incorporated into the commercial thinning and prescribed fire contract and staff will monitor to make sure that they are being properly implemented.

Wildlife

- Equipment “no entry” zones for environmentally sensitive areas, such, as wetlands, riparian zones, etc., will be identified with flagging and/or non-toxic paint.
- Post signs notifying the public that the entire area will be closed for timber stand and habitat improvements. Access for authorized personnel only.
- Access roads to the treatment areas will be gated to restrict unauthorized access during the thinning and prescribed fire operation.
- All motorized vehicles are prohibited within the wintering area from December 1st through March 31st each year and a human presence closure for the same time frame is established to prevent further disturbance to wintering deer. During winter logging we will minimize disruptions of normal or expected wildlife activity. Annually, up to a 1,000 acres over a 5-year period would be treated, meaning that approximately 14.5% of the wildlife habitat would be affected in any given year. The remaining wildlife habitat would continue to serve as wintering areas.
- The deer response to this type of habitat manipulation would be monitored and assessed after each treatment and adjustments made to the prescriptions, where necessary.
- Activities above ambient noise levels (defined as the background noise in an area that is a composite of sounds from many sources near and far) will not occur within .25 miles (or 0.5 miles line-of-sight) from occupied bald eagle nests during the nesting season from January 1 to August 15 or known bald eagle winter roost areas from October 31 to April 30. No suitable bald eagle habitat will be removed by the project.

- Activities above ambient noise levels will not occur within 0.25 miles (or 0.5 miles line-of-sight) from occupied golden eagles nest during the nesting season from February 15 to July 15.
- Activities above ambient noise levels will not occur within 0.25 mi of known Gray wolf denning habitat or rendezvous sites from March 15 to June 30.
- Activities above local ambient noise and visual activity levels will not occur within 0.25 miles (mi) of known Canada lynx denning habitat from May 1 to August 31.
- Activities above ambient noise levels will not occur within 0.25 mi of known Grizzly bear denning habitat from November 1 to April 30.
- Management prescriptions include leaving all snags for cavity nesting species.
- All trees in riparian zones that do not pose a danger to roads, facilities or campsites will be retained for shade and wildlife habitat enhancement
- Most hardwood trees such as black cottonwood, red alder, maple and willow species, etc., and shrubs such as red-osier dogwood, vine maple, elderberry, and Wood's rose will be left intact for diversity of wildlife habitat.
- Steep areas will be left intact as wildlife travel corridors and for soil stability.
- Trees that are unmarketable due to scars or cat faces on the lower bole will be left as wildlife reserve trees where they do not pose a safety risk.
- Maintain beneficial, non-invasive roadside vegetation. If beneficial, non-invasive vegetation is removed during blading or other ground disturbing activities, revegetate the area.

Vegetation

- Winter logging would be conducted on snow and/or frozen ground while driving over limbs and treetops.
- Summer logging would be conducted under dry conditions, while driving over limbs and treetops.
- Equipment "no entry" zones for environmentally sensitive areas, such as wetlands, riparian zones, etc., would be identified with flagging and/or non-toxic paint.
- Harvest equipment will drive over limbs and unmerchantable tops to minimize soil disturbance and reduce erosion potential.
- Should any threatened, endangered, sensitive, or rare plants be discovered during project layout or implementation, the appropriate specialist(s) would examine the area and take necessary mitigation measures.
- Known invasive plant infestations would be mapped as a means to avoid further spread and monitor future control efforts.
- Conduct post-project monitoring for noxious weeds as all activities have the potential to introduce or spread invasive plants, including but

not limited to activities such as prescribed burning, timber harvest and road maintenance.

- Maintain beneficial, non-invasive roadside vegetation. If beneficial, non-invasive vegetation is removed during blading or other ground disturbing activities, revegetate the area.
- Follow the noxious weed prevention measures included in the Sherman Creek Wildlife Area Management Plan.
- Use weed-free straw and mulch for erosion control measures.

Fire and Fuels

- Equipment would have safety mufflers for emission control and to minimize noise disturbance. All equipment would have spark arresters on mufflers for fire prevention.
- Prescribed burning would be implemented per federal, state, and local laws and regulations.
- Firelines built with hand tools (handline) would be avoided through seeps, bogs, springs, meadows, and any other wet areas. Where it is necessary to limit fire spread near streams, surface fuels would be cleared without disturbance to or exposure of the soil. The prescribed fire will produce a low intensity burn with typically less than 4 foot flame lengths and treat areas to move from high-risk of wildfire to low risk and/or maintain those areas that are already within desirable standards for fuels accumulation. To meet intensity objectives under heavy fuels conditions or mosaic objectives, fire may be purposely ignited within RMZs. Prescribed fire within RMZs on fish bearing and perennial non-fish bearing streams would be approved by District Fish and Area Habitat Biologists and would occur a minimum of 50 feet beyond riparian vegetation. Prescribed fire would not reduce ground cover that would expose additional soil to erosion within RMZs. Prescribed fire would also not result in a reduction in shade to surface waters because of the removal of only surface fuels, the low intensity burn, short flame height, and 50 foot minimum buffer.
- Post signs notifying the public that the entire area will be closed for timber stand and habitat improvements. Access for authorized personnel only.
- News releases will be issued before each spring or fall burn season. The areas to be burned that season would be included in the release.
- Frequent contact prior to the day of ignition is essential. At a minimum, contact will be made to inform adjacent landowners that the area is coming close to being in prescription and is being monitored, the day before ignition, and on burn day. Landowners will also be notified when the project has been completed.
- Burning would be coordinated with holders of special use permits, as needed. Efforts would be made to minimize conflicts between recreation permittees and burning activities. To minimize conflicts during hunting seasons, signs with maps, objectives, and a district contact with phone number would be posted at road junctions on roads

that have historically had hunter camps on them. Signing would be accomplished at least 2 days prior to the beginning of the current season.

- Where it is necessary to limit fire spread near cultural resource sites, surface fuels would be cleared without disturbing the soil.
- Prescribed fire crews and contractors would be briefed to avoid disturbance within or adjacent to noxious weed infestations.
- All prescribed burning would be conducted under a Burn Plan (which identifies specific fuel and weather parameters needed to achieve the project objectives as well as mitigation measures), a Smoke Management Plan (to ensure compliance with the Clear Air Act), and a Burn Permit (issued by WDNR). WDFW will also implement the Fire Control Plan associated with the Sherman Creek Wildlife Area Management Plan. Federal and state standards will not be exceeded.
- Prescribed fire crews would be instructed to avoid deliberate ignition adjacent to the following features: snags greater than 10” dbh, large woody debris, old slash piles with no fine fuels (small mammal habitat), and springs, seeps, bogs, meadows, wetlands, etc.
- This project does not include the construction of machine fire lines.

Soils

- Winter logging would be conducted on snow and/or frozen ground, covered with limbs and treetops to avoid and minimize disturbance. Summer logging would be conducted under dry conditions.
- The harvest equipment would drive over limbs and unmerchantable tops to minimize soil disturbance and reduce erosion potential.
- Equipment will have safety mufflers for emission control and to minimize noise disturbance. All equipment will have spark arresters on mufflers for fire prevention.
- Operation of equipment would be limited to a maximum of 45% slope, but in most cases would not exceed 40% slope.
- Work will involve hand felling, in addition to ground-based equipment such as feller processor and self-loader/forwarder, which will only be allowed to make single out and back passes.
- Retain limbs and tops on site parallel to contour to reduce erosion.
- Use weed-free straw and mulch for erosion control measures.

Water

- During periods of adverse weather conditions, roads will be closed to hauling to avoid soil and watershed damage due to sloughing and siltation.
- Runoff intercepted by existing roads, ditches and culverts will be diverted to the undisturbed forest floor, where possible.
- Catch basins will be used under equipment when fueling or doing machine maintenance.
- Stream crossing structures (culverts and fords) needed on reconstructed roads adjacent to streams would be installed when the channel is dry.

- Reconstructed roads with stream crossings would have adequate relief drainage installed prior to runoff reaching the stream channel.
- Stream fords would only be used when the channel is dry or frozen.
- Timber harvest buffers for Type F (2), F (3), N (4) and N (5) streams which occur within the project boundaries will be doubled and far exceed the WDNR Forest Practices Rule.

Air Quality

- Burning would be coordinated with holders of special use permits, as needed. Efforts would be made to minimize conflicts between recreation permittees and burning activities. To minimize conflicts during hunting seasons, signs with maps, objectives, and a district contact with phone number would be posted at road junctions on roads that have historically had hunter camps on them. Signing would be accomplished at least 2 days prior to the beginning of the current season.
- Prescribed burning will be implemented per federal, state and local laws and regulations.
- Equipment will have safety mufflers for emission control and to minimize noise disturbance. All equipment will have spark arresters on mufflers for fire prevention.

Cultural Resources

- WDFW would conduct an initial cultural resources database search through the Forest Practices Application Process (TRAX System). If the TRAX System identifies sites within the project boundaries, “no-activity” zones would be established and flagged or marked to protect these areas.
- A cultural resource survey would be conducted prior to harvesting the units. If cultural sites are identified within the project boundaries, “no-activity” zones will be established and flagged or marked to protect the area.
- “No activity” zone protection buffers will be based on recommendations that will be proposed as part of the cultural resources survey.
- All new temporary road corridors and re-opened orphaned roads would be flagged and/or staked and walked by the Archaeologist prior to road construction.
- Where it is necessary to limit fire spread near cultural resource sites, surface fuels would be cleared without disturbing the soil.

Transportation

- Cleanout all ditches, and maintain water bars and cross-ditches.
- Road maintenance (within the existing roadbed) during the timber harvest may include, but is not limited to:
    - Reinforcement of soft spots with rock from a licensed/certified rock and gravel company
    - Grading
    - Slide removal (including large rocks)
    - Drainage maintenance

    - Snow removal
    - Maintain erosion control measures
- During periods of adverse weather conditions, roads would be closed to hauling to avoid soil and watershed damage due to sloughing and siltation.
- Runoff intercepted by existing roads, ditches, and culverts would be diverted to the undisturbed forest floor, where possible.
- Drainage structures would be maintained during operations and erosion bars constructed.
- Catch basins would be used under equipment when fueling or doing machine maintenance.
- When available, flaxseed oil will be used in the hydraulic systems of the operating equipment to reduce water and soil contamination.
- Stream crossing structures (culverts and fords) needed on reconstructed roads adjacent to streams would be installed when the channel is dry.
- The Road Maintenance and Abandonment Planning (RMAP) Biologist would review all roads adjacent to streams to assess road drainage conditions and needs prior to road construction or maintenance. Post-harvest, re-opened orphan and temporary roads and landings would be ripped where necessary and seeded with a native seed mix prior to closure; following scarification and seeding, all culverts, water bars, and landings would be reviewed by the RMAP Biologist. Closures would follow thinning and prescribed fire activities.
- Reopened roads would be closed in accordance with Forest Practices Rules and the Sherman Creek Wildlife Area Road Maintenance and Abandonment Plan (2002), when thinning and prescribed fire operations are completed. The purpose of closing and/or obliterating roads is to eliminate motorized travel, provide long-term drainage, and reduce erosion potential to speed recovery. At a minimum, these roads would be properly drained, scarified and seeded, and the entrances blocked upon completion of the project activities.
- Reconstructed roads with stream crossings would have adequate relief drainage installed prior to runoff reaching the stream channel.
- All new temporary road corridors and re-opened orphaned roads would be flagged and/or staked and surveyed for cultural resources by an Archaeologist prior to road construction.
- Access roads would be gated to restrict unauthorized access during the thinning operation.
- Post signs notifying the public that the entire area will be closed for timber stand and habitat improvements. Access for authorized personnel only.
- No new permanent road construction, just temporary and re-opened orphan roads.
- Road assessments will be conducted annually and may include periodic ditch and culvert cleanout, and road grading, as needed to

minimize erosion.

Recreation

- Post signs notifying the public that the area will be closed for thinning and prescribed fire. Access for authorized personnel only.
- Burning would be coordinated with holders of special use permits, as needed.
- Efforts would be made to minimize conflicts between recreation, thinning and burning activities.
- To minimize conflicts during hunting seasons, signs with maps, objectives, and a district contact with phone number would be posted at road junctions on roads that have historically had hunter camps on them. Signing would be accomplished at least 2 days prior to the beginning of the current season.

Comparison of Alternatives

This section provides a summary of each alternative. Table 1compares the activities proposed in Alternative 1 (No Action) and Alternative 2 (Proposed Action). The major difference between Alternative 1 and Alternative 2 is project implementation.

Table 1. Alternative Comparison

	Alternative 1, No Action	**Alternative 2, Proposed Action**
Thinning	0	4,000 acres
Prescribed Burning	0	600-1,200 acres
Roads	Routine road maintenance would continue.	Existing – 13.8 miles Temporary – 2.03 Orphan – 3.77
Logging Operations	0	5-Year Period: -Winter Logging -Summer Logging
Logging System	0	Hand felling, feller processors with rubber tracks or tires, and self-loader/forwarder with rubber tracks or tires

Weed Control	Current weed control management would continue.	Weed control needs would increase due to current weed management combined with the need to be vigilant with harvested and burned sites to prevent additional infestations.
Recreation	All recreation would continue.	Recreation would be limited within harvest and burn areas. Hunting success may increase in short term.
Secondarily, funds resulting from prescription.	None.	Yes, funds would result and they would be used to purchase the PTRs.

CHAPTER 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes past, present and foreseeable future actions near, adjacent or within the wildlife area, the direct, indirect, and cumulative effects of a reasonable range of alternatives; summarizes the physical, biological, and social environments of the affected project area; as well as describes the potential changes to those environments due to implementation of the alternatives. This section also presents the scientific and analytical basis for comparison of alternatives. This assessment analyzes only affected resources. The level of detail is commensurate with the amount of information necessary to understand the effects of the actions and their significance. All alternatives are consistent with the Sherman Creek Wildlife Area Management Plan (2006). Further, measures needed to avoid, minimize, and mitigate for the effects of this project are described in Chapter 2, Page 21-27, Project Design: Best Management Practices, with impacts described herein.

PAST, PRESENT, AND FORESEEABLE FUTURE ACTIONS

Specific actions that were considered in cumulative effects included, but were not limited to:

1. The Washington State Department of Transportation DOT conducts annual road maintenance activities adjacent to the project area along SR #20. These include application of winter traction sand and deicing chemicals, winter snowplowing, spraying herbicides for noxious weeds, pavement sweeping, culvert and ditch maintenance, brushing, asphalt repair, etc. No new road construction or reconstruction is planned by the state during the implementation period of this proposal.
2. The Forest Service also maintains roads within the vicinity of the wildlife area. These are normally gravel or native surfaced roads that may or may not include a ditch. Typical activities include spot spraying herbicides for noxious weeds, culvert and ditch maintenance, blading the travelway, and brushing of roadside vegetation. Forest Service roads are not normally maintained for winter travel except in support of active timber sale operations. These winter services are normally performed by the timbersale purchaser under the authority of the timber sale contract. No new road construction or timber sales are planned by the Forest Service during the implementation of this proposal.
3. The Washington State Department of Fish and Wildlife conducts routine operation and maintenance activities per an approved USFWS Biological Assessment.
4. The Washington State Department of Fish and Wildlife operates a fish hatchery at the bottom of Sherman Creek. This facility utilizes water directly from Sherman Creek in the operation of the rearing ponds.

The following list of proposed actions were identified in the Forest Services' "Schedule of Proposed Actions" that span from April 2006 to March 2008, that will begin or are currently undergoing environmental analysis and documentation.

5. The Sherman Pass Byway Development Plan proposes to develop education and interpretative sites on the Colville National Forest portion of State Route 20 (between Republic WA and Columbia River west of Kettle Falls WA) including improvements for safe site entrance and egress of highway.
6. The Vulcan Vegetation Project EA proposes a timber management and fuels treatment project on the Colville National Forest. Legal: T40N R33E, WM. Vulcan Mountain area northwest of Curlew, Washington.
7. The Big Border AMP Revision CE proposes a grazing reauthorization analysis for the Vulcan, Day Creek, Lone Ranch, Little Boulder, Jasper, Graphite, Hope, Churchhill and Elbow Allotments within the Colville National Forest. Located within the northern 1/3 of Okanogan, Ferry and Stevens Counties.
8. The NRCS Snow Course Permit Amendment CE proposes an amendment to an existing permit to authorize construction of buck and pole fence around Baird #2 Snow Shoe Course and to add three new snow shoe courses: Vulcan Mountain, Vulcan Road, and Skookum Lakes. Legal: Baird #2 NW1/4SE1/4, Section 19, T36N, R42E, WM.
9. The Black Diamond Star Plan of Operation proposes approval of a 5-year plan to continue the removal of material from a mining claim within the Colville National Forest. Proposal to extract and remove decorative stone and materials from rock body and outcrops. Legal: Sections 22 and 27, T36N R35E, WM. Located in the Fritz Creek Watershed.
10. The Trout Vegetation Management Project EA proposes to reduce hazard fuels and manage timber. Legal: T37N, R32E and T38N, R32E. Trout Creek and Storm Mountain areas, northwest of Republic, Washington.
11. The Herron Fuels Reduction DM involves precommercial thinning and thin-from-below harvesting to reduce overstocked stands that contribute to a hazardous fuel condition in the vicinity of private lands along the National Forest boundary. Legal: Sections 11, 12, 13 and 14, T37N, R33E, WM. Federal lands within ½ mile of the National Forest boundary in the Herron Creek and Mires Creek areas. Approximately 8 miles NE of Republic, WA.
12. The Growden Dam and Sherman Creek Restoration Project and Forest Plan Amendment #28 proposes to remove the Growden Dam and restore approximately 3 miles of fish habitat. Legal: Sections 25-36, T36N, R36E, WM. Sherman Creek, west of Kettle Falls, Washington.
13. The Vaagen Bros. Lumber Co. Road Use Permit DM proposes to construct 200 feet of temporary road and use Forest Service roads to haul private timber. Legal: Section 23, T35N, R32E, WM. Scatter Creek drainage, south of Republic, Washington.

14. The Verizon Wireless Bisbee Mountain Communications Lease DM involves the construction of a 150-foot tall tower and a 12-foot by 30 foot prefabricated electronics building at the site. The actual site will measure 100 feet by 100 feet. Legal: Section 6, T36N, R37E. The project is located at the former Bisbee Mt Translator Associations translator, approximately 7 miles NW of Kettle Falls, Washington.
15. The Aerial Application of Fire Retardant EA proposes to continue the aerial application of fire retardant to fight fires on National Forest System lands. An environmental analysis will be conducted to prepare an Environmental Assessment on the proposed action. Legal: Nationwide includes all counties of Washington State.
16. The Lone Ranch Plan of Operation CE proposes to drill and reclaim 17 exploratory holes in the Lone Ranch area over an 8-10 week period. Expected disturbance of approximately 1 mile of temporary road, .23 acres of drill pad area for a total of 2.8 miles of total for all activities. Legal: Sections 1, 12, 13 and 24, T40N R34E, and Sections 7, 18, and 19 T40N, R35E, WM. The Lone Ranch area is near Boundary Mountain on the Republic Ranger District.
17. The Malo-East Lake EA proposes fuels and stand treatments in the wildland-urban interface. Legal: T39N, R34E; T38N, R34E; T37N, R33E; T37N, R34E. East of Curlew Lake and Malo, Washington.
18. The Deadman Creek Ecosystem Management Projects Final SEIS includes numerous management activities that are planned and analyzed in support of identified needs for forest products and late forest structure. Legal: T36N, R35E, Sections 1-5, 11, and 12; T36N, R36E, Sections 1-11; T37N, R35E, Sections 1-3 and 9-36; T37N, R36E, Sections 1-4 and 6-35; and T37N, R37E, Sections 7, 16-20, and 30, WM. The Deadman Creek Watershed is located within Ferry County, approximately thirteen air miles northwest of the town of Kettle Falls, Washington, and west of State Highway 395.
19. The Barnaby Thinning and Bangs Wildland Urban Interface Projects CE addresses vegetation treatments and the treatment of forest fuels in two adjacent project areas located on the Three Rivers Ranger District, Colville National Forest Legal: T35N, R36E, Sections 1, 2, 11-15, 22, 23, 26-28, and 32-34; and T35N, R37E, Sections 6 and 7. The Barnaby thinning project area lies within the Barnaby Creek Watershed on the Three Rivers Ranger District of the Colville National Forest approximately 14 miles southwest of Kettle Falls, WA. The Bangs WUI project area lies within the Barnaby Creek Watershed on the Three Rivers Ranger District of the Colville National Forest approximately 9 miles southwest of Kettle Falls, WA.

