United States Department of Agriculture

Forest Service
Pacific Northwest Region

ENVIRONMENTAL ASSESSMENT

WESTERN ROUTE VEGETATIVE MANAGEMENT

May 2004

Umatilla National Forest
North Fork John Day Ranger District

Grant, Morrow, Umatilla County, Oregon

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CHAPTER I – PURPOSE AND NEED

DOCUMENT STRUCTURE

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. The document is organized into five parts:

- Purpose and Need: This section includes a brief description of the area, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need.
- 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 measures to mitigate resource concerns. It also details how the Forest Service informed the public of the proposal and how the public responded. A summary table comparing the predicted environmental consequences of each option considered is provided at the end.
- Environmental Consequences: This section describes the existing resource conditions and the potential direct, indirect, and cumulative environmental effects of implementing the proposed action and its alternatives.
- Supporting Information: This section provides a list of persons, organizations, and agencies consulted during the development of the environmental assessment, preparers and contributers to the assessment, and a bibliography.
- Appendices: The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the North Fork John Day Ranger District Office in Ukiah, Oregon.

BACKGROUND

The Western Route Analysis Area lies approximately 15 miles west of Ukiah, along the western edge of the Ranger District (See Maps 1 and 2 in Appendix C). A legal description of the area is T.4S. R.29E. sections 22-36; T.4S. R.30E. sections 19-22 and 27-34; T.5S. R.29E. sections 1-5, 9-12, 13-15, and 24-25; T.5S. R.30E. sections 4-9, 16-21, and 27-35; T.5S. R.31E. Section 31, and T.6S. R.31E. sections 4-9. The analysis area includes the Upper and Lower Fivemile Creek subwatersheds, which drain into the North Fork John Day River via Camas Creek.

Topography is generally rolling, with an average of 10 percent slope; elevations range from 4,000 to 5,800 feet. Vegetation is primarily dry, upland forest occurring on western and southern aspects (15,610 acres), with the remainder being cold, upland forest (5,620 acres) and moist upland forest (4,680).

Areas of interest include a portion of the Blue Mountain National Scenic Byway, which traverses the northern end of the analysis area. The analysis area is also part of Oregon Department of Fish and Wildlife's Heppner Management Unit for big game and the southern portion of the analysis area is within big game winter range. There are no inventoried roadless areas or wilderness. Table 1 shows the land ownerships within the analysis area.

Table 1. Land Ownership within the Western Route Analysis Area

	Analysis Area	
Ownership	**Acres**	**%**
USDA Forest Service	26,672	82
State of Oregon.	72	<1
Total Private	5,580	18
Total Analysis Area	**32,324**	

PURPOSE OF AND NEED FOR ACTION

The purpose of the Western Route Vegetative Management projects is to improve vigor, health, and fire resistance in upland forests that are outside their historic, pre-fire-exclusion conditions for species composition, structural diversity, stocking densities, and fuel loads. The needs associated with this purpose are further detailed below.

Approximately two-thirds of the Western Route analysis area is defined as a Dry, Upland Forest type based on site conditions that would provide the appropriate temperature, moisture, and soil-type for this forest type (Forest Composite Vegetation Database - Powell, 2001). Historical disturbance patterns of frequent, low-intensity fire resulted in a predominance of ponderosa pine, western larch and (to a lesser extent) Douglas-fir on these sites (Camas Ecosystem Analysis, Silviculture Report, and Forest Composite database). However, a century of fire exclusion has allowed shade-tolerant fir to grow in underneath the once-open canopies, outcompeting the ponderosa pine and western larch for light and moisture (Camas Ecosystem Analysis, USDA 1995a). Past harvest accelerated this shift by removing more of the ponderosa pine and larch than other species. As a result, current stands on these sites contain much more Douglas-fir, grand fir, and lodgepole pine than they did when frequent, low intensity fires were common (Agee 1994).

- There is a need to return Dry, Upland Forests in the Western Route Analysis Area to early successional species to reduce potential for large-scale insect and disease outbreaks and maintain long-term stand integrity (Forest Plan, 4-66, 4-73; Camas Ecosystem Analysis page 122)

Changes in stand composition are a direct driver in changes in stand structure. Stand structures in the warm, dry plant associations have changed from historic conditions of open, well-spaced large trees with sparse regeneration (essentially two

layers of trees), to current conditions of stands with semi or closed canopies of smaller trees with occasional large trees and abundant regeneration in the understories (multi-layered)(Hessburg et. al. 1999). For instance, it is estimated that old, single-storied structure on Dry, Upland Forest types historically covered between 15-55 percent of the landscape, while old, multi-storied, structure covered a range of 5-20 percent (Blackwood 1998). Current structure has shifted so that only 1 percent of the Dry, Upland Forest within the landscape now contains old, single-storied structure and 22 percent contains old, multi-storied structure. In fact, 42 percent of the Dry, Upland Forest is currently in the stem exclusion open canopy structure class (understory growth is limited by moisture availability), which historically ranged from 5 to 20 percent (Silviculture Report). This shift has changed conditions not only for vegetative species, but also for other species that rely on the open stands of pine, such as white-headed woodpecker.

- There is a need to increase the amount of old, single-storied structure in the Western Route Analysis Area from its current 1 percent toward a desired condition of 15 to 55 percent (Forest Plan, Eastside Screens, and implementation letter 1998, Camas Ecosystem Analysis pages 122 and 126).

The shift in stand species and structure has also affected aspen stands. Aspen stands not only provide a unique component in the landscape's diversity, but are valued for their aesthetic qualities along the Blue Mountain Scenic Byway and in the forest as a whole. At one time, aspen were abundant in the Blue Mountains, however, they have declined in numbers due to fire exclusion, an increase in elk and livestock (Shirley and Erickson, 2001). Aspen now only occur in small clumps or as individual trees interspersed with conifers. Presently, all stands within the Western Route Analysis Area either have the capability or are reproducing well, however aspen trees are a short-lived species (~120 years) and the trees in this area are reaching the end of their life cycle with few young trees to replace them. The continuing conifer encroachment into these stands will eventually outcompete the aspen for water, nutrients and sunlight, contributing to their further decline.

- There is a need to remove most conifer species from aspen stands across the Western Route Analysis Area to sustain this unique vegetation feature in the future (Forest Plan page 4-74, Camas Ecosystem Analysis page 126).

About 62 percent of all forest stands within the analysis area are classified as "overstocked"[1] (Forest Composite database-Powell 2001). This means there are more trees in the stand than the site can support for optimum health. Trees in overstocked stands (in all potential vegetation groups) tend to be stressed by competition for light and water, which slows their growth and makes them more susceptible to insects and disease (Powell 1999). Insects and disease have been more prevalent in overstocked stands due to the stress caused by competition for water, nutrients, and light. A variety of insect and disease damage is currently evident as individual, weak trees succumb to infestation. Many stands within the

[1] The numbers of trees within a stand is called "stocking

project area were heavily impacted by spruce budworm in the late '80's/early '90's (particularly cool grand fir stand types), and remain in poor health. A number of large, old ponderosa pine are currently at risk of insect attack (primarily from bark beetles) because their large root systems require greater growing space to maintain tree health. Annosus root disease appears to be on an upswing (Schmitt 2002) and is causing noticeable mortality in the grand fir throughout the analysis area. Annosus and other root rots tend to be specific to certain tree species and so will continue to spread and cause mortality as long as the host tree species is present. Some stands with heavy mortality lack an understory due to a lack of seed.

- There is a need to reduce the amount of lands classified as overstocked across the Western Route Analysis Area to reduce the insect and disease risk (Forest Plan, page 4-71).
- There is a need to remove dead trees and susceptible species from about 600 acres of root rot or insect-infested stands in the Western Route Analysis Area to restore a healthy forest on these sites.

The increased stand densities and tree mortality have consequently resulted in increased fuel loads and continuity. Dry, upland forests historically exhibited low fuel loads with more breaks between stands of trees. Field observations in 2003 using the Photo Series for Quantifying Fuels (USDA 1976a, 1976b, 1980, 1981) revealed an estimated 40+ tons per acre in the northern part of the analysis area (Cold Upland and Moist Upland Forests) and an average of 25 tons per acre in the southern portion (Dry, Upland forest). Also, multi-canopied stands provide a ladder for fire to move from the ground into the canopy of the forest, which tends to increase the severity of fires, causing a higher level of tree mortality.

- There is a need to reduce fuel loading across the Western Route Analysis Area from 20 to 80 tons per acre toward a desired condition of 9 to 12 tons per acre to reduce the risk of stand mortality when fire occurs (Forest Plan, 4-110, 4-149, 4-161, and 4-185).

About 10,314 acres of the Western Route Analysis Area has been allocated by the Forest Plan to C4-Wildlife Habitat. The goal of this allocation is to "*manage forest lands to provide high levels of potential habitat effectiveness for big game and other wildlife species with emphasis on size and distribution of habitat components (forage and cover areas for elk…*" (Forest Plan page 4-158). Another 12,311 acres of the analysis area has been allocated to E2-Timber and Big Game. The goal of E2 is to "*manage forest lands to emphasize production of wood fiber (timber), encourage forage production, and maintain a moderate level of big game and other wildlife habitat"* (Forest Plan page 4-182). Field reconnaissance revealed that approximately 2,470 acres of C4 and 3,750 acres of E2 need to be thinned or converted to insect/disease resistant tree species to maintain the future health of the stands and associated wildlife cover.

While satisfactory cover currently exists on 32 percent of the C4 in this area (the Forest Plan calls for a minimum of 15 percent), the Habitat Effectiveness Index is 59 (north of Forest Road 53) and 46 (south of Road 53). This is below the Forest Plan standard of no less than 60 in C4. In E2, the Habitat Effectiveness Index is 52,

which is above the Forest Plan minimum standard of 45. However, satisfactory cover, currently at 10.4 percent for E2, is near the minimum identified in the Forest Plan standard (10 percent). Removal of trees from the canopy could convert satisfactory cover to marginal, and existing marginal cover to forage. This could further reduce the Habitat Effectiveness Index in C4 and the satisfactory cover in E2, which would not be consistent with the Forest Plan.

- There is a need to amend the Forest Plan to achieve the species composition, structural diversity, stand density, and fuels reduction needs in the C4 and E2 portions of the Western Route Analysis Area.

PROPOSED ACTION

To fulfill the above purpose and needs, the North Fork John Day Ranger District proposes to treat approximately 6,484 acres as follows (see Map 3 in Appendix C):

- 4,133 acres of commercial thinning (including 20 acres of conifer removal from aspen stands)
- 5,901 acres of non-commercial thinning (overlaps with much of the commercial thinning and 76 acres of salvage harvest)
- 659 acres of regeneration harvest (shelterwood, seedtree, sanitation, and salvage)

Thinning and harvest would be conducted using chainsaws or ground-based equipment, and would involve a mixture of non-commercial and commercial-sized trees. Thinning would leave a fully stocked stand, while shelterwood, seedtree, sanitation, and salvage prescriptions would not. Where stocking is deficient, seedlings would be planted. Thinned material that is merchantable would be sold, producing an estimated volume of 4,600 hundred cubic feet (Ccf).

No permanent or temporary road would be constructed to access sites, but approximately 25 miles of existing closed roads would be opened for the duration of harvest activities. Opening would involve removal of closure devices and blading as necessary. Upon completion of harvest activity, such roads would once again be closed.

The Forest Plan would be amended to waive the cover and HEI standards in the C4 management area for the duration of this project. The proposed action would be implemented as early as the summer of 2004.

Activities that would occur concurrently or in association with thinning include (see Chapter 2 for further details):

- Maintenance of existing roads as necessary to conduct harvest
- Mechanical treatment of debris (i.e. grapple piling, skidding, chipping)
- Prescribed burning of debris
- Planting of tree seedlings
- Control of damage to planted seedlings by animals using Vexar® tubing and gopher trapping)

TIERING AND INCORPORATION BY REFERENCE

Some material in this Environmental Assessment (EA) tiers to or incorporates by reference information from other existing documents, in order to avoid redundancy and to decrease the size of this document.

This EA documents the site-specific implementation of the Forest Plan. As a result, it is tiered to the *Umatilla National Forest Land and Resource Management Plan Final Environmental Impact Statement, Record of Decision*, and the accompanying *Land and Resource Management Plan* (USDA 1990), dated June 11, 1990. This includes the clarifying direction of Plan Amendment #8, *Continuation of Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales* (Eastside Screens) dated May 20, 1994; and Plan Amendment #10, *The Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California* (PACFISH) dated February 24, 1995. The Eastside Screens established additional management direction regarding riparian area buffers, structural diversity, connectivity of late/old structure, retention of snags and downed wood, and goshawk nest-sites. PacFish provided further protection for fish habitat, particularly regarding activities within riparian areas.

This EA also incorporates by reference the following:

- Umatilla National Forest Interim Snag Guidance letter dated April, 1993 (which provides direction on the number and distribution of snags to retain in harvest units);
- Environmental Assessment for the Management of Noxious Weeds and its Decision Notice dated May 24, 1995 (which identifies prevention and appropriate treatment methods for known noxious weed populations);
- Environmental Assessment for the North Fork John Day Motorized Access and Travel Management Program and its Decision Notice dated June 5, 1990 (which provides District-wide direction on the management of roads and OHV trails, both open and closed)
- Camas Ecosystem Analysis (which is a watershed-level ecosystem analysis of current and reference conditions, along with recommendations for restoration)
- The Biological Assessment for Columbia River bull trout, Mid-Columbia steelhead trout, Steelhead trout proposed critical habitat, Snake River fall Chinook salmon proposed critical habitat, and westslope cutthroat trout for Ongoing and Proposed Activities in the North Fork John Day River Sub-Basin and its associated Biological Opinions. The biological assessment described ongoing and proposed actions in the North Fork John Day River subbasin, the environmental baseline, and the potential effects of those actions on the fish species. The biological opinions and letters of concurrence were the responses of regulatory agencies (USDI Fish and Wildlife Service and National Marine Fisheries Service) to complete consultation.

- Other sources of information cited in this EA and its analysis file, such as specialist reports, published studies, and books. The analysis file is available for review at the North Fork John Day Ranger District, Main Street (Highway 244), Ukiah, Oregon, 97880.

MANAGEMENT DIRECTION

Analysis and documentation has been done according to direction contained in the *National Forest Management Act* (NFMA), the *National Environmental Policy Act* (NEPA), the *Council on Environmental Quality regulations*, *Clean Water Act*, *Clean Air Act*, *National Historic Preservation Act*, and the *Endangered Species Act*.

The Umatilla National Forest Land and Resource Management Plan (Forest Plan) provides programmatic direction for the Forest, including the Western Route Analysis Area. The Forest Plan does this by allocating parts of the Forest to different resource emphasis areas or "management areas", and prescribing the type and intensity of management that may occur within each allocation. These areas are shown on Map 4 in Appendix C. Relevant portions of the Forest Plan are summarized below and Standards and Guidelines will be discussed in Chapter 3.

Table 2 shows the management areas that occur within the National Forest portion of the Western Route analysis area. The proposed action would occur within three of these management areas: A4 – Viewshed 2, C4 – Wildlife Habitat, and E2 – Timber and Big Game (compare Map 3 and Map 4 in Appendix C). It would also treat 20 acres of Riparian Habitat Conservation Areas identified through Forest Plan Amendment #8.

Table 2. Management Areas within the Western Route Analysis Area

Forest Plan Management Areas	Mgt. Area (acres)
A4 – Viewshed 2	824
C1 – Dedicated Old Growth	1,023
C2 – Managed Old Growth	304
C3 – Big Game Winter Range	290
C4 – Wildlife Habitat	10,314
C5 – Riparian	1,605
E2 – Timber and Big Game	12,311

STANDARDS AND GUIDELINES

The proposed action would follow the Standards and Guidelines for the following management areas as defined in the Forest Plan:

A4 – Viewshed 2 (Forest Plan, pages 4-105 through 110): The goal is to "*manage the area seen from a travel route…where some forest visitors have a major concern for the scenic qualities (Sensitivity Level 2) as a natural appearing to slightly altered landscape."*

Standards and Guidelines allow "*all timber management practices and intensities* [that are] *consistent with achieving the primary visual quality goals. Uneven-aged management is the preferred…silvicultural system in the foreground; even-aged management techniques may also be used to meet objectives. Both systems are available in the middle and background zones. Scheduling of treatments and timber harvest, logging systems, debris disposal, reforestation, and stand improvement practices will be designed and implemented to accomplish visual management objectives. Manage the viewshed for an overall mix of size classes of trees…Emphasis will be on viewing large diameter trees and multi-age stands; both vertical and horizontal diversity will also be emphasized. New roads…will be permitted and will be designed and constructed to meet the partial retention and modification visual quality objectives.*

Visual Quality Objective will generally be Partial Retention in the foreground and Modification in the middleground…Landscapes containing negative visual elements will be rehabilitated. Landscapes will be enhanced by opening views to distant peaks, unique rock forms, unusual vegetation, or other features of interest…Maximum even-aged opening that can be created is 5 acres in the foreground and 10 acres in the middleground. The maximum percent of the travel corridor that can be in a created opening at one time is 10 percent in the foreground and 20 percent in the middleground.

Fuel treatments in foreground areas should be planned, timed, and implemented to avoid being highly visible and to minimize adverse visual effects. In foreground areas, slash and damaged unmerchantable trees will be treated to a higher standard that in the middle ground and background. Within 200 to 300 feet of observers, handpiling, hauling material away, utilizing it for fuelwood, etc. are methods preferable to machine piling and crushing. Treatment should be completed prior to the next high human-use period. Prescribed low intensity fire with minimal scorch is acceptable in the partial retention area. In the partial retention area, a 1 year or less recovery period is most desirable, if conditions are suitable."

C4 – Wildlife Habitat (Forest Plan, pages 4-158 through 162): The goal is to *"manage forest lands to provide high levels of potential habitat effectiveness for big game and other wildlife species with emphasis on size and distribution of habitat components (forage and cover areas for elk, and snags and dead and down materials for all cavity users). Unique wildlife habitats and key use areas will be retained or protected."*

Standards and Guidelines allow *"all timber management practices and intensities* [that are] *consistent with achieving the primary wildlife habitat management goals…Harvest practices may include clearcutting, shelterwood, salvage, removal, and commercial thinnings, as well as group or individual tree selection. Other cultural practices may be used including natural and artificial regeneration,… release, precommercial thinning, and insect, disease, and animal damage protection. Road construction, reconstruction, and maintenance are permitted, consistent with the primary overall objective of*

wildlife habitat management. Roads will be limited to minimum standards necessary for timber harvesting. Roads will be closed upon completion of harvest activities or when open timber sales are inactive.

Elk habitat will be managed to achieve a habitat effectiveness index of no less than 60…measured on a subwatershed (allocation zone) basis. A minimum of 15 percent of the area will be managed as satisfactory cover…

Fuels should not exceed an average of 12 tons per acre in the 0- to 3-inch size class. All types of prescribed fire may be used…"

E2 – Timber and Big Game (Forest Plan, pages 4-182 through 186): The goal is to *"manage forest lands to emphasize production of wood fiber (timber), encourage forage production, and maintain a moderate level of big game and other wildlife habitat."*

Standards and Guidelines allow *"all timber management practices and intensities. Even-aged silviculture will be the most commonly used silvicultural system in the mixed conifer, associated species, and lodgepole pine plant communities. Uneven-aged management would be the preferred silvicultural system in ponderosa pine and mixed pine-Douglas –fir plant communities. Uneven-aged management may also be used where necessary to meet management goals. The following practices may be employed: site preparation,…reforestation, protection of growing stock from animals, insects, and disease; release…,precommercial thinning;…commercial thinning; salvage of mortality as needed; and…shelterwood, seed tree, clearcut,…individual tree, and group selection.*

Elk habitat will be managed to achieve a habitat effectiveness index of no less than 45…measured on a subwatershed (allocation zone) basis. A minimum of 10 percent of the area will be managed as satisfactory cover…

Fuels should not exceed an average of 9 tons per acre in the 0- to 3-inch size class… All methods of fuel treatment are appropriate. Utilization of wood residues should be encouraged in order to reduce fuel loadings. When treatment is needed to meet resource objectives, prescribed fire is preferred in fire-dependent ecosystems …"

DESIRED FUTURE CONDITIONS

The Forest Plan identifies desired future conditions for each management area to serve as a guide of what the forest should look like at the end of 10 years and at the end of 50 years, given full implementation of Forest Plan direction:

A4 – Viewshed 2 (Forest Plan, page 4-105 and 106): "*Viewsheds will be managed primarily to meet the visual quality objectives of partial retention and modification. An attractive, near natural landscape will be maintained or created. A maximum of three distance zones for each viewshed including foreground, middleground, and background radiating from the viewer position (and a visual quality objective for each zone) have been delineated according to the process defined in the Agriculture Handbook 462, 'National Forest*

Landscape Management;' Vol. 2, Chap. 1, The Visual Management System (USDA Forest Service 1974).

Management activities will be done with sensitivity to people's concern for scenic quality (Level 2), with vegetative manipulation conducted so that Forest management activities remain visually subordinate in foregrounds of selected travel routes and sites. Management activities will be obvious in the middleground and background viewing area, but designed to compliment their surroundings. Forest stands will occasionally be logged in order to maintain long-term health and vigor, and to encourage a park-like, near natural appearance with big trees in the immediate foreground. Recreation opportunities will be mostly road oriented."

C4 – Wildlife Habitat (Forest Plan, pages 4-158): *The Forest will be a mosaic of even-aged and uneven-aged stands dispersed in a manner to create a pattern of forage, and marginal and satisfactory cover for big game. Management activities including timber harvest, prescribed fire, tree planting, and thinning will be readily apparent. Created openings will range from 1-2 acres up to 40 acres (generally 20 to 30 acres) in size. At least 15 percent of the area will be maintained as satisfactory cover, which will appear as stands of trees larger than 10 acres in size, with crown closures of 70 percent or more. An additional 15 to 25 percent of the area will be maintained as marginal cover with crown closures of 40 to 69 percent, and generally capable of obscuring 90 percent of a standing elk at a distance of 200 feet or less. Stands managed using uneven-aged practices will also be apparent. Through the use of both even-aged and uneven-aged silvicultural treatments, horizontal and vertical diversity of timber stands will be maintained, providing habitat for a wide variety of wildlife species.*

A variety of native and seeded grasses, sedges, forbs, and shrubs will be available for big game, other wildlife, and domestic livestock. Range and timber management practices will result in improved range condition and increased amounts of available forage.

Emphasis will be apparent on managing roads, providing security for big game, protecting important calving and fawning areas, and providing for a quality hunting experience. Road closures and other management techniques will result in a noticeable amount of travel restrictions across the area. Dispersed recreation opportunities of all types will be available, but motorized access may be limited. As a result of management, quality big game and other wildlife habitat will assist in meeting state wildlife agency population and productivity goals and Forest recreation objectives.

E2 – Timber and Big Game (Forest Plan, page 4-182): *"Management of forests for timber production, domestic livestock, big game, and other wildlife habitat will be apparent. Forests will contain a mosaic of even-aged and uneven-aged stands dispersed in a manner creating patterns of tree cover for big game and openings providing forage. Created openings will range from 1-3 acres up to 40 acres, but will often be 20-30 acres in size. Horizontal and vertical diversity will be apparent; tree species will be diverse, but seral, more pest-free species*

such as ponderosa pine, western larch, and lodgepole pine will predominate. Accumulated fuels will be generally light, and large destructive fires will seldom occur. Prescribe fire will continue to be an important management tool.

A variety of native and seeded grasses, sedges, forbs, and shrubs will be available for big game, other wildlife, and domestic livestock. Range and timber management practices will result in improved range condition and increased amounts of available forage for both big game and domestic livestock. Dispersed recreation opportunities of all types will be available for a variety of users. However, management of roads will result in a noticeable amount of travel restrictions in some areas."

DECISIONS TO BE MADE

If an alternative requiring a Forest Plan amendment is selected, Jeff Blackwood, Umatilla National Forest Supervisor will be the deciding official. For alternatives not requiring a Forest Plan amendment, Craig Smith-Dixon, North Fork John Day District Ranger will serve as the deciding official. The deciding official will decide whether to implement the proposed action, another action alternative, or the no action alternative, and his decision will be based on the following criteria:

• Forest stand stocking levels	Which alternative best achieves the desired stocking levels identified for dry upland forests?
• Short-term and Long-term risks	Which alternative best balances short-term risk of resource impacts from thinning and harvest with the long-term risk of resource impacts from doing nothing?
• Fuel Loads	Which alternative decreases fuel loads to the point of lessening the risk of lethal wildfire?
• Timber Value	Which alternative maximizes the recoverable value of timber?

If implementation is chosen, the District Ranger will also determine:

- Whether a Forest Plan amendment is necessary
- What, if any, measures are needed to mitigate potential undesired effects
- What monitoring requirements are needed to assure the selected alternative and mitigation are implemented as designed and effective.

CHAPTER II - ALTERNATIVES

This chapter describes in detail and compares the Proposed Action, No Action, and two alternative ways to manage forest vegetation in the Western Route Analysis Area. A team of resource specialists ("Interdisciplinary Team"—see Chapter 4, List of Preparers) developed these alternatives within the framework of the Forest Plan and applicable laws. These alternatives were designed to address or resolve the significant issues identified through public involvement and cause/effect analysis. A key design requirement of each action alternative was that it had to respond to the purpose and need for the project (identified in Chapter 1). This chapter is divided into the following sections:

- Issues and Public Involvement
- Alternative Development Process (including a description of each alternative considered)
- Potential Knutsen-Vandenburg Projects
- Comparison of the Alternatives

ISSUES & PUBLIC INVOLVEMENT

Issues are points of discussion, debate, or dispute about environmental effects that could occur as a result of the proposed action. It is these *potential* environmental effects, particularly potential negative effects, through which issues provide focus and influence alternative development, including development of mitigation measures. Issues are also used to display differing effects between the proposed action and its alternatives regarding a specific resource (i.e. water, vegetation, wildlife, etc.). A summary of these effects is presented at the end of this chapter, with a more detailed discussion in Chapter 3, Environmental Consequences.

The Forest Service encourages public involvement in the identification of issues and development of alternatives through a process called "scoping". During scoping, a description of this project's purpose and need and proposed action was distributed to the public through letters, personal contact, the Forest's Schedule of Proposed actions, and other methods. The public was invited to comment on the potential conflicts posed by the proposed action. These comments were then used to identify issues, alternatives to the proposed action, and the extent of environmental analysis necessary for making an informed decision.

Scoping for this EA was initiated when the project was listed in the Winter 2003 quarterly edition of the Umatilla National Forest Schedule of Proposed Activities. Scoping letters were sent on July 23, 2003 to three local Tribes and 108

organizations, individuals, and other agencies that had indicated an interest in this type of project. These efforts produced responses from the following:

- John Edmundson, local resident
- Olney Patt, Jr., Columbia River Inter-Tribal Fish Commission
- Charles Burley, American Forest Resource Council

Comments were evaluated as to whether they presented an issue or alternative, indicated how to conduct analysis, referenced pertinent research, or provided an opinion. This evaluation is contained in the project analysis file at the North Fork John Day Ranger District, along with the original letters.

Since public response was so small, the Interdisciplinary Team considered potential issues not identified by the public. This was done by first identifying all the activities connected to accomplishing the proposed action. Then the team identified potential cause/effect relationships associated with each type of action that could result in resource conflicts, relying in part on public comments from previous, similar projects (see meeting notes from October 1, 2003 in the project analysis file for further detail). The interdisciplinary team considered these potential conflicts or issues, together with those identified during scoping, to determine whether the issue was addressed under existing direction, whether it could be mitigated, whether it required development of an alternative to the proposed action, or whether it was beyond the scope of this project. These issues are discussed below:

- The proposed vegetative manipulation could harm listed fish species within Fivemile Creek and downstream in Camas Creek. Cursory research [by Columbia Inter-Tribal Fish Commission] indicates summer steelhead (Threatened) spawn and rear in at least the lower 13 miles of Fivemile Creek, as well as parts of it's tributaries; Redband Trout can be found all the way up the system; these two plus spring Chinook also utilize Camas Creek below.

  There has been an impassible barrier to steelhead since the fish ladder near the mouth of Fivemile Creek began to fail in 1999. Cumulative effects on fish downstream will be considered, but IDT did not feel this was a key issue because T & E fish no longer occupy this area and anticipated activities would be low in magnitude of disturbance and outside of RHCAs for the most part.

- The proposed vegetative manipulation is too limited by only addressing vegetative issues; a wide range of alternatives is needed to explore the need and opportunity for watershed restoration activities (such as road removal, culvert replacement, and other watershed restoration efforts).

  This is beyond the purpose and need and, therefore, scope of this project. The Decision-maker was very specific that actions focus on vegetative need only. Also Regional Office has issued a directive to avoid "Big Gulp" projects that contain a variety of unconnected actions because these types of projects are difficult to adequately analyze.

- The proposed vegetative manipulation could cumulatively effect the riparian and stream environment, particularly when coupled with the Tower Fire Recovery Projects (along Camas Creek upstream of the Western Route project)

  Tower Fire Recovery Projects occur about 20 miles upstream of this proposed project, so extent of cumulative effects unlikely. This distance, couple with the fact that little timber harvest will occur in the Tower Fire area indicate that magnitude of cumulative effects would be small, if any. Cumulative effects will be tracked through analysis, but this is not a key issue.

- The proposed action could limit Treaty Rights (rights to fish, hunt and gather forest products), both on and off project locations, for the Confederated Tribes of the Umatilla Indian Reservation and Confederated Tribes of the Warm Springs Reservation of Oregon.

  Past correspondence with the Confederated Tribes of the Umatilla Indian Reservation on other similar projects has revealed a strong concern regarding impacts to the exercise of their treaty rights. This proposed project has the potential to affect fish habitat, water quality, big game habitat, and historic properties. This issue is considered in several locations under the following headings: Fish Habitat, Water, Wildlife Habitat (specifically the subheadings of Big Game Habitat, Threatened, Endangered, and Sensitive Species, and Species of Concern), Treaty Rights, and Cultural Resources.

ISSUES RELATED TO BIOPHYSICAL RESOURCES

Future Fire Severity

The Purpose and Need established fuel reduction needs relating to fuel loads, vertical continuity, and horizontal continuity. In addition the proposed thinning could add another 10 to 20+ tons of fuel per acre when existing fuel loads are already well above the Forest Plan guideline. Treatment of thinning debris usually occurs within three years of its creation, however, until fuels are treated the risk of a severe fire that would kill most trees and damage soils would be high. Also, reducing the tree canopy would allow more sunlight to reach the forest floor increasing the amount of flashy fuels (grass) that contribute to a high rate of fire spread. However, after fuel treatment the rate of spread would not be as damaging, since the longer burning fuels that lead to more severe effects on the ground would be gone. This rate of spread would mimic historic rates of spread experienced in dry, open pine stands. Duration of this condition would be about 30 years until the tree canopy closes.

Big Game Cover

Thinning and associated burning of debris can decrease the density of the canopy, converting satisfactory cover to marginal cover or marginal cover to forage if enough of the canopy is removed. The Proposed Action would amend the Forest Plan to

change Forest Plan standards for satisfactory cover in E2 and HEI in C4. Other options may exist to address the purpose and need while maintaining existing levels of satisfactory cover and HEI.

Snag and Down Wood Habitat

About 65 percent the entire Western Route Analysis Area has been harvested in the past. As a result, large snags and down wood are not available in large quantities. However, a spruce budworm epidemic in the 1980's created many smaller snags and down wood. Timber harvest and fuels treatments (including burning) would have the potential to further reduce this habitat type, perhaps below levels needed to sustain some wildlife species.

Late/Old Structure Habitat Connectivity

Past harvest, other treatments, and insect/disease epidemics have reduced the amount of Late Old Structure habitat as well as reduced the connective corridors between Late Old Structure stands.

Species of Interest

Proposed treatments could reduce habitat for species of interest like the Northern goshawk. Also, application of fire often occurs in the spring because the cool temperatures and moisture aid in fire control. This is also a time when birds nest, and nesting birds could be disturbed or killed by burning activities, particularly neotropical migratory birds which are protected under the Neotropical Migratory Bird Treaty Act.

Soils and Water

Proposed use of ground-based equipment and burning of activity debris can expose soil to erosion and other disturbances, including compaction. Proposed activities could combine with past and predicted future activities (including past timber harvest, roads, and livestock grazing and an ongoing headwater diversion) to influence stream flows, sediment, and water temperaturesin the Fivemile Creek drainage. In particular, proposed treatment of aspen stands could increase the potential for sediment to enter Fivemile Creek and its tributaries. Fivemile Creek and Camas Creek are currently listed by the State of Oregon as water quality limited for temperature (1998 and 2002 303(d) lists).

Fish Habitat

"The Columbia River Inter-Tribal Fish Commission is very concerned about any potential impacts to anadromous fish stocks arising from activities such as grazing, logging, and/or road building on national forests. All of these activities have the potential to damage anadromous fish habitat thereby further harming salmon populations that can no longer tolerate additional impacts…In addition, the Forest

should refer to Wy-Kan-Us-Mi Wy-Kish-Wit, The Columbia River Anadromous Fish Restoration Plan of the Nez Perce, Umatilla, Warm Springs, and Yakama Tribes." (Columbia River Inter-Tribal Fish Commission) There are two species of salmonids that use streams within the Western Route Analysis Area: steelhead and redband trout Steelhead have been listed as a Threatened species under the Endangered Species Act.

Threatened, Endangered, Proposed, and Sensitive Species

The proposed action would change the composition and structure of wildlife and plant habitat within the Western Route Analysis Area, which could affect Threatened, Endangered, Proposed, or Sensitive species. Based on local studies, surveys and monitoring, as well as published literature regarding distribution and habitat use, the following Threatened, Endangered, Proposed, or Sensitive species have the potential to occur in or adjacent to the analysis area: gray wolf, California wolverine, Columbia spotted frog, steelhead, spring Chinook, redband trout, Pacific lamprey, *Carex crawfordii, Carex interior*, and *Silene spaldingii* (the last three are plants).

Noxious Weeds

The Western Route Analysis Area has some of the lowest incidence of noxious weeds on the North Fork John Day Ranger District (Forest Database). Heavy machines and fire often remove existing vegetation and disturb the soil, particularly where landings, temporary roads, and fire control line are constructed. Noxious weeds are often more effective at invading disturbed soils than native plants. Once established, the duration of effects could be long, since many noxious weeds produce profuse amounts of seed or are capable of regenerating from a small segment of root. Many weeds aggressively outcompete native vegetation and some are poisonous to wildlife and livestock. Public concern over noxious weed spread in general is high as well.

ISSUES RELATED TO SOCIAL, CULTURAL, AND ECONOMIC CONCERNS

Treaty Rights

The Western Route analysis area lies within the area ceded to the United States Government by the Confederated Tribes of the Umatilla Indians (CTUIR) as a result of the Treaty of 1855. Specific treaty rights applicable to this land base are generally articulated in Article I of the CTUIR Treaty of 1855 and include:

> *"The exclusive right of taking fish in all the streams where running through or bordering said reservation is further secured to said Indians; as also the right of taking fish at all usual and accustomed places in common with citizens of the Territory; and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land."*

Although the 1855 Treaties do not specifically mandate the federal government to manage habitats, there is an implied assumption that an adequate reserve of water be available for executing treaty-related hunting and fishing activities.

Cultural Resources

Thinning, harvest, roadwork, and fuels treatment (mechanical or applied fire) have the potential to disturb artifacts of cultural significance, reducing their value for interpretation.

Visual Quality along the Blue Mountain Scenic Byway

Currently, drivers' views along the Blue Mountain Scenic Byway are limited by dense concentrations of lodgepole pine adjacent to the road, and there are few vistas that open a broader landscape view. Extending proposed thinning units to the byway in several areas could increase the diversity of sizes, ages, and species of trees viewed, and harvest could be used to create openings that would allow more distant views (such as Arbuckle Mountain). However, harvest methods and treatment of debris could also reduce visual quality by introducing uncharacteristic changes in color, texture, and form.

Recreation

This area is a popular hunting grounds for big game. Closures to public use due to harvest or prescribed fire activities could prevent some recreationists from accessing their preferred recreation site. Thinning proposed near the Divide Well Campground could disturb campers via noise, dust, and traffic, particularly during the peak hunting season. This location is also a popular snowmobile area. Plowing Forest Roads 53, 5312, or 5320 to allow access for winter harvest could conflict with use of these roads as groomed snowmobile trails.

Access

Opening closed roads for administrative access to treatment units could result in unauthorized public vehicle use. Also, mechanized fireline construction around treatment units can create access opportunities for Off-Highway Vehicles, resulting in new unauthorized trails.

Human Health and Safety

Thinning and associated activities would increase traffic within the analysis area, which could increase risk of vehicular accidents with the public, particularly when conditions are dusty. Proposed activities could affect suppression of wildfire and associated risks to fire fighters, property, and the public. Burning of thinning debris would emit smoke, particulates, and gases into airsheds. This could impact the health of people in adjacent and downwind communities, and impair visibility along roadways.

Economics/Social

Commercial sale of merchantable trees could create jobs and income for local communities. Unit selection and project design and mitigation could create costs that render the commercial sale of trees unfeasible.

ISSUES CONSIDERED BUT NOT ANALYZED IN DETAIL

Some topics were outside the scope of the proposed action, covered by existing direction, irrelevant to the decision, or not affected by the proposed action:

Monitoring

Columbia River Inter-Tribal Fish Commission suggested a list of monitoring items to include in the monitoring plan for the Western Route Vegetation Management project. Much of the monitoring recommended is already done at the Forest Plan level and is not sensitive enough to detect changes related to the project alone. A monitoring plan was developed specifically for the Western Route Vegetation Management project and is detailed in this document

Process

Columbia River Inter-Tribal Fish Commission was concerned that specific water and fish habitat parameters be discussed in the environmental assessment. They posed that not enough detail was provided in the scoping to allow for meaningful comment, particularly with relation to the amount of timber volume to be sold. Timber volume was considered a by-product to the proposed thinning, so was not deemed important during the scoping phase since acres of thinning, location, and residual tree stocking was discussed. This information has been provided in this Environmental Assessment.

They specifically point to surveys that record summer steelhead spawning and rearing in at least the lower 13 miles of Fivemile Creek, as well as parts of its tributaries. There is a natural barrier falls at the mouth of Fivemile Creek, which was passable via a constructed fish ladder for many years. However, this ladder began to fail in 1999 and no anadromous fish have been observed in the area above the barrier since then.

Columbia River Inter-Tribal Fish Commission felt the range of alternatives to be analyzed was too narrow. They recommended an alternative that would "*explore the need and opportunity for watershed restoration activities as well, such as road removal, culvert replacement, and other watershed restoration efforts"* The purpose and need for the Western Route Vegetation Management project specifically focused on vegetation, and watershed restoration activities such as road treatments go beyond this scope. Including a broader array of activities as proposed would increase the complexity of analysis, making it more difficult to consider all the relevant details. Other restoration activities may be considered in the future, but under a separate analysis.

The American Forest Resource Council was concerned that the project would be implemented via a contract for the harvest and decking of merchantable material to be sold later. A standard timber sale contract is the planned vehicle of implementation, which would make this concern a moot point.

ISSUES RECOMMENDED FOR ALTERNATIVE DEVELOPMENT

Most of the issues carried through analysis can be resolved through project design, mitigation, or the required No Action alternative. However, two issues stood out as needing a modification or "alternative" to the Proposed Action in order to be resolved (40 CFR 1500.4(g), FSH 1909.15 12.3). These issues are:

- Big game cover
- Visual quality along the Blue Mountain Scenic Byway

ALTERNATIVE DEVELOPMENT PROCESS

The interdisciplinary team used the purpose and need statement, together with information from field reconnaissance, to develop the **Proposed Action**. The decision-maker directed the interdisciplinary team to avoid salvage or thinning within Riparian Habitat Conservation Areas (with exception for treating aspen stands) and Old Forest (C2). This direction was intended to avoid effects in the most sensitive areas and to make analysis more efficient. Units were located and activities designed in an attempt to avoid changes in water quality or measurable effects on federally listed fish and wildlife species.

The interdisciplinary team defined the **No Action** alternative as no change from current management. In other words, dry, upland forest and aspen stands would not be thinned or harvested, but other activities not associated with the proposed action (such as road maintenance, grazing, etc.) would continue.

The key issues then served as a basis for development of two other alternatives to the Proposed Action, while remaining issues were addressed either by avoiding associated activities or by mitigating their effects. **Alternative 1** addressed the big game cover issue by eliminating harvest in stands providing satisfactory cover within the C4 management area. **Alternative 2** addressed visual quality along the Blue Mountain Scenic Byway issue by extending some thinning units to the road, adding a harvest unit to open a view of Arbuckle Mountain, and reducing the amount of young, dense lodgepole pine that grow in a narrow band along the roadway.

ALTERNATIVES DROPPED FROM CONSIDERATION

Harvest trees of all sizes

Charles Burley, representing the American Forest Resource Council, requested that a Forest Plan amendment be made so harvest would not be limited to removing trees less than 21 inches. His letter referenced a June 11, 2003 memo from the Pacific Northwest Regional Forester regarding the Eastside Screens interim policy. This policy (known also as Forest Plan Amendment #8) requires that all live trees

greater than 21 inches dbh will be maintained if the old and late structural stage falls below the Historic Range of Variability (measured at the watershed scale). He pointed out that diameter limits are not the best way to manage the forest and that such limits should be justified using sound silvicultural rationale.

The silviculturist studied the stand characteristics in this area to determine whether such an amendment would fit this particular area. There are few trees in this area over 21 inches due to past harvest. Also, the Historic Range of Variability has shown this area is deficit in Old Forest Single Stratum structure. Therefore, this alternative was dropped from further consideration.

Watershed Restoration

Olney Patt, Jr. of the Columbia River Inter-Tribal Fish Commission requested that additional watershed restoration activities be considered as part of this project. This alternative was dropped from further consideration for several reasons.

Landscape analyses at the watershed scale provide an ideal opportunity for considering integrated resource management, with multiple unrelated projects. This was done for the Western Route area through the Camas Ecosystem Analysis. While Camas Ecosystem Analysis identified a number of projects for watershed restoration, the District Ranger chose to focus this environmental assessment on the forest vegetation and fuel projects (as reflected in the Purpose and Need section of this document). Watershed restoration activities such as road removal and culvert replacement go beyond the scope of this Purpose and Need, though such restoration activities may be considered in the future under a separate analysis. A copy of the Camas Ecosystem Analysis is available at the North Fork John Day Ranger District.

Also, including a broader array of activities in the Proposed Action would have increased the complexity of analysis, making it more difficult to consider all the relevant details. The Pacific Northwest Regional Forester pointed out the hazards of large projects with multiple actions in her letter of July 18, 2002. Such analyses *"consistently fail to consider a reasonable range of alternatives and to adequately disclose site-specific environmental effects for the numerous proposals they contain…* [They have] *generally been found insufficient in their disclosure of direct, indirect and cumulative effects."* Her letter established regional policy that *"each proposed action be clearly defined and focused on a single action or set of connected or similar actions consistent with 40 CFR 1508.25."*

Reduce open road density

One option for maintaining HEI while allowing harvest to occur in C4 without a Forest Plan amendment was to reduce open road density within the analysis area. The interdisciplinary team wildlife biologist calculated the amount of road closures that would be required to allow the proposed harvest of satisfactory cover. This revealed that 34 miles of open road would need to be closed to public and administrative use, out of an existing 84 miles of open and seasonally open roads in the analysis area. Also, this area is very flat, and it is physically difficult and

expensive to effectively close many roads. Upon review of this information, the decision-maker determined that closure of this many roads would too greatly limit public access to the Western Route area. While closed roads could still be used for fire suppression and other limited entries, closure would also reduce administrative access. Road closure was not identified as part of the purpose and need for this analysis. Finally, Alternative 1 was developed that would address the big game cover issue.

ALTERNATIVES STUDIED IN DETAIL

No Action

Description

This alternative addresses the requirement of the National Environmental Policy Act and the National Forest Management Act to consider taking no action. Under this alternative, current management direction and existing activities such as grazing, fire suppression, and road maintenance would continue.

Also, one respondent to scoping commented they were "very concerned about any potential impacts to fish stocks arising from activities such as grazing, logging, and/or road building on national forests." This alternative would allow the stands identified as needing treatment at this time to progress through natural successional processes at their own rate (see Map 2 in Appendix C). Biological and ecosystem processes would continue to progress along their present path to provide a baseline for comparison with other alternatives.

Proposed Action

Description

To fulfill the above purpose and needs, the North Fork John Day Ranger District proposes to treat approximately 6,484 acres (Table 3) within the Western Route analysis area as follows (see Map 3 in Appendix C):

- 4,133 acres of commercial thinning (including 20 acres of conifer removal from aspen stands)
- 5,901 acres of non-commercial thinning (overlaps with much of the commercial thinning and 76 acres of salvage harvest)
- 659 acres of regeneration harvest (shelterwood, seedtree, sanitation, and salvage)

Thinned material that is merchantable (i.e. sawlog, chip, or hog fuel) would be sold, producing an estimated volume of 2,954 hundred cubic feet (Ccf). The proposed action would be implemented as early as the summer of 2004.

Thinning of commercial-sized trees (7 to 21 inches dbh) would occur using ground-based equipment. Non-commercial thinning would be done using chainsaws or mechanical methods (e.g. slashbusting, chipping, grapple piling). Stands would remain fully stocked after thinning, so no reforestation would be necessary. The

majority of thinning debris would remain in the unit, and would be burned, unless excessive fuel loading requires mechanical treatment (grapple piling, grinding, crushing, etc.).

Table 3: Units and activities associated with the Proposed Action.

Unit	Area (Acres)	Harvest Prescription[1]		Unit	Area (Acres)	Harvest Prescription[1]
TP2	34	NCT		TP43	147	NCT
TP3	149	NCT		TP44	64	NCT
TP5	105	HSSW				
TP6	15	NCT		L03	80	NCT
TP7	22	HSSW		L04	85	HITH/NCT
TP8	70	HSSW		L05	5	HITH/NCT
TP9	70	HISM/HSSW		L06	90	HITH/NCT
TP10	27	HSST		L07	53	HITH/NCT
TP11	34	NCT		L08	57	HITH/NCT
TP12	50	HITH/NCT		L09	68	HITH/NCT
TP13	54	HITH/NCT		L10	62	HITH/NCT
TP14	45	HIT/NCT		L11	104	HITH/NCT
TP15	64	HITH/NCT		L12	76	NCT
TP16	48	HITH/NCT		L13	36	HITH/NCT
TP17	39	HITH/NCT		L14	49	NCT
TP18	88	HITH/NCT		L15	24	NCT
TP19	27	HITH/NCT		L16	34	NCT
TP21	270	HITH/NCT		L17	47	HITH/NCT
TP22	37	HITH/NCT		L18	62	NCT
TP23	57	HITH/NCT		L19	82	HITH/NCT
TP24	11	NCT		L20	22	HITH/NCT
TP25	15	HITH/NCT		L21	125	HITH/NCT
TP26	145	HITH/NCT		L24	76	NCT
TP27	72	HITH/NCT		L25	116	NCT
TP28	38	HITH/NCT				
TP29	71	HITH/NCT		K3	76	HITH/NCT
TP30	81	HITH/NCT		K4	34	HITH/NCT
TP31	149	HITH/NCT		K6	14	NCT
TP32	91	HITH/NCT		K7	55	HSSW
TP33	168	HITH/NCT		K8	24	HITH/NCT
TP34	36	HITH/NCT		K9	40	HITH/NCT
TP35	67	NCT		K10	40	HITH/NCT
TP36	116	HITH/NCT		K11	88	HITH/NCT
TP37	111	HITH/NCT		K12	33	HITH/NCT
TP38	107	HITH/NCT		K13	50	HITH/NCT
TP39	61	HITH/NCT		K14	45	HISS
TP40	112	HITH/NCT		K15	17	HISS
TP41	84	HITH/NCT		K16	76	NCT/HISM
TP42	53	HITH/NCT		K17	35	HSST

Unit	Area (Acres)	Harvest Prescription[1]		Unit	Area (Acres)	Harvest Prescription[1]
K19	19	HITH/NCT		K30	122	NCT
K20	58	HITH/NCT		K31	162	NCT
K21	72	NCT		K32	65	HITH/NCT
K22	23	NCT		K33	100	HITH/NCT
K23	49	HITH/NCT		K34	31	HITH/NCT
K24	162	HITH/NCT		K35	44	HITH/NCT
K25	30	HITH/NCT		K36	55	HITH/NCT
K26	74	HSSW		K37	94	NCT
K27	75	HSST		K38	171	NCT

[1] HSSW is Shelterwood Seed Cut – harvest that leaves at least 12 acceptable, well-distributed seed trees per acre. Used to promote seed production and to create conditions that are favorable to establishment and survival of natural or planted regeneration.

HISM is Salvage – harvest that removes trees that are dead or in immenent danger of being killed by insects of other injurious agents. After harvest, the density of live trees must meet or exceed the minimum stocking levels specified in the Forest Plan, as amended.

HSST is Seed Tree Seed Cut – harvest that leaves at least 6 acceptable, well-distributed seed trees per acre. Otherwise the same as HSSW.

HITH/NCT is Commercial thinning combined with Non-commercial thinning, which stimulates growth and development of the residual stand.

Shelterwood, seedtree[2], sanitation, and salvage prescriptions would remove dead or disease-susceptible trees from 659 acres of root-rot and insect-infested areas. Few mature trees would remain, though in many places there would be an understory. Harvest would be conducted using ground-based equipment and there would be no upper size limit for dead trees. If available, a minimum of 25 live trees would be left per acre to serve as replacements for snags as they die (with a preference for non-host species and healthy trees). Harvest debris on these acres would be burned. Units would be planted primarily with ponderosa pine, western larch, and other species that are less susceptable to the site-related disease. Damage of seedlings by animals would be controlled using Vexar® tubing and gopher trapping.