The actions listed above are on average within 21.3 miles of the wildlife area, with the exception of actions 1, 2, and 15, that may take place immediately adjacent to the wildlife area and the exception of action 3 that would take place within the wildlife areas.

AFFECTED ENVIRONMENT
WILDLIFE RESOURCES

The wildlife resources section describes the current conditions with regards to priority habitat and species, and other important wildlife found on the wildlife area. Additionally, threatened and endangered species that are known to occur or potentially may occur on the wildlife area are described in this section. Further this section also describes and compares the environmental effects associated with the two alternatives (Alternative 1(No Action), and Alternative 2 (Proposed Action)).

Priority Species

Priority species are fish and wildlife species requiring protective measures and/or management guidelines to ensure their perpetuation (WDFW 2008). The following priority species were selected because the wildlife area was purchased primarily for deer habitat protection and management and wildlife-related recreation. In addition, these species also serve as good management indicators (forest dependent) for forest habitat and range conditions.

Mule Deer/Elk

As mule deer *(Odocoileus hemionus)* and elk *(Cervus elaphus*) habitats in forested areas and grass/forbs types are very similar, it will be assumed that analysis of effects for mule deer will also be applicable to elk. Mule deer were selected for this analysis because: they were identified as a priority species that would greatly benefit from this proposal; the project proposes management actions that would emphasize big game habitat; they require early succession forest and grass/forb types that may be manipulated or enhanced by this proposal; and they occupy much of the wintering/birthing habitat in the lower elevations of the wildlife area.

Based upon Washington Department of Fish and Wildlife herd data that is updated annually and based upon intensive monitoring and modeling, mule deer inhabit almost all portions of the Sherman Creek Wildlife Area during some portion of the year. Current mule deer populations in northeastern Washington are below historical levels and their overall numbers are low compared to white tailed deer. Elk populations continue to grow slightly in numbers and expand their distribution in northeastern Washington, primarily in Pend Oreille County, eastern Stevens County and generally east of the Columbia River. For the most part, elk use of the wildlife area is limited. In addition, elk are not well distributed throughout Ferry County.

The primary limiting factors affecting mule deer and elk populations are forage availability, the loss of crucial wintering and birthing areas on adjacent private lands due to land conversion and development and the displacement from critical ranges during crucial periods as a result of human activities (i.e. illegal use of motorized vehicles throughout the year). Resident deer can be found throughout the wildlife area in spring, summer, and fall.

Existing Conditions
On the 8,782 acres wildlife area, there are currently 6,900 acres (or 78.6% percent forested acres) providing cover habitat (hiding/security and thermal) for ungulates. Stand density was estimated using a combination of aerial photographs (with stereoscope) and timber cruise information to assess the existing cover habitat conditions. Hiding/security cover occurs on 2,760 acres (or 40 percent forested acres) on the wildlife area. In addition, hiding/security cover is well distributed throughout the area, 90 percent of the roads and more than 95 percent of the streams all have hiding/security cover available. Thermal cover occurs on 4,140 acres (or 60% of the forested acres) on the wildlife area. The remaining 21.4 percent of the total wildlife area acreage consists of summer/spring range habitat (1,160 acres or 13.2%), rock land (602 acres or 6.85%) and agricultural fields (120 acres or 1.36%). In addition, there are 13.8 miles (5.02 acres) of existing roads within the wildlife area of which 13.11 miles have hiding/security cover along their edges.

As mule deer and elk are primarily early-succession habitat related species, habitat quality on the wildlife area for these species has been declining due to advancing succession for several decades. Ceanothus habitat types are an essential habitat component for deer and elk. Deer forage in the ceanothus habitat type a high percentage of time during fall, winter, and spring and to a lesser extent by elk due to their low population and limited distribution in Ferry County. The grass/forb understory is the preferred component except in extreme conditions. Ceanothus and related vegetative species also provide cover for deer year round. Existing forage conditions for deer are less than the desired on the wildlife area relative to horizontal diversity, maintenance of minor vegetative types (e.g. aspen), and distribution of habitat structural stages.

Further, not many elk use the wildlife area, particularly the lower elevations where there is agriculture (approximately 120 acres). Deer are attracted to the fields and have established travel routes. By doubling the required distance on each side of the RMZs we are protecting the corridors used by the majority of wildlife, including deer.

Cover Habitat
Hiding/security and thermal cover are important components of deer habitat. Cover habitat is particularly critical during fawning and calving season, when newly born fawns and calves are vulnerable to predation, and during the fall hunting season when deer are vulnerable to hunting mortality. Hiding/security cover is generally described as screening cover, usually in the form of vegetation that screens a standing deer from sight. Thomas describes hiding cover in his publication, “Wildlife Habitats in Managed Forests: The Blue Mountains of Oregon and Washington,” as vegetation capable of covering 90% of a standing adult deer from human view at a distance not less than 200’ (1979). Hiding/ security cover may also mitigate some of the effects of open roads, road densities and vehicle traffic. Much of the vegetation that makes up hiding/security

cover is in the form of sapling, poles, reproduction, and brush understories that provide a dense horizontal cover. Currently, 40 percent of the forested acres on the wildlife area are providing hiding/security cover, although not all of those stands are providing hiding/security cover of similar quality.

Thermal cover, as described by Thomas (1979), is forested vegetation that allows deer to achieve homoiothermy (thermoneutrality in maintaining body temperature). Such habitat conditions allow deer to manage body temperature at a desirable condition without undo energetic stress. Thermal cover is often defined as either marginal or satisfactory. Marginal cover maintains a minimum canopy closure of 40% and a generally single story stand condition at least 40' in height. Satisfactory cover maintains at least a 60% canopy closure with at least pole sized trees (Thomas 1979) and often is demonstrated by multi-storied mature forest conditions. Currently 60 percent of forested acres on the wildlife area provide thermal cover.

Forage Areas

Summer/spring and winter range habitats are present on the wildlife area. A total of approximately 1,160 acres exists as summer/spring range habitat, roughly 13.2% of the wildlife area. Winter range habitat on the wildlife area, however, may include all of the area. This is dependent upon annual snowfall and snow conditions. As an example, the winter of 1996-97 found near record levels of snow pack and snow depths on the wildlife area, as well as a long persistence. Wintering mule deer and white tailed deer stayed to the lowest elevations of the wildlife area, with most wintering on neighboring private and US Forest Service (USFS) lands. However, with average and below average winter severity, winter track surveys found mule deer and white tailed deer at all elevations across the wildlife area throughout the months of December through March (WDFW 2007).

The current cover/forage ratio of approximately 79:21 on the wildlife area is higher in cover than the 40:60 level considered optimal (Thomas et al.1979). The wildlife area ratio is misleading somewhat, because within stands associated with cover habitat there are some patches of shrubs/forbs and open forest edges that provide forage. Overall, this excessive level of cover habitat is a result of continued fire suppression and the lack of habitat management on the wildlife area.

ENVIRONMENTAL CONSEQUENCES

Direct and Indirect Effects

Under Alternative 1, cover would remain at elevated levels; however, some decrease in cover may occur, as a result of insect and disease related mortality. The persistent lack of adequate forage would continue to threaten the health of mule deer. Forage would continue to be a limiting factor for deer and other big game species. Further, wildlife and their habitats in general would be subject to increased vulnerability to catastrophic fire without some kind of natural or man-caused large-scale disturbance to mature forest stands. Existing road densities

would remain unchanged under this alternative; however, routine road maintenance would continue to improve existing road conditions on the wildlife area.

Alternative 2, would open the stands, reduce competition from young trees, retain older and larger trees on the landscape, and promote forage. The treatments are not designed to remove the larger overstory trees that create good cover in winter and which help intercept snow and keep the areas around the boles snow-free; this alternative however, to some degree will change the amount of cover in general on the wildlife area. The loss of canopy cover has the potential to change deer use, and movement patterns within the wildlife area, especially during the hunting period. Effects are expected to be negligible to individual animals, except during the hunting season when they are more vulnerable to hunters due to loss of tree cover. Although hiding/security and thermal cover would continue to be adequate based on an integrated management of timber and deer approach (Armleder et al, 1989), this alternative would result in a considerable reduction of cover habitat (approximately 57.9%) overall. But given the uncharacteristically high amount of cover and the persistent canopy cover that currently exists the spotty, discontinuous nature of that change would not result in measurable reductions in cover effectiveness. The reduction of the 2,760 acres of hiding/security cover on the wildlife area would result in 1,104 acres (40%) of hiding/security cover remaining and the reduction of the 4,140 acres of thermal cover on the wildlife area would result in 1,796 acres (43.3%) of thermal cover habitat remaining. Given the current relationship between cover and forage habitats, initially the effects on cover habitat would be moderate to high but incremental improvements to browse and herbaceous forage would be expected.

Under, Alternative 2, forage habitat in forested areas would be enhanced more than in Alternative 1 in both the short and long terms, because disturbance caused by treatment would set succession back on the wildlife area. Prescribe fire would enhance the grass/forb understory component of Ponderosa pine/evergreen-ceanothus habitat by increasing composition and production. Overall habitat value of the area would be improved for deer and move the wildlife area toward the desired cover: forage ratio resulting in a more historical level of cover and forage. The treatment areas and areas immediately adjacent to roads (within ¼ mile) would be largely unavailable to deer during thinning and burning activity, as disturbance would cause temporary displacement of individuals from the area. Short-term (0-5 years) direct effects on habitat effectiveness due to temporary disturbance or displacement would be expected to be adverse, but would most likely be negligible as deer generally acclimate to human activities and the distance and duration of displacement is expected to be minimal due to the number of acres expected to be treated per year. No permanent displacement would be expected. Also no measurable effects would be anticipated on productivity and recruitment of deer because they are somewhat acclimated to human activity already and any displacement that occurs would move individuals to other adjacent secure areas having sufficient

forage and cover for survival. Alternative 2 would contribute to the overall maintenance of the deer populations over the long-term, although the alternative may adversely impact individuals in the short term by reducing cover habitat and causing displacement during the project period. Given the anticipated improvement to forage conditions and the adequate mosaic of cover habitats, impacts to mule deer populations are not considered to be significant.

One of the goals of this project is to use existing roads as much as possible and keep the need for new temporary roads to a minimum. The reduction in hiding/security cover along roads can mean that wildlife using this habitat could be more vulnerable to hunters or be displaced from this habitat when startled by vehicles on the road. These effects would not likely result in any appreciable or measurable reduction in their populations because hiding/security cover in the project area is well distributed across the landscape. In the long-term (30-50+ years) as these stands regenerate, hiding/security cover habitat will reestablish along these roads.

Best Management Practices for Wildlife (pages 21-22) would reduce or mitigate for potential effects that might be caused by the proposed action. In general, thinning and prescribed fire would be scheduled to concentrate use by time and space to minimize disruptions of normal or expected wildlife activity.

Cumulative Effects

Relative to big game habitat, timber harvest, lack of management, fire suppression, and road construction have had the greatest effect on habitat quality and deer populations. Cumulatively, these past actions have helped shape the current habitat conditions as described above and have affected the quality, condition, and distribution of foraging areas and thermal and hiding/security cover across the wildlife area.

Wildfire suppression and the changes to the fire regimes on the wildlife area have likely had the greatest cumulative effect on habitat on the wildlife area. Through wildfire suppression and the change in effective fire regimes, stand densities and, thus, canopy closure have developed to levels outside of historic conditions, which has allowed for fire intolerant species (Douglas fir, grand fir, western juniper) to invade historically Ponderosa pine communities, and mature into the middle and upper canopy levels. This has converted areas historically in forage to cover for deer and elk. By and large, this has benefited deer and elk by reducing their vulnerability to severe winter mortality, to predation and to some degree reduced the disturbance associated with open roads. A negative, however, has been in forage production, in particular browse forage, which often responds positively to fire stimuli.

Open roads have also affected deer populations. Open roads affect the distribution of deer and elk and their access to cover and forage habitat (Wisdom et al. 2005; Rowland et al. 2005). Open roads also affect individual deer and risk

of hunter related mortality. Johnson et al. 2005 also found ties to roads and effects upon nutritional condition of deer particularly associated with hunting season activity. Road closures occurring since 1948 when the wildlife area was acquired have reduced road density to 1.28 miles of road/square mile area.

Alternative 1 would continue to contribute to the cumulative effects as described above, and perpetuate the unnatural levels of cover and forage, potentially resulting in increased winter mortality and supplemental winter-feeding for deer and vulnerability to a catastrophic fire. The existing condition of deer habitat would be maintained in the short term (0-5 years). Existing trends in changes to habitat, primarily in the form of increases in cover habitat, would continue. In the mid (5-30 years) to long-term (30-50+ years), percent of area in cover habitat would increase and forage production would continually decline. This scenario is generally true unless a natural fire occurs.

Alternative 2 would reduce existing cumulative effects similar to the recent WDNR salvage operation in Section 16, T36N R37E, that has resulted in changes to cover habitat, mostly in the reduction of thermal cover and hiding/security cover (603 acres). This has brought the stand closer to historic levels of cover habitat, with associated improvements to forage habitat. The proposed prescribed fire, coupled with commercial thinning, would reverse some of the effects of past wildfire suppression and fire regime changes by opening canopies and re-introducing fire into the forest communities. A better overall mosaic of cover and forage habitats would result further reducing the cumulative effects of fire suppression and the lack of management. Incremental improvements to browse and herbaceous forage would be expected. While this local reduction of existing cumulative effects would be an improvement, due to its spatial impact and impact to cover habitats in the short term (0-5 years), the improvement is not considered to be a significant impact. In addition, Alternative 2 would result in cumulative effects of increased miles of open road over the short term (0-5 years). However, those roads would be closed after project implementation is complete, and returned to existing condition levels. In addition, temporary and re-opened roads would be closed to public access for safety and wildlife concerns, and thus would not contribute to the overall open road densities as it is considered for wildlife effects. Cumulative effects would be short term and minor due to the aforementioned and through sustained road maintenance activities that will be conducted during and after the project.

Cumulative Effects of Past, Present and Future Actions

Thinning, prescribed fire and routine road maintenance projects have occurred in the past both on the wildlife area and adjacent national forest lands, and will likely continue into the future. Present and foreseeable actions on or adjacent to the wildlife area would further reduce the cumulative effects of past fire suppression and management. See Chapter 3, Past, Present and Foreseeable Future Actions, Page 29 –31 for more detail.

White-tailed deer (*Odocoileus virginianus*)
White-tailed deer are generalists and can adapt to a wide variety of habitats. Although most often thought of as forest animals depending on borders or edges more than dense, uniform stands, white-tailed deer can equally adapt themselves to rangeland and agricultural-dominated habitats. One of the main reasons for this habitat preference is that the variety of foods deer like grows best along the margins of timbered areas or in clearings in the timber. Another reason, especially true in the more agricultural sections of the state, is that the deer can utilize the forage offered by agricultural crops adjacent to timbered lands and still have the sanctuary and other attractions of the timber itself.

In the western portions of the United States and Canada, the white-tailed deer range overlaps with those of the black-tailed deer and mule deer. In the extreme north of the range, their habitat is also used by moose in some areas. White-tails may also occur in areas that are exploited by elk such as in mixed deciduous river valley bottomlands. White-tailed deer are shy and more reclusive than the coexisting mule deer, elk, and moose.

In general, white-tailed deer are slowly increasing in numbers and gradually expanding in distribution, although populations in some areas have stabilized The availability of desired forage and the absence of natural population controls (i.e., predation) have allowed deer populations to thrive in such areas (Krausman et al. 1992), even though deer management (i.e., controlling the annual harvest by hunters, transplanting live-trapped deer to stock new ranges and preventing illegal kills) has had some effect. Due to the slight increases in the white-tailed deer population, damage to habitats (e.g., lack of forest regeneration and loss of woody understories), economic impacts (e.g., agricultural damage and vehicle collisions), and tick-borne disease transmission has increased. In addition, the lack of predators might allow a broader habitat selection by each species (Schoener, 1982; Werner et al., 1983), permitting both to sympatrically utilize this area without showing avoidance mannerisms exhibited between mule deer and white-tailed deer elsewhere (Kramer, 1973).

White-tailed and Mule Deer Interactions
A question often asked by landowners and hunters is “Are white-tailed deer driving out the mule deer?” White-tailed deer do not physically “drive out” mule deer from an area; however, in some areas mule deer numbers are declining while white-tailed deer numbers are increasing. This change in species composition gives the appearance that the mule deer are being physically displaced. What actually is occurring is a gradual change in the vegetation that favors white-tailed deer (Texas Parks and Wildlife (TPW) 2008).

In areas where cover habitat is increasing, the habitat is becoming more suitable for white-tailed deer and less desirable for mule deer. Research indicates that mule deer prefer a canopy cover of 40 percent or less, while white-tailed deer numbers increase dramatically in areas with a canopy exceeding 50 percent

(Wiggers and Beasom 1986). When the two species occupy the same area, they often are segregated-- mule deer preferring the high, rougher canyons and open hillsides and white-tailed deer occupying the brushy draws and lowlands (TPW 2008).

For details on Existing Conditions, Cover Habitat and Forage Areas refer to the Mule deer section above.

ENVIRONMENTAL CONSEQUENCES

Direct and Indirect Effects

Stand density would be reduced by 57.9%. The effects to white-tailed deer habitat would be a decline in dense cover habitat over the short to mid term. The reduction in stand density and canopy closure would move these stands below 50%. The prescriptions to be implemented would retain a moderate canopy closure (40%-42.1%), which would favor mule deer that use habitat much differently than white tails. The mosaic of retention densities would also help maintain some upper canopy level structure that is important to white tails. This may result in changes to the distribution, movements and patterns of the white tails. White-tailed deer populations would likely continue to be stable and expansion into habitat that was once favorable for mule deer would be limited due to the change in cover and forage habitat. Cumulative effects are probably of little consequence to individual white tails, except during the hunting season when they are more vulnerable to hunters due to loss of tree cover.

Best Management Practices for Wildlife (pages 21-22) would reduce or mitigate for potential effects that might be caused by the proposed action. In general, thinning and prescribed fire would be scheduled to concentrate use by time and space to minimize disruptions of normal or expected wildlife activity.

Cumulative Effects

See Cumulative Effects section under Mule Deer above.

Cumulative Effects of Past, Present and Future Actions

See Cumulative Effects of Past, Present and Future Actions section under Mule Deer above.

***Cavity Excavators: White-headed** (Picoides albolarvatus) **and Lewis' Woodpeckers** (Melanerpes lewis)*

Lewis' woodpecker prefers a forested habitat with an open canopy and a shrubby understory, with snags available for nest sites and hawking perches (Bock 1970). Bock (1970) states that the critical features of Lewis' woodpecker habitat are forest openness, understory composition, and availability of insect fauna (Lewis et al. 2004a). White-headed woodpeckers are primarily associated with open-canopied, mature, and old growth ponderosa pine forests. They require large, decayed snags for nesting and roosting while they forage, primarily

in the bark of large ponderosa pines [>60 cm (24 in) dbh] (Thomas et al. 1979, Raphael and White 1984, Garrett et al. 1996). White-headed woodpeckers prefer to forage for insects on the scaly bark of live trees (Raphael and White 1984, Morrison et al. 1987), and they feed heavily on seeds from unopened pinecones during winter (Ligon 1973, Garrett et al. 1996) (Lewis et al. 2004b).