No permanent or temporary road would be constructed to access sites, but approximately 25 miles of existing closed roads would be opened to access treatment units for the duration of activities. Opening would involve removal of closure devices and blading as necessary. Upon completion of harvest activity, waterbars, crossdrains, and closure devices would be replaced. Closed roads could also be seeded with native grass.

Burning of debris would involve 92 miles of tractor or hand constructed fire control line. Also, 31 miles of existing road would function as fire control line. Fire would be applied by hand-held drip torch, ATV-mounted drip torch, or helicopter. Burning could occur in either spring or fall for up to five years after thinning or harvest

[2] The shelterwood and seedtree prescriptions would actually be applied to stands that are already understocked as a result of insects and disease. As a result, harvest of the dead and infected material would leave a stand similar in appearance to what a shelterwood or seedtree prescription would leave.

activities are complete. Burn prescriptions would be designed to conform to current prescribed fire policy and to stay within environmental conditions that allow for safe control of fire (e.g. low humidity, low-to-no wind, moderate fuel moistures, low flame lengths).

The Forest Plan would be amended to change the HEI standard in management area C4 from 60 to its current level of 59. The amendment would also change the satisfactory cover standard in management area E2 from 10 percent to 6 percent. These changes would only apply to the Western Route Vegetation Management projects.

Activities that would occur concurrently or in association with thinning include:

- Maintenance of existing roads as necessary to conduct harvest
- Manual treatment (i.e. handpulling) of five populations of noxious weeds identified since the 1995 Forest Noxious Weed EA
- Mechanical treatment of debris (i.e. grapple piling, skidding, chipping)
- Prescribed burning of debris
- Planting of tree seedlings
- Control of damage to planted seedlings by animals using Vexar® tubing and gopher trapping)

Standard Operating Procedures:

The following are Standard Operating Procedures that would be applied to activities:

Layout and Marking

1. Units will be defined to exclude most PACFISH Riparian Habitat Conservation Areas [300 feet on each side of class 1 and 2 (fish-bearing) streams, 150 feet for Class 3 (non-fish bearing perennial) streams, and 100 feet for Class 4 (intermittent) streams and springs, seeps, and bogs less than one acre]. The exception to this is the treatment of aspen stands (which is permitted under PACFISH because it would meet Riparian Management Objectives).
2. Special habitats (scabflats and meadows) which occur within or adjacent to harvest units will be treated as follows to protect unique wildlife habitat:
    - Kenney 03, buffer meadow by 100 feet
    - Kenney 33, buffer meadow by 100 feet
    - Kenney 27, buffer scabflat using a 50-foot width
    - Three Prairie 25, buffer meadow by 100 feet
    - Three Prairie 33, buffer meadow by 100 feet
    - Three Prairie 21, buffer scabflat using a 50-foot width
    - Lower 5 09, buffer meadow by 100 feet
3. Active and historical goshawk nests will be protected by deferring harvest on 30 acres of the most suitable nesting habitat. A 400-acre post-fledging area will be established around the nesting area where late old structure will be retained and younger stands will be enhanced toward late old structure.

Known nest and roost trees will be protected from all management activities and human disturbances until fledging has been completed. Levels of protection will vary by the requirements of the species involved.

4. Snag retention will be achieved on a 40-acre basis with at least 10-15 percent of the snags represented on each 10 acres, if available, (as per Forest Supervisor memo dated 1993 and District Ranger memo dated Aug. 4, 1997). Use **Table 4** to identify the amount based on Plant Association Group. Retention trees will be distributed naturally, either individually or in small groups, in all plant association groups. Preferably, all snags retained will be greater than 18-inch diameter at breast height, but if there are not enough snags of this size within the 40-acre unit, all large snags will be left and some smaller snags will be retained to make up the difference. Tree species and soundness at the base will also be considered. The tree species preferred in order of most to least desired are: Douglas-fir, ponderosa pine, western larch, other species, and grand fir. In addition, where safety allows, hollow or partially hollow, broken top snags greater than 15 inches diameter at breast height will be left to provide bat habitat.

Table 4: Snag retention per acre by plant association group.

Plant Association Group	Snags per Acre	Green Trees left for Snag Replacement
Warm – Dry	2.3	15.8
Cool – Moist	1.8	9.4
Cold – Dry	1.8	14.4

5. Large down wood will be retained as illustrated in **Table 5**.

Table 5: Down wood retention per acre by plant association group.

Plant Association Group	Pieces per acre	Diameter at small end	Length per piece	Total length per acre
Ponderosa pine	3	12 inches	>6 feet	>20 feet
Warm grand fir	15	12 inches	>6 feet	>100 feet
Cool grand fir	15	12 inches	>6 feet	>100 feet
Lodgepole pine	15	8 inches	>8 feet	>120 feet

Implementation

6. A copy of known noxious weed infestations and identification material will be given to the Forest Service contracting representative. Known infestations will be treated by the Forest Service prior to implementation of activities according to the Umatilla National Forest Environmental Assessment for the Management of Noxious Weeds (1995). On noxious weed sites that have been identified since 1994, hand pulling will occur.
7. Off-road equipment shall be certified in writing to be free of weeds prior to moving onto the treatment area. The Forest Service will be notified at least 5

days prior to moving each piece of off-road equipment onto the treatment area so that equipment can be inspected and approved by the Forest Officer in charge of administering the activity. Disassembly of components or the use of specialized inspection tools is not required. Equipment in need of cleaning shall be transported off National Forest land to be cleaned, unless otherwise agreed. During the fire season, the fire truck, as required to be at the worksite, shall be reserved for fire use and not be used to clean equipment, unless otherwise agreed. This requirement does not apply to passenger vehicles or other equipment used exclusively on roads.

8. Fences, gates, and cattleguards will be maintained in their existing condition during activities to prevent cattle from passing between allotments or pastures.
9. Where conditions and safety permit, trees will be felled away from riparian areas, residual conifers, large broken or hollow top snags, dispersed campsites, fences, landlines, research plots (ecology plot center markers and condition and trend transect markers) and improvements (i.e. stock ponds, section corner monuments, etc.). If a tree is felled into a Riparian Habitat Conservation Area or unique habitat buffer, the portion within the buffer will be left in place, with one exception. Within aspen stands designated for conifer removal, trees may be removed from the Riparian Habitat Conservation Area as long as no soil displacement[3] occurs. The intent is to avoid disturbance within these areas.
10. No ground-based equipment will operate in units where the average slope is greater than 35 percent in order to reduce the potential for soil movement. Skid trails, forwarder trails, and other log transportation routes will be approved by the Forest Service to meet the Best Management Practices and applicable management requirements during timber sale contract administration. All equipment will operate outside of Riparian Habitat Conservation Areas, unless soil disturbance can be avoided.
11. Cross-ditches and water-spreading ditches will be installed at locations marked on the ground by the Forest Service as a means of reducing the potential for soil displacement and sedimentation.
12. Equipment operation within ephemeral draws will be confined to designated crossings in order to minimize soil disturbance. Debris will be placed into the crossings to reduce soil displacement and compaction.
13. Use of ground-based equipment will be suspended when weather conditions (such as intense or prolonged rainfall or winter breakup conditions) would otherwise result in excessive soil displacement. This is to reduce surface erosion and rutting.
14. Non-commercial thinning debris will be simultaneously lopped and scattered, mulched, piled, or removed to reduce the risk of high intensity wildfire.
15. A screen of small trees (if existing) will be retained along open and seasonally open roads to the extent possible given thinning, harvest, and prescribed

[3] Soil displacement is defined as lateral movement of exposed soil.

burning constraints. This is to reduce big game vulnerability. An exception to this is within Forest Plan areas designated for scenic quality (A4-Viewshed 2 management area).

16. Burn prescriptions will be designed to imitate low intensity wildfire effects on soil and dominant tree mortality. Burning will take place when heavier fuels and duff moisture contents are high, such as in the spring or in the late fall.
17. Prescribed fire will not be ignited in Riparian Habitat Conservation Areas; however, fire will be allowed to back into them and exposure of mineral soil will not exceed 10 percent.
18. Fire control lines adjacent to Riparian Habitat Conservation Areas, on slopes exceeding an average of 35 percent, and on other sensitive areas where soil disturbance is of concern will be constructed by hand. All fire line will be rehabilitated after the burn by returning displaced soil to the line, construction.
19. Roads will be kept open to the public where safety permits. Safety signs that comply with the Manual on Uniform Traffic Control Devices specifications will be posted to warn motorists of harvest-related hazards.
20. Dust abatement on roads will be approved by the Forest Service before activity begins, in order to protect the water and fisheries resources.
21. Snowplowing will meet road maintenance specifications as described in the Biological Opinion for the North Fork John Day Sub-basin Multi-Species Biological Assessment for Ongoing and Proposed Activities (2003). In summary:
    - Snowplowing will occur in a way that prevents erosion damage to roads and streams
    - There will be no side casting of snow into Riparian Habitat Conservation Areas.
    - No plowing will occur during winter breakup conditions.
    - To prevent the blade from digging into the road prism, snowplow height will be a minimum of two inches above the road surface.

Post-Treatment

22. Borax will be applied to tree stumps in areas infected with *Fomes annosus* to prevent spread of the disease.
23. Upon completion of activities, skid trails, landings, or exposed mineral soil will be treated as necessary and appropriate to the site to reduce soil erosion, soil compaction, or establishment of noxious weeds. This may include seeding, waterbarring, subsoiling of landings, etc. Displaced soil in berms or ruts may be returned to its prior location.
24. Any seed will be provided by the Forest Service, using seed that has been tested to be free of noxious weeds (list in the State of Oregon). Native grasses and forb seed will be used as available, otherwise non-persistent exotic species will be provided.

Monitoring

25. Units will be spot checked during layout by an aquatic specialist to assure that riparian protection, as delineated by PACFISH requirements and Best Management Practices, is implemented as stated. Boundaries that do not meet mitigation requirements will be adjusted accordingly. This monitoring is considered essential.
26. Number, size, and distribution of snags and down logs within units will be field checked by Forest Service personnel. Layout and treatment practices will be adjusted where mitigation parameters are not met. This monitoring will be done as funding is available.
27. The Forest Service contract representative will spot monitor during and after activities to ensure sediment and soil compaction constraints are met. If constraints are not met, Forest Service personnel will identify and document modifications to be used in future projects. This monitoring is considered essential.
28. Noxious weed species surveys will be conducted by the District noxious weed coordinator or crew prior to initiation of harvest or other ground disturbing activities within the project area. This monitoring is considered essential.
29. Forest Service personnel will spot check activities during implementation to determine whether noxious weed mitigation measures and project risk management plans are implemented. Deviations will be corrected immediately. This monitoring is considered essential.
30. For five years after activities are completed, the District noxious weed coordinator or crew will conduct an annual inventory of the treatment area and access routes to determine if existing noxious weed populations have spread or if new sites have occurred. This monitoring is considered essential.
31. After prescribed fire treatments, Forest Service personnel will field check a sample of burn units to determine whether the prescription and mitigation (i.e. mortality, mineral soil exposure, fuel load reductions, etc.) have been met. If objectives or mitigation have not been met, additional burning may be delayed or the fire prescription and procedures adapted to ensure the mitigation is achieved. This monitoring is considered essential.

Alternative 1

Description

This alternative was designed to address the big game issue by retaining big game cover in C4 and E2 in its current status to avoid a decline in big game satisfactory cover and HEI. Units in the C4 management area would be adjusted so that big game cover would not be affected. As a result about 1,271 acres would be dropped from any treatment, while prescriptions would change on another 1,119 acres as detailed below (see also Map 5 in Appendix C):

- Units dropped from all treatments (1,271 total acres):
    - Part of L11 (52 acres)
    - Unit L13 (36 acres)
    - Unit L14, (49 acres)
    - Unit L16, (34 acres)
    - Unit L17, (47 acres)
    - Unit TP28 (38 acres)
    - Unit TP29 (71 acres)
    - Unit K14 (45 acres)
    - Unit K15 (17 acres)
    - Part of Unit K17 (6 acres)
    - Unit K21 (72 acres)
    - Unit K23, (49 acres)
    - Part of Unit K24 (31 acres)
    - Part of Unit K31 (24 acres)
    - Part of Unit K37 (42 acres)
    - Unit TP3, (149 acres)
    - Unit TP7, (22 acres)
    - Unit TP8, (70 acres)
    - Part of Unit TP9 (12 acres)
    - Unit TP10 (27 acres)
    - Unit TP11, (34 acres)
    - Unit TP14, (45 acres)
    - Unit TP15, (64 acres)
    - Unit TP16, (48 acres)
    - Unit TP17, (39 acres)
    - Unit TP18, (88 acres)
    - Unit TP19, (27 acres)
    - Part of Unit TP21 (29 acres)
    - Part of Unit TP26 (4 acres)
- Treatment prescription changed from a combined commercial and non-commercial thin to non-commercial thin only (712 total acres)
    - Part of L11 (52 acres)
    - Unit L19 (82 acres)
    - Unit L20 (22 acres)
    - Unit TP12 (50 acres)
    - Unit TP13 (54 acres)
    - Unit TP25 (15 acres)
    - Unit TP33 (168 acres)
    - Unit K13 (50 acres)
    - Unit K20 (58 acres)
    - Unit K25 (30 acres)
    - Part of Unit K24 (131 acres)
- Treatment prescription changed from shelterwood to non-commercial thin (234 total acres)
    - Unit TP5 (105 acres)
    - Unit K26 (74 acres)
    - Unit K7 (55 acres)
- Treatment prescription changed from a combined salvage and shelterwood harvest to non-commercial thin
    - Part of TP9 (58 acres)
- Treatment prescription changed from a combined commercial and non-commercial thin to combined non-commercial thin and sanitation harvest
    - Unit K9 (40 acres)
- Treatment prescription changed from a seedtree to a combined non-commercial thin and sanitation harvest
    - Unit K27 (75 acres)

This alternative would result in an estimated 1,833 Ccf of merchantable material (i.e. sawlog, chip, or hog fuel). All other activities would remain as described in the Proposed Action. No additional mitigation or standard operating procedures were identified.

Alternative 2

Description

This alternative was designed to address the scenic quality issue by expanding views along the Blue Mountain Scenic Byway and modifying treatment to reduce evidence of management in the foreground. Alternative 2 would add units V1 (7 acres), V2 (11 acres), V3 (24 acres), V4 (39 acres), and V5 (18 acres) to improve vegetative diversity, stand health, and viewing distance along the Blue Mountain Scenic Byway (see also Map 6 in Appendix C). The treatment prescription for all units would be a combined commercial and non-commercial thinning with variable densities, so that treated stands become more dense away from the scenic byway. This would help blend treatments with non-treated stands to produce a more natural appearing view.

Thinning prescriptions in units V1, V2, and V3 would be designed to provide variety in stand density, color (i.e. larch in the fall or species with orange bark), and tree sizes, with an emphasis to make larger trees more prominent after thinning. Units V4 and V5 would open a view of Arbuckle Mountain and adjacent larch and meadows in the middleground and background. This would result in an estimated 3,038 Ccf of merchantable material (i.e. sawlog, chip, or hog fuel).

All activities would remain as described in the Proposed Action, including the proposed Forest Plan amendment. The following mitigation would be applied:

- All units adjacent to the Scenic Byway would include thinning of the dense bands of lodgepole pine adjacent to the road to increase the viewing area of motorists.
- Stumps will be cut as low as possible in units within the A4 management area to minimize visibility of management.
- Slash will not be placed in the skid trails within the foreground of units along the Blue Mountain Scenic Byway to avoid unnatural deviations in line and color.
- In units V2 and V3 and where non-commercial thinning occurs along the byway, debris will be piled and burned in the immediate foreground (200 to 300 feet of the roadway) in order to meet the Visual Quality Objective of Partial Retention. Fuels will be burned prior to the next high human-use period.
- Skid trails within the foreground will parallel the roadway in order to disguise their presence.
- Landings will be located away from the scenic byway on alternate roads.

POTENTIAL KNUDSEN-VANDENBURG PROJECTS

The following projects and opportunities have been identified as possible candidates to receive funding under the Knudsen-Vandenburg Act. These are commonly referred to as KV funds and are collected from the sale of timber.

Some of these projects are part of the Proposed Action or its alternatives; other projects are not included in this analysis but are possible activities for future consideration. Projects not covered by this analysis would require analysis under the National Environmental Policy Act before they could be implemented.

If harvest occurs, KV funds might not be generated for all enhancement projects listed because the predicted value of timber is low. Therefore, other funding sources would be necessary or the unfunded projects would not be implemented.

KV projects included in this analysis

- Site preparation and tree planting
- Noxious weed control
- Non-commercial thinning
- Removal of conifers from aspen
- Thinning of the narrow band of lodgepole pine that constricts views along the Blue Mountain Scenic Byway
- Treating debris created by harvest and non-commercial thinning
- Underburning treated ponderosa pine stands to maintain structure and control undesirable vegetation
- Installing guardrails/gates to replace closures on currently closed roads used to access treatment units

KV projects requiring future analysis

- Installing fencing around treated aspen stands and plant aspen
- Installing guardrails/gates on other closed roads in the area to improve closure effectiveness
- Decommissioning roads no longer needed (as identified in the Roads Analysis for this project)
- Planting hardwoods in riparian areas
- Maintaining instream structures
- Constructing or reconstructing spring water sources
- Constructing or reconstructing range improvement fences

COMPARISON OF ALTERNATIVES

This section is intended to clearly define the differences in effects between alternatives with regard to the Purpose and Need described in Chapter 1 and the issues detailed earlier in this chapter. The environmental effects for some issues did not vary by alternative or varied only in minor ways. Those effects were not included in this comparison, though they are described in detail in Chapter 3. Issues with effects common or similar for all alternatives were: Snag and Down Wood Habitat, Species of Interest, Soils and Water, Threatened, Endangered, Proposed and Sensitive Species, Range, Cultural Resources, Recreation, Access. **Table 6** summarizes the area affected and operational outcomes of the alternatives.

Table 6. Summary of Operational Outcomes Between Alternatives

Activity	No Action	Proposed Action	Alternative 1	Alternative 2
Commercial & noncommercial thinning	0	4,133	2,765	4,232
Other Harvest (salvage, seed tree, etc.)	0	659*	208**	659*
Non-commercial thinning alone	0	1,545	2,240	1,545
Total Treatment Acres	**0**	**6,484**	**5,213**	**6,583**
Number of Treatment Units	0	99	73	104
Volume Harvested	0	2,954 Ccf	1,833 Ccf	3,038 Ccf
Harvesting System	0	Ground-based	Ground-based	Ground-based
Aspen Rehab.***	0	20	20	20
Road reopening	0	25 miles	18 miles	25 miles

*76 acres includes non-commercial thinning.

**179 acres includes non-commercial thinning

***Already included in commercial thinning acres.

Purpose & Need	No Action	Proposed Action	Alternative 1	Alternative 2
Return Dry Upland Forest to Early Successional Species	Species compositions would remain out of balance with historical conditions, with ponderosa pine and larch declining on Dry Upland Forest sites due to their shade intolerance. The Dry Upland Forest landscape would continue to lose its resiliency in the face of disturbance.	Species compositions on 6,484 acres would shift closer to historical conditions, particularly on 3,935 acres of Dry Upland Forest sites, improving resiliency to disturbance.	Effects similar to Proposed Action. However, 1,271 fewer acres would experience a shift in species compositions, with 543 fewer acres of Dry Upland Forest sites converted back to dominance by ponderosa pine and larch.	Effects similar to the Proposed Action. However, species compositions on 99 more acres of Cold Upland and Moist Upland forests would shift to an earlier seral mix.
Increase amount of Old Forest Single-Stratum Structure	Current stand structures would remain as they are. With continued fire suppression, there would be little chance for the Old Forest Single Stratum structure in Dry Upland Forest (currently at 436 acres) to recover to its historic levels. Forest Plan goals and desired future conditions related to diversity in habitats, visual resources, and healthy forests would be difficult to achieve.	Old Forest Single Stratum structure promoted on 4,116 acres. Thinning in Stem Exclusion Open Canopy structure (currently well above HRV) would not alter structural stage, but would enhance tree growth to more quickly develop Old Forest Single Stratum. In Dry Upland Forest, some Old Forest Multi-Strata structure (above historic levels) would shift to Old Forest Single Stratum (below historic levels).	Effects similar to Proposed Action. However, Old Forest Single Stratum structure would be promoted on 519 fewer acres.	Effects similar to Proposed Action. However, 18 more acres of Old Forest Multi-Strata structure would be treated to adjust stand structure in the Dry Upland Forest.

Purpose & Need	No Action	Proposed Action	Alternative 1	Alternative 2
Remove Most Conifers From Aspen Stands	Aspen stands would continue to decline as conifers encroach. Because only small, remnant stands of aspen remain, this could cause irreversible loss of this species from the Western Route Analysis Area.	Conifers under 21" dbh would be removed from 20 acres of aspen. When added to past aspen rehab. and future fencing, aspen would begin to recover from their decline in the Western Route area.	Effects similar to Proposed Action.	Effects similar to Proposed Action.
Reduce Overstocking	Stands with dense understories would be at high risk of severe wildfire, insect, and disease disturbances. Insects and diseases would increase where trees are weakened by competition for light, moisture, and growing space.	Stand densities would be returned to historic conditions on 5,901 acres. Reduced densities would improve the overall health and resiliency of affected stands.	Effects similar to Proposed Action, though stand densities would be returned to historic conditions on 1,072 fewer acres of treatment.	Effects similar to Proposed Action, though stand densities would be returned to historic conditions on 99 more acres of treatment.
Remove Trees affected by Root Rot or Insects	Existing root rot and insect infestations would continue causing tree damage and mortality in a number of stands. The opportunity to reforest areas with poor stocking due to insects or disease would be irretrievably lost.	In the Cold Upland or Moist Upland forests, 659 acres affected by insects and root rots would be treated to promote the health of remaining trees. Minimizing machine-caused soil compaction would mitigate the effect on root rot virulence.	Effects similar to Proposed Action, except 451 fewer insect/disease-infested acres would be treated.	Same as Proposed Action.

Purpose & Need	No Action	Proposed Action	Alternative 1	Alternative 2
Reduce Fuel Loading	Fuels would accumulate, shifting to higher condition classes (currently Condition Class 1= 7,260 acres, Condition Class 2= 16,825 acres, Condition Class 3= 2,571 acres). In Fire Regimes III and V, potential for crown fire would increase further. In 10 years, fuel loads would average 35 tons/acre in Dry Upland Forest and 60 tons/acre in Cold Upland and Moist Upland forests. Horizontal and vertical fuel continuity would also increase. Fuel models 10, 11, 12, and 13[4] would dominate.	Stands currently in Condition Class 1 would be maintained as Condition Class 1. Stands on 4,850 acres that are currently in Condition Class 2 or 3 would change to Condition Class 1. Fuel loadings on 6,484 acres would be reduced to an average 9-12 tons/acres. Prescribed burning would require construction (manual and tractor) of 92 miles of fire containment lines.	Same effects as Proposed Action, though 585 fewer acres of Condition Class 2 and 3 would change to Condition Class 1. Fuel loadings would be reduced on 1,271 fewer acres, and 12 less miles of fire line would be constructed.	Same effects as Proposed Action, though 97 more acres of Condition Class 2 or 3 would change to Condition Class 1. Fuel loadings would be reduced on 99 more acres, 3 more miles of fire line would be constructed.
Amend Forest Plan	Big game satisfactory cover in E2 would remain at 10.6% and HEI in C4 would remain at 59. Forest Plan would remain unchanged. Silvicultural and fuel needs would not be achieved.	Forest Plan amendment would change big game satisfactory cover in E2 to 6% and changes HEI in C4 to 58. Silvicultural and Fuel needs would be achieved on 6,484 acres.	No Forest Plan amendment needed and HEI would increase 1 point in E2. Silvicultural and Fuel needs achieved on 1,271 fewer acres.	Same as Proposed Action. Silvicultural and Fuel needs achieved on 99 more acres.

[4] While Fuel Models 11, 12, and 13 are related to timber harvest and there would be no harvest in this alternative, the fuel accumulation would mimic fire behaviour conditions represented by these models.

Issue	No Action	Proposed Action	Alternative 1	Alternative 2
Future Fire Severity	Fire intensities would continue to increase in all fuel models, as would spotting and crown fires. Increased fire intensities and erratic fire behavior would decrease firefighter/public safety. High flame lengths would make direct suppression by hand crews unlikely. Indirect methods or the use of heavy equipment could increase effects caused by the fire and/or its suppression. Future Wild West Underburn would be less effective. Underburning would be harmful where fuels are $\geq$ 20 tons/acre.	Fire danger would increase on 6,484 acres for 1-3 years due to debris from thinning/harvest. After mechanical fuel treatment or burning, fire danger would decrease for 20-30 years. Breaks in fuel continuity would slow fire spread, reduce intensity; and force fire into surface fuels. Crown fire potential would decrease. Fire suppression would be safer and more effective. Fuels on 3,563 acres of the future Wild West Underburn would be pretreated.	Effects similar to Proposed Action, though on 1,271 fewer acres. 403 fewer acres of the future Wild West Underburn would be available for implementation.	Effects similar to Proposed Action, though on 99 more acres. 24 more acres of the future Wild West Underburn would be available for implementation.
Big Game Habitat	No change in big game habitat in the short-term (20 years). Beyond 20 years, cover would increase. However, risk of habitat loss and vulnerability would grow due to increased risk of insects, disease, and high severity wildfire. Past harvest has reduced cover quality on approximately 65% of the Forest within the analysis area.	See "Amend Forest Plan" for cover and HEI. Decreased stand densities would increase big game vulnerability. However, fuel treatments would increase forage and mobility of animals. Individual animals could be disturbed by temporary use of closed roads. Proposed activities would combine with past harvest to reduce cover on 72% of analysis area.	See "Amend Forest Plan" for cover and HEI. Effects on animal vulnerability, forage, mobility, and road densities similar to Proposed Action. Proposed and past activities would combine to reduce cover on 70% of analysis area.	See "Amend Forest Plan" for cover and HEI. Thinning along byway would raise vulnerability, though varying thinning densities mitigates somewhat Proposed and past activities would combine to reduce cover on 73% of the analysis area.

Issue	No Action	Proposed Action	Alternative 1	Alternative 2
Late/Old Structure Habitat Connectivity	Old growth and connectivity between stands of late/old structure would be unaffected. Stands would continue to develop along existing successional pathways given current management direction.	Treatment on 129 acres of inventoried old growth, but connectivity maintained as recommended in Camas Watershed Ecosystem Analysis. Thinning would increase average tree size in connecting corridors by removing understory. Down wood densities and multi-storied stand structure would be reduced on 1,994 acres of pine marten habitat (a Management Indicator Species).	Effects similar to Proposed Action except 51 fewer acres of inventoried old growth and 577 fewer acres of pine marten habitat treated.	Effects similar to Proposed Action except 46 more acres of pine marten habitat treated.
Fish Habitat	No direct effect on fish species. Large, high severity fire could potentially remove all fish from burned over stream. Habitat would be degraded by loss of shade, increased sediment, loss of future large wood. Spawning and rearing success would be reduced.	Thinning and road blading May Impact **Redband trout** individuals or habitat, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species. Use of some native surface roads in Riparian Habitat Conservation Areas would result in some soil disturbance near creeks, though mitigation measures would minimize sediment transport to a short-lived, negligible localized increase. Habitat parameters would not change.	Effects similar to Proposed Action.	Effects similar to Proposed Action.

Issue	No Action	Proposed Action	Alternative 1	Alternative 2
Noxious Weeds	Current weed densities are sparse. 5 weed populations discovered after the 1995 District Noxious Weed EA would continue to go untreated, increasing the risk of spread. Compared to other alternatives, No Action has lowest risk of weed spread.	The 5 new weed populations would be approved for manual removal. Proposed activities could increase the potential for noxious weed invasion where mineral soil is exposed (389 to 649 acres). This would have the second highest risk of weed spread.	Effects similar to Proposed Action, though mineral soil exposure would be less (313-521acres). This would have the second lowest risk of spread of the alternatives, and the least risk of weed spread of the action alternatives.	Effects similar to the Proposed Action, though mineral soil exposure would be slightly more (395-659 acres). This would have the highest risk of weed spread.
Treaty Rights	Treaty Rights would remain unaffected.	There would be no effect on exercise of water, fishing, hunting, or cultural resource treaty rights. Big game cover and HEI would be reduced in the short-term. However, this alternative would provide the second greatest long-term protection of big game habitat through improved forest health and reduced fuels. The big game population has been above State management objectives except for the last 2 years, so exercise of hunting rights should not be affected.	Effects similar to Proposed Action, except big game cover and HEI would not be reduced below Forest Plan standards. Also, this alternative would provide more long-term habitat protection than No Action by reducing the threat of severe wildfire and improving growing conditions and health of remaining trees.	Effects similar to Proposed Action.

Issue	No Action	Proposed Action	Alternative 1	Alternative 2
Scenery Along Blue Mt. Scenic Byway	Present viewsheds and their Visual Quality Objectives would not be altered by management activities; changes would be shaped by natural events. Color, line, and texture along the scenic byway would remain homogeneous, with little visual diversity and no openings. Forest Plan standards of viewing large diameter trees and multi-age stands would not be met because the existing dense border of young trees obscures views beyond the road.	Thinning on 206 acres in A4 would increase visual diversity along Scenic Byway. Treatments would move stands toward a healthier forest, directing form back toward historically more open landscape. Improved health would contribute to the long-term scenic integrity of the viewshed. However, the proposed treatments would have little immediate affect on visual quality because few units extend all the way to the road and an existing dense band of young trees constricts viewing in many areas. In the long-term, views of open grown forest would become more obvious as the band of trees along the road naturally thins through competition mortality and growth.	No thinning would occur in A4.	Thinning would occur on 65 more acres in A4 than under the Proposed Action. The dense, narrow band of young trees would be fragmented, allowing greater depth of viewing and creating visual diversity. Large trees would become more visually dominant as identified in the Forest Plan. Two units, V4 and V5, would open views of Arbuckle Mountain in the background, with a larch stand in the more immediate middleground providing striking fall color. Mitigation would reduce evidence of management activity so Visual Quality Objectives would be met. As a result of project design and mitigation, activities would meet the Visual Quality Objectives for A4 and would comply with standards and guides for visual resource management (Forest Plan page 4-51).

Issue	No Action	Proposed Action	Alternative 1	Alternative 2
Economics/Social	No harvest would occur. No change in direct or indirect local income or direct or induced employment. Declining trends in timber harvesting from National Forest lands would continue in the future.	Commercial harvests show bid rates ($28/Ccf) above the base rate ($11/ Ccf), which would produce a viable harvest for the purchaser. However, Present Net Value for harvest (-$35,000) would be negative, which indicates the sale would be "below cost" to the Forest Service. 14 direct and induced jobs would be created, with $1.8 million in direct and indirect local income. When the commercial and non-commercial treatments are aggregated, a negative Present Net Value (-$347,000) would occur due to the combination of low value and the large amount of the non-sawtimber wood fiber being removed.	Bid rates would be the same as the Proposed Action. Present Net Value for harvest would be the lowest of the action alternatives at -$22,000. 8 direct and induced jobs would be created, with $2.093 million in direct and indirect local income. Aggregated Present Net Value(-$437,000) indicates this alternative would be the most expensive.	Bid rates would be the same as the Proposed Action. Present Net Value for harvest would be the second lowest of the action alternatives at -$34,000. Direct and induced jobs created would the same as the Proposed Action, with slightly higher ($1.807 million) direct and indirect local income. Aggregated Present Net Value (-$346,000) indicates this alternative would be the least expensive of the action alternatives.

CHAPTER 3 –ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter discloses the potential effects of each of the alternatives described in Chapter 2, including the scientific and analytical basis for the comparison of the alternatives. The effects discussion is generally organized in the same order as the issues listed in Chapter 2:

- Forest Vegetation (covers Purpose of and Need for Action)
- Fuels/Fire Management (covers Purpose and Need and human health/safety issue)
- Wildlife Habitat (covers significant issue regarding big game cover, as well as snag/down wood habitat, late/old structure habitat connectivity, Proposed, Endangered, Threatened and Sensitive species, and Species of Concern issues. Also covers Forest Plan required Management Indicator Species)
- Soil
- Water
- Fish Habitat (covers fish habitat and the Proposed, Endangered, Threatened and Sensitive species issues, as well as Forest Plan required Management Indicator Species)
- Non-Forest Vegetation (covers noxious weeds and Proposed, Endangered, Threatened and Sensitive plant species issues, as well as Range)
- Treaty Rights
- Cultural Resources
- Visual Quality (covers significant issue regarding scenery along the Blue Mt. Scenic Byway)
- Recreation (covers human health/safety and access issues)
- Transportation (covers human health/safety and access issues)
- Socio-Economic

Effects are shown as being direct (occurring at the same time and place as the triggering action), indirect (separate in time and space from the action that caused them), or cumulative[5] (the incremental effect of the project when added to effects from other past, present, and reasonably foreseeable actions). These effects are described in terms of increases or decreases, intensity, duration, and timing. The discussion of these effects also provides a comparison of the trade-offs associated

[5] Cumulative effects are primarily discussed under the heading "Environmental Consequences Common to All Action Alternatives" for each section, unless there are cumulative effects unique to a particular alternative.

with each alternative. The chapter ends with a discussion of compliance with the Forest Plan, various laws, and executive orders.

Additional documentation, including more detailed analyses of project-area resources, may be found in the analysis file located at the North Fork John Day Ranger District Office in Ukiah, Oregon.

FOREST VEGETATION

This section incorporates by reference the Western Route Vegetative Management Silviculture Report contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report, and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

All effects analyses were accomplished at the project area scale, with the exception of the Historical Range of Variability analysis, which was conducted on a landscape scale (see next section). Temporal scales used are short term (loosely 0-5 years) and long term (loosely 20 to 100+ years). These time frames were chosen for a very long-lived resource (trees) so that immediate effects of treatments could be discussed, as well as "out-year" effects of alternatives on tree stands.

SETTING

Disturbances played a large part in the recent history of the forested landscape in the Western Route analysis area, and are responsible for the condition that we see today. Following is a general discussion of different factors that have affected the development of the forest in the analysis area.

Disturbance influences stand structure and species composition by reducing vigor and killing trees, either selectively or non-selectively. Insects have been a prominent disturbance agent in the analysis area; spruce budworm caused widespread damage and mortality in fir species in the 1980's and mountain pine beetle caused heavy mortality in lodgepole pine in the 1970's. Currently bark beetles continue to cause mortality in both the fir and pine species. Another disturbance agent is disease, which includes root rots and bole rots in the Western Route analysis area. Annosus root rot is most prominent and is actively causing mortality in grand fir at a higher level than observed in the past; Armillaria root rot is primarily causing damage to fir species; and Indian paint fungus (a bole rot) is reducing vigor in grand fir.

Timber harvest has been a disturbance agent in the area over the past several decades; and its selective removal of tree species has influenced stand compositions. Past ground-based equipment practices have influenced soil compaction in some areas (Schmitt 2002), which is connected to disease susceptibility. Compaction can exacerbate root rot diseases by causing poor root development or stressing host trees enough to weaken their defense.

Fire, it's historical cycles and subsequent suppression by humans, has had the greatest influence on the Western Route analysis area as a whole, and is primarily responsible for the current forest stands in most of the area. Most of the analysis area has been classified as a Fire Regime I (Powell 2001), which indicates a 0-35 year fire frequency and low fire severity. Frequent, low-intensity underburns were characteristic of this area in the past, creating the open stands of ponderosa pine, western larch and (to a lesser extent) Douglas-fir associated with this fire regime. Stands that were maintained as open single-story pine and larch, with large trees scattered and in clumps surrounded by pockets of regeneration of seral species, are now closed-in and multi-storied as more shade-tolerant fir have been able to grow underneath the once-open canopies. The less fire-tolerant fir species and lodgepole pine have become more dominant as they out-compete the ponderosa pine and western larch for light and moisture.

In those areas classified as Fire Regime III (35-100 year fire frequency, mixed severity) and V (200+-year fire frequency, stand-replacement fire severity), insect and disease disturbances were more prevalent. Fire suppression in these areas has allowed fuels (created by insect/disease-related tree mortality) to build up to unnatural quantities.

Fire plays an important role in nutrient cycling in the dry forests of eastern Oregon; fire suppression has altered this process, affecting species that have evolved with it (Harvey and others, 1994). When a fire does burn through the area now, nutrient cycling does not function as it historically did due to the large fuel build-up that has occurred. More fuel is available (increased needle mat, woody debris, etc.) and fires are "hotter" in comparison to historical conditions (Harvey and others, 1994).

SPECIES COMPOSITION

Existing Condition

Temperature, moisture (related to sun exposure, slope and aspect), and soils all influence the potential vegetation that may grow on a site. Since vegetation behaves in a similar way on sites that are similar in temperature, moisture and soil type, it is possible to characterize a site and the vegetation that may be expected to grow there. In other words, potential vegetation is what is expected to be there if the vegetation is allowed to grow in response to a site's temperature, moisture and soil without any disturbance. The potential vegetation and the disturbance that occur on a site are the main drivers of plant succession.

Based on physical site characteristics, the potential vegetation on National Forest System lands in the analysis area is mostly dry, upland forest type (15,614 acres), occurring on western and southern aspects. Cold, upland forest (5,614 acres) and moist upland forest (4,681 acres) make up the potential vegetation on the rest of the analysis area. Both of these types occur on eastern and northern aspects

Stands currently occupying the area vary from mixed ponderosa pine and Douglas-fir, to subalpine fir and Engelmann spruce (Table 7). Specific stand types and conditions vary across units, but most stands show many of the same

characteristics. Most obvious are higher levels of downed wood and litter (needles, leaves, etc.), and regeneration of shade tolerant species (grand fir, Douglas-fir, and lodgepole pine) in what were historically ponderosa pine-dominated stands. These conditions are a result of many years of fire suppression in stands that evolved with and adapted to frequent, low-intensity natural fires (USDA 1992). The natural pattern of fire has been altered, causing a domino effect of changes in other landscape components. Less obvious is the alteration of the vegetative mosaic and stand structures in the landscape, the change in diversity for these stands from historical conditions, and the alteration of nutrient-cycling processes (USDA 1991a).

Table 7: Forest Cover Types on National Forest System lands in the Western Route analysis area(from Powell 2001)

Cover Type	Description	Acres
PIPO	ponderosa pine is the majority species	968
mix-PIPO	Mixed forest; ponderosa pine is the plurality species	3,346
LAOC	western larch is the majority species	1,148
mix-LAOC	western larch is the plurality species	2,994
PSME	Douglas-fir is the majority species	1,717
mix-PSME	Douglas-fir is the plurality species	6,941
ABGR	grand fir is the majority species	843
mix-ABGR	grand fir is the plurality species	3,395
PIEN	Engelmann spruce is the majority species	114
mix-PIEN	Engelmann spruce is the plurality species	643
PICO	lodgepole pine is the majority species	1,605
mix-PICO	lodgepole pine is the plurality species	1,931
mix-JUOC	Western juniper is the plurality species	264
grass	grassland site	722
shrub	shrubland sites	22

Areas of cool, grand fir plant associations are present in the analysis area, consisting of grand fir, western larch, lodgepole pine, sub-alpine fir and Engelmann spruce; these associations usually occur on north- or east-facing slopes which receive less sun exposure and are generally more moist. Regeneration in these stands is primarily grand fir and lodgepole pine. These types of stands typically experienced infrequent stand-replacement fires that killed much of the stand; they would then regenerate with early seral species (western larch, lodgepole pine, and

ponderosa pine). Late seral species would come in underneath the new canopy and eventually become the primary stand component. Past spruce budworm defoliation has had an impact in these stands, creating heavy fuels and damaging the health of current grand fir and Douglas-fir.

Several stands contain Quaking aspen (*Populus tremuloides*), which occurs in clumps or as individual trees, with tree sizes ranging from large, old remnant trees to smaller saplings and suckers. In general, the aspen in this landscape are declining in numbers. Historically, the aspen stands were larger and fire was a frequent visitor that encouraged regeneration. With the suppression of fire and pressure of browsing from large ungulate populations (cattle, deer, and elk), the aspen stands have been shrinking in size through the years (Shirley and Erickson, 2001). Presently, all stands in the Western Route Analysis Area either have the capability or are reproducing well, however browse of the regeneration often prevents establishment of the next generation. Conifer encroachment into these stands is also a factor in the declining aspen population, as the conifers compete successfully against the aspen for water, nutrients and sunlight. Current overstory trees are becoming decadent and have been slowly dying out. Aspen stands are not only providing a unique component in the landscape's diversity, but are valued for their aesthetic qualities along the scenic byway and in the forest as a whole.

Table 8 shows some details from mapping done in 1937. Historical mapping is another way to compare historical conditions with current conditions, and provides an interesting look at how species compositions have changed in the area. **Note:** this mapping covers a larger area than the analysis area, as discussed later in the Historical Range of Variability analysis.

Table 8: Species Composition in 1937*

Species	Acres**
PICO (lodgepole pine)	8,086
PSME (Douglas-fir)	357
PIPO (ponderosa pine)	41,185
ABGR (grand fir)	7,372
Non-forest	5,769

* From forest type maps for Grant, Morrow, Umatilla, Union, and Wallowa Counties in northeastern Oregon, 1936-1937 (See Powell, 2002).

Environmental Consequences Unique to No Action

Direct and Indirect effects:

Taking no action on the Western Route analysis area would result in species compositions that remain out of balance with historical conditions. Species mixes in ponderosa pine communities would continue to be dominated by fir and other species, progressively lessening the amount of pine regeneration as time passes. As a result, it would be difficult for ponderosa pine to maintain a presence in stands where it should be the primary species based on environmental factors. As species

compositions remain out of balance in the dry upland forest, the landscape would continue to lose its resiliency in the face of disturbance. In stands where insects or disease are currently causing mortality, there would be no chance for a timely shift in species composition to help dilute the effects of the agents causing damage and mortality. In these stands, the opportunity to reforest areas with poor stocking due to insects or disease would be irretrievably lost.

Aspen stands would continue to decline as conifer encroachment takes over resources needed for aspen survival. With only small, remnant stands currently left in the analysis area, any more loss of this unique habitat could cause irreversible loss of this species from the Western Route Analysis Area. The opportunity to help re-establish these stands across the Western Route landscape would be foregone.

The analysis area falls under the description of Forest Cluster 5 in the Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin (ICBMP) (Quigley et al., 1996). An analysis arising from the ICBMP looked at historical and current forest landscapes, and discussed the trends found in vegetation patterns and compositions (Hessburg, et al. 1999). Hessburg et al. states: "*Dramatic change in vital ecosystem processes such as fire, insect, and pathogen disturbances, succession, and plant and animal migration is linked to recent change in vegetation patterns.*" These types of changes have occurred in the Western Route Analysis Area, and No Action would not change the trends in any way. ICBMP found that "*forest landscapes have changed significantly in their vulnerability to major insect and pathogen disturbances*" (Hessburg et al., 1999). This change was influenced by timber harvest, fire suppression and grazing, and resulted in a loss of large trees, an expansion of Douglas-fir cover, and grass/shrub understories replaced by conifers (Hessburg, et al. 1999). No Action, coupled with these past activities, would perpetuate such trends.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:

Table 9 displays a comparison of acres treated for each alternative. The silvicultural prescriptions in all action alternatives would include some form of thinning or other harvest cuts and planting that would have a direct effect on the species makeup of each stand. In all cases, early seral species such as ponderosa pine and western larch would be favored, while grand fir and lodgepole pine, and to a lesser extent Douglas-fir and Engelmann spruce, would be chosen more often for removal. While planting would primarily consist of ponderosa pine and western larch, other species appropriate to the site would also be used so that a mix of species would remain. Ponderosa pine and western larch are early seral species for plant associations in both the cold and moist upland forests, as well as the dry upland forest. At the end of all activities, the overall effect in the treated stands would be a shift toward early seral conditions (with a much smaller component of fir, lodgepole pine, and spruce). Species compositions across the analysis area would better align with what occurred historically, improving overall stand health in the long-term.

Table 9: Acres* moved toward historic species compositions.

Potential Vegetation Group	Type of Treatment	Proposed Action	Alternative 1	Alternative 2
Dry Upland Forest	Thinning/Harvest (acres)	3,935	3,392	3,953
	Planting (acres)	275	160	275
Cold Upland Forest	Thinning/Harvest (acres)	1,662	996	1,662
	Planting (acres)	221	203	221
Moist Upland Forest	Thinning/Harvest (acres)	864	802	945
	Planting (acres)	476	135	135

* Thinning and planting acres overlap.

In areas where aspen is growing, the action alternatives would remove as much of the encroaching conifer species as possible (trees over 21 inches dbh would remain). Historically, these stands were pure aspen and covered many more acres, and thinning the conifer species from them would help aspen begin to re-establish itself in the landscape.

Some stands are infected with root rots, which are affecting the health of the grand fir and Douglas-fir. Root rots remain in infected roots and can be spread by direct root contact or by spores; root rots can be exacerbated by soil compaction. In areas where root rots are present, the most effective "treatment" is not to treat the disease, but rather to change the species mix on the site so that the loss of trees to the disease is not as damaging to the stand as a whole. The stands in the Western Route Analysis Area that have known root rots (TP12-14, TP17-19, TP21-23, TP31-34, TP36, TP38-43, L4, L7, L8, L13, L17, L19, L21, K4, K8, K9, K14-17, K26, K27, K30, K32, K33) would be treated in this manner—removing much of the susceptible fir and favoring less-susceptible species such as larch. Mitigation requiring the use of machines that distribute their weight over a large area (e.g. a machine with tracks versus rubber-tires) would minimize soil compaction and mitigate its associated affects on root rot virulence, as would the use of designated skid trails.

Based on details in the Silviculture Report, selection of the silvicultural treatments discussed above was guided by standards in the Forest Plan and would meet direction of CFR 36 219.27.

Cumulative effects:

The activities proposed to treat the identified stands would begin to reverse the trends discussed in Hessburg's 1999 publication (see discussion under No Action for details). The intent of the prescriptions for all action alternatives would be to start bringing species compositions and their pattern on the landscape back to historical conditions, which when considered with past trends, would begin to restore a more

resilient landscape. A future planned project, Wild West Fuels Reduction, would continue in this direction by re-introducing fire to the landscape through prescribed burning.

The Forest Service began fencing, planting, and removing encroaching conifers in small (less than an acre each), remnant aspen stands in the analysis area several years ago, and more such activities are planned for the future to reduce browse damage and promote aspen regeneration. The current action alternatives, added with these past and future projects, would continue the trend of successful re-establishment of aspen stands in the area.

STAND STRUCTURE

Existing Condition

Stand structures in the warm, dry plant associations have changed from historical conditions of open, well-spaced large trees with sparse regeneration (essentially two layers of trees), to current conditions of stands with semi- or closed canopies of smaller trees with occasional large trees and abundant regeneration in the understories (multi-layered). Structural diversity across the landscape has decreased somewhat, with the development of multi-layered stands covering much more of the area than they did historically. The mosaic (arrangement on the landscape) of stands and structures has changed over the years with fire suppression and other management practices; the extent of open pine stands has been reduced (Hessburg and others, 1999).

Table 10 shows structural stages and species compositions as they were in 1957 and Table 11 shows existing structural stages within the Western Route analysis area, allowing comparisons of the shifts that have taken place. These shifts have changed conditions not only for vegetative species, but also for other species that rely on the open stands of pine.

Table 10: Structural Stages and Species Composition in 1957*

Species	UR	OFMS	OFSS	SECC	SEOC	SI	YFMS	Total Acres
Douglas-fir	88	3,809	74	115	16	8		**4,110**
Lodgepole pine			707	2,925	95	3,886		**7,613**
Ponderosa pine	278	2,808	31,551	1,618	2,280	420	917	**38,955**
White fir	490	78						**568**
Western larch	1,311	584	1,021	672	21		102	**3,711**
Total acres for each stage	**2,167**	**7,279**	**33,353**	**5,330**	**2,412**	**4,314**	**1,019**	

* From Forest type maps for Grant, Morrow, Umatilla, Union, Wallowa and Wheeler Counties in northeastern Oregon, 1953-1957 (see Powell 2002). The area covered by the above table is larger than the analysis area, taking in all the subwatersheds within the District boundary on the western portion of the District.

Table 11: Forest Structural Stages in the Analysis Area (from Powell 2001)

Structural Stage	Description	Acres
OFMS	Old Forest Multi-Strata	4,856
OFSS	Old Forest Single Stratum	389
SECC	Stem Exclusion Closed Canopy	1,716
SEOC	Stem Exclusion Open Canopy	8,752
SI/BG	Stand Initiation/Bare Ground	3,719
UR	Understory Re-initiation	955
YFMS	Young Forest Multi-Strata	5,522

On the dry sites, changes in stand composition are a direct driver in changing stand structure. Fire suppression has allowed stands to follow a different successional path by allowing tree species to grow in stands they would not commonly be as successful in. As canopies close in and the ground becomes more shaded, shade-tolerant (and some fire-intolerant) species regenerate and prosper with more ease than the shade-intolerant species (western larch, ponderosa pine). This has caused a shift in the composition of some of the stands across the landscape, from pine- and larch-dominated overstories and understories, to dominance by fir and lodgepole either in the overstory or understory. Past harvest selections have accelerated the effect of this shift by removing more of the ponderosa pine and larch than other species.

Historic Range of Variability (HRV) Analysis

As stated in the Eastside Screens (Forest Plan Amendment #8), the Forest Service is required to conduct an analysis of the current stand structure in an analysis area, comparing current conditions to historical ranges; this is commonly called “HRV analysis”.

Table 12Table 13 shows historical ranges and existing conditions for the landscape that includes Western Route Analysis Area, comparing whether each structural stage is within or outside the range that occurred historically for a given potential vegetation group.

> **Note:** The HRV analysis encompassed an area somewhat larger than the analysis area; essentially the District boundary in the area was used to delineate the extent of the HRV analysis (Figure 1). This larger area was determined to be the most appropriate for this landscape-scale type of analysis and ”Existing Condition” acres will not match the size of the analysis area.