Ponderosa Pine Habitat
Late and old structure ponderosa pine habitat for the white-headed and Lewis' woodpeckers is largely absent in the project area. Historic harvest activity, targeting the largest old growth ponderosa pine trees, has limited the availability of such habitat. Large tree structure is present, but largely scattered and at very low densities, or has developed multi-strata characteristics as a result of fire suppression, with fire intolerant species such as grand fir, Douglas fir, and western hemlock invading these stands. Such habitat conditions are less conducive to productive habitat for the white-headed and Lewis' woodpeckers. A total of 649 acres of suitable habitat for the white-headed and Lewis' woodpeckers has been identified. This habitat, for the most part, is provided in a larger, contiguous habitat condition on the southeastern part of the wildlife area.

Snags and Primary Foraging Habitat
Snag data was not specifically assessed for the wildlife area; however, some general statements can be made about snag habitat for these two species.

- Large snags (greater than 20" dbh) are generally absent across the wildlife area, with the exception of few small pockets of 10-20 snags greater than 20' dbh.
- Small diameter snags (less than 16' dbh) are generally abundant in overstocked stands. This accounts for the majority of the forested acres.

Existing snags are relatively new, being created from insect activity and wildfire over the past 2-5 years. Foraging use by the various woodpeckers is low. Based upon this information, coupled with available habitat data, nesting snag and foraging habitat for the white-headed and Lewis' woodpeckers is currently very low on the wildlife area.

Existing Conditions
In 1999, one Lewis' woodpecker was observed during breeding bird surveys on a young ponderosa pine within an open shrub field habitat on the wildlife area. This observation was made in T36N R37E Section 33, where 262 acres of the wildlife area occurs. This portion of the wildlife area primarily consists of 192 forested acres and 70 acres of shrub field habitat. The section is low to moderately fragmented by adjacent private lands, agricultural fields, irrigation pipelines, and roads. In 2003, one female white-headed woodpecker was observed foraging on the trunk of a 14-inch dbh ponderosa pine. This observation was made in T36N R37E Section 27, where 387 acres of the wildlife area occurs. This portion of the wildlife area primarily consists of 358 forested acres and 29 acres of shrub field habitat. The section is not as fragmented as Section 33 but does contain roads

and is adjacent to private lands. General observations indicate that overall snag and downed wood levels on the wildlife area are similar to levels found in other areas: sufficient small snags and downed wood and infrequent large snags and downed wood.

Limiting Factors
The availability of snags, nest holes excavated by other woodpeckers, and abundant prey populations are the predominant factors that limit distribution and abundance of the Lewis' woodpecker (Jackman 1975). The selection of one specific area by this woodpecker probably depends on insect abundance. Certain timber management practices (i.e. that remove snags, replant single species after timber harvest instead of duplicating the natural tree species, etc) and heavy livestock grazing (i.e. that do no set specific threshold limits on grazing pressures so that native understory vegetation is not destroyed, etc) can impact an area's suitability for Lewis' woodpeckers (Jackman 1975, Jackman and Scott 1975). Fire suppression also has likely impacts on the availability of suitable habitat for this species (Saab and Dudley 1997, Tobalske 1997). Certain habitats are only temporarily suitable, such as logged or burned forests prior to regeneration of second growth stands. However, post-burn forests likely provide suitable habitat for longer periods within the dryer portions of Lewis' woodpecker range (e.g., eastern fringe of the Cascades) as a result of slower regrowth (Lewis et al. 2004a). A paucity of mature and old growth ponderosa pine forests with adequate snags for nesting and winter foraging has resulted in the decline of white-headed woodpecker (Garrett et al. 1996). Logging of old ponderosa pine reduces suitable habitat and maintaining even-aged stands limits a site's capacity to replenish itself with large trees and snags. Fire suppression results in a closed canopy leading to eventual displacement of important ponderosa pines with firs resulting in less suitable habitat (Lewis et al. 2004b).

ENVIRONMENTAL CONSEQUENCES

Direct and Indirect Effects

Alternative 1 does not propose any thinning or prescribed fire and would not result in the immediate loss of existing snags. However, the smaller trees that shade snags keep the moisture content of snags higher and result in faster decomposition, which would result in faster loss of snags over the longer term (30-50+ years). Additionally, the increased risk of insect, disease, and/or wildfire problems presented by this alternative could result in an increase in all-sized snag numbers across the wildlife area, benefiting these two species.

Alternative 2 would leave additional snags per acre. The increase of snags that would occur with this alternative would generally have a beneficial effect on individuals in the short term (0-5 years), as it maintains existing small and large diameter snags and facilitates the recruitment of larger snags. Prescribed fire generally has positive effects on snag recruitment in the short term. Both the prescribed fire and the thinning would increase the amount of snags over the very long term, as stands would be regenerated and contribute towards providing

and maintaining a sufficient number of appropriate large snags and large decaying live trees for nesting and roosting. Therefore, while this alternative would yield benefits to these two species, they would be relatively minor due to the number of existing snags that will remain, the number of additional snags proposed to be left and the length of time until snags would naturally accrue. Further, treated areas would provide suitable alternate habitat almost immediately.

Best Management Practices for Wildlife (pages 21-22) would reduce or mitigate for potential effects that might be caused by the proposed action. In general, thinning and prescribed fire would be scheduled to concentrate use by time and space to minimize disruptions of normal or expected wildlife activity.

Cumulative Effects
Suitable habitat for the white-headed and Lewis' woodpeckers is very limited on the wildlife area. Approximately 274 acres of suitable habitat and 375 acres of potential suitable habitat exist in Sections 27 and 33 of Township 36 North, Range 37 East, WM where the woodpeckers are known to occur on the wildlife area. The existing habitat in these sections is fragmented to some extent because of existing roads, ag fields, irrigation pipelines and adjacent private land. The woodpeckers, while documented on the wildlife area (mostly associated with or near shrub field habitats), are not abundant, due to current habitat limitations.

Alternative 1 would maintain the current habitat conditions for the white-headed and Lewis' woodpeckers and contribute to the cumulative effects of fire suppression and lack of habitat management on the wildlife area, increasing the risk of fire and susceptibility to disease and insects.

Alternative 2 could potentially reduce the woodpecker habitat by 375 acres in Sections 27 and 33. However, the 375 acres of habitat affected are associated with closed canopy, dense stands. The reduction of forested habitat in these sections would result in 274 acres of suitable habitat remaining and improvements to approximately 5.4% of the 6,900 forested acres on the wildlife area. Improvements to the 375 acres could serve as alternate suitable habitat right away. As such, the effects to woodpeckers would be beneficial and crucial to maintaining existing snag and foraging habitat conditions and improving overall forest health conditions, that would, in the short to mid-term open up more habitat, increase forage availability and reduce the cumulative effects associated with fire suppression and lack of habitat management.

Cumulative Effects of Past, Present and Future Actions
Thinning, prescribed fire and routine road maintenance projects have occurred in the past both on the wildlife area and adjacent national forest lands, and will likely continue into the future. Present and foreseeable actions on or adjacent to the wildlife area would further reduce the cumulative effects of past fire suppression and management. See Chapter 3, Past, Present and Foreseeable

Future Actions, Page 29 –31 for more detail.

Other Wildlife: Merriam's Wild Turkey (*Meleagris gallopavo merriami*)
The wild turkey is a state game species and is commonly pursued by hunters and bird watchers. The wild turkey is a ground nesting bird that generally nests between the first weeks of April through early June, depending upon weather conditions, breeding activity, nest failures, and other factors. The wild turkey is not native to the Sherman Creek Wildlife Area or the state of Washington. However, a large, stable population of Merriam's wild turkeys currently resides throughout the wildlife area. Its presence on the wildlife area is the result of past introductions through release of wild birds captured elsewhere and released on the wildlife area. Documented releases of the wild turkeys by WDFW occurred from the mid-1980s to 2002. The source populations for the released birds on the wildlife area have mainly come from Stevens County, Washington, and South Dakota. WDFW considers the wild turkey a desirable non-native species and has worked cooperatively with the National Wild Turkey Federation and private landowners to protect and maintain this species on the wildlife area.

Habitat Requirements
(Habitat Requirements taken from: Morgan, J. T., D. A. Ware, M. Tirhi, and R. L. Milner. 2004. Wild turkey (*Meleagris gallopavo*). In E. M. Larsen, J. M. Azerrad, and N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds).

Wild turkeys are habitat generalists, adapting to a variety of conditions across their range (Dickson et al. 1978). However, the two habitat features wild turkeys depend on are trees and grasses. Trees provide food, escape cover, and roost sites, while grasses provide food for adults and an environment that allows poults (juvenile turkey) to efficiently forage for insects (Porter 1992).

Turkeys nest in a variety of habitats, though the key component appears to be lateral or horizontal cover (Porter 1992). Horizontal cover includes terrain and/or dense woody and herbaceous vegetation that help conceal the nest (Beasom and Wildon 1992, Hurst and Dickson 1992, Lewis 1992, Shaw and Mollohan 1992, Wunz and Pack 1992). These conditions are found in timbered stands with a dense understory, fields, clearcuts, utility right-of-ways, young pine plantations, and some agricultural fields. In south-central Washington, Mackey (1982) noted that turkey nests were typically found at the base of a tree, partially covered by dead limbs or understory vegetation, in oak, oak/pine, or oak/fir forest types.

Porter (1992) described three ingredients essential for brood habitat during the first 8 weeks after hatch. First, there must be an environment that produces insects and in which poults can efficiently forage. Additionally, good brood habitat must have features to permit frequent foraging throughout the day. Lastly, brood habitat must provide enough cover to hide poults while simultaneously allowing the adult female an unobstructed view to avoid predators. All of these must occur

within a relatively small area because the weekly home range of a turkey brood has been reported as only 30 ha (75 ac) and a total summer home range of 100 ha (250 ac) (Speake et al. 1975, Porter 1980). Brood habitat for wild turkeys consists of timbered areas adjacent to grassy openings. Grassy, herbaceous areas provide poults with insects for forage and cover from predators. Trees are also needed for thermal cover to protect poults from cold, wet conditions, particularly during the first 2 weeks after hatching, and as escape cover once poults can fly (10-12 days after hatching).

Stands providing good roosting habitat are sheltered from prevailing winds and contain tall, large diameter trees with sizable horizontal branches, high canopy coverage and basal area (Hoffman 1968, Boeker and Scott 1969, Crockett 1973, Hauke 1975). Single large trees are apparently not used for roosting unless they are associated with a stand (Phillips 1980, Mackey 1984). During fall and winter, turkeys switch to habitats that offer the best food resources, environmental conditions, and thermal cover for protection from colder temperatures and snow. Typically, this means greater use of stands of larger trees with greater canopy coverage and basal area; springs, seeps, and other riparian areas with denser vegetation; and areas with more abundant hard mast. It also means a decreased use of open areas (Beasom and Wilson 1992, Hurst and Dickson 1992, Shaw and Mollohan 1992, Wunz and Pack 1992). Turkeys may also exhibit an increase in flocking behavior during winter, particularly if available food is concentrated in specific areas (Thomas et al. 1966, 1973; Wunz and Pack 1992).

Existing Conditions
Potential suitable habitat is generally abundant throughout the wildlife area. Most of the various vegetation communities on the wildlife area provide nesting cover and habitat. Ponderosa pine woodland and forest communities, with a shrub understory, Douglas fir mixed conifer forest types with shrub understories and/or down logs, and shrub dominated riparian areas provide suitable habitat for wild turkeys. Approximately, 7,904 acres (90%) of potential suitable habitat exists on the 8,782-acre wildlife area. Almost 80% (6,900 acres) of those acres are associated with the forest.

Limiting Factors
Turkeys are limited by a number of natural and artificial factors. The northern natural range of turkeys in the east seems to be limited by the condition, depth, and duration of snowfall (Healy 1992). In the mid west, central, and southwest United States, the range of the turkey is limited by the availability of trees. Nest and poult predation may impact wild turkey populations when natural (predation, disease) and human-related (hunting, habitat change) mortality occur in conjunction (Miller and Leopold 1992). Because turkeys need an interspersion of forest and open areas, any management activities that disrupt this habitat diversity or degrade the habitat may impact local turkey populations. For instance, timber operations to open up areas for development or agricultural expansion may eliminate too much of the forest cover and food resource. On the other hand, forest thinning or creation of small openings may benefit turkey

populations. Heavy grazing of grassy openings and understory vegetation may limit turkey populations by reducing food for adults and cover for nests and poults (Morgan et al. 2004).

ENVIRONMENTAL CONSEQUENCES

Direct and Indirect Effects

Alternative 1 would maintain existing habitat conditions, as they currently exist. No disturbances like commercial thinning or prescribed fire would occur and as such would not affect the wild turkeys. There would be no risk of direct and indirect effects in the form of nest loss, mortality in young poults or nesting hens, or loss of potential suitable nesting habitat and cover. Over the long term, a steady decline in habitat quality would likely occur as forested habitats increase in stand densities and lower canopy complexity. By allowing stands to persist under these conditions would keep the wild turkeys and their habitat vulnerable to fire, insects and disease.

Under Alternative 2, thinning and prescribed fire activities would occur on 4,000 acres (of the 6,900 forested acres on the wildlife area). This accounts for 58% of potential suitable habitat. Annually, up to 1,000 acres for each of the five years would be treated. This means that up to 14.5 % of the potential suitable habitat would be treated in a given year. Such actions would have the potential to affect the quality and conditions of suitable habitat in the short term (0-5 years) by removing potential nesting cover and structure. Prescribed fire would be conducted annually on approximately 120-240 acres and would be conducted mainly during the fall burning season; however, a small percentage, less than 20%, may be burned during the spring depending on management objectives, burning conditions, and timing restrictions. There would be potential for direct effects to nesting wild turkeys through the burning of active nests or mortality of very young, relatively immobile poults. While individual nests may be lost to burning activities, adverse effects to overall population reproductive effort would be negligible. Only a very small portion of the suitable habitat would be affected at any one time, with very low risk of individual nests being affected based upon existing populations and the availability of suitable alternate habitat.

Best Management Practices for Wildlife (pages 21-22) would reduce or mitigate for potential effects that might be caused by the proposed action. In general, thinning and prescribed fire would be scheduled to concentrate use by time and space to minimize disruptions of normal or expected wildlife activity.

Cumulative Effects

Alternative 1 would maintain the current habitat conditions for the wild turkeys and contribute to the cumulative effects of fire suppression and lack of habitat management on the wildlife area, increasing the risk of fire and susceptibility to disease and insects.

Implementation of Alternative 2 would result in local, cumulative effects to quality and condition of potential suitable habitat on the wildlife area. Only about 14.5% of the potential suitable habitat would be affected in any given year. However, newly altered suitable habitat would be available almost immediately following the proposed actions because of the spotty, discontinuous nature of the change. Further, given the existing population when compared to potential suitable habitat (more nesting opportunities than nesting wild turkeys to take advantage of), the risk of individual turkeys and nests being affected by the proposed project would be low.

Cumulative Effects of Past, Present and Future Actions
Thinning, prescribed fire and routine road maintenance projects have occurred in the past both on the wildlife area and adjacent national forest lands, and will likely continue into the future. Present and foreseeable actions on or adjacent to the wildlife area would further reduce the cumulative effects of past fire suppression and management. See Chapter 3, Past, Present and Foreseeable Future Actions, Page 29 –31 for more detail.

Wildlife—Other Concern—Public Concern—Common Nighthawk and Yellow-bellied Marmot
With the public scoping, a responding public identified the concern of potential impacts to the nighthawks and marmots in the project area. The scope of the EA and its anticipated impacts do not require us to discuss every single species which may or may not occur on the wildlife area, but only those expected to be impacted. With concern raised for these two species, we thought it prudent to explain why we do not anticipate any impacts to either species.

Common nighthawks arrive in the Pacific Northwest Mountains in late May or early June and lay their eggs in late June. They nest on bare ground in exposed areas. The prescribed burns will be completed long before the birds arrive. The nest locations typically are in open, exposed areas where ground based logging equipment will not enter because of the lack of stems per acre for thinning. Nighthawks favor nesting in forest openings, they currently suffer from habitat loss, such as the reduction in openings due to fire suppression (one old nickname, "burnt-land bird," indicates their preference for recently burned-over areas) and deforestation. Therefore, no impacts to nesting/breeding birds are expected and habitat improvements are expected to result from the implementation of mosaic stand structure advocated in the Proposed Action.

Yellow-bellied marmots have a single breeding season per year, which begins shortly after they emerge from winter hibernation. They hibernate from September-May each year, though hibernation length varies with elevation. The young are born underground in a grass-lined nest, from April to June. Yellow-bellied marmots generally occupy open habitats such as pastures, meadows, and forest edge but prefer to construct their burrows on open, grassy, or herb-covered slopes in rocky outcropped areas. Marmots feed mainly on green

vegetation, especially grasses and forbs and largely forage for seed in the late summer. Due to burrow depths, underground hibernation and breeding, impacts from ground based logging equipment should not pose problems for the marmots because equipment will not be entering these areas. Further, the prescribed fire would not harm them because of the depth of their burrows underground and the extensiveness of their burrowing system that would allow them to freely move about the wildlife area, while still underground.

Overall, the effects to nighthawks and marmots would be beneficial and crucial to maintaining existing snag and foraging habitat conditions. Improving overall forest health conditions would, in the short to mid-term, open up more habitat, increase forage availability, and reduce the cumulative effects associated with the past lack of habitat management and past fire suppression. However, in the short-term, there could be temporary displacement associated with the disturbance, but due to its expected short-term duration, this is expected to be, at most, a negligible impact.

Threatened and Endangered Species

All endangered and threatened species that could potentially be affected were considered in this analysis. No federally proposed or candidate species or proposed or designated critical habitat are known to occur on the wildlife area. Effects analysis was completed for any species that could possibly occur in the project area. A review of information was conducted relating to the distribution of habitats on the wildlife area, observations of the species on the wildlife area, known areas of occupancy, and fieldwork over the past several years. Sources of information included the WDFW Priority Habitat and Species database, Salmonscape and other records and files, the WDNR Heritage Database, various federal fish and wildlife protection programs (i.e., NOAA and the Service), as well as local jurisdictions and published research. No further analysis is needed for species that are not known or suspected to occur in the project area, and for which no suitable habitat is present.

WILDLIFE SPECIES

Bull trout *(Salvelinus confluentus)* **T** (Columbia River Distinct Population Segment)

While suitable habitat exists for bull trout in the project planning area, only the lower ½ mile of Sherman Creek (Type F (2)) is accessible to Bull trout because of fish passage issues that likely prevent further access upstream. This stretch of the stream does not fall within the wildlife area. Trout Creek (Type F (3)) a tributary to Sherman Creek is limited to resident fish such as Rainbow trout. Type N (4) & N (5) streams located within the project boundaries are non-fish bearing intermittent streams and do not discharge directly into Sherman Creek or Lake Roosevelt/Columbia River. WDFW would exceed Forest Practices RMZ buffers for these typed streams. Bed load transport, fish barriers and elevated temperatures are some of the limiting factors. Therefore, given that Alternatives 1

and 2 will not occur within a 1 mile stretch of the lower ½ mile of Sherman Creek, effects on Bull trout and its habitat are not likely to occur.

ENVIRONMENTAL CONSEQUENCES

Direct and Indirect Effects

Alternative 1 will not affect potential or existing bull trout habitat because no harvest and prescribed fire are planned. However, there is an increasing risk of large scale, forest cover loss due to future hot fires. If a stand replacing fire occurs, there could be a temporary drop in fish populations due to impacts to sediment delivery, hydrologic conditions and vegetated cover.

Under Alternative 2, the project would maintain current habitat conditions. Thinning activities would not occur within riparian management zones or within streams that are located on the wildlife area, and therefore, not make any significant contributions to the sediment load or stream temperatures in Sherman Creek or its tributaries.

Best management practices described in Chapter 2 are designed to reduce any direct or indirect stream effects to an insignificant level. By implementing Wildlife, Soils, Water and Transportation BMPs on Page 24 to 27, the likelihood of increased stream temperatures and sediment delivery resulting from project activities affecting downstream bull trout occupied habitat, is low. In general, riparian protection buffers, routine road maintenance and erosion control measures will be in effect during the project activities.

Cumulative Effects

Alternative 1, would continue to contribute to cumulative effects from past fire suppression and lack of habitat management on the wildlife area. Therefore the status quo would be maintained and this situation could result in the potential for large wildfires that would severely impact aquatic resources primarily due to significantly increased sediment levels outside the natural range of variability. Alternative 2 would reduce existing cumulative effects as described previously. There would be no effects to fish and fish habitat due to thinning activities, roads, and prescribed fires. In the long term, the proposed actions would benefit fish and fish habitat by setting back succession, releasing under story vegetation, increasing stream nutrient input and productivity, and helping to deter large wildfires outside the natural range of variability.

Cumulative Effects of Past, Present and Future Actions

The Growden Dam and Sherman Creek Restoration Project and Forest Plan Amendment #28 (69 FR 9569; 70 FR 20349) proposes to remove the Growden Dam and restore approximately 3 miles of fish habitat. If implemented, this effort would further reduce the cumulative effects of past dam construction on fish habitat. In addition, thinning, prescribed fire and routine road maintenance projects have occurred in the past both on the wildlife area and adjacent national forest lands, and will likely continue into the future. Present and foreseeable actions on or adjacent to the wildlife area would further reduce the cumulative

effects of past fire suppression and management. See Chapter 3, Past, Present and Foreseeable Future Actions, Page 29 –31 for more detail.

Canada lynx *(Lynx Canadensis)* T

The Sherman Creek Wildlife Area falls within the current or historical lynx in Washington. Canada lynx are most vulnerable to suitable habitat alteration and increased human access into previously isolated areas. Lynx are not known to occur on the wildlife area, however lynx (individual occurrences) have been documented on adjacent national forest land approximately ½ mile west of Trout Lake, more than 5 miles northwest of the western most boundary of the project, and greater than ½ mile southeast of the S. Fork Sherman Creek. The project area in this section is approximately ½ mile from this individual occurrence and is separated by low elevation range and agricultural land. Over the past 16 years, no additional occurrences have been documented for these sections. The project area provides very limited suitable habitat for lynx and snowshoe hare, which may be used as travel and/or dispersal habitat in the future. Lynx prefer colder temperatures and deep snow at higher elevations (typically above 4,000 ft) in boreal forest environments dominated by lodgepole pine, subalpine fir, and Engelmann spruce. The habitat types of the wildlife area can be characterized by Ponderosa pine-ceanothus forest habitat types at lower elevations (1,300 ft) and western larch, Douglas fir, grand fir, Engelmann spruce and sub-alpine fir at higher elevations (nearly 4,600 ft). Deciduous shrubs dominate the understory. The habitat types at 4,600 ft are very limited, not well distributed and fractured by drier sites that do not support lynx habitat, especially on south facing slopes. Snowshoe hare, the lynx primary prey source also prefer higher boreal forest environments.

The project area has a total road density of less than 1.28 miles/square mile; 0.832 miles/square mile is associated with the lower Sherman Creek drainage and 0.448 miles/square miles is associated primarily with the Trout Creek sub-drainage. Short-term road densities would increase with the implementation of Alternative 2 by constructing a total of 2.03 miles of new temporary roads. This alternative would also re-open 3.77 miles of orphaned roads, resulting in an open road density of 1.81 miles of road/square mile area during the implementation of the project. After project activities are complete within treatment areas, roads would be closed and no longer available, returning the open road density to 1.28 miles of road/square mile area.

Roads can negatively affect lynx by allowing human disturbance in denning habitat and increasing access for incidental or illegal hunting or trapping. Plowing or packing snow on roads or snowmobile trails in winter might allow competing carnivores to access lynx habitat thus increase competition for prey. Current information suggests that lynx do not directly avoid, nor are they displaced by low-use forest roads (Ch. 12 in Ruggiero et al., 1999; LCAS/Ruediger et al., 2000), although roads can still negatively affect lynx. No areas serve as designated snowmobile routes, and snowmobile use of the area is low to near

absent because such activity is generally not authorized on the wildlife area and use is more associated with illegal trespass (USDA 2006b). See also the Transportation Section below.

ENVIRONMENTAL CONSEQUENCES

Direct and Indirect Effects

Alternative 1 would not affect suitable habitat for Canada lynx and snowshoe hare because no thinning and prescribed fire would occur. However, there is an increasing risk of large scale, forest cover loss due to future hot fires that could devastate existing suitable habitat and prey resources for lynx.

Under Alternative 2, project activities would not occur within suitable lynx or snowshoe hare habitat, or within the vicinity of any known den sites, and there is a lack of quality foraging habitat (i.e., snowshoe hare habitat) in the project area. Alternative 2 could possibly cause temporary avoidance of lynx from the treatment areas during project activities should transient lynx pass through there. If lynx do travel through the project area, the species would likely avoid roads, harvest units, and logging haul routes during the daytime when these areas are open and active. At night when human activity is absent and after harvest activities are completed, lynx use of these areas would likely resume.

Best Management Practices for Wildlife (pages 21-22) would reduce or mitigate for potential effects that might be caused by the proposed action. In general, thinning and prescribed fire would be scheduled to concentrate use by time and space to minimize disruptions of normal or expected wildlife activity. Also, noise level thresholds and timing restrictions will be in effect during the project activities.

Cumulative Effects

Therefore, given that Alternative 2 will not occur in an area where suitable lynx and snowshoe hare habitats exist, effects on lynx and its habitat are not likely to occur. This project will improve habitat conditions for mule deer, white-tailed deer, woodpeckers, wild turkey, cavity nesters and other small mammals, which are considered a supplemental prey base for lynx when snowshoe hares are in decline or absent. After project activities are complete within treatment areas, temporary and reopened roads would be closed and obliterated and no longer available, returning the open road density to pre-project levels. At a minimum, roads would be properly drained, scarified and seeded, and the entrances blocked upon completion of the project activities. Also, no additional habitat fragmentation should occur because suitable lynx and snowshoe hare habitat is very limited on the wildlife area and is located in remote areas that currently do not have roads.

Cumulative Effects of Past, Present and Future Actions

Thinning, prescribed fire and routine road maintenance projects have occurred in the past both on the wildlife area and adjacent national forest lands, and will

likely continue into the future. This could further reduce the cumulative effects of past fire suppression, management and road construction, but may contribute to the temporary displacement of transient lynx from project areas. Present and foreseeable actions on or adjacent to the wildlife area would further reduce the cumulative effects of past fire suppression and management. See Chapter 3, Past, Present and Foreseeable Future Actions, Page 29 –31 for more detail.

Grizzly bear *(Ursus arctos horriblis)* **T**
Sherman Creek Wildlife Area is outside of known existing grizzly bear habitat and range. Grizzly bears are not known to use the wildlife area and there are no known dens or suitable denning habitat on the wildlife area. However, Sherman Creek Wildlife Area lies immediately adjacent to the Colville National Forest where the species has been known to occur. Transient grizzly bears have not been recorded or sighted in or near the project area. However, the potential exists for the species to occupy or pass through the wildlife area, but the potential for grizzly bears to use the project area for summer/fall foraging is low.

See the road discussion under the Lynx section above as its also applicable to grizzly bears.

ENVIRONMENTAL CONSEQUENCES
Direct and Indirect Effects
Alternative 1 would not affect the grizzly bear because no thinning and prescribed fire will occur. However, there is an increasing risk of large scale, forest cover loss due to future hot fires that could devastate existing suitable grizzly bear habitat and prey resources.

Under Alternative 2, activities would not occur within the vicinity of any known den sites. Similar to lynx, Alternative 2 could possibly cause temporary avoidance of grizzlies from the treatment areas during project activities should a transient bear pass through there. The extent and magnitude of disturbance and displacement that could affect grizzlies is not known. Current information suggests that because grizzlies are sensitive to human presence, some bears show a tendency to avoid roads that are open, with a lesser tendency to avoid roads that are closed. In contrast, some bears become habituated to human presence and do not avoid roads to the same degree as others.

Best Management Practices for Wildlife (pages 21-22) would reduce or mitigate for potential effects that might be caused by the proposed action. In general, thinning and prescribed fire would be scheduled to concentrate use by time and space to minimize disruptions of normal or expected wildlife activity. Also, noise level thresholds and timing restrictions will be in effect during the project activities.

Cumulative Effects
Since grizzly bears do not regularly occupy the project or wildlife area, no anticipated adverse direct or indirect effects are expected to result by implementing Alternative 2. This project will improve forage habitat for mule deer and elk, which are considered prey species for the grizzly bear. Opportunities for improved grizzly bear habitat will be created through the removal of the understory to promote the development of the overstory, which would be expected to increase foraging attractions should the occasional grizzly bear visit the area. After project activities are complete, temporary and reopened roads would be closed, returning the open road density to pre-project levels. At a minimum, these roads would be properly drained, scarified and seeded, and the entrances blocked upon completion of the project activities. This would minimize the potential affects of habitat fragmentation and displacement. Therefore, adverse effects as a result of implementing Alternative 2 on the grizzly bear and its habitat would be low. In the short term, there would be an increase in road densities (see lynx road discussion above)**.**

Cumulative Effects of Past, Present and Future Actions
Thinning, prescribed fire and routine road maintenance projects have occurred in the past both on the wildlife area and adjacent national forest lands, and will likely continue into the future. This could further reduce the cumulative effects of past fire suppression, management and road construction, but may contribute to the temporary displacement of transient grizzly bear from project areas. Present and foreseeable actions on or adjacent to the wildlife area would further reduce the cumulative effects of past fire suppression and management. See Chapter 3, Past, Present and Foreseeable Future Actions, Page 29 –31 for more detail.

PLANT SPECIES

Spiranthes diluvialis (Ute ladies'-tresses) **T**
There are four known populations of this species within Washington, three of which occur quite near one another on the Columbia River along the shoreline of the Rocky Reach Reservoir between River Mile (RM) 505 and RM 510 in Chelan County, Washington. The other can be found at Wannacut Lake in Okanogan County. This plant species is not known to occur on the wildlife area. This species is restricted to broad low-elevation intermontaine valley plains, with deltaic meandered wetland complexes**,** calcerous, temporarily inundated wet meadow zones, and segments of channels and swales where there is stable subsurface moisture and relatively low vegetation cover. Sherman Creek Wildlife Area is located in Ferry County within the Upper Columbia River Subbasin, well out of range of the four known populations. In addition, the wildlife area lacks physical and chemical soil properties needed to support this plant.

If a population of Ute ladies'-tresses should occur in the project area, they would most likely be found in the riparian areas. By implementing the Water BMPs listed above for Alternative 2, riparian habitat in the project area would be

protected by stream buffers that exceed the forest practices laws and regulations. Further should any threatened, endangered, sensitive, or rare plants be discovered during project layout or implementation, the appropriate specialist(s) would examine the area and additional mitigation measures would be incorporated into the project to protect the species.

AFFECTED ENVIRONMENT
VEGETATION

The vegetation section describes the current and/or desired conditions with regards to plant associations, insect and disease, fire and fuels, sensitive plants, and noxious weeds/invasive plants. It also describes and compares the environmental effects associated with the two alternatives (Alternative 1(No Action) and Alternative 2(Proposed Action)).

Sherman Creek Wildlife Area

The 8,782-acre Sherman Creek Wildlife Area consists of approximately 6,900 acres of forest, approximately 1,160 acres of summer/spring deer and elk habitat, approximately 602 acres of rock land and 120 acres of agricultural fields. The wildlife area contains various vegetation communities and important habitat types. Its great biological diversity can be attributed to the vast change in elevation from 1,289 to 4,600 feet. Climate, geomorphology, and geology also influence the composition and distribution of plant species.

Wildlife Area Plant Associations

Ponderosa pine and Evergreen ceanothus habitat types dominate Sherman Creek Wildlife Area. Higher elevations, are characterized by increased precipitation allowing a greater variety of conifers including western larch, Douglas fir, grand fir, Engelmann spruce and sub-alpine fir. Deciduous shrubs, including ceanothus, snowberry, serviceberry, rose and ocean spray; and grasses, such as pine grass and Idaho fescue, dominate the forest understory. Aspen thickets are common around the many seeps and springs on the area. Variety and distribution of vegetation at Sherman Creek provide hiding, escape and thermal cover for deer and elk; shade, foraging and nesting sites; perches, and water sources (WDFW, 2006).

Insect and Disease

Insects and diseases are a natural part of the ecosystem. They occur in stressed trees within stands. Insect and disease populations are typically low when stands are in good condition with adequate moisture, sunlight and nutrients. . However, stands become unhealthy when overstocked, or drought limits moisture, and forest pests respond by increasing populations and attacks. In severe cases, populations may become epidemic. Current conditions of excess trees and continuous multi-story stands create excellent conditions for forests pests. Acres in the early structural stages are generally free of insects and diseases that favor dense multi-canopy late structure forests. However, as stands grow they become overly dense, especially without frequent underburning or precommercial

thinning. Overstocking puts enormous stress on individual trees and entire stands by exceeding the carrying capacity of the site. At a certain point, overstocked stands are said to reach a zone of imminent mortality where trees begin to die. Forest pathogens may move in just prior to this point, speeding mortality (USDA 2006b).

The current condition of the vegetation related to insect and disease problems was determined by the Washington Department of Natural Resources (DNR) and US Forest Service who strive to help landowners identify and manage forest insect and disease problems. An annual, aerial sketchmapping is conducted that is key to monitoring forest insect and disease activity levels across the state. The survey is flown at 90-130 mph, about 1,500 feet above ground level. In recent years, they have incorporated a new digital system utilizing GPS linkup with touch screens for recording damage. Further they have been consistently incorporating newer and better satellite imagery as well. Two observers (one on each side of the plane) look out over a two-mile swath of forestland and mark either on a digital touch screen or on a paper map groups of recently killed or defoliated trees (WDNR 2006).

Existing Conditions

Douglas-fir Bark Beetle: Douglas-fir beetle outbreaks occur when an event, such as a large wildfire or windstorm, coupled with favorable weather and the presence of elevated endemic populations, create conditions favorable for beetles (trees with thick phloem tissues for feeding, but reduced resistance mechanisms). Outbreaks may occur over large areas, killing vast amounts of timber and creating fuel for uncontrolled wildfires. Prior to attack, stands are usually in a multi-storied middle or old growth. Following attack, the stand may lose 60-80% of the largest trees, returning the stand to a middle or early structural stage. A small outbreak of Douglas-fir bark beetle occurred on the wildlife area in 2003. The beetle caused localized mortality and affected roughly 40 trees. This active beetle population died off. However, in general the Douglas-fir beetle is still active in areas where trees have become stressed by a pathogen such as Armillaria root rot, fire damage, or due to close proximity to fresh, large, down material successfully colonized by beetles (USDA 2006b).

Other Bark Beetles: Mountain pine bark beetle often moves into early structural stands of dense lodgepole and ponderosa pine. High densities stress the trees, encouraging successful bark beetle attacks. Bark beetles may kill the attacked tree within a year and move on to the next tree. Attacks usually start out in small patches and may move on to cover many acres. Mountain pine beetle has been active in the central part of the wildlife area where acres of dense lodgepole pine and western larch seeded-in following fires. Based on 2007 aerial survey observations, there were no additional mountain pine beetle mortalities. The 2006 aerial survey observed 2 trees per acre were affected and in 2005 aerial surveys observed that 33 trees per acre were affected.

Western pine beetle attacks and kills larger diameter ponderosa pine. The insect attacks trees that are stressed, often by drought in over-dense stands. Mortality greatly increases fuel loads and may allow the area to burn hot, bringing the stand back to the earliest structural and successional stage. The 2007 aerial survey observed an additional 8 trees per acre of western pine beetle caused mortality. Prior surveys in 2006 observed that 1 tree per acre was affected and in 2005, 44 trees per acre were affected.

Further, the 2007 aerial survey observed no additional mortalities associated with the western balsam beetle on spruce and subalpine fir found on wildlife area. A previous survey in 2006 observed 1 tree per acre caused mortalities.

Fir engraver beetle is a native bark beetle that attacks and kills, or strip kills (i.e. strip away the bark), weakened true fir trees. A few scattered true fir mortalities were mapped throughout Eastern Washington in 2007. Most of the affected trees were in the understory, but larger trees were also affected (WDNR 2006). The 2007 aerial survey observed an additional 0.5 trees per acre affected on the wildlife area. No additional fir engraver caused mortalities was observed in 2006. However, in 2005 aerial surveys observed 22 trees per acre affected. Drought conditions likely precipitated and exacerbated this event.

Without some kind of natural or man-caused large-scale disturbance to the forest stands, the insect and disease epidemic would continue and more trees would be killed adding to the current unnaturally high fuel levels found throughout the wildlife area, this in turn would increase the risk of a stand replacing fire.

ENVIRONMENTAL CONSEQUENCES

Direct and Indirect Effects

No active management would take place under Alternative 1, other than routine operation and maintenance. This alternative would not reduce tree stand densities, nor would it reduce hazardous fuels. No prescribed fire or thinning would occur in the immediate future. Stand susceptibility to insect and disease attacks would be unchanged and would continue to worsen over time. Tree and stand vigor would continue to decline. Beetles and other forest pathogens would continue to affect the area. This alternative would not remove diseased or insect infested trees, nor modify conditions that are favorable to the spread of pathogens. The ponderosa pine and western larch would continue to die due to beetles or severe wildfire and would rarely be replaced by new seedlings. The understory will continue to fill in with shade tolerant Douglas-fir, subalpine fir, and spruce. Pathogens that have existed as endemic pests would verge on the epidemic. As mortality of the overstory occurs, regeneration of Douglas-fir, a species prone to forest pathogens and fire damage, could establish in openings. By not treating the understories, the already high stand densities would increase and ladder fuels would not be reduced. Alternative 1 may result in the irreversible effect of loss of old growth structure and habitat if lack of management results in conditions that cause stand replacing fires (USDA 2006b).

Alternative 2 is designed to improve and maintain wildlife habitat, increase tree vigor and growth, reduce the probability of insect and disease epidemics and severe wildfire, and restore balance to within the historic range of variability. In general, the objectives are achieved by commercial thinning and prescribed fire. Proposed activities would open up the understory to allow enough light penetrate to the forest floor stimulating forage production and reduce stand density, which would reduce conditions favorable to forest pests and ladder fuels. Existing stands with beetles and other forest pathogens would be reduced and forest pathogen caused mortality would decline. This would help to keep the forest pathogens endemic, but not epidemic. Wildfires would be expected to occur, but would not be stand replacing.

Cumulative effects
Alternative 1, would continue to contribute to cumulative effects from past fire suppression and lack of habitat management on the wildlife area. In addition, no acres would be treated to increase forage production, reduce the potential for fire and insect/disease infestations adjacent to private and federal property boundaries. Alternative 2 would reduce the cumulative effects by thinning and prescribed fire. Further, by treating acres to increase forage production and reduce the potential for land burned and losses experienced because of fire and pest infestations would benefit adjacent ownerships.

Cumulative Effects of Past, Present and Future Actions
Thinning, prescribed fire and routine road maintenance projects have occurred in the past both on the wildlife area and adjacent national forest lands, and will likely continue into the future. Present and foreseeable actions on or adjacent to the wildlife area would further reduce the cumulative effects of past fire suppression and management. See Chapter 3, Past, Present and Foreseeable Future Actions, Page 29 –31 for more detail.