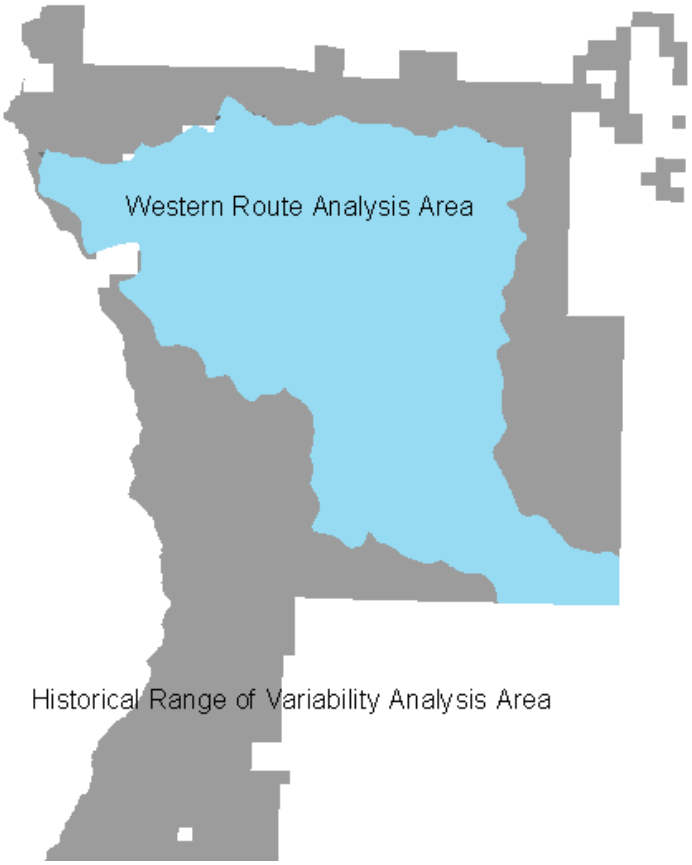

Figure 1. Comparison of Western Route Analysis Area and area used for Historic Range of Variability analysis.

Table 12: Structure definitions (Powell 2000)

OFMS	Old Forest Multi-Strata	Multi-layer stand, old trees in overstory
OFSS	Old Forest Single-Stratum	Single layer stand, old trees in overstory
SECC	Stem Exclusion, Closed Canopy	Fast-growing trees occupy site, understory excluded by lack of sunlight
SEOC	Stem Exclusion, Open Canopy	Fast-growing trees occupy site, understory excluded by lack of moisture
SI	Stand Initiation	Single layer of seedlings and saplings becoming established after disturbance
UR	Understory Re-initiation	Understory becoming established after overstory trees begin to die
YFMS	Young Forest Multi-Strata	3 or more layers, mix of sizes and ages, large trees scarce, high horizontal and vertical diversity

Table 13: Comparison of Existing Structural Condition to Historical Structural Condition

		OFMS	OFSS	SECC	SEOC	SI	UR	YFMS
Historical Ranges								
Cold UF	%	10-40	0-5	5-20	0-5	1-20	5-25	10-40
Dry UF	%	5-20	15-55	1-10	5-20	5-15	1-10	5-25
Moist UF	%	10-30	0-5	5-25	0-5	1-10	5-25	40-60
Existing Condition								
Cold UF	Ac.	819	123	490	506	1,760	448	2,063
	%*	13	2	8	8	28	7	33
Dry UF	Ac.	7,241	295	2,555	13,838	3,973	1,203	3,838
	%*	22	1	8	42	12	4	12
Moist UF	Ac.	1,132	18	787	2,003	831	214	1,870
	%*	17	0	11	29	12	3	27

* Black Shading = Below HRV
Grey Shading = Above HRV

The Historic Range of Variability analysis shows a deficit in the amount of Old Forest Single-Stratum stands in the dry, upland forest potential vegetation type–areas that typically had open stands of large ponderosa pine. Conversely, there is an over-abundance of dry upland forest in the Old Forest Multi-Strata structural stage. This fits with observations of old open stands of pine becoming overstocked with shade-tolerant species.

Environmental Consequences Unique to No Action

Direct and Indirect effects:

No action in the analysis area would leave the current stand structures as they are. In the case of Old Forest Single Stratum structure, active management would be the only foreseeable avenue for promoting an increase in this structural stage. With the current condition of Stem Exclusion Open Canopy, and assuming fire suppression would continue, the chance that this part of the District would be able to recover its historical range of Old Forest Single Stratum would be small. The level of shade-tolerant species within many stands would make it difficult for ponderosa pine and western larch to succeed to the point of becoming the primary large trees across the landscape in the future. More likely, large pine and larch would continue to decline in numbers slowly displaying less and less of a presence in the landscape.

The Forest Plan, when describing the goals and desired future conditions for the Forest, often mentions diversity in habitats and visual resources, and healthy and natural-appearing forests. The widespread loss of Old Forest Single Stratum structure across the Western Route landscape has had a direct effect on all these components. Leaving the analysis area in its current state (taking no action) would do little to achieve the goals and desired future conditions, and would most likely allow conditions to continue their decline.

ICBMP and Hessburg (1999) also discussed patterns of living and dead structure on the landscape from both a current and historical perspective as affected by changes in disturbance processes. Hessburg et al. (1999) found that in the Blue Mountains, old single-story structures declined "*by nearly 63 percent*". No Action, coupled with these trends stemming from the past, would have the effect of perpetuating the trends, which would do nothing to improve the 63-percent decline and would allow it to decline further.

Environmental Consequences Common to All Action Alternatives

Direct, and Indirect effects:

As shown in Table 14, all action alternatives would be focused primarily upon increasing Old Forest Single Stratum, which is well below its historic range of variability in this part of the District. Thinning would be the primary means of accomplishing this, especially in those stands that are in the Stem Exclusion Open Canopy stage. Thinning would shift the site's growing potential[6] to fewer trees, allowing those trees to grow larger more quickly as a result. In the case of deficient Old Forest Single Stratum structure, this would directly affect the path each treated stand takes toward old forest structure. Since many of these stands are young, development of large trees would be a long process (100+ years), but the action alternatives would start the treated stands down this path.

Table 14: Acres of treatment to enhance Old Forest Single-Strata (OFSS) structure

	Proposed Action	Alternative 1	Alternative 2
Acres treated to promote OFSS	4,116	3,597	4,134

Thinning in Stem Exclusion Open Canopy (which is well above its historical range in occurrence/abundance) would not alter the current structural stage, but it would enhance growing conditions for individual trees within stands so that they may obtain Old Forest Single Stratum more quickly. Growing Old Forest Single Stratum is obviously a long-term process, but any enhancement we could affect now with silvicultural treatments would have far-reaching effects in the future. Influencing species composition and individual stand health now would allow ponderosa pine and western larch to prosper and compete effectively with other species as the stands grow up, ultimately speeding the process of becoming Old Forest Single

[6] The potential for a site to grow trees.

Stratum. Thinning from below would begin to reduce the multiple layers found in many of these stands, further enhancing development of Old Forest Single Stratum.

Some treatments would be prescribed for Old Forest Multi-Strata. In the Dry Upland Forest, Old Forest Multi-Strata stands are above their range of variability, and a shift from Old Forest Multi Strata to Old Forest Single Stratum would be the goal of treatment in these stands. Again, pine and larch would be favored, promoting the growth of these species with the intent of providing Old Forest Single Stratum in the future. In the Cold or Moist Upland forest, Old Forest Multi Stratum is within its range of variability for the landscape. However, past and current insect infestations and active root rots (Schmitt 2002) are taking a toll on some of these stands and treatments would be prescribed to promote the health of remaining trees.

Selection of the silvicultural treatments is consistent with standards in the Forest Plan, as described in the Silviculture Report. Specifically, Forest Plan Amendment #8 (Eastside Screens) directs the treatment of an area in regard to stand structures (the Interim Wildlife Standard under the amendment), when one or both of the late and old structural stages fall below their historical range of variability (Scenario A under the Interim Wildlife Standard). The treatments which would be prescribed in each of the action alternatives would follow the direction set forth in this amendment for Scenario A.

Cumulative effects:
As discussed under No Action, ICBMP and Hessburg (1999) also discussed patterns of living and dead structure on the landscape. The intent of the prescriptions for all action alternatives is to begin bringing stand structures and their pattern on the landscape back to historical conditions. When considered with past trends, this treatment would begin to return conditions toward a more resilient landscape, particularly with regard to Old Forest Single Stratum. A future planned project, Wild West Fuels Reduction, would continue in this direction by re-introducing fire to the landscape through prescribed burning.

STOCKING

Existing Condition

A little more than half of the acres within the Western Route Analysis Area are classified as “dense” (Table 15 as identified in Forest database queries). Trees in these dense stands tend to be stressed by competition with their neighbors for light and water. Stressed trees are more susceptible to insect attack or disease infestation, and are usually slower growing (Powell 1999).

Table 15: Areas of overstocking (from Powell 2001)

Potential Vegetation Group	Overstocking (acres)
Dry Upland Forest	8,133
Cold Upland Forest	4,416
Moist Upland Forest	3,497

Stocking[7] is closely tied to disturbance cycles. Insects and disease have been more prevalent within the analysis area due to the stress caused by dense stocking. The spruce budworm epidemic in the late 1980's/early 1990's and the resulting defoliation, dead tops, sparse crowns, and tree mortality was an example of what can occur from disruption of natural processes by something such as fire suppression.

Many stands within the analysis area were heavily impacted by the budworm and remain in poor health. A variety of insect and disease damage is currently evident as individual, weak trees succumb to infestation or attack—Annosus root disease appears to be on an upswing (Schmitt 2002) and is causing noticeable mortality in the grand fir throughout the analysis area. Dense stocking appears to be a noteworthy obstacle for trees and stands in the area to overcome, which, if this condition continues, would weaken trees and create opportunities for insects or disease to increase above present levels. Many of the large, old ponderosa pine are currently at risk of attack, primarily from bark beetles; their large root systems require even greater growing space to maintain tree health. Increased shade cover (less sunlight on the forest floor) and lack of soil exposure for seed germination has resulted from a lack of frequent fire has reduced the amount of ponderosa pine and western larch regeneration in some areas, and encouraged regeneration of shade-tolerant fir and lodgepole pine.

Environmental Consequences Unique to No Action

Direct and Indirect effects:

Thinning would not occur with No Action, which would leave stands at higher risk from disturbances. Insects and diseases would gain a stronger foothold where trees are weakened by competition for light, moisture and growing space. Stands with denser understories would be at higher risk of wildfire. No Action would perpetuate trends of increased stocking as described in ICBMP and Hessburg (1999).

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:

As displayed in Table 16, all action alternatives would reduce stocking in the treatment units; this would be accomplished primarily by non-commercial or commercial thinning. Thinning can mimic low-intensity surface fires, defoliator damage, or other similar natural disturbance processes (Powell 2000), removing trees from a stand that would have been absent given natural disturbance. Prescriptions for all action alternatives would be designed to begin bringing stand densities back to historical conditions. Removal of some of the trees in the treatment units would allow remaining trees more access to sunlight, nutrients, water, and growing space, which would improve the overall health of affected

[7] Stocking is the number of trees that occupy a given site, usually measured as trees per acre or basal area per acre.

stands. Maintaining or improving tree health could reduce damage and mortality from insects and disease, and create a more long-lived and resilient stand. This would move the analysis area toward the desired condition listed in the Forest Plan (page 4-4) for a reduction in large-scale pest outbreaks and an improvement in the overall health of the forest. Selection of the silvicultural treatments was guided by standards in the Forest Plan as described in the Silviculture Report.

Table 16: Comparison of improved stocking among the action alternatives.

	Proposed Action	Alternative 1	Alternative 2
Acres of reduced stocking	5,901	4,829	6,000

Cumulative effects:
Past activities of fire suppression and selective timber harvest helped create the stocking problems observed in current stands within the analysis area. The proposed thinning would counteract effects of these past activities by creating more sustainable stand densities in the treated units, which would begin to re-initiate a more resilient landscape. The future Wild West Fuels Reduction project would continue in this direction by re-introducing fire to the landscape through prescribed burning. Since fire is a natural thinning tool, this future project would enhance the effects of the action alternatives.

FUELS

This section incorporates by reference the Western Route Vegetative Management Fire/Fuels Report contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

Analysis of fuel conditions and associated fire behavior was conducted at the subwatershed level for the Western Route Vegetative Management Area, which includes the Upper and Lower Five Mile sub-watersheds. Fuel loading developed for this analysis is specific to the identified unit and areas within the analysis area. The private property within the subwatersheds was not included in this analysis

Air quality was analyzed at a much broader scale. The Oregon Department of Environmental Quality has identified sensitive areas and “Special Protection Zones” for the State of Oregon as directed by the Clean Air Act. Section 169 of the Clean Air Act also provided protections from visibility impairment for Class I Airsheds, above designated Wilderness areas. The proposed treatment units are more then 60 air miles from the nearest Class I Airshed designated Wilderness. Class II Airsheds covers all other areas. Wilderness areas with Class II Airshed areas are not directly protected under the Oregon Visibility Protections Program (OAR 340-20-047, Section 5.2).

FIRE & FUELS HISTORY

The subwatersheds within the analysis area have experienced 85 fires between the years 1970 and 2002. The Western Route area is generally less conducive to large fire growth because the flat topography limits uphill spread potential, and the network of roads within the area allows for quick suppression response. These conditions have kept fires small, with most fires being contained at 0.25 acres or less (74 ignitions). Table 17 below shows ignitions by size class. Ignitions sources include 29 human caused fires, 45 lightning caused fires, and 11 other ignitions that did not have a cause listed in the database.

Table 17: Fire Occurrence within the Western Route Analysis Area 1970-2002*.

Size	# Fires
Class A (0-.25 acres):	74
Class B (.25-10 acres):	11
Class C (10-100 acres):	0
Class D (100-300 acres):	0
Class E (300-1,000 acres):	0
Class F (1,000-5,000 acres):	0
Class G (5,000 + acres):	0
Total:	**85**

*Data for 2003 was not available at the time this report was prepared.

The Western Route analysis area shows signs of past fuels treatment, primarily through burning associated with timber sales. Pile burning has occurred within the analysis area as recently as November 2003 to dispose of piles associated with post and pole sales and hand piles created through thinning associated with aspen recovery projects. Some natural fuels underburning have occurred adjacent to the analysis area, with small areas that overlap the edge of the analysis area (about 25-30 acres).

FIRE REGIME

Existing Conditions

Fire regime is the frequency of fire occurrence coupled with typical fire intensity for a given forest stand type. Current stand conditions and their associated fuel complexes are the result of a number of influences including historic fire activity, fire suppression within the past 100 years, timber harvest, site preparation and reforestation, thinning, and livestock grazing. The three dominant fire regimes found within the analysis area are described below (see Map 7 in Appendix C). Acreages given below have been rounded to nearest full acre. Privately owned acreage within the subwatershed has not been included.

Dry Forest (Fire Regime I) – 16,337 acres
Low intensity, short return interval (0-35 years) fires dominate dry forests. Fire sustains early seral species, such as ponderosa pine, and thins a large proportion of the seedlings and saplings that become established between fires. The result is a relatively open, single-storied stand with low levels of accumulated fuels.

Moist Forests (Fire Regime III) – 4,705 acres
Fire regimes are complex in these forests, with a return interval of 35-100+ years. This is often referred to as a mixed fire regime, indicating that fires often burn with a combination of low to moderate intensity surface fire with patches of high intensity where changes in surface fuels, stand density, and/or topography come together to increase fire intensity. Because of the variation in these factors, patch sizes resulting from this type of fire regime are likely to be highly variable.

Cold Forest (Fire Regime V) – 5,614 acres
The cold forest fire regime is characterized as high intensity-low frequency (200+ years). Associated tree species show little resistance to fire, but, in the case of lodgepole pine, can quickly reclaim a site after fire. The late seral species of these forest types, such as subalpine fire and Engelmann spruce, are very susceptible to crowning and/or torching, which produces fires that spread rapidly via spotting or crowning runs.

FUEL CONDITION CLASS

Existing Condition

Condition classes are used to describe the current condition of the analysis area with respect to historical fire return. Condition classes are defined as the degree of departure from the historic fire regimes resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, canopy closure, and fuel loading. One or more of the following activities may have caused this departure: fire exclusion, timber harvesting, regeneration activities following harvest, livestock grazing, introduction and establishment of exotic plant species, insects and disease (introduced or native), or other past management activities.

Each fire regime has a condition class (see Map 8 in Appendix C). Areas in Condition Class 1 (7,260 acres of the analysis area) exhibit conditions that mimic what would historically be expected on the site. Areas in Condition Class 2 (16,825 acres of the analysis area) are beginning to trend away from their historic norm, primarily through increased stocking levels, in-growth of mid and late seral species, and increased fuel loading. Areas in Condition Class 3 (2,571 acres of the analysis area) have moved further away from what would be expected historically.

Much of the Condition Class 2 within the Western Route analysis area is contained in the low intensity, Fire Regime I. This supports the concern expressed in the Camas Ecosystem Analysis that areas historically dominated by a low intensity fire regime are lacking the single-storied stand structure, early seral species composition

that would exist under a natural disturbance regime. Overall, most of the analysis area outside the private property is in Condition classes 1 and 2, with a limited portion trending toward Condition Class 3.

Environmental Consequences Unique to No Action

Direct and Indirect effects:

Under this alternative, no areas would be treated for stand structure modification or fuels under this Environmental Analysis. Predominately open ponderosa pine stands within Fire Regime I would continue to accumulate fuels (horizontal and vertical) and shift to a higher condition class. While stands in Condition Class 1 are currently at low risk for high severity fire, these stands would eventually develop fuel conditions that would increase the potential for high intensity, difficult-to-control fires. In those areas of Fire Regime I where the in-growth of seedlings and saplings and/or understory fuels have created Condition Class 2 or 3, the stands would continue to be at risk for moderate to high severity wildfires. Stands in Fire Regimes III and V would also continue to accumulate fuels and increase stocking levels, which would further increase the potential for crown fire that is already higher in these fire regimes (Table 21).

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:

None of the alternatives would change the fire regimes within the Western Route areas. Fire regimes are static site conditions that do not change in a time or scale related to this analysis.

Stands currently in Condition Class 1 would be maintained as Condition Class 1. Treatments would prevent trending towards higher condition classes by maintaining stocking levels and stand structure within a normal range of variance for the associated fire regime/stand type. Treatment of stands classified as Condition Class 2 or 3 would change to Condition Class 1 (Table 18). This conclusion is supported by monitoring of the Owens Hazardous Fuels Reduction project, which began mechanical fuels reduction in 2003 (Table 19). The fuels conditions treated by the Owens project are similar to the conditions found in the Western Route proposed treatment units.

Table 18: Changes in Condition Class resulting from Action Alternatives

	Proposed Action	**Alternative 1**	**Alternative 2**
Acres of Condition Class 3 converted to Condition Class 1*	1,237	1,216	1,259
Acres of Condition Class 2 converted to Condition Class 1*	3,613	3,049	3,688

Table 19: Condition Class for the Owens Project Trial Units

Owens Unit	Type	Pre-treatment Condition Class	Post-treatment Condition Class
1	Ground Base	2	1
2	Ground Base	2-3	1
3	Ground Base	3	1
4	Ground Base	3	1
5	Skyline	3	1

FUEL PROFILE

Existing Condition

The fuel profile consists of the amount of fuel present (fuel load), fuel type/composition, structure, and arrangement (horizontal and vertical). Fuel models have been developed to characterize the mix of these components.

Fuel loading in the Western Route area is generally trending to higher tons per acre than would be normal under historical fire disturbance patterns due to suppression of fires that would have consumed fuels. The fuel models found within the Western Route analysis area include Fuel Models 1, 2, 5, 8, and 10 (see Map 9 in Appendix C). Fuel model 11 is listed here for reference; while there are currently no areas of this fuel model in the analysis area, the proposed action could temporarily create conditions associated with it. Fuel Models 12 and 13 are included where expected behavior of existing fuels would be similar to these models.

Northern Forest Fire Laboratory Fuel Model 1
Fire spread is governed by fine, porous, continuous herbaceous fuels (including annual and perennial grasses) that are cured or nearly cured. These are surface fires that move rapidly through the cured grass and associated material. Generally, less than one-third of the area contains shrubs or trees (i.e. grasslands, savanna).

Northern Forest Fire Laboratory Fuel Model 2
Fire spread is primarily via fine herbaceous fuels that have cured or are dead. These are surface fires where herbaceous material, plant litter, and fallen dead stem wood from the open shrub or timber overstory contribute to the fire intensity. Open shrub lands and pine stands that cover about one-third of the area generally fit this model. Such stands may include clumps of fuels that generate higher intensities and may produce firebrands.

Northern Forest Fire Laboratory Fuel Model 5
Fire is carried in surface fuels made up of litter cast by shrubs and understory grasses or forbs. Shrubs are short and almost totally cover the area. The fires are seldom very intense because surface fuel loads are light, the shrubs are young with little dead material, and foliage contains little volatile material.

Young, green stands with no dead would qualify: laurel, vine maple, alder, even chaparral (Manzanita, chamise, and Ceonothus).

Northern Forest Fire Laboratory Fuel Model 8
Fires are generally slow burning surface fires with low flame lengths, although an occasional heavy concentration of fuel may flare up. Only under severe weather conditions, involving high temperatures, low humidity, and high winds, do the fuels pose fire hazards. This model is defined by closed canopy stands of short-needled conifers or hardwoods that have leafed out, with a compact litter layer and little undergrowth. Representative conifer types are white pine, and lodgepole pine, spruce, fir, and larch.

Northern Forest Fire Laboratory Fuel Model 9
Fire occurs mainly within the surface litter and understory, and fire spreads faster than Model 8 and with higher flame lengths. Concentrations of fallen dead woody material contribute to possible torching out of trees, spotting, and crowning. Both long-needle conifer stands (i.e. closed stands of ponderosa pine) and hardwood stands are typical.

Northern Forest Fire Laboratory Fuel Model 10
Fires burn in surface fuels with greater fire intensity than other timber litter models. Fallen dead fuels include greater quantities of 3-inch (7.6 cm) or larger limbs, resulting from overmaturity or natural events that create a large load of dead material on the forest floor. Fire control may be difficult due to crowning, spotting, and torching. Any forest type may fall within this category if heavy down material is present (e.g. infested or diseased stands, stands blown down by wind, overmature forest with deadfall, and aged light thinning or light harvest debris).

Northern Forest Fire Laboratory Fuel Model 11
Fires burn actively in the slash and herbaceous material intermixed with the slash. The arrangement and variation in the fuel load along with age and decay can limit fire potential. Thinning operations and light harvest units in mixed conifer, hardwoods and southern pine stands are representative. Clear-cut stands generally produce more slash than is considered in this model. The less-than-3-inch size classes of fuel are usually less than 12 tons per acre. The greater-than-3-inch size classes are represented by not more than 10 pieces of 4-inch diameter material in a 50 foot transect. (This model is listed here for reference as a future condition).

Northern Forest Fire Laboratory Fuel Model 12
Rapidly spreading fires with high intensities capable of generating firebrands can occur. When a fire starts, it is generally sustained until a fuel break or change in fuels is encountered. The visual impression is dominated slash and much of it is less than 3 inches in diameter. The fuels total is less than 35 tons per acre and seems well distributed. Heavy partial cuts are represented. The material larger than 3 inches is represented by encountering 11 pieces, 6 inches in diameter, along a 50-foot transect.

Northern Forest Fire Laboratory Fuel Model 13
Fire is generally carried across the area by a continuous layer of slash. Large quantities of material larger than 3 inches in diameter are present. Fires spread quickly through the fine fuels and intensity builds up more slowly as the large start burning. Active flaming is sustained for long periods and a wide variety for firebrands can be generated. These contribute to spotting problems as the weather conditions become more severe. Clearcuts and heavy partial-cuts in mature and overmature stands are depicted where the slash load is dominated by the greater-than-3-inch diameter material. The total load may exceed 200 tons per acre, but fuels less than 3 inches is generally only 10 percent of the total fuel load. Situations where the slash still has "red" needles attached but the total load is lighter (more like model 12) can be represented because of the earlier high intensity and quicker area involvement.