AFFECTED ENVIRONMENT
SENSITIVE PLANTS

See Threatened and Endangered Species, Plant Species Section, Page 52.

AFFECTED ENVIRONMENT
NOXIOUS WEEDS/INVASIVE PLANTS
Noxious weed infestations on the wildlife area are being treated using an integrated approach. State law (RCW 17.15) requires that, to accomplish weed control, WDFW use integrated pest management (IPM), defined as a coordinated decision-making and action process that uses the most appropriate pest control methods and strategy in an environmentally and economically sound manner to meet agency programmatic pest management objectives. The elements of IPM include:

Prevention- Prevention programs are implemented to keep the wildlife management area free of species that are not yet established but which are known to be pests elsewhere in the area.

Monitoring- Monitoring is necessary to implement prevention and to document the weed species, the distribution, and the relative density on the management area.

Prioritizing- Prioritizing weed control is based on many factors such as monitoring data, the invasiveness of the species, management objectives for the infested area, the value of invaded habitat, the feasibility of control, the legal status of the weed, past control efforts, and available budget.

Treatment- Treatment of weeds using biological, cultural, mechanical, and chemical control serves to eradicate pioneering infestations, reduce established weed populations below densities that impact management objectives for the site, or otherwise diminish their impacts. The method used for control considers human health, ecological impact, feasibility, and cost-effectiveness.

Adaptive Management- Adaptive management evaluates the effects and efficacy of weed treatments and makes minor adjustments to improve the desired outcome for the wildlife management area.

Prevention is a key part of the integrated approach to weed control. Measures commonly taken on the wildlife area include washing equipment and vehicles, using weed-free hay and seed, and posting educational signs. The Sherman Creek Wildlife Area Management Plan, which includes a weed control plan, provides new management direction relative to invasive plants, and further increases the emphasis on prevention. The premise behind a weed control plan is that a structured, logical approach to weed management, based on the best available information, is cheaper and more effective than an ad-hoc approach where one only deals with weed problems as they arise (WDFW 2006).

Based upon current information found in the weed control plan, roads, trails, and parking areas are the major pathways for the spread of invasive plant species on the wildlife area. All open roads in the area are conduits for and recipients of invasive plants that can cause various problems to ecosystem health. Invasive plants exist and will continue, especially if recreation use of the area expands. Weed seeds are easily dispersed via vehicle activity and tend to follow and spread along road corridors, trailheads, trails, and campgrounds.

Weed Species of Concern on Sherman Creek Wildlife Area:
St. John's wort (*Hypericum perforatum*), spotted knapweed (*Centaurea maculosa*), diffuse knapweed (*Centaurea diffusa*), Dalmatian toadflax (*Linaria genistifolia)*, Canada thistle (*Cirsium arvense*).

The wildlife area contains a large population (500 acres infested) of St. John's wort. There are large infestations throughout Ferry and Stevens counties. This weed is widely scattered throughout the wildlife area. We expect infestations to continue for the foreseeable future regardless of control efforts, due to the large amount of annual seed production and the lack of funds available to control this aggressive weed. Preventing encroachment into agricultural fields on the wildlife area has been the highest priority with this species.

Spotted knapweed is widely scattered throughout the wildlife area on 20 acres or less. Spotted knapweed control efforts have focused on reducing plant density in scattered patches and stopping seed production annually. Patch size and plant density within individual populations have been reduced over time.

Diffuse knapweed is widely scattered throughout the wildlife area on approximately 180 acres. Diffuse knapweed control has been a high priority at Sherman Creek for the past 15 years. Agricultural fields that were once solid, waist-high stands of diffuse knapweed now have a few scattered plants at most. Diffuse knapweed has been greatly reduced on the wildlife area due to ongoing control efforts. We expect the presence of scattered plants along roadsides to continue for the foreseeable future regardless of control efforts, due to the introduction of seeds from vehicles, hunters ' clothing, etc.

A small population (20 acres total) of Dalmatian toadflax can be found throughout the wildlife area where the population size and density have been reduced over the past several years.

Very small patches (total population 5 acres) of Canada thistle can be found scattered on the wildlife area. Current weed control, reduction, and eradication efforts appear to be successful as far as reducing current populations and preventing new occurrences (WDFW, 2006).

Table 2. Sherman Creek Wildlife Area Weeds Including the State and County Weed Class Listing and Approximate Number of Acres Present.

Weed Species	2006 State Weed Class	2006 Ferry County Weed Class	Wildlife Unit(s)	Acres Present**
Spotted knapweed	B	B-designate	All Units	20
Diffuse knapweed	B	B-Non-designate	All Units	180
Dalmatian toadflax	C	B-Non-designate	All Units	20
Canada thistle	C	C	All Units	5
St. John's wort	C	C	All Units	500
General weeds	(n/a)	(n/a)	All Units	10

** The number of acres listed represents an estimate of acres occupied if all populations were combined into one solid stand of the weed.

B – Designate: Control will be required and enforced.
B – Non-designate: Control will be required and enforced for vehicle corridors, buffer strips, and in areas of limited distribution, control is encouraged in areas of larger infestations.
C – Control is encouraged in areas of large infestations and required in areas of limited distribution.
Source: 2006 Ferry County Noxious Weed List and Policy.

ENVIRONMENTAL CONSEQUENCES

Direct and Indirect Effects

For Alternative 1, no increased ground disturbance would occur; however, a slight decrease in weeds can be expected due to current weed control efforts. In this alternative, only the current levels of weed treatments would occur, as funds are available. Weed treatment activity on the wildlife area has been fairly consistent. An early detection and rapid response effort has helped to reduce existing populations.

For Alternative 2, all of the above invasive weed species would pose a competitive threat to native plant communities on the wildlife area. Aspen and riparian communities are particularly vulnerable to being altered by invasive species. Under the Alternative 2, there is a moderate potential of weed increase due to potential ground disturbance, canopy loss, road use, and maintenance. However, this risk is reduced to a manageable level by ongoing early detection and rapid response efforts and project design features. These would be implemented to avoid or minimize the spreading of weeds. In addition, monitoring of the project would occur, with follow-up weed treatment, as needed in accordance with the Sherman Creek Wildlife Area Management Plan (WDFW 2006). Limiting motorized access through travel management (road closures and decommissioning) would slow the spread of invasive plant species on the wildlife area. Conversely, all open roads in the area are conduits for the spread of invasive plants that can cause various problems to ecosystem health (land productivity, biodiversity, and displacement of native plant communities).

This project has a low to moderate weed assessment rating due to the current presence of noxious weeds within and adjacent to the wildlife area. The overall rating is moderate due to the size of populations and current treatment levels keeping noxious weed populations in check. These invasive species have possible effects to land productivity, biodiversity, and displacement of native plant communities, but due to implementation of project design elements, would likely remain at acceptable levels with implementation of Alternative 2.

Best Management Practices for Vegetation (page 22-23) would reduce or mitigate for potential effects that might be caused by the proposed action. In general, clean equipment, re-vegetate disturbed areas immediately, conduct inspections of the project area prior to project activities and post project weed control would minimize the introduction and spread of noxious weeds.

Cumulative Effects

There are approximately 735 weed-infested acres throughout the wildlife area that would potentially be affected by thinning, prescribed fire, travel, staging, and

maintenance activities. Because the weeds exist in the area, soil disturbance may benefit those populations, however, the spread of the populations would be restricted by the Best Management Practices and by the continual implementation of the Sherman Creek Wildlife Area Management Plan (WDFW 2006).

Alternative 1 would reduce the cumulative affects of existing weed infestations over the long term through sustained active weed management. However, noxious weeds could increase in areas with existing weed populations due to wildfires and fire suppression activities. Stand replacement wildfires are the most likely to provide good growing conditions for noxious weeds. With such high intensity burns there would be more overhead canopy removed (higher light levels), more duff consumed (exposing soils), and less living vegetation for newly established weeds to compete with for sunlight, soils and nutrients. If burned areas become infested with weeds, existing native plants could be replaced, including those palatable to big game animals. Large infestations could change the way animals use the landscape by effectively reducing the area of suitable habitat (USDI 2006c). Alternative 2 would not increase the spread of existing weed populations because of the following BMPs such as winter logging on snow and/or frozen ground, summer logging during dry conditions, equipment driving over limbs and tree tops, monitoring and enforcement of road closures would minimize the spread of weeds and sustained active weed management.

Cumulative Effects of Past, Present and Future Actions
Thinning, prescribed fire and routine road maintenance projects have occurred in the past both on the wildlife area and adjacent national forest lands, and will likely continue into the future. Present and foreseeable actions on or adjacent to the wildlife area would further reduce the cumulative effects of past fire suppression and management. See Chapter 3, Past, Present and Foreseeable Future Actions, Page 29 –31 for more detail.

AFFECTED ENVIRONMENT
FIRE AND FUELS
The fire and fuels section describes the past and current conditions. It also describes and compares the environmental effects associated with the two alternatives (Alternative 1(No Action), and Alternative 2 (Proposed Action)).

Historical Fire Regime
Within the wildlife area, fires occurred across the landscape in varying degrees of severity and in different frequencies. The ponderosa pine vegetation communities (i.e., dry-site forest ecosystem) on Sherman Creek Wildlife Area are “fire-dependent” and, in fact, they are “frequent fire-dependent.” This means that these plant communities and ecosystems become dysfunctional and unhealthy in the absence of frequent fire (e.g., fire return intervals of about 0-35 and/or 35-100+ years). Unfortunately, fire has been excluded for nearly 100 years on the wildlife area resulting in succession being the primary disturbance.

Thus, the wildlife area has potentially missed 1-3 fire cycles in the last 100 years, creating a relatively homogenous vegetative stands. Historically, frequent fire maintained a mosaic of plant communities from early to late successional stages in varying configurations across the landscape (Swedberg 2007)**.**

Fire History
The policy of controlling fires since the creation of the US Forest Service is reflected in the buildup of natural fuels and the conversion through natural succession of what were grassland, sagebrush, and aspen stands to areas dominated by conifers through the successional process. The most significant fire event on the Sherman Creek Wildlife Area was the Dollar Mountain Fire that burned in the summer of 1929. This devastated much of the watershed and caused significant changes in vegetation. Smaller fires have occurred since that time but have varied in effect. In September 2006 the Bisbee Mountain Fire, which was human caused fire occurred on the wildlife area. . This fire consumed 500 acres of state, federal, and private forestland, of which roughly 90% of the acreage was associated with the Sherman Creek Wildlife Area. The fire was a moderately intense burn due to light winds, heavy fuel loads, steep terrain, and dry forest conditions.

Existing Conditions
Forested areas that have not burned in the past 60 years are in a mature condition allowing more frequent natural disturbances such as wildfire, insect attacks, and disease. Meadows and other openings are being encroached into by conifers, forming dense timbered stands with few breaks in continuity and increasing shade tolerant species that create ladder fuels. Currently within the wildlife area, conifer encroachment into aspen stands has created a wildfire risk; historically, these aspen stands had been recognized as natural fire breaks because no conifers existed within the habitat to carry a fire. Along with conifer encroachment into aspen communities, conifers have overtaken the majority of the open areas that would have historically been dominated by grasses, such as bunch grasses and fescues. These changes in landscape structure have created the opportunity for fire expansion and increased intensity in areas that would have historically decreased fire intensity due to lower fuel loads in the open areas.

The majority of the wildlife area is in Fire Regimes II (0-35 year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced)) and III (35-100+ year frequency and mixed severity (less than 75% of the dominant overstory vegetation replaced)), and fuel loadings are primarily in Condition Class 2. Condition Class 2 is defined as a moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances. Fire behavior, effects, and other associated disturbances are moderately departed (more or less severe). Meaning that, composition and structure of vegetation and fuel are moderately altered. Uncharacteristic

conditions range from low to moderate. Risk of loss of key ecosystem components is moderate (Hann and Bunnell 2001, Hardy et al. 2001, Schmidt et al. 2002). Over time, without disturbance, fuel loading in stands would continue the progression toward Condition Class 3, which has a higher risk of high intensity fire. Condition Class 3 is a high departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances. Fire behavior, effects, and other associated disturbances are highly departed (more or less severe). Meaning that, composition and structure of vegetation and fuel are highly altered. Uncharacteristic conditions range from moderate to high. Risk of loss of key ecosystem components is high (Hann and Bunnell 2001, Hardy et al. 2001, Schmidt et al. 2002).

ENVIRONMENTAL CONSEQUENCES

Direct and Indirect Effects

Under Alternative 1, ongoing activities such as fire suppression, road maintenance and closures, and other routine operations would continue at or near present levels. Under this alternative, the natural successional process would continue to occur slowly, including changes to age class structure, aspen, and other diversity components, such as meadows and riparian areas. Diversity would continue to decline as components, such as aspen, open range, and grasslands would continue to be lost to increased conifer encroachment. Forage and available habitat for many wildlife species would continue to decline, as encroaching conifer communities would continue to increase in overall cover at the expense of rangelands, aspen/shrub habitats, and wildlife forage. Without disturbances, such as commercial thinning or prescribed fire, to create age class diversity, especially in aspen/shrub communities, aspen and open areas would continue to decline and may eventually disappear from the wildlife area.

Alternative 2 would open areas to increase sunlight and ground temperatures, thus creating a semi-open mosaic of grasslands, shrubs, aspen, and conifer communities. Fire risk would be reduced during periods of drought conditions by removing compounded fuel loadings from insect and diseased stands. Encroachment by conifers into aspen/shrub communities has also altered potential fire growth by increasing the likelihood of vertical fire movement into stands that would have historically been known as natural fire breaks. The likelihood of a wildfire resulting in removal of entire stands, and vegetation is dependent on numerous factors, such as fuel moisture content, weather conditions, topography, fuel loading, stand density, and the presence of multiple vegetation layers that provide ladder fuels. Management of the last three factors, as in Alternative 2, could greatly influence fire severity and intensity. If not managed over time, the increase in understory and decrease in natural firebreaks, such as aspen stands and open grass/shrub areas, could lead to uncharacteristically intense wildfires. Thinning and prescribed fire would have a direct effect on the fuel loading and encroachment throughout the wildlife area by reducing fuel conditions that are being created by late serial stands that are being affected by insect attacks and disease. Thinning activities and prescribed

fire would also open canopy spacing, reducing the risk of crown fires and possible stand replacement fires. Further by reducing the risk of a large, uncontrollable wildfire, fire fighter and public safety are enhanced.

Best Management Practices for Wildlife, Vegetation, Fire and Fuels, Air Quality, Cultural Resources and Recreation (pages 21-27) would reduce or mitigate for potential effects that might be caused by the proposed action. In general, fire intensity would be low, ignition would take place at least 50 feet from streams, burning would be performed by WDFW personnel with assistance and/or contracted prescribed fire crews, contractors would be briefed to avoid disturbance within or adjacent to noxious weed infestations, protection buffers for cultural resources would be established and operations would be coordinated with DNR and Washington's Smoke Management Program.

Cumulative Effects

Under Alternative 1, in the short to long term, there is the potential for additional cumulative effects associated with continued, unaddressed fuel loading that could carry a high intensity wildfire. However, under Alternative 2, vegetation management, through actions such as thinning and prescribed fire, would result in reduced fire severity within the treated areas due to: 1) reduced fuel loading, 2) possible reduction in spread rate, size and severity of wildfires, and 3) improved safety and ease of suppression (Pollet et al. 2002). This would reduce the existing fuel load. Alternative 2 would reduce the cumulative effects of years of fire suppression, however with this alternative there is the potential for a prescribed fire to escape the treatment areas. In spite of this, the unpredictable effects of prescribed fire can be minimized by burning within the prescriptions of a burn plan. Burning within prescription will minimize damage and mortality to desired residual vegetation and soils and reduce potential for escape of prescribed fire.

Cumulative Effects of Past, Present and Future Actions

Thinning, prescribed fire and routine road maintenance projects have occurred in the past both on the wildlife area and adjacent national forest lands, and will likely continue into the future. Present and foreseeable actions on or adjacent to the wildlife area would further reduce the cumulative effects of past fire suppression and management. See Chapter 3, Past, Present and Foreseeable Future Actions, Page 29 –31 for more detail.

AFFECTED ENVIRONMENT

SOIL RESOURCES

The soils section describes the current conditions with regards to soils in North Ferry County, Washington, where the wildlife area is located. It also describes and compares the environmental effects associated with the two alternatives (Alternative 1(No Action), and Alternative 2 (Proposed Action)).

Soil conditions were analyzed for the project area based on the 1979 published soil survey, North Ferry Area, Washington (WA619), which was conducted by USDA, Natural Resources Conservation Service (formerly Soil Conservation Services). The original soil survey consisted of broad level mapping and sampling done across the area.

Geology

The soils of the North Ferry Area formed in material derived mainly from volcanic ash, glacial till, glacial outwash, lake sediment, weathered bedrock, recent alluvium, and organic matter. The ash from volcanic eruptions in the Cascade Mountains was carried and deposited by postglacial winds over most of the North Ferry Area. Two eruptions, that of Glacier Peak about 12,000 years ago and that of Mount Mazama about 6,600 years ago, are considered the main sources of the ash (Fryxell 1965).

Soils formed in volcanic ash and glacial till are the most common. They are on hills and mountainsides, but are typically more than 60 inches deep over bedrock. Below the soft ash mantle, the till is hard when dry but friable when moist. It ranges from sandy loam to loam or silt loam and from 15 to 40 percent gravel. Molson and Nevine soils are examples. As the climate changed and the temperature became warmer, streams flowing from the melting ice moved the surface material and sorted it into sand, gravel, and other deposits. These deposits remain as terraces in the primary and secondary drainage channels in the area. Examples of these sorted deposits, known as glacial outwash, surround Curlew Lake. Around this lake, the tops of terraces are level to rolling and, in places, have deep depressions. These depressions resulted when outwash material formed around blocks of ice. As the ice melted, the material that rested on or against it collapsed. The glacial outwash is nearly free of clay or silt particles. Soils formed in glacial outwash are about 20 to 30 inches deep over loose, coarse material. Below the soft ash mantle, the texture of the outwash is commonly loamy sand or coarse sand and the gravel content ranges from about 25 to 60 percent. Examples are Goddard, Mires, and Torboy soils. Where drainage paths were temporarily dammed by ice, glacial lakes formed. Non-gravelly very fine sand, silt, and clay particles were deposited. In the Curlew area and along the Kettle River from Orient south to Lake Roosevelt, remnant lake sediment occurs on high terraces. In places, this lake sediment is capped by ash. Soils formed in glacial lake sediment are more than 60 inches deep over bedrock. The sediment ranges from very fine sandy loam or silt loam to silty clay and is stratified. Most of the soils are calcareous at lower depths. Examples are Anglen, Hodgson, and Hunters soils. On ridges and peaks in the area, glacial till and volcanic ash material is thin or is not evident. The forces of climate have weathered the exposed bedrock in varying degrees. In the eastern part of the area, gneiss rock is only slightly weathered and only shallow soil has formed. In the western part, andesite rock is weathered enough that a shallow soil has formed. This soil, called Vallan soil, ranges from heavy loam to clay loam and from neutral to slightly acid and is 10 to 25 percent angular and rounded gravel

and stones. The churning of soil by animals and windthrown trees has exposed fragments of calcareous argillite. For this reason, Molcal soils are moderately alkaline and calcareous. Recent alluvium is the main kind of parent material along streams and in basins. Carried from uplands, it is deposited during periods of overflow. The soils formed in this material are stratified, are variably deep over bedrock, are poorly drained to somewhat excessively drained, and are sandy to clayey. Mixed alluvial land and Malo and Ret soils are examples. Organic soils are of minor extent. They formed in wet depressions where plants that thrive in water grow and decay in place. Peat and Muck are examples. Ash is important in the soils of the area mainly in that it affects soil texture. For example, Bisbee soils, which lack any trace of this airborne material, are sandy. Molson and Nevine soils, which have a large amount of ash, are loamy (Zulauf 1979), where wildlife flourishes.

During the Pleistocene epoch, which was prior to deposition of the ash, all of the North Ferry Area was covered with ice and snow. The ice was a lobe of the Cordilleran icecap, the center of which was in British Columbia. The greatest thickness of this glacier was 6,700 feet. In the Kettle Range, some peaks, such as Sherman Peak and Copper Butte, are considered to have protruded above the ice as islands or nunataks. As the glacier moved southward in response to tremendous pressure from the icefield in British Columbia, existing residual soil and rock torn from ridges and peaks were mixed with material carried and ground by ice sheets. This material, known as glacial till, was deposited as the ice sheets melted. Little or none of it was transported by water. Glacial till is generally an unstratified, unconsolidated, heterogeneous mixture of clay, silt, sand, gravel, stones, and, in places, boulders. It is derived mainly from granite, andesite, gneiss, schist, argillite, and quartzite (Zulauf 1979).

Minerals
Mineral potential on the wildlife area is low and no evidence of past mining activity has been identified.

Slope Stability (Landslides, Slumps)
No features suggesting unstable landscape are present on the wildlife area. Due to substantial vegetation cover, the soils and steep slopes are very stable. No soils present on the wildlife area have a high clay content, which means they have a low potential for slides or slumps.

Soils
Soils found on the area are primarily associated with 4 soil associations and woodland and wildlife habitat are generally found on all 4 of these types of soils. These soil associations are: the Nevine-Pepoon-Oxerine (NPO) association, the Torboy-Wapal-Gahee (TWG) association, the Springdale-Bisbee-Scala (SBS) association and the Togo-Manley-Scar (TMS) association. The NPO association is described as “…nearly level to very steep, well-drained, sandy and gravelly or stony loamy soils; on glacial till plains and uplands.” Specific soil classifications fall into either a loam or stony loam category. The TWG association is described

as “…nearly level to very steep, well drained and somewhat excessively drained, sandy loam and gravelly sand soils; on uplands and mountains.” Specific soil classifications fall into either a sandy loam or cobbly sandy loam category.” The SBS association is described as “nearly level to steep, somewhat excessively drained and well drained, stony sandy loam, fine sandy loam and loamy fine sand soils; on terraces and alluvial fans.” Specific soil classifications fall either in fine sandy loam or stony sandy loam category. The TMS association is described as “…nearly level or to very steep, well drained, silt loam and sandy loam soils; on uplands and mountains." Specific soil classifications fall into either a silt loam or sandy loam category.

Erosion
Erosion and sediment delivery potentials for these soils are moderate to moderately high due to the dominance of silt and sandy loam textures and steep slopes. Erosion concerns are greatest where vegetation is completely removed.

Compaction
Sandy loams, loams, and sandy clay loams are more easily compacted than other soils. Gravelly soils are less susceptible to compaction than non-gravelly soils. A moderate to high compaction hazard exists for all soil types found on the wildlife area. Soils along the bottom of stringers, which is lowland associated with drainages, are especially sensitive to compaction from equipment, ungulates, and illegal recreational vehicle activity.

Existing Conditions
Past road construction and the lack of maintenance accounts for much of the erosion impacts within the wildlife area, especially where roads are located adjacent to streams. Past harvest impacts to soil have recovered over the last 60 years. The use of caterpillar type tractors and skidders has occurred on much of the forested acreage on the wildlife area with slopes ranging from 0 to 45%. Current disturbance conditions are a result of impacts from past road construction and vary according to the extent and intensity with which the activity had occurred. By implementing routine road maintenance activities, the existing conditions have greatly improved on the wildlife area. Such routine operation and maintenance activities are being conducted according to the existing Biological Assessment for Washington Department of Fish and Wildlife, Wildlife Restoration Grant Program, Grant W-94-D (USDI, 2006).

ENVIRONMENTAL CONSEQUENCES

Direct and Indirect Effects

Alternative 1 would not change existing soil conditions because of the sustained road maintenance activities. Current soil conditions would continue with no change in soil and geologic resources on the wildlife area.

Alternative 2 may affect soil resources by removing vegetation and exposing soil to erosion.

Best Management Practices for Soil, Water and Transportation (pages 24-27) would reduce or mitigate for potential effects that might be caused by the proposed action. In general, keeping soils stabilized, diverting runoff and preventing sediment from reaching streams.

Cumulative Effects
Past, timber practices on the wildlife area have not caused detrimental erosion, sedimentation, or compaction, and did not remove excessive ground cover, organic matter, or nutrients from the sites. However, compaction and soil erosion would probably be the impacts of greatest concern because of the potential for soil disturbance associated with roads. However, these impacts would be avoided or minimized through implementation of the project design features. Cumulatively, impacts to soils on the wildlife area would be site-specific, minor, and short-term.

Cumulative Effects of Past, Present and Future Actions
Thinning, prescribed fire and routine road maintenance projects have occurred in the past both on the wildlife area and adjacent national forest lands, and will likely continue into the future. Present and foreseeable actions on or adjacent to the wildlife area would further reduce the cumulative effects of past road construction, fire suppression and management. See Chapter 3, Past, Present and Foreseeable Future Actions, Page 29 –31 for more detail.

AFFECTED ENVIRONMENT
WATER RESOURCES
The water resources section describes the current conditions with regards to the lower Sherman Creek Watershed and associated streams. It also describes and compares the environmental effects associated with the two alternatives (Alternative 1(No Action), and Alternative 2 (Proposed Action)).

Watershed Condition and Stream Health
The Sherman Creek Wildlife Area is located at the lower end of the Sherman Creek Watershed. Sherman Creek begins at the Kettle Crest (T36N, R35E, Sec 24) and flows 24 miles down to the Columbia River. Trout Creek drains into Sherman Creek from the north. Once a popular fishery, this watershed has undergone changes in the last century, including modification from fire, the construction of Highway 20, and other events that have led to increased sedimentation. In 1992, Bonneville Power Administration opened the Sherman Creek Fish Hatchery to boost salmon stocks in the Roosevelt Basin. To provide a successful hatchery program and further stabilize the basin, many issues concerning the health of the Sherman Creek watershed have been addressed. WDFW continues to work with the U.S. Forest Service, National Park Service, DNR and other land managers to improve the watershed (WDFW 2006).

The Sherman Creek watershed is dominated by snowmelt runoff and also experiences short-intensity, high-duration events associated with summer thunderstorm activity. Precipitation generally parallels elevation, with higher elevations experiencing higher annual precipitation.

Drainages on the wildlife area normally have peak annual flows in March through April as a result of snowmelt. Peak annual flows, as a result of rain on snow events in early winter, have produced some of the highest flows in the area over the last 60 years. Peak annual floods can also result from intensive convective thunderstorms that cause flash floods during the spring and summer. The forest canopy tends to buffer the intensity of thunderstorms at higher elevations. Peak flows are probably higher than historically, due to soil loss, compaction, timber harvest, and road construction, which cause flashier responses. This has been offset somewhat by increased canopy cover, better forests practices and routine road maintenance. Base flows were probably higher prior to watershed alterations, which have occurred over the last 100 years. Prior to European settlement, frequent fires maintained lower evapo-transpiration and interception rates and water storage in wetlands and beaver ponds contributed to base flows. Increases in base flow due to removing trees tend to be short term (5 to 10 years) and return to pre-disturbance levels as other vegetation utilizes the increase, such as grasses, shrubs, and remaining trees in higher precipitation zones.

Water quality in the project area in general is good. A few surface waters flowing within the Sherman Creek Wildlife Area are listed on Washington's most current 2004 303 (d) list. Sherman Creek is listed because of elevated water temperature and South Fork Sherman Creek is listed for low dissolved oxygen and elevated water temperature. Per WAC 173-201(A) 600, the wildlife area has a water quality use designation for: salmonid spawning, rearing, and migration; primary contact recreation; domestic, industrial, and agricultural water supply; stock watering; wildlife habitat; harvesting; commerce and navigation; boating; and aesthetic values.

ENVIRONMENTAL CONSEQUENCES

Direct and Indirect Effects

Watershed conditions and stream health would remain unchanged under Alternative 1. However, over the long term the increased canopy cover would decrease the peak flows. However, direct and indirect impacts associated with Alternative 2 could include short term changes in peak and base flows due to changes in snowmelt dynamics and transpiration, changes to water quality associated with altered stream flows, and changes to sediment delivery due to ground disturbance. As vegetation will quickly recolonize post-treatment, it is not anticipated that these short term impacts would be significant.

Best Management Practices for Soils, Water and Transportation (pages 24-27) would reduce or mitigate for potential effects that might be caused by the

proposed action. In general, minimize effects of project activities on water resources and maintain water quality to meet state standards.

Cumulative Effects
Alternative 1 would increase the cumulative effects of fire suppression and the lack of habitat management activities resulting in an increase in canopy cover and thus reduce peak flows over the long-term.

Under Alternative 2, the thinning and prescribed fire would reduce snow-interception by decreasing down-fuels and vegetation, reduce evapo-transpiration by killing or burning grasses, shrubs and small trees, and change the timing and rate of snowmelt. Snowmelt rates are dependent on elevation and aspect. At the elevations found on the wildlife area, the snowmelt rate increases with decreases in canopy density, as would occur under this alternative, with the reduction being greatest on southerly aspects. The rate of snowmelt would be affected by exposing the snow pack to rain or wind and would result in increased snow depths and increased solar radiation. These reductions would be partially offset by increased uptake by remaining trees and vegetation. The reduction in snow-interception, evapo-transpiration and rate of snowmelt resulting from project activities should not result in any measurable increase in flows from areas being treated. The probability of a flood event occurring can be increased by increasing the runoff efficiency of a drainage by road construction, increasing the snow pack through distribution, increasing snowmelt rate through reducing canopy closure, or increasing the amount of water available by removing vegetation.

Roads can reduce canopy and leaf area index, but the covered area is small (5.02 acres). The primary affects of roads are increased runoff efficiency resulting from enhanced drainage systems and erosion from the road surface, cut and fill slopes. Water quality impacts are primarily related to activities that may contribute sediment, nutrients and contaminants conducted immediately adjacent to or within riparian management zones.

Detrimental effects to watershed hydrology and water quality as a result of the proposed action are unlikely. This action is unlikely to permanently alter the aquatic system either by affecting its physical integrity, water quality, sediment regime or stream-flow. The long-term effects of the proposal may be slightly beneficial for the aquatic system as a result of increased wood recruitment and species and structural diversity in the riparian zones and the forest in general. It is unlikely that the proposal would result in any detectable change to local ground water. Although, the proposal would remove more than half of the existing forest cover, the root systems of the retained trees, shrubs, grasses, etc. would quickly use any additional moisture available in the soil. Further, proposed temporary access road construction would not involve excavation into side slopes where water tables could be intercepted. Also, it is unlikely the proposal would result in any significant change to local base flow, because the proposed

project would maintain more than 40 percent of the existing forest cover, so that the root systems of the retained vegetation would quickly use any additional soil moisture available. Since portions of the project area are in a zone subject to transient snow accumulations in the winter, it can be assumed that the reduction in stand density may result in some small increase in snow accumulation and melting during rain-on-snow (ROS) events. However, because canopy closure would not be reduced below 40 percent, this effect is not likely to result in detectable changes to snow melt and peak flows in this watershed. Further, no new permanent roads would be constructed under the proposed action, but the project may necessitate the re-opening of existing closed roads and existing orphaned roads, as well as the construction of a few temporary access roads that would be obliterated after project completion. Majority of the roads that will be used are existing roads, which are routinely maintained.

In light of the BMPs employed during this project (e.g. no thinning within RMZs, erosion control measures, etc) there would not be any direct impacts on surface water and the potential for effects on peak flows would slightly increase initially, however with the remaining vegetation and as the understory vegetation (such as browse species) increases, peak flows should return to pre-project conditions without adversely effecting water resources on the wildlife area. In addition, creating small openings (i.e. thinning spacing prescriptions) dispersed throughout the wildlife area instead of removing large volumes of timber by clearcutting should not cause significant adverse cumulative effects. It is not anticipated that thinning and prescribed fire treatments that change forest stand structure, reduce fuel loadings, and restore historic fire regimes on the wildlife area would significantly affect the hydrologic conditions. Proposed thinning and prescribed fire treatments would occur over a period of five years, so that only limited areas would potentially be disturbed at any one time.

Cumulative Effects of Past, Present and Future Actions

The use of fire retardants or foams by the Forest Service for suppression activities on or adjacent to national forest could potentially cause short and long-term impacts to water resources if misapplied or mishandled. Retardants contain ammonia and phosphate or sulfate ions, which can change the chemistry of a water body, thus making it lethal to fish and other aquatic organisms. Foams contain detergents that can interfere with the ability of fish gills to absorb oxygen. The degree of impact would depend on the volume of retardant/foam dropped into the water body, the size of the water body, and the volume of flow in the stream or river. For example, if a 800-gallon drop hits a fast flowing river, it is likely that the lethal effects to aquatic resources will be short-lived as dilution below the toxic level is quickly achieved. On the other hand, a 3,000-gallon drop in a stagnant pond would likely cause toxic levels to persist for some time (USDA, 2008).

Alternative 1 would increase the cumulative effects of past fire suppression and may increase the likelihood of retardant use in response to a fire that could occur

under current habitat conditions. Alternative 2, would reduce the cumulative effects of past fire suppression and reduce the likelihood of retardant being used on the wildlife area.

See Chapter 3, Past, Present and Foreseeable Future Actions, Page 29 –29 for more detail.

AFFECTED ENVIRONMENT
AIR QUALITY

The air quality section describes the current conditions with regards to local and regional air quality in the immediate vicinity of the wildlife area. It also describes and compares the environmental effects associated with the two alternatives (Alternative 1(No Action) and Alternative 2 (Proposed Action)).

Air Resources

The 1967 Clean Air Act (CAA) provides direction to protect and enhance the quality of the nation's air resources and protects health and welfare. The Environmental Protection Agency (EPA) developed primary air pollution standards in compliance with the act and authorized the Washington Department of Ecology to enforce the Clean Air Act. Air quality particulate standards under the CAA were originally defined in terms of Total Suspended Particulate. More recently, EPA refined the particulate standard to focus on particulates less than 10 microns in diameter (PM^{10}). The 24-hour PM^{10} standard is 150 micrograms per cubic meter. These PM^{10} particles are too small to be effectively filtered by the human respiratory system and can cause respiratory problems, especially for those who are predisposed to respiratory ailments. These small smoke particulates are also suspended in the atmosphere for long periods that can contribute to regional haze and reduced visibility (USDA 2004).

The CAA defines areas found to be in violation of standards as non-attainment areas. Pollution sources in these areas are subject to tighter restrictions. The wildlife area is located within an attainment area. The nearest designated non-attainment area for criteria pollutants:

- Bonner County, Idaho, is "serious" for PM^{10}. Bonner County is located about 90 miles east of the project area. The dominant airflow in the area is from west to east. Bonner County is located downwind from the project.

The Clean Air Act also contains provisions to protect Class 1 airsheds. The nearest Class 1 airsheds are the Selway Bitteroot Wilderness Area (about 120 miles east of the project area) and the Paysayten Wilderness Area (about 100 miles west of the project area). The dominant airflow in the region is west to east. The Selway Bitteroot Wilderness is generally downwind and the Paysayten Wilderness is generally upwind.

Air quality on the wildlife area was assessed with EPA air quality data (EPA 2008).

Existing Conditions
There are no major point sources of air emissions within 70 miles of the wildlife area. Existing sources of non–point emissions are from motor vehicles, agriculture, forest practices and wildfire. Automobiles and trucks on local highways release carbon monoxide and PM_{10} particulates, mostly in the dust form.

Motor vehicle traffic along unpaved roads has created non-point sources of carbon monoxide and particulates in the form of dust. Fire generated air impurities were a natural byproduct of historic fires that frequented the Pacific Northwest over thousands of years. Prior to recent fire suppression, an average of 800,000 acres burned annually in the Pacific Northwest. Settlement and dramatic increase in human population over the past 200 years have increased the concern for the effects of smoke on air quality and human health (USDA 2004).

Smoke from prescribed fire and wildfire and dust from motor vehicle traffic along unpaved roads have the potential to cause negative effects on air quality. The use of prescribed fire for ecosystem restoration can produce enough particulate matter to be a public health and welfare concern. Fine particulates in smoke travel downwind, impacting air quality in local communities, causing a safety hazard on public roads from impaired visibility, and causing a general nuisance to the public.

The Sherman Creek Wildlife Area lies between Republic on the west and Kettle Falls on the east. These towns may experience high-pressure inversions in both winter and summer. During such events, smoke and dust may settle in the local valleys and populated areas.

Smoke Management
Smoke management is controlled by the State of Washington, and any prescribed fire that consumes more than 100 tons of fuel within a 24-hour period requires approval from the State. By considering the cumulative effects, ignition methods, timing, weather, and smoke dispersion potential, the State maintains air quality standards and limits effects to acceptable levels. The State considers burning on Federal, State, and private lands when managing smoke emissions so that air quality standards are met (USDA 2004).

ENVIRONMENTAL CONSEQUENCES

Direct and Indirect Effects

Alternative 1 would have the least effect on air quality since no burning would occur. However, routine operation and maintenance activities would occur.

Under Alternative 2, the principle potential effects on air quality would be smoke from prescribed fire. This would be a short-term, temporary impact that would have the potential to affect local communities and valleys. Adherence to BMPs and the State smoke management program would ensure that the Proposed Action would have little effect on the local communities and valleys. When compared against the No Action Alternative. Alternative 2 would have the greatest potential impact on air quality given the prescribed fire component, although it would be insignificant due to the required adherence to BMPs and the State smoke management plan.

The Paysayten Wilderness Area is located 100 miles west of the wildlife area, and prevailing winds blow from west to the east. Consequently, smoke from prescribed fires proposed by Alternative 2 would not affect the Class 1 airsheds associated with the wilderness area. The Selway Bitteroot Wilderness Area is located 120 miles east of the wildlife area and may be affected slightly, albeit insignificantly, if wind and weather conditions concentrate project smoke in that direction without adequate dispersal.

The non-attainment area of Bonner County, Idaho, located downwind from the wildlife area and may be affected by a small incremental increase in particulate if wind and weather conditions concentrate project smoke in that direction without significant dispersal.

Best Management Practices for Air (page 25) would reduce or mitigate for potential effects that might be caused by the proposed action. In general, the impact is expected to be minimal as burning periods would have a short duration and smoke conditions must be in compliance with state air quality standards.

Cumulative Effects

Alternative 1 would not result in any cumulative effects beyond the existing air quality conditions. Alternative 2, project implementation would result in a minor cumulative increase in fugitive dust from the additional soil exposure and disturbance. However, this effect would only occur during the operational period and would be localized and negligible. The proposed activities would also increase vehicle emissions from operating machinery and hauling materials. However, the increased emissions would be localized and would not have a measurable effect on regional or local pollutant levels. Limited burning is likely to occur in the reasonable foreseeable future associated with residential and commercial developments on nearby private lands. Burning would also likely occur on other State and Federal lands in the area, although no projects have been identified at this time. Impacts from smoke could affect widely scattered individual dwellings in the Kettle Falls Valley, but would be short-term.

Alternative 2 would meet requirements for monitoring and compliance with the State Air Quality Standards. Under Alternative 2, activities would maintain air quality at a level adequate for protection and use of the wildlife area resources,

and meet or exceed applicable Federal and State standards and regulations. All prescribed fire would be planned and conducted in accordance with a State smoke management plan.