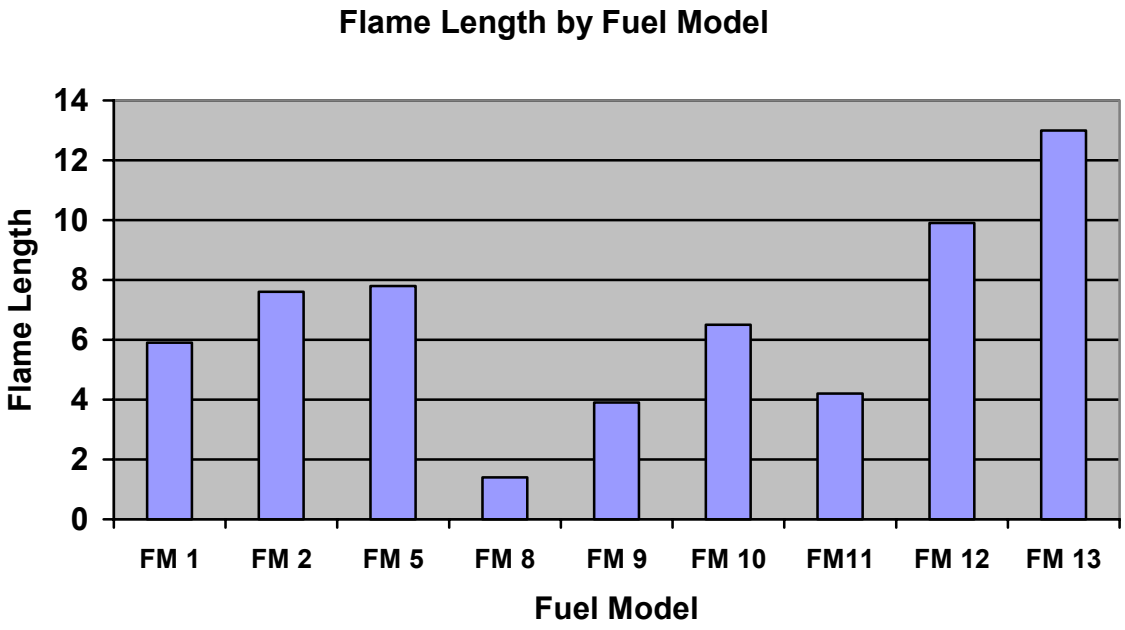

Figure 2. Predicted flame length by fuel models for standard fuel loads.

Environmental Consequences Unique to No Action

Direct and Indirect effects:
Understory stocking and fuels would continue to increase in all fire regimes, increasing fuel loads and continuity (both horizontally and vertically). Fuel conditions

would shift predominantly toward fuel models 10, 11, 12, and 13[8], with expected fuel loads increasing in 10 years to an average of 35 tons per acre in dry upland forest and an average of 60 tons per acre in cold upland and moist upland forests. This estimate is based on past observations of fuel build-up in similar settings.

Some of the future Wild West Underburn units would need to be modified or dropped from implementation due to fuel levels that would exceed the fire prescription.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:

Natural fuel loadings would be reduced through removal of fuels from units, piling the material, and prescribed burning (pile burning, underburning, or jackpot burning) (Table 20). Piled material would be removed for utilization or burned in place if conditions preclude its use. Pile burning would occur in late fall or early winter when weather conditions allow for best fire control. Underburning of treatment units would be used where practical and needed to further reduce fuel loads to meet guidelines. Underburning on a frequent return interval (5-15 years) would also be used to mimic natural disturbance patterns, to prevent dense tree stocking in the future, and to promote stand health.

Table 20. Fuels Effects of Proposed Action and its Alternatives

	Proposed Action	**Alternative 1**	**Alternative 2**
Acres of fuels treated	6,484	5,213	6,583
Miles of fireline constructed (tractor and manual)	92	80	95
Acres coinciding with future Wild West Underburn	3,563	3,160	3,587

* Note: All other acres treated would be maintenance of Condition Class I.

All phases of treatment combined would reduce fuel loads to the Forest Plan guidelines discussed earlier in this document. This conclusion is supported by monitoring of the Owens Fuel Reduction project, which showed that units with fuel loading as high as 60 tons per acre dropped to a range of 8 to 12 tons per acre after treatment (Owens Trial Study, 2003)

Prescribed burning would require construction of fire containment lines to prevent the spread of fire beyond treatment areas. Where ever possible existing roads and natural barriers would be used to minimize the amount of fireline constructed. Also units with common boundaries would be combined into larger units when practical to reduce line construction. Fire containment lines would be constructed to the minimum necessary to stop fire spread, in order to reduce soil disturbance (Table 20). Mitigation would also be applied to water bar and seed fireline as needed after

[8] While Fuel Models 11, 12, and 13 are related to timber harvest and there would be no harvest in this alternative, the fuel accumulation would mimic fire behaviour conditions represented by these models.

treatment is completed. Fireline would be constructed by hand on any areas that are considered sensitive.

Cumulative Effects:
The future Wild West Underburn has a number of units that would coincide with the proposed treatment units under this project. Wild West was initially developed a number of years ago and fuel conditions have changed such that the proposed treatments would aid in fire control under the Wild West project.

FIRE BEHAVIOR

Existing Condition

Fuel conditions, fuel arrangements, topography and associated potential fire behavior vary across the Western Route analysis area. This is the case for horizontal fuel profiles (surface) and for vertical fuel profiles (ladder fuels). Generally, areas with lighter fuel loadings experience short duration, low to high intensity fires—areas dominated by grass (fuel models 1 and 2) burn intensely, but burn out quickly. Fires spread very slowly in the case of the short needle timber areas (fuel model 8) or very rapidly in the case of the grass fuels. Areas with heavy fuel accumulation burn with higher intensities for longer periods of time with moderate rates of spread (Fuel Model 10).

Stands are overstocked by smaller-sized trees that present continuous vertical fuel continuity, which can contribute to the initiation of a crown fire. In addition, fuel loads in lodgepole and mixed conifer (Fire Regime III and V) have sufficient surface fuels that fire intensity would be high enough to initiate crown fire without ladder fuels. Research has shown that high tree density causes forest stands to be more vulnerable to crown fire initiation at any age, and that it also extends the duration of a stand's exposure (by 20 to 30 years) to crown fire hazard (Keyes and O'Hara 2002). As a result, an assessment of crown fire susceptibility was completed for the Umatilla National Forest (Powell 2004); Table 21 displays information from this Forest database that applies to the Western Route analysis area. Results of the crown fire analysis show that about 28% of the analysis area currently has a high potential to express crown fire behavior during a fire, ranging from a low of 10% on Dry Upland sites (Fire Regime I) to a high of 64% for Moist Upland (Fire Regime III) sites (Powell 2004). In addition to the overstocking, species composition is changing to species that are less fire tolerant and more susceptible to mortality by fire, either by cambium layer damage or combustion of the crown of the tree.

Table 21. Existing crown fire potential by vegetation type for the analysis area.

Potential Vegetation Group	Crown Fire Potential			
	Low (Acres)	Moderate (Acres)	High (Acres)	High (Percent)
Dry Upland Forest Area, Fire Regime I	10,828	3,213	1,574	10%
Moist Upland Forest Area, Fire Regime III	978	703	3,001	64%
Cold Upland Forest Area, Fire Regime IV	1,043	1,321	3,250	58%
Total Area	**12,849**	**5,237**	**7,825**	**28%**

Sources/Notes: Criteria used to determine crown fire potential are described in Powell (2004) and are based on work by Agee (1996).

Environmental Consequences Unique to No Action

Direct and Indirect effects:

Fuel conditions and expected fire behavior would continue to vary dramatically across the Western Route analysis area. Both horizontal and vertical fuel continuities would increase. Generally, areas with lighter fuel loadings would experience lower to high intensity fires (i.e. grass-type fuel models 1 and 2 burn intensely but burnout quickly). Fires would spread very slowly in the case of the short needle timber areas (Fuel Model 8) or very rapidly in the case of the grass fuels (Fuel Models 1 and 2). Areas with heavy fuel accumulation would burn with higher intensities for longer periods with moderate rates of spread (Fuel Model 10).

Fire suppression would be more difficult due to the addition of the vertical fire component and increased fire intensities. Direct attack by hand crews is generally limited to 4 foot flame lengths, and many of these stands would exhibit higher flame lengths (see Appendix A of Fire/Fuels Report). Such flame lengths would require indirect attack methods or the use of heavy equipment, both of which have the potential to increase the effects caused by the fire and/or its suppression.

Increased fuel loads also pose higher levels of risk to firefighting personnel and to the public who use forestlands. With higher horizontal and vertical fuel continuities and fuel loading, fire behavior would become less predictable due to increases in spotting and crown fire activity.

The future Wild West Underburn would not be as effective, due to heavy existing fuel loads. With no pretreatment to remove fuels, underburning would be detrimental to those forest stands with more than 20 tons per acre. Underburning with current fuel loads would have scorch heights (see Appendix A of Fire/Fuels Report) that would initiate crown fire, even in the absence of ladder fuels, and cause increased tree mortality.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:
Fire danger in all action alternatives would temporarily increase due to heavier fuel loadings created by the proposed harvest and thinning. The increase in potential fire activity would be of short duration (1-3 years), until all treatments and associated prescribed burning would be completed. Fire danger would be decreased for 20-30 years after treatment.

Horizontal and vertical fuel continuities would be disrupted within treatment units. Where vertical continuity is broken, fire would be forced into surface fuels where it would be more easily and safely suppressed. Breaks created in horizontal continuity would slow fire and reduce its intensity, providing an area for suppression to be effective. Crown fire potential would be reduced due to changes in fuel continuity (both horizontally and vertically) and the reduction of fire intensity due to lower fuel loads.

WILDLIFE HABITAT

This section incorporates by reference the Western Route Vegetative Management Wildlife Report contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

The overall scale for analyzing the effects on wildlife is the Upper and Lower Fivemile Creek subwatersheds. Wildlife habitats in this area are predominantly ponderosa pine forest (containing ponderosa pine, western larch and some Douglas-fir). Mixed Douglas fir, grand fir, western larch, and lodgepole pine forests are also common in the area, particularly on moist sites. Other important habitats include riparian areas, meadows, and intermittent aspen stands. Scales for analyzing individual species needs will be discussed in the related section for that animal.

MANAGEMENT INDICATOR SPECIES

The Forest Plan (1990) terrestrial wildlife management indicator species are listed in Table 22 along with their representative habitat type. The habitat requirements of these species are presumed to represent those of a larger group of wildlife species requiring similar habitats. All of these species have the potential to occur in the Western Route analysis area. Habitat conditions for these species are displayed under their related habitat. Numerous sightings of pileated woodpeckers and Rocky Mountain elk have been made throughout the analysis area by individuals in the past and during reconnaissance of the analysis area. Sightings of these species have also been recorded in the FAUNA database[9]. There have been no sightings of

[9] FAUNA is a data collection tool for biologists to enter terrestrial wildlife observations.

northern three toed woodpeckers or pine marten in the analysis area, although there have been sightings of pine marten to the west and south. The silvicultural report was examined to determine the extent of dry upland, cold upland, and moist upland forest types. The presence of these habitats is one factor for determining which primary cavity excavators have the potential to occur within the analysis area.

Table 22. Wildlife management indicator species on the Umatilla.

Species	Habitat Types	Applicable Subheading
Rocky Mountain elk	General forest habitat and winter ranges.	Big game habitat
Pileated woodpecker	Dead/down tree habitat (mixed conifer) in mature and old stands.	Old Growth Habitat
Northern three-toed woodpecker	Dead/down tree habitat (lodgepole pine) in mature and old stands.	Old Growth Habitat
Pine marten	Mature and old stands at high elevations (>4000')	Old Growth Habitat
Primary cavity excavators	Dead/down tree (snag) habitat.	Snag and Down Wood Habitat

BIG GAME HABITAT

Existing Condition

Winter Range

The Monument big game winter range (Management Area C3) occurs to the west and south of the analysis area, with about 290 acres (0.1% of the analysis area) overlapping the southernmost edge of the Lower Fivemile Subwatershed. No proposed units would occur within the C3 management area allocation within the analysis area, so this habitat component will not be discussed further.

Cover and Forage

Another value important to big game is the amount of cover, particularly satisfactory cover[10]. This habitat provides valuable hiding, thermal, and escape cover for elk. Marginal cover also provides hiding and escape cover, but its tree canopy is less dense and so does not provide as much protection from the weather. A mosaic of forage and cover habitats is distributed throughout the analysis area. Available forage is allocated to both big game and domestic livestock in the analysis area. Table 23 displays the existing condition and Forest Plan standards for cover.

[10] Satisfactory cover is defined as "cover used by animals to improve the effects of weather." For elk, this consists of stands of coniferous trees 40 feet or more in height with an average crown closure of 70 percent or more.

Marginal cover consists of trees that are 10 or more feet high with an average canopy closure of at least 40 percent, and generally capable of obscuring at least 90 percent of a standing elk from the view of humans at a distance of 200 feet.

Disturbance

The quality of elk habitat is influenced by the presence of humans, which causes animal stress and hunting vulnerability. This is primarily associated with motorized use of open roads and availability of cover. Elk have been found to select habitats preferentially based on increasing distance from open roads (Rowland et al. 2000). Vulnerability and hunting mortality have been found to be higher in forested stands with greater road densities and less hiding cover (Weber et al. 2000). Many roads in the Western Route analysis area have been closed to motorized vehicles since the early 1990's such that the potential for road disturbance to elk has declined in recent years. Currently, there are 86.6 miles of open road on National Forest System lands within the analysis area, for an open road density of 2.1 miles per square mile. This almost achieves the desired condition of an average of 2 miles per square mile or less Forest-wide (USDA 1990).

Habitat Effectiveness Index (HEI)

Potential disturbance to elk can be measured by evaluating the density of open roads, the availability of cover (satisfactory and marginal), and by considering the distribution of cover and forage across the landscape. This has been done for the Western Route analysis area using a model called the Habitat Effectiveness Index, or HEI. The Forest Plan identified standards for HEI calculated on a subwatershed (allocation) basis[11] (USDA 1990): E2 requires an HEI value of no less than 45, while C4 requires an HEI of no less than 60. Table 23 shows existing cover and HEI calculations.

Table 23. Current HEI in C4 and E2 in the Western Route Analysis Area

			Existing			Forest Plan Standard		
Allocation	**Area (acres)**	**Open Roads (miles)**	**Sat. Cover**	**Total Cover**	**HEI**	**Sat. Cover**	**Total Cover**	**HEI**
C4 North	6,095	9	38%	67%	62			
C4 South	4,219	17	11%	45%	53			
C4 Total	10,314	26	27%	58%	59	15%	30%	60
E2	12,311	49	11%	50%	53	10%	30%	45

Management Indicator Species: Rocky Mountain Elk

The analysis area occurs within the Heppner Management Unit for big game. Elk are abundant in the analysis area in the spring, summer, and fall. In the late fall, elk typically migrate down in elevation to winter range habitats to the north, east, and west of the analysis area. In mild winters, some elk may remain in the lower elevations of the analysis area, particularly in the south and east. The population management objective set by Oregon Department of Fish and Wildlife is 2,800 elk. Oregon Department of Fish and Wildlife population estimates for the management

[11] HEI was analyzed for each management area (allocation) at the analysis area scale (Upper and Lower Fivemile subwatersheds combined). The C4 was actually split by the C4 north of Forest Road 53 and C4 south of Forest Road 53 because these are unconnected.

unit are summarized in Figure 3. The elk population has exceeded or met the management objective for the Heppner Unit 11 of the last 13 years (Schommer and Johnson 2003, ODFW). However, in the last two years, the population has fallen below the management objective for the unit. In spring 2004, surveys of elk in the winter range resulted in a population estimate that would be 300 animals short of the Heppner Unit management objective. Reasons for this are speculative at this time.

Calving occurs in the late spring and early summer in the analysis area where good escape cover and forage habitats are adjacent to one another. These areas are typically at low to mid elevations, although calving is believed to occur throughout the analysis area.

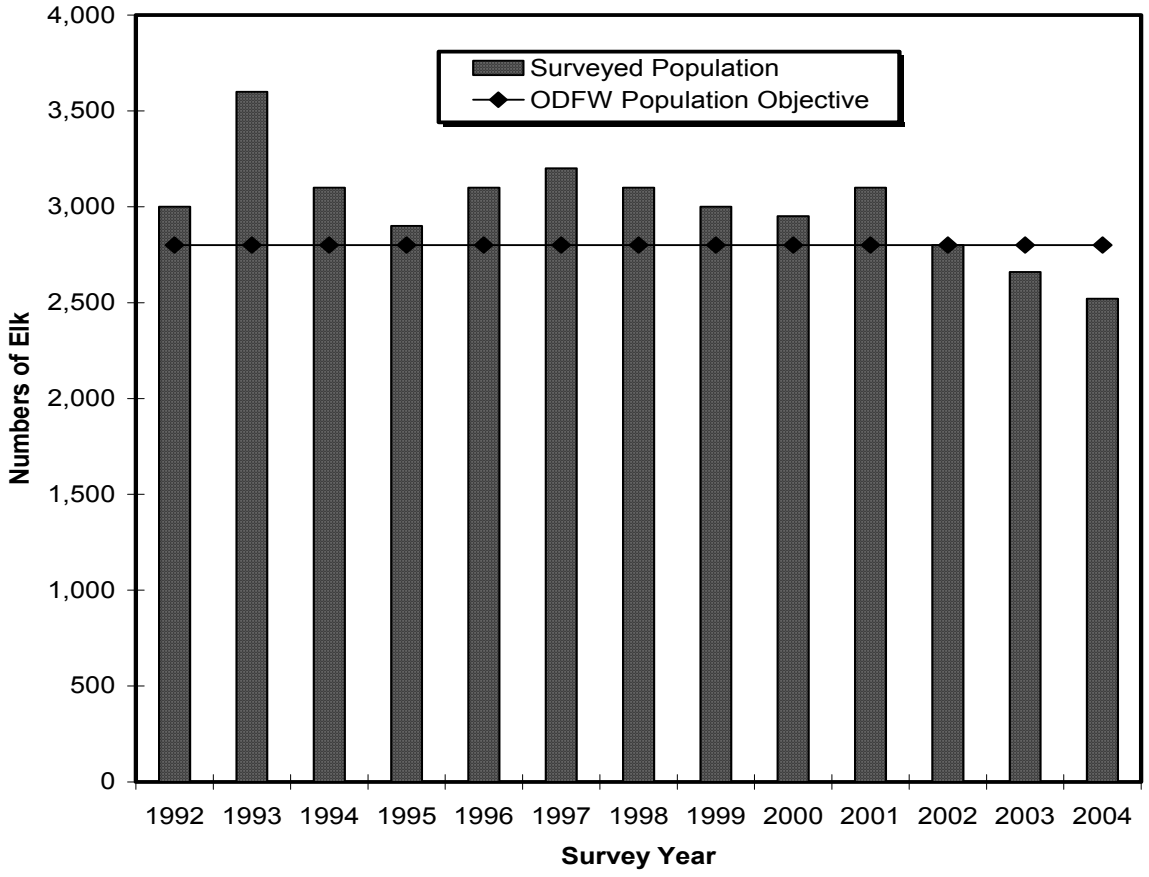

Figure 3. Elk population estimates in the Heppner Management Unit (Schommer and Johnson 2003, ODFW).

Environmental Consequences Unique to No Action

Direct and Indirect Effects:

The percent of satisfactory, marginal, and total cover would not change in the short-term (20 years), nor would the quantity and quality of hiding cover. Elk cover would remain the same, with percent of satisfactory cover in C4 South staying below

Forest Plan standard. The open road density in the analysis area would remain at 2.1 miles per square mile. With the current management direction, road density is not expected to increase within the analysis area, although some closed roads have been proposed for future decommissioning (project Roads Analysis, Appendix A). Habitat effectiveness index (HEI) would remain the same as well, which means HEI in C4 South and in the entire C4 would continue not to meet the Forest Plan standard (Table 23).

Over the long term (beyond 20 years) given current fire suppression policies, stands would continue to develop a multistory structure, increasing the amount of satisfactory, marginal, and total cover above what is currently present. Stands would shift from forage to marginal cover, and marginal cover to satisfactory cover where there is the capability to support cover.

The increase in cover and multi-layer canopies would increase susceptibility of stands to insect and disease outbreaks and high severity wildfires. These events would cause large-scale disturbance in the analysis area. Based on observations of similar stand types on the Umatilla National Forest that have burned in the past decade and current conditions in the analysis area, this type of disturbance would result in a reduction of total and satisfactory cover below Forest Plan standards. Habitat would shift from cover to forage and HEI would decrease below Forest Plan standards. Vulnerability of big game would also increase following these events.

Environmental Consequences Common to All Action Alternatives

Direct/Indirect Effects:

Regeneration harvest, commercial and non-commercial thinning, and fuels treatment activities would all affect cover in the Western Route analysis area. The proposed treatments would convert a portion of existing satisfactory cover to marginal cover and a portion of marginal cover to forage in the E2 and C4 management areas (Table 24). However, removal of conifers from aspen stands would not affect cover because the conifers are scattered, aspen clumps are small, and aspen lose their leaves in the fall and winter. Table 25 shows the post-treatment HEI by alternative.

Table 24. Post-Treatment Cover in the Western Route Analysis Area

Management Area	Post-Treatment Satisfactory Cover			Post-Treatment Total Cover		
	Proposed Action	Alt. 1	Alt. 2	Proposed Action	Alt. 1	Alt. 2
C4 North	24%	38%	24%	63%	67%	63%
C4 South	10%	11%	10%	40%	45%	40%
C4 Total	18%	27%	18%	53%	58%	53%
E2	6%	10%	6%	46%	46%	46%

Gray shading indicates need for Forest Plan amendment to waive the percent satisfactory cover standard.

Table 25. HEI in the Western Route Analysis Area.

Management Area	Pre-Treatment HEI	Post-Treatment HEI		
		Proposed Action	Alternative 1	Alternative 2
C4 North	62	62	62	62
C4 South	53	54	53	54
C4 Total	59	58	59	58
E2	53	53	54	53

Gray shading indicates need for Forest Plan amendment to waive HEI standard.

Big game vulnerability would increase in commercially and non-commercially thinned stands due to decreased stand densities (increased visibility), though this would happen to a lesser extent in non-commercially thinned units (where multi-layered conditions would be thinned to fewer layers). In the salvage, sanitation, shelterwood, seedtree, and commercial thin units, both the overstory and middle structure would be reduced.

Burning to treat fuels would temporarily remove shrubs, grasses, and seedlings from the understory in treated stands. Within a year after the burn, these types of vegetation would re-occupy the burned area, increasing forage for big game. Burning would not change the overstory composition or structure because the burn prescription would be designed to produce a cool, controllable fire. Mechanical fuels treatments would encourage new growth of grasses and shrubs, and improve elk mobility in stands that currently contain heavy fuel loads.

Use of existing open roads and closed roads temporarily reopened to access treatment units would not change open road densities. Also, no temporary roads would be constructed. As a result, there would be no change in HEI related to roads. However, use of these roads together with treatment activities would result in disturbance to elk and other big game species during implementation, potentially causing affected animals to shift their use away from these areas during active implementation (several months a year for up to 5 years).

Cumulative Effects:

Past activities and events that have had cumulative effects on cover and HEI in the Western Route analysis area are discussed in Appendix A. Proposed harvest and thinning would combine with past commercial harvest and insect outbreaks to cumulatively decrease the amount of cover in the Western Route area. Past harvest has reduced the quality of affected cover on approximately 65% of the National Forest System lands within the analysis area. While proposed harvest (commercial thinning, seedtree, shelterwood, salvage, and sanitation) would overlap much of the area harvested in the past, new areas would be harvested as well, reducing the quality of cover on a greater portion of the analysis area (Table 26). The amount of cover affected by insects is unknown, although insect outbreaks in the 1980s resulted in heavy overstory tree mortality in portions of the analysis area and spruce budworm in the late 1980's/early 1990's defoliated trees in overstories and

understories throughout the analysis area. As a result, a portion of the available cover in the analysis area was converted to forage habitat.

Table 26: Amount of Cover Affected by Combined Proposed and Past Harvest

	Current Condition	Proposed Action	Alternative 1	Alternative 2
Amount of analysis area affected	65%	72%	70%	73%

Proposed harvest, thinning, and fuels treatment would combine with past harvest to further reduce the cover to forage ratio[12] in C4 North and E2. These effects would increase the vulnerability of big game to hunting, particularly where road densities are high.

Proposed removal of conifers from aspen stands would combine with past and planned future aspen restoration activities to protect a greater portion of these unique habitats in the analysis area.

Proposed fuel treatments (mechanical and prescribed fire) would combine with the future Wild West Prescribed Fire to begin to reverse the effects of decades of fire suppression. Reductions in accumulated fuels and changes in fuel continuity would reduce the risk of large, high severity fires in the future, which otherwise would remove cover, further decrease HEI, and increase animal vulnerability. Proposed fuel treatments and the Wild West underburn would also cumulatively increase forage quantity and quality and mobility of animals, benefiting elk and other big game that use the analysis area.

Environmental Consequences Unique to Alternative 1

Direct/Indirect effects:

Thinning, harvest, and fuel treatments associated with this alternative would occur in some satisfactory and marginal cover, but would not reduce stand densities or structure below thresholds that define these cover types, so the cover would not be converted to a lower quality. About 20 acres of satisfactory cover would be converted to marginal cover in E2. This amount comes from the accumulation of numerous small blocks of satisfactory cover that would be impractical to separate from the larger units. These acres equate to a 0.2% reduction in cover, but since existing satisfactory cover is 10.6% (rounded to 11% in Table 23) the reduction would remain above Forest Plan standards. HEI would remain the same in C4 and improve in E2 following treatment. The improvement would result from better distribution of cover to forage. As a result, this alternative would not require a Forest Plan amendment to waive cover standards or HEI.

[12] The optimum cover-to-forage ratio is 60% cover and 40% forage.

Environmental Consequences Common to Proposed Action and Alternative 2

Direct/Indirect effects:
Both the Proposed Action and Alternative 2 would shift some satisfactory cover to marginal cover, and marginal cover to forage in C4 and E2. This would reduce satisfactory cover in the E2 management area to below Forest Plan standards, requiring a Forest Plan amendment.