Cumulative Effects of Past, Present and Future Actions
Thinning, prescribed fire and routine road maintenance projects have occurred in the past both on the wildlife area and adjacent national forest lands, and will likely continue into the future. Present and foreseeable actions on or adjacent to the wildlife area would further reduce the cumulative effects of past fire suppression and management. See Chapter 3, Past, Present and Foreseeable Future Actions, Page 29 –31 for more detail.

AFFECTED ENVIRONMENT
CULTURAL RESOURCES
The cultural resources section briefly describes historical use of the area in general and management actions with regards protecting cultural resources. It also describes and compares the environmental effects associated with the two alternatives (Alternative 1(No Action), and Alternative 2 (Proposed Action)).

Area History
Prior to European settlement of the area, the tribes heavily used Kettle Falls on the Columbia River as a salmon fishery. Many of the flats and benches along both sides of the river and south of the falls were reportedly used as burial areas. Wildlife area land was part of the Colville Reservation from 1872 to 1892. In 1892, Congress under the Dawes Act of 1887 ceded the land back to the United States.

Cultural Resources
To ensure cultural resource protection, a survey of the project area would be completed prior to project implementation that follows all laws, regulations, and policies relative to cultural resources and historic surveys. Any cultural resources identified during the survey process would be excluded from the project area. Work in the project area would not begin until cultural resources are identified, evaluated and adequate measures for their protection are implemented. Sites that could be potentially affected during thinning and prescribed fire would be avoided to eliminate damage to cultural sites. Site boundaries would be clearly marked for avoidance, and sites would be monitored during and after completion of the activities. Because these sites would be avoided, there would be no effect to these cultural resource sites. If cultural resources are discovered, WDFW staff will stop all actions in the area and coordinate all subsequent actions on the discovered resources with the Washington Department of Archeology and Historical Preservation Officer and respective Tribes.

ENVIRONMENTAL CONSEQUENCES
Direct and Indirect Effects

Alternative 1 would have the least potential to disturb historic surface and subsurface prehistoric sites. No thinning or prescribed fire would take place; however, routine operation and maintenance activities would continue. Archaeological sites, if any, on the wildlife area would continue to degrade from weathering and erosion.

Alternative 2 would have the potential to disturb cultural resources, if found on the wildlife area; however, BMPs built into the proposed project would protect these resources. For cultural resources within treatment areas, protection buffers of at least 15 feet would be placed around them. In consideration of the BMPs on Page 25, this Alternative would conform to state and federal laws and guidelines for the protection of cultural resources.

Best Management Practices for Cultural Resources (page 25) would reduce or mitigate for potential effects that might be caused by the proposed action. In general, avoid impacting cultural resources, follow all laws, regulations, and policies relative to cultural resources and historic surveys, and if any cultural materials are discovered during implementation, work in potential site would cease immediately and the operator would contact the appropriate WDFW staff.

Cumulative Effects
Wildfires, flooding, erosion, and weathering are just some of the natural damage agents that deteriorate archaeological sites. The cumulative effects of logging, road building, surface collecting and/or illegal digging, and natural fuels reductions accelerate the effects from natural causes. All of these activities would still be reflected in the integrity of these sites. With that said, archaeological sites would continue to be damaged from natural causes, and also from human disturbances unless protective measures were implemented.

No such measures are proposed for implementation under Alternative 1, so the existing cumulative effects would persist and naturally continue, but this alternative would not exacerbate them. Alternative 2 would prevent damage that could affect potential archaeological sites for the proposed project and contribute to the existing cumulative effects as stated above. Further, Alternative 2 would protect identified sites from the general public through education and enforcement.

Cumulative Effects of Past, Present and Future Actions
Thinning, prescribed fire and routine road maintenance projects have occurred in the past both on the wildlife area and adjacent national forest lands, and will likely continue into the future. Present and foreseeable actions on or adjacent to the wildlife area would further reduce the cumulative effects of past fire suppression and management. See Chapter 3, Past, Present and Foreseeable Future Actions, Page 29 –31 for more detail.

AFFECTED ENVIRONMENT

TRANSPORATION

The transportation section describes the current conditions with regards to existing roads. It also describes and compares the environmental effects associated with the two alternatives (Alternative 1(No Action), and Alternative 2 (Proposed Action).

Existing Conditions

The project area has a total road density of less than 1.28 miles/square mile; 0.832 miles/square miles is associated with the lower Sherman Creek drainage and 0.448 miles/square miles is associated primarily with the Trout Creek sub-drainage. Many roads in the project area receive little use during most of the year and several closed roads probably receive no traffic at any time. Roads are primarily lower maintenance level native surface roads, requiring high clearance vehicles to travel, particularly in poor weather conditions. Main arterial roads, including US 395, SR 20, and the Kettle Falls County Road are higher maintenance roads and are suitable for passenger cars. Numerous studies have rigorously looked at the effect on deer and elk of open roads, road densities, and the access and use by motor vehicles afforded by those roads (Roland et al. 2005; Wisdom et al. 2005; Johnson et al. 2005; Wisdom et al. 2005). Increases in road densities (miles of roads/square mile), location of roads, and intensity of traffic greatly influence animal distribution, movement patterns, and access to habitat, as well as risk to hunter related mortality. Increases in road density typically are associated with increased hunter related mortality of deer and elk (Johnson et. al. 2005); other studies reported adverse impacts to nutrition and energetics (Cook et. al. 2004; Johnson et. al. 2005).

ENVIRONMENTAL CONSEQUENCES

Direct and Indirect Effects

Under both alternatives routine road maintenance would continue further improving road conditions. Road densities would remain unchanged with Alternative 1. Short-term road densities would increase with the implementation of Alternative 2. A total of 2.03 miles of new temporary roads would be constructed with Alternative 2. This alterative would also re-open 3.77 miles of an orphaned road, resulting in an open road density of 1.81 miles of road/square mile area during the implementation of the project. These roads, however, would not contribute to the open road density in the mid to long term, as they would be unavailable to public use due to thinning/prescribed fire operations and wildlife concerns. After project activities are complete within treatment areas, roads would be closed and no longer available, returning the open road density to 1.28 miles of road/square mile area. At a minimum, these roads are properly drained, scarified and seeded, and the entrances blocked upon completion of the project activities. In the short term, there would be a slight decrease in cover adjacent to roads, which would improve sight distances and allow for safer travel.

Best Management Practices for Soils, Water and Transportation (pages 24-27) would reduce or mitigate for potential effects that might be caused by the

proposed action. In general, minimize effects of project activities on soils and water resources and maintain roads to forest practices standards

Cumulative Effects
From a transportation context, there would be no effective change to road density with either alternative because the roads would not be available to public access due to safety and wildlife concerns. Overall, effective open road density would remain at current levels, so no cumulative effects would be anticipated to result from implementation of either alternative. Both alternative would continue to reduce the cumulative effects of past road construction through sustained road maintenance.

Cumulative Effects of Past, Present and Future Actions
The routine road maintenance activities conducted by the Forest Service and WSDOT adjacent to the wildlife area, on top of WDFW road maintenance activities, would further reduce the cumulative effects of past road construction in the area in general through sustained road maintenance. See Chapter 3, Past, Present and Foreseeable Future Actions, Page 29 –31 for more detail.

AFFECTED ENVIRONMENT
RECREATION
The recreation section describes the current conditions with regards to recreational access and use on the wildlife area. It also describes and compares the environmental effects associated with the two alternatives (Alternative 1 (No Action), and Alternative 2 (Proposed Action)).

Department Directive
The Department is not only responsible for the protection of the species, habitats, and biodiversity of the state, but for providing citizens with opportunities to access wildlife resources for hunting, fishing, and wildlife viewing. It is estimated these uses account for over 1 million visits/year to Washington wildlife areas. In recent years, Department lands have also become popular for nature walking, rock climbing, mountain biking, geocaching, hang-gliding, and other diverse outdoor activities. For the most part, these activities are consistent with the Departments philosophy of providing all outdoor recreation opportunities that do not threaten fish and wildlife or degrade the habitats that support them. The Department lands portfolio includes more than 800,000 acres of owned and managed land in numerous wildlife areas. In addition, the Department is the largest provider of water access in the state and currently manages over 600 access sites that provide public access to lakes, rivers, and marine areas. Most sites have toilets, boat launches, and parking space. High quality hunting and fishing opportunities are legally and physically accessible, offer few or no restrictions, give access to many types of fish and game, and are on a physical scale that leaves everyone plenty of room to enjoy their recreational experience. A high quality wildlife viewing opportunity is also legally and physically accessible; offers a unique viewing opportunity, such as a migration corridor,

wintering area, or area of high biodiversity; and accommodates wildlife viewers without crowding. In addition to the wildlife areas and access sites in its lands portfolio, the Department also partners with private landowners to offer public access for public hunting, fishing, and wildlife viewing opportunities (WDFW 2005).

Sherman Creek Wildlife Area
The Sherman Creek Wildlife Area is located next to the Sherman Pass Scenic Byway. Sherman Pass Scenic Byway stretches 35 miles across Northeast Washington on the Colville National Forest, connecting the communities of Republic to the west and Kettle Falls on the east. Along this section of State Route 20, the Byway passes through the Kettle Range, which is an extension of the Selkirk range, ultimately leading to the Canadian Rockies. Sherman Pass, at an elevation of 5,575 feet, is the highest pass in the State of Washington that is kept open year round. It is named for General William T. Sherman, who passed through the area in 1883. Recreationists use the byway area for berry picking, hunting, dispersed camping, fishing, driving for pleasure, and a variety of other recreational activities (USDA 2006). Sherman Creek Wildlife Area is primarily used for hunting and seasonal wildlife viewing. There are no developed recreation sites or trail system on the wildlife area.

ENVIRONMENTAL CONSEQUENCES

Direct and Indirect Effects

Under Alternative 1 recreation use would remain unchanged, with temporary or seasonal closures are necessary to protect wildlife from human disturbances during crucial life stages and to conduct routine operation and maintenance activities.

During implementation of Alternative 2, recreational access to the wildlife area would be temporarily or seasonally closed to the public during the thinning and prescribed fire activities. Temporary closures associated with treatment areas may be in effect for up to 1-year; seasonal closures associated with winter to protect wildlife would be in effect annually from December 1st to March 31st. With this implementation, the potential effects to, recreation sites and permit holders would be low to moderate. Recreation use patterns may change in the short term due to closures and general disturbances.

Best Management Practices for Recreation (page 27) would reduce or mitigate for potential effects that might be caused by the proposed action. In general, interested parties, such as hunters, fishers and landowners would be notified of upcoming thinning and prescribed fire activities. During ignition, recreation use of the prescribed burn area and vicinity would be discouraged or closed for safety reasons if needed or appropriate. News releases and/or posted notices and on-site signing would be used to further notify the public.

Cumulative Effects
Spring burning would have relatively few impacts on tourist and recreational use of the area, which is generally light in spring. Smoke may drift into adjacent areas and decrease the quality of the recreational experience in the short term, possibly for several days. The burn plan process could minimize smoke impacts. A fall burn would be more likely to conflict with hunter activities. During prescribed fire, recreation use would be closed for safety reasons, if needed or appropriate based on timing or proximity. Prescribed fire may have negative effects for some users because of the resulting blackened vegetation.

The planned commercial thinning would have short-term impacts on those who use the wildlife area since there would be closures in effect during the operations. The thinning would have a positive effect because it would greatly reduce the number of hazardous trees along roads and access sites, making for a safer environment for people. The roadside clearing would also have a similar negative/positive set of effects: there would be travel delays, but the end result would be improved sight distances, which leads to a safer environment for travel. If these activities take place in the fall, they would impact the biggest number of users since that is when hunting season takes place. Removal of vegetative cover has the potential of affecting the way hunters use the area. The time of the least amount of recreational use would be the winter, the targeted season for project activities. Per project design, recreation impacts and safety concerns would be minimized by notifying the public of the intended burn time(s) and logging operations through news releases and/or posted notices. While some individuals may be inconvenienced in the very short term, it is not expected that the impacts from the Proposed Action would be significant to recreational pursuits or their participants.

Cumulative Effects of Past, Present and Future Actions
Thinning, prescribed fire and routine road maintenance projects have occurred in the past both on the wildlife area and adjacent national forest lands, and will likely continue into the future. Present and foreseeable actions on or adjacent to the wildlife area would further reduce the cumulative effects of past fire suppression and management. See Chapter 3, Past, Present and Foreseeable Future Actions, Page 29 –31 for more detail.

AFFECTED ENVIRONMENT
SOCIO-ECONOMICS
The socio-economics section describes the current conditions with regards to minority and/or low-income members of the community and/or tribal resources. It also describes and compares the environmental effects associated with the two alternatives (Alternative 1(No Action, and Alternative 2 (Proposed Action)).

Census Data
Ferry County had a total of 2,823 occupied housing units and a population density of 3.3 persons per square mile reported in the 2000 Census. Ethnicity in

Ferry County is distributed: white 75.5%, black or African American 0.2%, American Indian or Alaskan Native 18.3%, Asian 0.3%, Hispanic or Latino 2.8%, two or more races 3.5%, and some other race 2.2%. In addition, 19%, of families are at or below the poverty level.

Specific economic data for individual communities is collected by the US Census. Ferry County households earn a median income of $30,388 annually compared to the state of Washington median income during the same period of $45,776. The unemployment rate was 10.9% in Ferry County in 1999, compared to 4.4% nationally during the same period. Approximately 12.8% of the Ferry County employed population worked in natural resources, with much of the indirect employment relying on the employment created through these natural resource occupations. Approximately 47% of Ferry County's employed persons are private wage and salary workers, while around 39% are government workers (Ferry County 2006).

Environmental Justice
Presidential Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" was issued in February 1994. This directed federal agencies to consider, as part of the NEPA analysis process, how their proposed actions or projects might affect human health and environmental conditions on minority and/or low-income communities. Two fundamental questions are posed by the Environmental Protection Agency (EPA) to help agencies address these and related factors: 1) "Does the potentially affected community include minority and/or low-income populations?" and, 2) "Are the environmental impacts likely to fall disproportionately on minority and/or low-income members of the community and/or tribal resources?"

In answering the first question, WDFW used 2000 Census data to examine the minority and low-income populations in Ferry County, the county where the Proposed Action would occur. For this analysis, the affected area is identified as Ferry County and the state of Washington is used as the geographic reference for the general population. The minority populations for Ferry County represent less then 25% of the total population for the county. This compares to 18.3% minority populations for the whole of Washington. EPA guidance identifies a minority population as one where either: a) the minority population of the affected area exceeds 50 percent or b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population. Ferry County meets the second condition.

The percentage of persons below the poverty level for Ferry County is 13.3 percent, as compared to 10.6 percent for Washington. Based upon the known demographics of the county, it is assumed that a large percentage of these persons are located on and near the Confederate Tribes of The Colville Reservation. For this analysis, this population is identified as a low-income population.

ENVIRONMENTAL CONSEQUENCES

Direct, Indirect, and Cumulative Effects

In considering potential environmental justice concerns, WDFW evaluated the potential effects on the Native American population on and near the Confederated Tribes of The Colville Reservation. Alternative 1 would not have disproportionate health or environmental effects on minorities or low-income populations given that nothing would change under this alternative. Under Alternative 2, the socio-economic effects are insignificant at the county scale. In addition, it does not appear that those effects would be disproportionately larger or smaller on the population of concern. In summary, we do not believe there are any environmental justice concerns with this project.

The local economy and most businesses of the communities surrounding the wildlife area are based on private businesses and government and to a lesser degree on recreation and tourism; however the regional economy is strongly influenced by recreation and tourism. There may be short-term, negligible benefits to the local and regional economy resulting from project-related expenditures and employment.

CHAPTER 4

Listed below are the members of the interdisciplinary team and other individuals that participated in the development of this EA.

AGENCIES AND PERSONS INVOLVED

Dana Base	Wildlife Biologist, Region 1 Washington Department of Fish and Wildlife (WDFW)	Harvest Prescription
Barb Behan	Fish and Wildlife Biologist/Grants Manager, U.S. Fish and Wildlife Service (USFWS)	Endangered Species Act, Section 7
Ginna Correa	LIP Program Coordinator, WDFW	Document Review and Editing
Kelly Craig, M.S.	Wildlife Area Program Assistant/Planning Coordinator/Biologist, WDFW	Project Lead, NEPA/SEPA, Section 7/106, Primary Author
Bruce Crespin	Regional Cultural Resources Specialist, Bureau of Land Management (BLM)	National Historic Preservation Act, Section 106
Paul Dahmer	Wildlife Program Section Manager, WDFW	Contributor, Section 106
Dan Edwards	Wildlife Branch Chief, USFWS	Project Approval, Project Oversight
Teresa Eturaspe	SEPA Coordinator, WDFW	SEPA
Nell Fuller	Fish and Wildlife Biologist/Grants Manager, USFWS	NEPA
Doug Kuehn, M.S.	Wildlife Forester, WDFW	Forest Management, Harvest Prescription, Project Layout, Site Preparation
John Talmadge	Information Technology Specialist, WDFW	GIS Maps
Jennifer Quan	Lands Division Manager, WDFW	Project Oversight, Responsible Official
Steve Zender	WDFW Wildlife Biologist, Region 1	Harvest Prescription

CONSULTATION AND COORDINATION

U. S. Fish and Wildlife Service, Wildlife Restoration Program: NEPA, Section 7 and 106

Washington State Department of Fish and Wildlife, Habitat Program: SEPA

BIBLIOGRAPHY

Armleder, H. M.; Leckenby, D. A.; Freddy, D. J.; and Hicks, L.L. 1989. *Integrated Management of Timber and Deer; Interior Forest of Western North America.* Gen. Tech. Rep. PNW-GTR-227. Portland, OR: U. S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 98pp.

Environmental Protection Agency. 2008. *Air Quality: Air Data*. Web page. Date accessed February 7, 2008. Available at: http://www.epa.gov/air/data/reports.html

Ferry County, Washington 2006. *Volume II: Community Wildfire Protection Plan.*187pp.

Fryxell, Ronald. 1965. *Mazama and Glacier Peak Volcanic Ash Layers: Relative Ages*. Sci. 147: 1288-1290pp, illus

Hann, W.J., Bunnell, D.L. 2001. *Fire and Land Management Planning and Implementation Across Multiple Scales.* Int. J. Wildland Fire. 10:389-403.

Hardy, C.C., Schmidt, K.M., Menakis, J.M., Samson, N.R. 2001. *Spatial data for national fire planning and fuel management*. International Journal of Wildland Fire 10:353-372.

Johnson, Bruce K.; Alan A. Ager; James H. Noyes; and Norman J. Cimon. 2005. *Elk and Mule Deer Response to Variation in Hunting Pressure.* Pages 127-138 in Wisdom, M.J., Technical editor. The Starkey Project: a synthesis of long-term studies of elk and mule deer. Reprinted from the 2004 Transactions of the North American Wildlife and Natural Resources Conference, Alliance Communications Group, Lawrence, Kansas, USA.

Lewis, J. C., M. Whalen, and E. A. Roderick. 2004a. Lewis woodpecker (*Melanerpes lewis*). In E. M. Larsen, J. M. Azerrad, and N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds [Online]. Available at: http://wdfw.wa.gov/hab/phs/vol4/lewo.pdf

Lewis, J. C., and E. A. Roderick. 2004b. White-headed woodpecker (*Picoides albolarvatus*). In E. M. Larsen, J. M. Azerrad, and N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds [Online]. Available at: http://wdfw.wa.gov/hab/phs/vol4/whwo.pdf

Morgan, J. T., D. A. Ware, M. Tirhi, and R. L. Milner. 2004. Wild turkey (*Meleagris gallopavo*). In E. M. Larsen, J. M. Azerrad, and N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds [Online]. Available at: http://wdfw.wa.gov/hab/phs/vol4/turkey.htm

Pollet, J., and Omi, P.N. 2002. *Effect of thinning and prescribed burning on crown fire severity in ponderosa pine forests*. International Journal of Wildland Fire, 11(1), 1–10.