In C4 South the proposed harvest and thinning would improve distribution of cover and increase edge habitat, which would improve HEI in this area. However, HEI for the entire C4 allocation actually dropped because satisfactory, marginal, and total cover in C4 North and marginal and total cover in C4 South were reduced. This would also require a Forest Plan amendment to implement.

Cumulative effects:
Proposed activities would combine with the effects of past road construction and timber harvest (see Appendix A) to decrease the quality of big game habitat in C4 in the short-term. However, the treatments would actually reverse the combined effects of past activities on HEI in C4 South because of a better cover to forage distribution. In the long-term, the cover coefficient in both C4 areas would improve as a result of treatments due to better growing conditions for trees and reduced susceptibility to insects, disease, and fire mortality. This would begin to reverse the combined effects from past activities, which would be leveraged further by the future Wild West prescribed burn and road closures identified in the roads analysis done for this project.

Environmental Consequences Unique to Alternative 2

Direct/indirect effects:
An additional 99 acres adjacent to Forest Road 53 (in the A4 and C4 management areas) would be thinned under this alternative. Thinning of these units would produce a graduated density of trees, with the greatest amount of trees removed from the foreground with trees increasing in density toward those areas furthest from the road. Due to the proximity to Forest Road 53 (a paved, heavily used road), these treatments would have the potential to increase vulnerability of big game using these stands. Since only 7 more acres would be converted from satisfactory to marginal cover, there would be no additional effects to cover distribution and HEI beyond what was already discussed under “Effects Common to All Action Alternatives”. Big game would likely avoid these areas after treatment, shifting their use to adjacent stands of satisfactory cover.

SNAG AND DOWN WOOD HABITAT

Existing Condition

Snags

Most wildlife species rely on moderate to high levels of snags and down logs for nesting, roosting, denning, and feeding. Forest Plan standards and guidelines for snags and down wood have evolved over the years as new information became available. Current Forest Plan direction for dead wood management is based on Forest Plan Amendment #8. The white-headed woodpecker is a focal species for dry forest habitat (Altman, 2000).

Snag densities (Table 28) were derived from current vegetation surveys (CVS) for the dry upland, moist upland, and cold upland forest potential vegetation groups. Snag densities for the dry upland forest were compared to the white-headed woodpecker cumulative species curves (DecAID) for that habitat type (Table 27). According to the Guide for Interpretation and Use of DecAID (http://wwwnotes.fs.fed.us:81/pnw/DecAID/DecAID.nsf), the appropriate management level for the white-headed woodpecker would be between the 50% and 80% tolerance level[13] at all size classes in the ponderosa pine/Douglas-fir forest types. While snag density estimates in the analysis area exceed the 80% tolerance level in the ≥10-inch diameter group, they fell between the 30% and 50% tolerance levels for the ≥20-inch diameter group. DecAID, therefore, indicates that there are fewer large snags in the Western Route analysis area than the white-headed woodpecker population needs to meet the appropriate management level. However, these snag levels still meet the Forest Plan standards. In Eastside mixed conifer stands with low-to-moderate fire frequency, DecAID indicates the appropriate tolerance level would be 80%. Current snag densities also do not achieve this, but again the Forest Plan standards for snags would be met. Pileated woodpecker represents this species habitat and is further discussed in the Late Old Structure Habitat section.

Table 27. DecAid Tolerance Levels for the White-headed Woodpecker in the Ponderosa Pine/Douglas-fir Forest[1]

Diameter Group (Inches DBH)	Snag Density (#/acre)			
	DecAid Tolerance Levels (#/acre)			CVS Data Upper/Lower Fivemile SWS
	30%	50%	80%	
≥ 10	0.3	1.7	3.7	4.4 snags/acre
≥ 20	0.5	1.8	3.8	0.9 snags/acre

[1] For the small/medium trees structural condition class and snag density data from current vegetation survey inventories in the Upper and Lower Fivemile Subwatersheds

[13] Tolerance levels can be defined as an "assurance of use" or the likelihood that individuals in a population will use an area given a specified snag size and density. For example, at the 30% tolerance level for any given species, it would be expected that 30% of a population would find suitable or useable habitat at the specified snag density. Consequently, 70% of the population would not.

Table 28. Forest Plan standards (USDA 1993, Interim snag guidance for salvage operations) and average snag density in the Fivemile Drainage.

Umatilla Forest Plan (1992)			**Western Route CVS Plot Data**		
Working Group	Diameter Class Group	Snag Density (#/acre)	Potential Vegetation Group	Diameter Class Group	Snag Density (#/acre)
Ponderosa pine	≥10” dbh	2.25	Dry Upland Forest	≥10” dbh	4.4
	≥15” dbh	1.50		≥12” dbh	2.7
	≥20” dbh	0.14		≥20” dbh	0.9
South Associated (Mixed Conifer)	≥10” dbh	2.25	Moist Upland Forest	≥10” dbh	8.3
	≥15” dbh	1.50			
	≥20” dbh	0.14		≥12” dbh	6.3
North Associated (Grand fir)	≥10” dbh	1.80			
	≥15” dbh	1.50		≥20” dbh	2.9
	≥20” dbh	0.14			
Lodgepole pine	≥10” dbh	1.80	Cold Upland Forest	≥10” dbh	2.8
	≥15” dbh	0.59			
	≥20” dbh	0.00		≥12” dbh	2.8
Subalpine Zone	≥10” dbh	1.80			
	≥15” dbh	0.59		≥20” dbh	1.9
	≥20” dbh	0.00			

Down Wood

Forest Plan direction for down wood densities are found in the Forest Plan Amendment #8 and displayed in Table 29 on the next page. The current vegetation survey data was analyzed using a 13-inch minimum diameter for all down wood. The Forest Plan standard applies smaller minimum diameters that differ based on vegetation type. Therefore, the current vegetation survey data for lodgepole pine likely meets the Forest Plan standard, while the data for mixed conifer may not.

Table 29. Down wood (logs) density in the Fivemile Watershed

Forest Plan Amendment #8 (1995)			Western Route CVS Plot Data*		
Species	**Minimum Log Size Criteria**	**Down Wood Density (pcs./acre)**	**Potential Vegetation Group**	**Minimum Log Size Criteria**	**Down Wood Density (pcs./acre)**
Ponderosa pine	Small end diameter≥12 Piece length >6' Total length 20'-40'	3-6	Dry Upland Forest (Ponderosa pine)	Small end diameter≥13 Piece length >6' Total length 20'-40'	13.4
Mixed Conifer	Small end diameter≥12 Piece length >6' Total length 100'-140'	15-20	Moist Upland Forest (Mixed conifer)	Small end diameter≥13 Piece length >6' Total length 100'-140'	11.4
Lodgepole pine	Small end diameter≥8" Piece length >6' Total length 120'-160'	15-20	Cold Upland Forest (lodgepole pine)	Small end diameter≥13 Piece length >6' Total length 120'-160'	14.7

Management Indicator Species: Primary Cavity Excavators

Primary cavity excavator refers to 15 bird species that create holes for nesting or roosting in live, dead, or decaying trees. Secondary cavity users such as owls, bluebirds, and flying squirrels may use cavities later for denning, roosting, and/or nesting. Primary cavity excavators with the potential to occur on the Umatilla National Forest are listed in Table 30 along with their preferred habitat type. The Historic Range of Variability analysis indicates that the dry upland forest type historically dominated the landscape that includes the Western Route analysis area[14]. Dry upland forest accounts for 32,943 acres in the Historic Range of Variability analysis area; another portion of the area (13,064 acres) was in the cold upland and moist upland forest types. The presence of all three of these forest types indicates that all of the primary cavity excavators listed below have the potential to occur in the analysis area.

Habitat for primary cavity excavators mainly consists of dead and/or dying trees in various size classes. Primary cavity nester habitat can occur in a variety of vegetative communities with various structural conditions (Thomas 1979). In

[14] The Historic Range of Variability analysis encompassed the entire Western Route analysis area as well as that portion of the North Fork Ranger District west of Highway 395 and north of the North Fork John Day River.

general, existing and potential habitat can be found throughout the analysis area, except for non-forest areas and forest stands in the process of regeneration (stand initiation and stem exclusion structures). However, few large snags and down logs occur in much of the formerly harvested areas. Between 1970 and 1990, 65% of the National Forest System lands within the analysis area were harvested (commercial, non-commercial, salvage, etc.).

Table 30. Primary cavity excavators* on the Umatilla NF.

Common Name	Habitat Community**	Nest Tree Size**
Lewis' woodpecker	Ponderosa pine, riparian cottonwood, oak woodland, and burned stands.	13"– 43" dbh.
Red-napped sapsucker	Riparian cottonwood, aspen, conifer forests. Mid-high elevations.	11" dbh. Avg.
Williamson's sapsucker	Mid-high elevation mature or old conifer forests (ponderosa pine, fir, lodgepole pine, etc.) with large dead trees present.	27" dbh. Avg.
Downy woodpecker	Riparian cottonwood, willow, aspen, mixed deciduous, and mixed-conifer.	8" dbh. Min.
Hairy woodpecker	Mixed conifer, ponderosa pine, and adjacent deciduous stands.	17" dbh. Avg.
White-headed woodpecker	Open ponderosa pine or mixed conifer, dominated by ponderosa pine.	26" dbh. Avg.
Three-toed woodpecker	High elevation mixed conifer (grand fir) and true fir forests (lodgepole pine). Bark beetle presence in stand.	12" dbh. Min.
Black-backed woodpecker	Mixed conifer forests and to a lesser extent true fir stands. Stands with a high density of dead trees, recently burned or bark beetle killed stands.	12" dbh. Min.
Northern flicker	All forest types with older open forests and edges adjacent to open country.	22" dbh. Avg.
Pileated woodpecker	Primarily dense mixed-conifer forests (moist) in mature to late seral stages or deciduous stands in valley bottoms.	33" dbh. Avg.
Mountain chickadee	Open canopy, ponderosa pine, lodgepole pine and other conifer forests.	4" dbh. Min.
Chestnut-backed chickadee	Moist coniferous forests at moderate elevations.	4" dbh. Min.
Red-breasted nuthatch	Coniferous forests with mid to late seral stages.	12" dbh. Min.
White-breasted nuthatch	Mature ponderosa pine and mixed-conifer forest. Oak woodlands	12" dbh. Min.
Pygmy nuthatch	Mature to old ponderosa pine or mixed conifer with ponderosa dominant.	12" dbh. Min.

* Based on Johnson and O'Neil 2001.

** From Thomas 1979, Ehrlich et al 1988, Degraaf 1991, and Marshall et al 2003

Environmental Consequences Unique to No Action

Direct and Indirect effects:

At the watershed scale, dead standing trees and down wood would continue to occur at current densities and size classes for the next three to five years. With the existing management direction (including fire suppression) snags would eventually fall and change the density within the analysis area. Numerous factors influence the length of time snags remain standing on a site, including weather events, diameter, tree species, height, aspect, slope, elevation, and soil type/moisture (Bull et al 1997). Diameter is one of the most important factors that influence snag fall rates; typically, large diameter snags (>20 inches diameter breast height) stand longer on a site than smaller diameter snags (Bull et al 1997). Based on a snag study (Bull and Partridge 1986) in an area of northeast Oregon with a similar tree species composition, half of the snags less than 20 inches in diameter breast height would be expected to fall within six years while half of the snags greater than 20 inches diameter would fall within nine years.

The Silviculture Report predicts there would be an increased incidence of disease and insects in the analysis area. As a result, snag and downed wood densities would increase throughout the analysis area. However, the Fuels Report states that this would combine with current tree densities, stand composition, and structure to increase the susceptibility of the analysis area to high severity wildfire. A high severity fire would reduce or eliminate snags and down wood currently occupying the analysis area, and though new snags and down wood would be created by the fire, these would be fire-hardened and not available to most cavity excavators until they begin to decay and soften (2-3 years after the fire). Overall snag and down wood density in the burned area would increase in the short-term (about10 to 20 years for the snags). After this period, snag densities would begin to decrease as trees fall to the ground. Because the fire would have killed most of the understory, fallen snags would not be replaced for about 40-60 years (the length of time it would take for the new understory to reach a size that would produce 10-inch diameter snags). Therefore, from about 20-100 years post-fire, the analysis area would be below the Forest Plan standard for dead standing trees in the larger size classes.

Management Indicator Species would respond to the trends described above by using the habitat until fire occurs and snag densities consequently decrease. Then Management Indicator Species would shift use to unburned or lightly burned stands where sufficient standing and down wood would be available for nesting, foraging, and roosting. Management Indicator Species would not use burned stands again until cover and snag densities recover.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:

Proposed commercial and noncommercial thinning, salvage, sanitation, shelterwood, and seed tree prescriptions would have direct and indirect effects on

snags and down wood in the Western Route analysis area, though their effects on Management Indicator Species habitat would likely be negligible. Commercial and non-commercial thin treatments would decrease stand densities, and move stands towards a single stratum condition on dry forest sites. White-headed woodpecker and other primary cavity excavators that prefer single-stratum dry forest habitat (Table 30) would benefit from the treatments. Prescriptions for commercial and non-commercial thinning would focus on removing green trees; while other harvest prescriptions would remove a greater proportion of snags and down wood. Existing snag and down wood densities would decrease under these latter prescriptions, but would still meet Forest Plan Amendment #8 standards for snags, down wood, and green replacements after treatment. The largest snags available would be retained in all units.

Table 31. Effects of Action Alternatives on Snag Habitat

	Proposed Action	**Alternative 1**	**Alternative 2**
Portion of National Forest System lands within the analysis area affected by the proposed harvest	18%	11%	18%
Cumulative effect of proposed and past harvest on snag habitat	72%	70%	73%
Effect on Management Indicator Species	Negligible	Negligible	Negligible

Operation of machinery (thinning, harvesting, skidding, etc.), preparation of landings, and fuels treatments would require removal of snags that pose a safety hazard to workers. The number of snags that would be removed as a result would be negligible, and would not decrease nesting, foraging, or roosting habitat for primary cavity excavating bird species. Debris and down wood would increase after thinning and harvest, creating a higher fuel load until fuels are burned or mechanically treated (up to 10 years). This would pose a greater risk of habitat loss if a wildfire occurs before fuels are treated.

Burning and treatment of fuels would decrease down wood densities, although designing burn prescriptions to use low intensity fire would minimize this loss. Still, down wood densities would meet the minimum Forest Plan standard for the plant association group. Low intensity fire would result in a mosaic of burned and unburned understory vegetation and down wood with individual mortality of green trees and torching of some snags. Large snags would be less likely to be consumed by low intensity fire, though smaller snags would probably be consumed. Some green trees damaged by burning would die over a five-year period creating insect habitat and nesting, foraging, and roosting habitat for cavity nesting birds. Densities of downed woody material after fuels treatment would meet or exceed guidelines in Forest Plan Amendment #8.

Cumulative effects:

Past, present, and future actions in the Western Route analysis area and their associated effects are located in Appendix A. The proposed activities could

combine with past harvest and ongoing personal firewood collection in reducing snags within the analysis area; however the overall effects on Management Indicator Species would still be negligible. For instance, though many of the proposed treatment units overlap past harvest areas, Forest Plan standards (as amended) for down wood and snags would be met upon completion. Forest Plan standards were designed to provide habitat for viable populations of primary cavity excavators. Past and ongoing fire suppression has increased fuel loads and the associated hazard of habitat loss as a result of high severity fire. The proposed fuel treatment would overlap with some areas of future prescribed burning (such as Wild West Prescribed Burn). This would decrease downed fuel loads in a more contiguous portion of the analysis area. While there is a small potential that large snags could be consumed during prescribed burning, there is also a potential that green trees would die and replace them.

Environmental Consequences Unique to Alternative 1

Direct and Indirect effects:
Not only would acres of treatment be the least of the action alternatives, but activities would also involve more non-commercial thinning and less commercial harvest. As a result, there would be less reduction of sound snags than the other action alternatives. However, 1,271 fewer acres would be treated under this alternative, so fuels would continue to build, posing a greater risk for habitat loss in future high-severity fires.

Environmental Consequences Unique to Alternative 2

Direct and Indirect effects:
Because the additional acreage treated is so small, and thinning densities would be graduated, there would be little difference between this alternative and the Proposed Action.

LATE OLD STRUCTURE HABITAT

Existing Condition

Allocated Old Growth
The Forest Plan defines old growth habitat as any stand of trees 10 acres or greater generally containing the following characteristics:

- mature and overmature trees in the overstory and well into the mature growth stage
- usually a multilayered canopy with trees of several age classes
- standing dead trees and down material
- evidences of mans activities may be present, but do not significantly alter the other characteristics

The Forest Plan allocated units 75-300 acres in size as C1-Dedicated Old Growth or C2- Managed Old Growth to provide old growth tree habitat across the Forest (Table 32). Old growth units were initially classified as suitable and/or capable habitat for a selected management indicator species. Unit size and distribution are variable and depend on vegetation type and target management indicator species (Forest Plan 1990).

Table 32. Forest Plan allocated Old Growth within the Fivemile subwatersheds.

Unit #	Location	Acres	Management Indicator Species
C1 – Dedicated Old Growth			
1591	headwaters of Fivemile Creek near Arbuckle Mountain	196	Pileated woodpecker (suitable)
2032	next to Tribble Creek, and to the west of Fivemile Creek	332	Pileated woodpecker (capable)
1661	south side of lower Fivemile Creek	383	Pileated woodpecker (suitable)
1652	upper portion of a tributary to Silver Creek	437	Pileated woodpecker (capable)
	Total	**1,348**	
C2 – Managed Old Growth			
2058	Upper Fivemile Subwatershed	84	Northern three-toed woodpecker
2048	Upper Fivemile Subwatershed	51	Northern three-toed woodpecker
2067	Upper Fivemile Subwatershed	93	Northern three-toed woodpecker
2087	Upper Fivemile Subwatershed	75	Northern three-toed woodpecker
	Total	**303**	

Old growth units classified as “pileated woodpecker suitable” (1591 and 1661) contain habitat that is preferred for foraging, nesting, and roosting. “Pileated woodpecker Capable” units (2032 and 1652) contain a moist forest type vegetative composition that has the potential to provide suitable pileated habitat in the future. Units in the moist forest type that occur above 4,000 feet (2032, 1591, and 1652) are presumed to be potential habitat for pine marten and northern three-toed woodpecker. One unit (1661) is located in the Lower Fivemile Subwatershed at an elevation of approximately 4,000 feet in the warm plant association group. This stand is at the edge of the elevation range for suitable habitat for the three-toed woodpecker and pine marten, so it was not considered potential habitat for those species.

Late and Old Structure

In addition to the old growth stands designated in the Forest Plan, there are ten inventoried old growth[15] stands in the analysis area (2,127 acres). There are also a number of uninventoried late and old structure stands.

The wildlife standards in Forest Plan Amendment #8 require evaluation of late and old structural stages relative to the quantity of late and old structure within or outside the historical range of variability. For the purpose of this standard, late and old structure stages include Old Forest Multi-Strata and Old Forest Single-Stratum stands. Late and old forest conditions occupy about 20% the analysis area (Western Route Silviculture Report). As stated in the Silvicultural report, multi-stratum old forest in the analysis area is about 2% above the historical range of variability, while single-stratum old forest is 14% below the historical range of variability. The Camas Watershed Ecosystem Analysis (USDA 1995) proposed an old growth network to ensure the health and integrity of old growth habitats and populations of old growth-associated species in the Camas Creek watershed. This was done in response to losses of old growth and late old structure habitat caused by insects and disease outbreaks in the watershed. The Camas Watershed Ecosystem Analysis encouraged management activities that would hasten the creation of or enhance old growth characteristics of stands in the old growth network. Prescriptions aimed at restoring and enhancing old growth structure and appropriate species composition include burning/slash treatment, salvage logging, and thinning. Commercial thinning would also be allowed in the middle structure in order to reduce stand densities, stimulate growth in remaining trees, and accelerate the movement of these stands into late/old structure.

Connectivity

Other wildlife standards in Forest Plan Amendment #8 require late and old structure stands and allocated old growth areas to be connected to each other in the watershed. For this standard, connective habitat does not necessarily need to meet the same description of suitable habitat for a particular species of interest, but provide “free movement” between late/old structure stands and old growth areas for various wildlife species associated with a late/old structural condition.

The Camas Watershed Ecosystem Analysis old growth network was designed to maintain future connectivity between habitat blocks in order to sustain old growth-associated species. The Camas Watershed Ecosystem Analysis recommended that management activities within the old growth network focus on enhancing old growth characteristics of existing stands, hastening the creation of old growth habitat, and maintaining connectivity.

Old growth areas tend to be scattered throughout the Western Route analysis area. For the majority of the watershed, late and old structure stands and old growth areas are connected to each other by stands in the young forest multi-strata, young forest single-stratum, stem exclusion closed canopy, and understory regeneration

[15] Inventoried old growth has been surveyed on the ground and it doesn’t meet pileated woodpecker, pine marten, or three-toed woodpecker habitat characteristics. These stands are still valuable habitat for other species (i.e. northern goshawk, white-headed woodpecker, and Cooper’s hawk).

structural stages. Areas presenting poor connectivity are typically composed of ground with no vegetation, grassland habitats, or stands in the stand initiation and stem exclusion open canopy structural stages. The least connected areas would include stands where past salvage and commercial harvest, mountain pine beetle, spruce budworm, or bark beetle infestations have occurred, reducing stand density (Western Route Silvicultural Report).

Management Indicator Species: pileated woodpecker, pine marten, northern three-toed woodpecker

Pileated woodpecker

Preferred habitat (foraging and nesting) for pileated woodpecker includes dense moist forest types (mixed conifer), in late seral stages with a high density of standing dead and downed wood habitat (Marshall et al 2003). Preferred nesting and foraging habitat (suitable) for the pileated woodpecker occurs in old growth stands and in some cool moist mixed conifer stands within the Western Route analysis area. Sightings of pileated woodpeckers were recorded at several locations within and adjacent to proposed units during field reconnaissance. Observations of pileateds in the Western Route area are also present in the FAUNA database.

Table 28 provided snag densities for the moist upland and cold upland forest potential vegetation groups. These snag densities were compared to the pileated woodpecker cumulative species curves (DecAID) for the moist upland forest type (**Table 33**). DecAID did not provide estimates for snag densities in the 30% or 80% tolerance levels in either the >10-inch diameter group or the >20-inch diameter group. According to the Guide for Interpretation and Use of DecAID (http://wwwnotes.fs.fed.us:81/pnw/DecAID/DecAID.nsf), the appropriate management level for pileated woodpecker would be at the 50% tolerance level on dry sites and the 80% tolerance level on the moister sites for all snag size classes. Current Vegetation Survey estimates for snag densities fall below the 50% tolerance level in both the >10-inch and >20-inch diameter groups, which suggests that there are fewer snags in the Western Route analysis area than the pileated woodpecker population needs to meet the appropriate management level. However, the Current Vegetation Survey estimates for snag density still meet Forest Plan standards.

Table 33. DecAID Tolerance Levels for the Pileated Woodpecker in the Eastside Mixed Conifer Forest[1]

Diameter Group (Inches DBH)	Snag Density			
	DecAid Tolerance Levels (snags/acre)			CVS Data Upper/Lower Fivemile Subwatershed
	30%	50%	80%	
≥ 10	-	30.4	-	8.3 snags/acre
≥ 20	-	7.32	-	2.9 snags/acre

[1] For the small/medium trees structural condition class and snag density data from current vegetation survey inventories in the Upper and Lower Fivemile Subwatersheds

Northern three-toed woodpecker

Preferred habitat (foraging and nesting) for the northern three-toed woodpecker includes late successional, cold/moist forest types (lodgepole/mixed conifer) with high snag density, generally at higher-elevations (Marshall et al 2003). Preferred nesting, roosting, and foraging habitat (suitable) for the three-toed woodpecker is present in the analysis area in small amounts.

No records or sightings of the three-toed woodpecker have been documented in the Western Route analysis area. District wildlife personnel examined several C2 old growth stands during field reconnaissance and determined these stands do not provide preferred habitat due to a lack of large diameter mature to over-mature lodgepole pine. However, there remains potential that northern three-toed woodpecker could occur in the analysis area suitable old growth lodgepole pine that was not examined.

Pine marten

Preferred denning and foraging habitat for the marten occurs in the moist fir stands with developed riparian areas and high down wood densities, generally above 4,000 feet in elevation (Ruggiero et al. 1994). This species has also been associated with old growth mixed conifer stands. While no pine marten have been found in the Western Route analysis area, sightings have occurred to the south and west of the analysis area. Suitable habitat also occurs in the analysis area, so there is the potential that pine marten may be present.

Environmental Consequences Unique to No Action

Direct and Indirect effects:

In the short term, inventoried old growth, C1, and C2 old growth would remain unchanged, and would continue to develop along existing successional pathways under current management direction. Late and old structure would continue to occupy 20% of the analysis area; although single layer old forest would remain below the historical range of variability and multi layered old forest would remain above historical range of variability. In the short term, the number and distribution of existing large trees (greater than 21 inches dbh) in the project area would be unaffected. Connectivity between old growth stands outside of C1 and C2 management areas would be maintained at current levels, which would allow the free movement of wildlife between different stand types in the analysis area. The suitability of these stands for management indicator species would not change.