Rowland, Mary M.; Michael J. Wisdom; Bruce K. Johnson; and Mark A. Penninger. 2005. *Effect of Roads on Elk: Implications for Management in Forested Ecosystems.* Pages 42-52 in Wisdom, M.J., technical editor. The Starkey Project: a synthesis of long-term studies of elk and mule deer. Reprinted from the 2004 Transactions of the North American Wildlife and Natural Resources Conference, Alliance Communications Group, Lawerence, Kansas, USA.

Ruediger B., J. Claar, S. Mighton, B. Naney, T. Rinaldi, F. Wahl, N. Warren, D. Wenger, A. Williamson, L. Lewis, B. Holt, G. Patton, J. Trick, A. Vandehey, and S. Gniadek, 2000. *Canada Lynx Conservation Assessment and Strategy*. Unpubl. Report, January 2000. USDA Forest Service, Northern Region. Missoula, MT. 199 pp.

Ruggiero, L. F., K. B. Aubry, S. W. Buskirk, G. M. Koehler, C. J. Krebs, K. S. McKelvey, and J. R. Squires, 1999. *Ecology and Conservation of Lynx in the United States*. USDA Forest Service General Technical Report RMRUS-GTR-30WWW. 480 pp.

Schmidt, K.M., Menakis, J.P. Hardy, C.C., Hann, W.J., Bunnell, D.L. 2002. *Development of coarse-scale spatial data for wildland fire and fuel management.* General Technical Report, RMRS-GTR-87, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, CO.

Swedberg, Dale. 2006. *Personal communication*.

Texas Park and Wildlife. 2008. *White tailed deer*. Web page. Date accessed March 3, 2008. Available at: http://www.tpwd.state.tx.us/landwater/land/habitats/trans_pecos/big_game/wtd/

Thomas, Jack Ward. 1979*. Wildlife Habitats in Managed Forests – The Blue Mountains of Oregon and Washington*. US Department of Agriculture, Forest Service. Agriculture Handbook No. 553. 512pp

USDA, 2008. United States Department of Agriculture, Forest Service. *Aerial Application of Fire Retardant Environmental Assessment*. Web page. Date accessed: March 4, 2008. Available at: http://www.fs.fed.us/fire/retardant/index.html

USDA, Forest Service. 2004. *49 Degrees North Mountain Resort Revised Master Plan Final Environmental Impact Statement*. Colville National Forest, U.S. Department of Agriculture, Stevens County, Washington. 93pp

USDA, Forest Service. 2006a. *Growden Dam, Sherman Creek Restoration Project, and Forest Plan Amendment #28 Final Environmental Impact Statement.* Colville National Forest, U.S. Department of Agriculture, Ferry County, Washington. 118pp

USDA, Forest Service. 2006b. *Environmental Assessment for the Vulcan Vegetation Management Project.* Colville National Forest, U.S. Department of Agriculture, Ferry County, Washington. 165 pp

USDA, Forest Service. 2006c. *Conger Timber and Fuels Management Project and Forest Plan Amendments*. Colville National Forest, U.S. Department of Agriculture, Pend Oreille County, Washington. 69pp

USDA, Forest Service. *Forest Health Protection.* Web page. Date accessed February 7, 2008. Available at: http://www.fs.fed.us/r6/nr/fid/as/quad07/index.shtml

USDI, Fish and Wildlife Service. 2006. *Biological Assessment for Washington Department of Fish and Wildlife, Wildlife Restoration Grant Program, Grant W-94-D,* Division of Federal Assistance, Portland, Oregon. 26pp

Washington Department of Fish and Wildlife. 2004. *Management Recommendations for Washington's Priority Species, Volume IV: Birds***,** Washington Department of Fish and Wildlife, Olympia. 268pp

Washington Department of Fish and Wildlife. 2005s. *Lands 20/20: A Clear Vision for the Future*. Lands Division, Wildlife Management Program, Washington Department of Fish and Wildlife, Olympia. 42pp

Washington Department of Fish and Wildlife. 2005b. *Wild Turkey Management Plan*. Wildlife Program, Washington Department of Fish and Wildlife, Olympia, Washington, USA

Washington Department of Fish and Wildlife. 2006. *Sherman Creek Wildlife Area Management Plan*. Wildlife Management Program, Washington Department of Fish and Wildlife, Olympia. 40pp

Washington Department of Fish and Wildlife. 2007. *2007 Game Status and Trend Report*. Wildlife Program, Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Washington Department of Fish and Wildlife. 2008. *PHS Definitions*. Web page. Date accessed February 13, 2008. Available at: http://wdfw.wa.gov/hab/phsdef.htm

Washington Department of Natural Resources. *Washington Forest Health Issues in 2006.* Web page. Date accessed February 7, 2008. Available at: http://www.dnr.wa.gov/htdocs/rp/forhealth/2006highlights/index.html

Wiggers, E. P., and S. L. Beasom. 1986. *Characterization of sympatric or adjacent habitats of two deer species in west Texas*. J. Wildl. Manage. 50:129-134.

Wisdom, Michael J.; Alan A. Ager; Haiganoush K. Preisler; Norman J. Cimon; and Bruce K. Johnson. 2005. *Effects of Off-Road Recreation on Mule deer and Elk*. Pages 67-80 in Wisdom, M.J., technical editor. The Starkey Project: a synthesis of long-term studies of elk and mule deer. Reprinted from the 2004 Transactions of the North American Wildlife and Natural Resources Conference, Alliance Communications Group, Lawrence, Kansas, USA.

Zuluaf, Allen. 1979. Soil Conservation Service and Professor Warren A. Starr, Washington State University.

APPENDIX A--- Comment Letters

Letters received during the scoping period are presented below:

Letter #1

From: "Lee Pardini - Pardini design" <lpardini@pardinidesigngroup.com>
To: <SEPAdesk@dfw.wa.gov>
Date: Fri, Apr 4, 2008 4:44 PM
Subject: SHERMAN CREEK WILDLIFE AREA 5-YEAR HABITAT IMPROVEMENT PROJECT

Ms Teresa Eturaspe,

I own and occupy land located within the Wildlife Area. I am supportive of the logging operation and believe the Wildlife Area will be better suited to meet its mission because of the efforts being made. After reading the EA and DNS I would like to make the following comments:

1. The EA describes that once the logging operation is completed the forest floor will be burned to reduce fuel for future fires and stimulate growth of habitat for animals. The EA also says that not all of the Wildlife land will be burned. What criteria was used to determine how much and which area is to be burned. Also, what assurances are there that enough money will be set aside to guarantee that the prescribed burning will take place. The worst possible scenario is that after logging no or little burning took place thus leaving a huge amount of fuel on the floor with little stimulation of the ground for habitat growth.
2. The irregular tree cover left after logging for wildlife cover will be very important. What percentage of the logged area will be set aside as untreated density thinning.
3. The EA mentions the existence of the agricultural use within the Wildlife Area but does not adequately describe it as a determining factor in deer and elk migration patterns. The Deer and Elk are drawn to the fields each night and return home each morning. The routes they use are well identified by trails through ravines and dense brush cover. These are the routes that should be preserved to provide adequate cover to protect them from poachers on the Inchelium Highway.
4. The method of logging is described but does not address how the tops will be discarded. Will the tops of the "cut to length" logs also be limbed before being thrown to the ground. These represent large fuel sources if they are not limbed and could cause the fire to jump to trees.
5. The tree removal standards are not described. What criteria will be used to determine cutting practices. I understand that large trees will remain but what of the small trees in between. The logging operation will likely damage them. I suggest that the logger be required to remove all trees, except minor "starters",

located between the major "keeper" trees. With the price for chip wood and the need for sawdust at the power plant this should not be a hardship.
6. The logging and burning operation will impact nighthawks and marmots that are not listed in the EA. The nighthawks are only on the site during the spring and summer but do nest on the ground. The marmots live in the rocks and are not very mobile.
7. The cultural resources do not list the irrigation flume that cuts through the southern part of the Wildlife Area. This flume is believed to be agricultural and dates back to the early part of the previous century. In many places the original boards can be found laying on the ground. This flume was undoubtedly a major part of the early development of the area for non-native settlers. There are also two old spring structures that were used by early farmers.
8. My wife and I live within the Wildlife Area along with the occupants of Sherman Creek Orchards. What efforts will be made to keep us informed of logging and burning operations. Will air quality be an issue we should be concerned about? What impact, if any, will these operations have on the Orchard?

Lee Pardini, Principal
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Letter #2

April 9, 2008

SEPAdesk
Washington Department of Fish and Wildlife
600 Capital Way North
Olympia, WA 98501
SEPAdesk@dfw.wa.gov

RE: FWS/MBSP,
Sherman Creek Wildlife Area 5-Year Habitat Improvement Project

The following comments are in response to both the SEPA and NEPA documents referenced in the March 26, 2008 *Notification Letter* from WDFW announcing the public comment periods for the *Sherman Creek Wildlife Area 5-Year Habitat Improvement Project.*

Conservation NW represents over 10,000 members who are located primarily in Washington and Oregon and who depend on federal public lands to conserve biodiversity, provide ecosystem services such as clean air and clean water, and provide recreational activities such as bird watching and hiking.

On March 31, I met with several representatives of WDFW to learn more about the objectives of this project, as well as visit some of the snow-free lower-elevation harvest units with biologists Dana Base and Steve Zender to review tree marking and discuss retention levels, prescribed-fire plans, and other aspects of the prescriptions. I was provided a copy of the draft EA at that time. Based upon observations and discussions that day, and a subsequent review of the EA, Conservation Northwest provides the following comments.

Retention Levels

The marking in the areas visited on March 31 seemed, in general, to be appropriate for the ponderosa pine plant associations: The largest trees were marked for retention, ponderosa pine was favored for retention, wildlife trees were marked for retention, and the focus was clearly on removal of the smaller diameter trees. I took a few informal measurement of basal area, and came up with measurements of 40 to 65 sq. ft / acre, which is at the low end of the spectrum of what Conservation Northwest generally advocates for in ponderosa pine stands—but nonetheless, within the spectrum.

My primary concern was the lack of retention of untreated patches. Conservation Northwest is as advocate of variable-density thinning—an approach that leaves somewhere between 15 and 20 percent of each harvest unit in untreated patches. Variable density thinning facilitates the following:

- maintaining or *lifeboating* biota on a harvested site during and following logging by conserving their essential habitat
- allowing organisms to more quickly recolonize harvested sites
- modifying post-logging habitat conditions, such as microclimate, making it suitable for particular species
- facilitating the movement of organisms through the harvested area
- creation of diverse niches for animals and microbes

Attached are published studies the provide more information on variable density thinning.

An additional concern, based upon review of the EA, is the apparent lack of variation in retention densities from one plant association group to the next. While the EA states that the project area ranges in elevation from 1289 feet to 4600 feet (page 7), and that “[h]igher elevations, are characterized by increased precipitation allowing a greater variety of conifers including western larch,

Douglas fir, grand fir, Engelmann spruce and sub-alpine fir," there is nothing to indicate that post-treatment densities would vary accordingly. For example, the level of retention expressed in the tree marking in the lower elevation pine stands would be too low for higher-elevation moist sites supporting grand fir and Engelmann spruce, particularly given the indications on page 56 that "fuel loadings are primarily in Condition Class 2". Likewise, the variance in the range of spacing metrics provided on page 16 of the EA, the general statements on page 35 indicating "stand density would be reduced by 57.9%" and the statement that canopy closure would range from "40% to 42.1%" do not vary widely enough to parallel the range of plant associations present in the project area. Perhaps the moist sites are not proposed for treatment; but if that is indeed the case, there is no indication of that in the EA.

Lastly, the statement that "stand density would be reduced by 57.9%" in the absence of data on current stand densities provides little understanding of what the post-treatment densities would look like.

Hydrology

Beginning at page 62 of the EA states the following, in terms of current conditions:

> *[T]his watershed has undergone changes in the last century, including modification from fire, the construction of Highway 20, and other events that have led to increased sedimentation... Peak annual flows, as a result of rain on snow events in early winter, have produced some of the highest flows in the area over the last 60 years. Peak annual floods can also result from intensive convective thunderstorms that cause flash floods during the spring and summer. The forest canopy tends to buffer the intensity of thunderstorms at higher elevations. Peak flows are probably higher than historically, due to soil loss, compaction, timber harvest, and road construction, which cause flashier responses. This has been offset somewhat by increased canopy cover.* [Emphasis mine.]

Then, on page 64, the EA states the following, in terms of effects of Alternative 2:

> *[T]he thinning and prescribed fire would reduce snow interception by decreasing down-fuels and vegetation, reduce evapotranspiration by killing or burning grasses, shrubs and small trees, and change the timing and rate of snowmelt. Snowmelt rates are dependent on elevation and aspect. At the elevations found on the wildlife area, the snowmelt rate increases with decreases in canopy density, as would occur under this alternative, with the reduction being greatest on southerly aspects The rate of snowmelt would be affected by exposing the snow pack to rain or wind and would result in increased snow depths and increased solar radiation.*

Given that Alternative 2 would reduce stand density by nearly 60% and reduce canopy cover to approximately 40%, it is difficult to accept the following conclusion on page 64:

> *These reductions would be partially offset by increased uptake by remaining trees and vegetation. The reduction in snow-interception, evapo-transpiration and rate of snowmelt resulting from project activities should not result in any measurable increase in flows from areas being treated. The probability of a flood event occurring can be increased by increasing the runoff efficiency of a drainage by road construction, increasing the snow pack through distribution, increasing snowmelt rate through reducing canopy closure, or increasing the amount of water available by removing vegetation...*
>
> *It is not anticipated that thinning and prescribed fire treatments that change forest stand structure, reduce fuel loadings, and restore historic fire regimes on the wildlife area would significantly affect the hydrologic conditions. Proposed thinning and prescribed fire treatments would occur over a period of five years, so that only limited areas would potentially be disturbed at any one time.*

There are a number of gaps in this analysis, including but not limited to the following:

- The EA makes no indication that sediment modeling was conducted, nor is there any reference to current *Equivalent Clearcut Area* (ECA) ratings, or current cutover ratings in the project area, in spite of the acknowledgement that the watershed has been significantly altered by both human and natural disturbances.
- The assumption that a five-year window of activity would allow for only limited area of disturbance at any given time is inconsistent with any scientifically accepted definition of “greenup,” which is typically a minimum of 20 years.
- The EA makes no reference to climate change models that predict peak flows in Northeastern Washington will come earlier and be higher in the future, particularly in the rain-on-snow zone, and the extent to which this change will affect hydrology.

NATURAL FIRE REGIME

Page 55 states the following:

> *The ponderosa pine vegetation communities (i.e., dry-site forest ecosystem) on Sherman Creek Wildlife Area are “fire-dependent” and, in fact, they are “frequent fire-dependent.” This means that these plant communities and ecosystems become dysfunctional and unhealthy in the absence of frequent fire (i.e., fire return intervals of about 5-10 years). Unfortunately, fire has been excluded for nearly 100 years on the wildlife area resulting in succession being the primary disturbance. Thus, the wildlife area has*

potentially missed 10-20 fire cycles in the last 100 years, creating a relatively homogenous vegetative stands. (Emphasis mine.)

A fire-return interval of 5-10 years would unquestionably fall into Fire Regime I, which is typical for ponderosa pine plant associations. However, on page 56, the EA goes on to say that most of the project area is in Fire Regime II and III:

> *The majority of the wildlife area is in Fire Regimes II (0-35 year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced)) and III (35-100+ year frequency and mixed severity (less than 75% of the dominant overstory vegetation replaced))...*

This raises the following questions:

- Is most of the wildlife area something other than ponderosa pine plant associations (Regime I)? If so, why does the EA focus almost exclusively on treatment of ponderosa pine stands?
- Are stands in Fire Regimes II and III also being thinned? If so, the EA lacks information on the historic and current conditions of these stands, which have been far less affected by fire suppression, having missed only 1 to 3 fire cycles as compared to the "10-20 fire cycles" the EA indicates the ponderosa pine stands have missed. And if stands in Regimes II and III will be subjected to a nearly 60% reduction in density, the post-treatment condition will not parallel natural conditions in these more moist stands.

PRESCRIBED FIRE AND SLASH

The EA states the following in regards to prescribed fire and treatment of slash:

1. *Under the Proposed Action (Alternative 2), WDFW would remove trees through a cut-to-length ground-based logging system from approximately 4,000 acres. Approximately 600-1,200 acres of prescribed fire is proposed to reduce accumulations of forest fuels.* (Page 2)
2. *In addition, prescribed fire would be used to improve the health of remaining timber stands.* (Page 10)
3. *Prescribed fire would produce a low intensity burn with typically less than 4 foot flame lengths* (Page 17)
4. *Trees would be cut to length on site with the limbs and tops left on site to stabilize soils and reduce runoff* (Page 16)
5. *Burn the resulting slash to improve regeneration of fire-dependent species for browse.* (Page 10)

This raises the following questions:

- If CTL, ground-based logging will occur on 4,000 acres and prescribed fire will occur on only 600-1200 acres (and, according to #2 above, not all of these acres of prescribed fire will necessarily occur on stands that were

thinned), how will slash be treated on the commercially thinned acres that are not burned following treatment?

- Will slash be piled before burning, or lopped and scattered and then underburned. If it is the former, the stands will not be receive the benefits of mimicked natural fire as described in the EA.
- Does the 4-foot flame referenced in #3 above apply to stands burned following treatment, or to unthinned stands? Would flame lengths be this short even if slash resulting from CTL logging are underburned following treatment?
- Both #4 and #5 above cannot both be true for all stands at the same time. It is not possible to leave the slash on site for erosion control and burn it at the same time. What is the breakdown between acres to be treated as per #4 and acres to be treated as per #5? To what extent and for what period of time will the risk of uncharacteristically intense fire actually increase under #4?

Additionally, since prescribed fire does not produce a commercial product to pay for itself, and since the EA does not provide any certainty that prescribed fire will actually take place, residents in the immediate area are concerned that slash will ultimately remain untreated, leaving hazardous fuels on site as well as negatively affecting scenic quality of treated stands. WDFW needs to address these concerns and provide certainty that appropriate treatment of slash is funded in advance and will actually take place.

SUMMARY

Many of the above concerns are based on lack of data in the EA and seemingly conflicting statement in the EA. Conservation Northwest is hopeful that answers to questions, clarifications of confusing statements, and the provision of data from analyses conducted in preparation for the EA will mitigate or reduce these concerns.

In addition, concerns about commercial thinning prescriptions would be significantly reduced by the following changes:

- The use of variable density thinning, resulting in the retention of 15-20% of commercial thinning units in untreated patches. This change need not significantly affect volume, because in many cases the patches most critical to retain are comprised of smaller trees and understory components that provide refugia and habitat for wildlife. Conservation Northwest has considerable knowledge of variable density thinning (we have a forester on staff who has worked with the USFS in writing and testing prescriptions in pilot projects on USFS land) and would be pleased to work with WDFW staff in implementing variable density thinning in the Sherman Creek project. We encourage the WDFW to be a leader in implementing this approach to thinning that greatly facilitates that

maintenance of biodiversity as we attempt to use mechanical treatments to restore fire-suppressed forests. It will be easier for other public land agencies to follow, if WDFW (with a primary objective being to protect and enhance wildlife habitat) leads.

- The infusion of more variance in retention levels to parallel variances in plant associations of stands that will be commercially thinned.
- Increased application of understory burning following commercial thinning in dry stands.
- Increased certainty that funding will be set aside for prescribed fire.
- A clear, comprehensive slash-treatment plan for stands where it does not make ecological or social sense to treat with prescribed fire following thinning.

Conservation Northwest is eager to work with the WDFW to improve (and thus be able to fully support) this project. Please feel free to contact me at any time in this regard.

Sincerely,

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