Indirectly, the amount of late and old structure would change over time. With the existing management direction (including fire suppression) late and old structure stands would continue to grow into a multi-storied structure. In particular, late and old structure on warm dry sites would continue to develop into multistoried, overstocked, mixed conifer stands reducing the amount of old forest single stratum structure even further below its Historic Range of Variability. Old forest multi-strata structure would continue to develop, increasing even further above the Historic Range of Variability for this habitat. These changes would be most noticeable in the

dry upland forest plant association group, and little open single-stratum ponderosa pine habitat would persist in the analysis area. .

The risk of high severity wildfire would continue to increase. If it occurs, high severity fire would change the composition and structure of late and old structure stands, making them unsuitable for old growth associated species like the pine marten, pileated woodpecker, and northern three-toed woodpecker. This would result in fewer, and potentially no, late and old structure habitat in the analysis area. In particular Old Forest Single Stratum structure would be below its historic range and Old Forest Multi-Strata structure would be within, but no longer above, its historic range. A major disturbance such as this across the landscape could convert portions of the analysis area to grassland types with little or no forest cover. Old growth habitat and corridors between old growth stands would be lost during these events.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:

All management prescriptions would meet snag, downed wood, and stocking level standards in the Forest Plan Amendment #8 following treatment. Forest Plan standards for each of the affected management areas would also be met following treatment.

Activities associated with the action alternatives would not directly affect the current composition, structure, or function of C1 Dedicated Old Growth and C2 Managed Old Growth units within the analysis area. Table 34 displays proposed treatments that would take place within 100 yards of designated old growth. Non-commercial thinning (NCT) should not affect old growth quality or connectivity. The commercial thinning (HITH) should also not affect adjacent old growth quality, however the quality of connective corridors would be reduced as a result of reduced stand density, canopy cover, and snags. Still, connectivity in the treated stands would remain functional and allow the free movement of old-growth-dependent wildlife. In the seedtree (HSST), shelterwood (HSSW), and sanitation (HISS) treatments (units TP5, TP7-10, K7, K14, K15, and K26) post-treatment stands would be very open. Insects and disease have already eliminated the connective value of these stands. Treating these stands would benefit connectivity in the long-term by creating healthier conditions for tree development and growth.

Table 34. Treatment within 100 yards of Allocated Old Growth

C1 and C2 old growth affected	Proposed Action			Alternative 1		Alternative 2	
Old Growth Unit #	Harvest Unit	Acres	Treatment	Acres	Treatment	Acres	Treatment
2032	K27	63	HSST	63	NCT/HISS	63	HSST
	K24	162	HITH/NCT	131	NCT	162	HITH/NCT
1652	L03	80	NCT	80	NCT	80	NCT
	L24	76	NCT	76	NCT	76	NCT
	L04	58	HITH/NCT	58	HITH/NCT	58	HITH/NCT
	L12	72	NCT	72	NCT	72	NCT
	L14	49	NCT	0	No Treatment	49	NCT
2067	K03	76	HITH/NCT	76	HITH/NCT	76	HITH/NCT
	V3	0	No Treatment	0	No Treatment	24	HITH/NCT
2048	V1	0	No Treatment	0	No Treatment	7	HITH/NCT
2058	K33	91	HITH/NCT	91	HITH/NCT	91	HITH/NCT
Total acres		727		647		758	

Some activities would also occur within Inventoried Old Growth (Table 35), although the non-commercial thinning (NCT) should not affect current old growth characteristics because the overstory and snags would remain. Commercial thinning (HITH) would affect some old growth characteristics (i.e. canopy cover), and snags and down wood would decrease (though they would remain within Forest Plan standards). Nevertheless, thinned stands would retain their width and number of connections to surrounding Old Forest Single Stratum and Old Forest Multi-Strata stands. The resulting stocking reduction would decrease stress and associated insect/disease susceptibility on the overstory trees that remain. On dry sites, ponderosa pine would be favored over all other species, moving treated acres toward Old Forest Single Strata structure, which is currently deficient in this part of the District. The average size of trees in connecting corridors would also increase due to retention of the largest trees in these stands. Also, the risk of high severity fires would decrease once debris created by thinning is treated. As a result of better growing conditions, late/old structure could develop more quickly (Silviculture Report).

Table 35: Treatment within Inventoried Old Growth

Inventoried old growth affected	Proposed Action			Alternative 1		Alternative 2	
Old Growth Unit #	Harvest Unit	Acres treated in inventoried OG	Treatment	Acres treated in inventoried OG	Treatment	Acres treated in inventoried OG	Treatment
7429	TP02	22	NCT	22	NCT	22	NCT
	TP03	20	NCT	0	No Treatment	20	NCT
7389	TP11	30	NCT	0	No Treatment	30	NCT
7379	TP24	11	NCT	11	NCT	11	NCT
7559	L16	1	NCT	0	No Treatment	1	NCT
7439	K03	42	HITH/ NCT	42	HITH/ NCT	42	HITH/ NCT
7439	K10	3	HITH/ NCT	3	HITH/ NCT	3	HITH/ NCT

Canopy cover in the commercial thinning units would decrease (the amount would vary depending on current stand structure). This would reduce the quality of pileated woodpecker habitat. However, the largest trees and snags within treatment units would be retained, so the effect on nesting or roosting habitat would be small. This conclusion is based on observations of pileated woodpecker activity in stands with open canopies in similar habitat types on the North Fork John Day Ranger District. Snag and downed wood densities would meet or exceed Forest Plan Amendment #8 after treatment, as discussed earlier in this document.

In the short term, pine marten, if present, would likely shift use to other portions of their home range during implementation of proposed treatments. High down wood densities and multi-storied stand structure, both of which are preferred habitat characteristics for pine marten, would decrease following treatment.

Table 36: Acres of potential pine marten habitat affected*

Proposed Action	Alternative 1	Alternative 2
1,994	1,417	2,040

This table applies only to the 7,062 acres of National Forest System lands within the analysis area that are above 4,000 feet elevation, in the cold and moist plant association groups, and in all structural stages except Stand Initiation and Stem Exclusion Open Canopy. Acres that would be affected does not mean the quantity of pine marten habitat would be reduced or that marten would not use these treated areas. Instead they indicate a change in habitat characteristics (e.g. dense multi-storied stands would become less dense, high levels of down wood would be reduced).

Northern three-toed woodpecker nesting and foraging habitat in inventoried old growth would be unaffected because no mature lodgepole pine habitat would be treated. Treatments would stimulate growth in younger lodgepole pine due to decreased stand densities, which could expand three-toed woodpecker habitat in the future (50+ years).

Cumulative effects:
Past, present, and future actions in the Western Route analysis area and their associated effects on old growth, late old structure, and connectivity are located in Appendix A. Past and continuing fire suppression policies would perpetuate multi-storied structure in all stands. The proposed action could combine with past harvest, thinning, and insect/disease mortality to cumulatively reduce Old Forest Multi-Strata structure on a portion of all forest types within the analysis area. The proposed action would also reduce the quality of corridors that connect old growth stands. However, Old Forest Multi-Strata (which is above the historic range of variability in the dry upland forest habitat) would be converted to Old Forest Single-Stratum structure (which is currently below the historic range of variability in the dry upland forest habitat) (Silviculture Report).

In addition, past and ongoing fire suppression has increased fuel loads and the associated hazard of losing additional late old structure and fragmenting travel corridors as a result of high severity fire. The proposed fuel treatment would overlap with some areas of future prescribed burning (such as Wild West Prescribed Burn) to reduce the risk of old growth loss and begin converting structural stages back toward their historic range of variability.

Environmental Consequences Unique to Alternative 1

Direct and Indirect effects:
The shift of treatment from commercial thinning to non-commercial thinning or no treatment would reduce impacts adjacent to old growth unit #2032. About 51 fewer acres of inventoried old growth (units 7429, 7389, and 7559) would be treated, decreasing effects on late and old structure habitat. The quality of connective corridors would also be unaffected over a larger area than under the Proposed Action or Alternative 2.

THREATENED, ENDANGERED, PROPOSED, CANDIDATE, AND SENSITIVE SPECIES

Existing Condition

Federally “listed” species are identified by the U.S. Fish and Wildlife Service as endangered, threatened, proposed, or candidate species under the Endangered Species Act (USDI 1999 and 2001). Listed species that may be present on the Forest are found in Table 37.

Sensitive species are those recognized by the Pacific Northwest Regional Forester as needing special management to meet National Forest Management Act

obligations and requirements (USDA 2000). Sensitive species addressed on the Umatilla National Forest (Table 37) include those that have been documented (valid, recorded observation) or suspected (likely to occur based on available habitat to support breeding pairs/groups) within or adjacent to Forest boundary.

The Wildlife Report for this project contains a complete analysis of the potential for species to occur within the analysis area. Only species that could potentially be affected—gray wolf, California wolverine, and Columbia spotted frog—are discussed here.

Table 37. U.S. Fish and Wildlife Service "Listed" species (USDI 1999 & 2001) and Regional Forester's Sensitive Animals (USDA 2000) on the Umatilla NF.

Common Name	Species	Federal and R6 Listing	Umatilla NF Occurrence (USDA 2000)
Painted turtle	*Chrysemys picta*	Sensitive	Suspected
Northern Bald Eagle	*Haliaeetus leucocephalus*	Threatened	Documented
American Peregrine falcon	*Falco peregrinus anatum*	Sensitive	Suspected
Upland sandpiper	*Bartramia longicauda*	Sensitive	Suspected
Yellow-billed cuckoo	*Coccyzus americanus*	Candidate, Sensitive	-
Gray flycatcher	*Empidonax wrightii*	Sensitive	Suspected
Gray wolf	*Canis lupus*	Threatened	-
California wolverine	*Gulo gulo*	Sensitive	Documented
Canada lynx	*Lynx canadensis*	Threatened	-
Rocky Mtn. bighorn sheep	*Ovis canadensis*	Sensitive	Documented
Columbia spotted frog	*Rana luteiventris*	Sensitive	Documented

Gray wolf

Habitat preference for the gray wolf is more prey-dependent than cover-dependent. The wolf is a habitat generalist inhabiting a variety of plant communities, typically containing a mix of forested and open areas with a variety of topographic features (NatureServe Explorer 2002, Ballard and Gipson 2000, Verts and Carraway 1998, and Witmer et al 1998). Wolves are strongly territorial, defending an area of 75-150 square miles. Territory size and location is strongly related to prey abundance. Wolves prey mainly on large ungulates, such as deer and elk and to a lesser extent on small mammals. The gray wolf does prefer areas with few roads, generally avoiding areas with an open road density greater than one mile per square mile (NatureServe Explorer 2002, Ballard and Gipson 2000, and Witmer et al 1998). Dens typically occur as underground burrows, but can also be caves, or other types of shelter. Rendezvous sites are generally open areas (FEIS 1998).

Habitat for this species does occur throughout the Forest and within the analysis area. Habitat quality is considered good, because of the relatively low open road densities and moderate ungulate population. Habitat for potential dens or rendezvous sites occurs throughout the analysis area. A radio-collared gray wolf dispersed to the Blue Mountains from Idaho in March 1999, and was captured approximately 20 miles south of the analysis area (Cody 1999). In October 2000, another wolf was killed along Highway 395, north of Ukiah. Numerous reports of individual wolves have occurred on the Forest over the last few years. However, wolf packs have not been observed on the Forest.

The Idaho wolf population has been increasing steadily, and dispersal into the Blue Mountains will likely continue. Observations on the Forest are expected to continue. There is a slight chance that wolves could pass through the general project area and form a pack in the analysis area.

California wolverine

The wolverine prefers high elevation, conifer forest types, with a sufficient food source, and limited exposure to human interference (Wolverine Foundation 2003). Natal denning habitat includes open rocky slopes (talus or boulders) surrounded or adjacent to high elevation forested habitat that maintains a snow depth greater than 3 feet into March and April (Wolverine Foundation 2003). The wolverine is an opportunistic scavenger, with large mammal carrion the primary food source year-round. While foraging, they generally avoid large open areas and tend to stay within forested habitat at the mid and high elevations (>4,000') and typically travel 18-24 miles to forage/hunt (Wolverine Foundation 2003).

The analysis area does contain a limited amount of high elevation forest types. No potential natal denning habitat has been identified in the analysis area, although some does occur near Arbuckle Mountain about 2 miles northwest of the analysis area. Snow tracking surveys conducted across the District since 1991 for wolverine, fisher, American marten and lynx has resulted in one suspected set of wolverine tracks (2/18/94) on the "Kelly Route" near Forest Road 2105 on Ellis Creek (Weatherford 1995). This was about 10 air miles southwest of the analysis area and about 8 miles south of Arbuckle Mountain. Another suspected track (one lone track) was observed on the North Jones Trail off Forest Road 5300 on 9/30/03 (VanWinkle pers. comm. 2003). The wolverine has not been observed in the analysis area.

Columbia spotted frog

Habitat for this species consists of marshes and wet meadows, permanent ponds, and slow moving streams with abundant aquatic vegetation (Corkran and Thoms 1996). Spotted frogs breed in the spring in shallow water at pond edges, stream margins, and in inundated floodplain areas (Corkran and Thoms 1996).

Habitat for this species is present in ponds and streams within the analysis area. Columbia spotted frogs have not been observed in the analysis area, but have been noted elsewhere in the Camas Creek drainage. Therefore, they may be present in the Fivemile Creek drainage.

Environmental Consequences Common to All Alternatives

Based on District records, surveys and monitoring, as well as published literature regarding distribution and habitat use, the following species have the potential to be affected by treatment activities in the analysis area: California wolverine, gray wolf, and spotted frog.

Table 38: Determination of Effects on Threatened, Endangered, and Sensitive species with potential to occur in the Western Route Area

Species	Status	Determinations			
		No Action	**Proposed Action**	**Alternative 1**	**Alternative 2**
Gray wolf	Threatened	No Effect	No Effect	No Effect	No Effect
California wolverine	Region 6 Sensitive	No Impact	No Impact	No Impact	No Impact
Columbia spotted frog	Region 6 Sensitive	No Impact	No Impact	No Impact	No Impact

Environmental Consequences Unique to No Action

Direct and Indirect effects:

The gray wolf would not be directly affected by the current management direction because the species is not known to occur in the analysis area. Indirectly, open road density in the analysis area is expected to remain at 2.1 miles per square mile (on National Forest System lands). Openings for potential rendezvous sites over time could experience some conifer encroachment, but not enough to significantly reduce the overall size of the openings in the analysis area. Wildfire resulting from continued fire exclusion and fuel build-up could decrease the suitability of habitat in the Western Route analysis area by affecting the distribution and abundance of prey populations. Wolves, if present, would shift their use according to the prey population's response to fire.

The wolverine would not be directly affected by current management direction in the analysis area because the species is not known to occur in the analysis area. In the short-term, the abundance and distribution of prey animals would remain the same in the analysis area. There would be no effect on natal denning habitat because these habitats are not present in the analysis area. Wildfire could affect the wolverine in a similar fashion as the wolf. Wolverines, if present, would shift their use according to the prey population's response to fire.

The spotted frog is probably present, but has not been observed in the analysis area. The spotted frog would not directly be affected by current management

direction in the analysis area. In the short-term, there would be no change in habitat suitability for the spotted frog. In the long-term, high severity wildfire would affect Columbia spotted frogs and their habitat. High severity wildfire could cause direct mortality of spotted frogs if they were present in the analysis area. Such fire would also alter stream and pond habitats required by the spotted frog, reducing suitability as spotted frog habitat. Changes in water temperature, sediment transport, runoff timing, channel morphology, and other habitat parameters would also result in response to a fire of this magnitude.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:

Harvest, non-commercial thinning, and burning/mechanical fuel treatments would not directly affect the gray wolf or wolverine because these species are not known to occur in the analysis area. Rendezvous habitat for the gray wolf would not be affected by treatment activities because they tend to occur in openings or meadows, which would be buffered from treatment activities. There are no known dens within the analysis area and road densities are high, so wolves would not likely choose this location to establish a den. Individual wolves, if present, could avoid the area during implementation of proposed treatment due to associated increased road use and human disturbance.

There would be no effect on wolverine natal denning habitat because this habitat is not present in the analysis area. Increased road use (particularly on the closed roads being used to access treatment units) could result in a short-term disturbance to an individual wolverine if present, causing them to temporarily avoid the area. The likelihood of such disturbance would be low due to the fact that no wolverine are currently known to occur in the project area, and the disturbance would last only while implementation occurs.

Indirectly, treatment activities would cause minimal short-term impacts on prey species in the analysis area. Harvest, non-commercial thinning, and fuels treatment activities would reduce the density of the forest overstory and understory, which would increase the production and quality of forage for prey species. Forage productivity would remain moderate to high until the overstory closes and forage production declines. However, these same activities plus the reopening of closed roads to access units would cause disturbance. As a result, prey species (deer and elk) could shift their use from areas being treated to other portions of the analysis area. These movements would generally be of short duration (during the time of implementation). Harvest, thinning, and mechanical fuels treatment would increase the vulnerability of big game, particularly near roads, but would ultimately have negligible effects on prey populations (refer to Big Game Habitat section for further details). Finally, populations of deer and elk would continue to be managed at their current management objective in the management area.

Habitat quantity and quality for the spotted frog would not be affected because all potential habitat for this species would be protected by excluding treatment within Riparian Habitat Conservation Areas. While treatment would occur in aspen stands,

the stands proposed for treatment all occur along intermittent Class 4 streams, which do not provide breeding habitat for the frog. Four of the closed roads that would be used during proposed activities have low water fords (no culverts) at stream crossings, which could contribute sediment to spotted frog habitat if used during saturated conditions. These also occur on Class 4 streams and mitigation would avoid use of these roads unless the stream channel is dry, so there should be no effects on the spotted frogs.

Changes to habitats and effects on species within the analysis area are consistent with the Forest Plan and Endangered Species Act.

Cumulative effects:
Past activities and events in the analysis area that have had cumulative effects on gray wolf, wolverine, and spotted frog in the Western Route analysis area are discussed in Appendix A.

Proposed treatment activities coupled with the future Wild West Underburn would begin to shift forest structure and species composition (that were changed by past harvest, livestock grazing, and fire suppression) back toward their historic trends. In the long-term this would reverse the cumulative effects of past management and insect outbreaks, and ongoing use of roads on the distribution and abundance of prey populations by improving the quantity, quality, and distribution of their cover and forage.

Ongoing livestock grazing competes with big game for forage, which could be affecting big game distribution within the analysis area. This could combine with the disturbance that would be caused by ongoing recreation and proposed treatments, which could cause big game to move elsewhere. This cumulative effect should only last for the duration of implementation. In addition, future proposed road closures would reduce disturbance of prey animals, as well as wolves and wolverines, reducing the cumulative effects of livestock grazing.

Environmental Consequences Unique to Alternative 1

Direct and Indirect effects:
This alternative would result in less disturbance to wolves and wolverine due to 1,271 fewer acres of treatment and 9 fewer miles of closed road used for access.

Environmental Consequences Unique to Alternative 2

Direct and Indirect effects:
While an additional 99 acres would be thinned under this alternative, it is next to a busy, paved road. It is unlikely that this would cause additional disturbance to wolves or wolverine (if present) because they would likely avoid these areas anyway.

SPECIES OF "INTEREST"

Existing Condition

Species of "interest" includes species that the public have inquired about in past projects. Table 39 lists the species of interest that could occur, based on observations or potential habitat in the Western Route analysis area.

The Wildlife Report for this project contains a complete analysis of the potential for species to occur within the analysis area or to be affected by the proposed activities. Only the species with potential effects—northern goshawk, bat species, and neotropical migratory birds—are discussed here.

Table 39: Species of Interest with potential to occur in the Analysis Area

Common Name	Species	Oregon Status (1998)
Northern Goshawk	*Accipiter gentilis*	Sensitive
Long-eared myotis	*Myotis evotis*	Sensitive
Long-legged myotis	*Myotis volans*	Sensitive
Yuma myotis	*Myotis yumanensis*	Sensitive
Neotropical migratory birds	18 focal species (see Table 40)	Some species are Sensitive (see T, E, S section)

Northern Goshawk

Preferred habitat for the goshawk consists of coniferous forests with a mosaic of structural stages. Nesting sites typically consist of a dense cluster of large trees, surrounded by a similar forest type with a more open overstory. The understory is relatively open and the nest site is generally situated within one-quarter mile of a stream or other water source. The best foraging habitat occurs in a mosaic of structural stages scattered across the landscape (FEIS 1998).

Potential habitat for the goshawk occurs throughout the analysis area, although nests have not been observed. The stands that would be affected by treatment are suitable for foraging because the area provides a mosaic of structural stages and microhabitats for prey species. The northern goshawk has been observed in the analysis area (District Wildlife Database, FAUNA).

Bats of Interest

Available habitat for bats in the analysis area includes dry and moist forest types that may be associated with water. Bats associated with cave or cave like dwellings (mines, buildings, etc.) for hibernation or roosting (maternity or day/night roost) are not included in this assessment because the surrounding area does not provide this key habitat feature.

Forest-dwelling bats often use large-diameter snags and trees as roosts. Availability and quality of roost sites are thought to be critical factors influencing population size

and distribution of some bat species (Sallabanks et al. 2001). Potential roost habitat (large-diameter snags and trees) for forest bats occurs within the project area and affected stands, though the scarcity of water in the summer may limit use of some parts of the analysis area by bats.

In general, bats have not been specifically surveyed (mist-net or bat detection devices) within the analysis area. Up to 11 bat species may occur in the analysis area, including species of concern such as the Pale western big-eared bat, small-footed myotis, long-eared myotis, fringed myotis, long-legged myotis, and Yuma myotis. Whitaker et al. (1981) considered the long-eared bat to be "the most abundant bat in northeastern Oregon forests", while the Yuma myotis was considered "exceeding scarce" in eastern Oregon. Very little is known about the distribution and habits of the small-footed myotis in eastern Oregon (Verts and Carraway 1998). Large diameter snags are generally lacking in previously harvested stands in the analysis area. Insect infestations in the 1980's caused high mortality in some stands in the Western Route area, increasing potential roosting habitat for these species of bats. New recruitment of large snags will be limited in the future due to the fact that there are relatively few mature trees within some portions of the watershed.

The following species will be assessed as a group and not individually: long-eared myotis, long-legged myotis and Yuma myotis.

Neotropical Migratory Birds

Neotropical migratory birds are those that breed in the U.S. and winter south of the border in Central and South America. Continental and local declines in population trends for migratory and resident landbirds have developed into an international concern. Executive Order 13186 *Responsibilities of Federal Agencies to Protect Migratory Birds* (Clinton 2001) directs that environmental analyses evaluate the effects of proposed actions on migratory birds, especially species of concern.

The Partners in Flight Bird Conservation Plan is used to address the requirements contained in Executive Order 13186, particularly section 3(E)(6), which requires that agencies evaluate the effects of proposed actions on migratory birds, especially species of concern. Conservation Planning allows analysis of proposed projects through the use of guidelines for priority habitats and bird species of concern for each planning unit. The Umatilla National Forest occurs in the Northern Rocky Mountain Landbird Conservation Planning Region, which includes the Blue Mountains sub-region and the Blue Mountains sub-province. Conservation planning for this area is addressed in the *Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington* (Altman 2000), hereafter referred to as "the Strategy." Table 40 identifies priority habitat, habitat features, and focal species identified in the Strategy (Altman 2000).

Table 40. Priority habitat features and associated focal landbird species for conservation in the Northern Rocky Mountain Landbird Conservation Region of Oregon and Washington (Altman 2000)

Habitat Type	Habitat Feature/Conservation Focus	Focal Species
Dry Forest	Large patches of old forest with large trees and snags	White-headed woodpecker
	Old forest with interspersion of grassy openings and dense thickets	Flammulated owl
	Open understory with regenerating pines	Chipping sparrow
	Patches of burned old forest	Lewis' woodpecker
Mesic Mixed Conifer	Large snags	Vaux's swift
	Overstory canopy closure	Townsend's warbler
	Structurally diverse; multi-layered	Varied thrush
	Dense shrub layer in forest openings or understory	MacGillivray's warbler
	Edges and openings created by wildfire	Olive-sided flycatcher
Riparian Woodland	Large snags	Lewis' woodpecker
	Canopy foliage and structure	Red-eyed vireo
	Understory foliage and structure	Veery
Riparian Shrub	Willow/alder shrub patches	Willow flycatcher
Subalpine Forest	Subalpine Forest	Hermit thrush
Montane Meadow	Wet/dry meadows	Upland sandpiper
Steppe Shrublands	Steppe shrublands	Vesper sparrow
Aspen	Aspen	Red-naped sapsucker
Alpine	Alpine	Gray-crowned rosy finch

Habitat types that could be affected by the proposed action in the Western Route analysis area include Dry Forest, Mesic Mixed Conifer, and Riparian Shrub. Several unique habitats are also present in the Western Route area. These include Aspen and Montane Meadow habitats. The remaining habitat types do not occur within the analysis area or are not adjacent to stands proposed for treatment, so the stand structure or vegetative composition of these habitats would not be altered by the proposed activities.

- **Dry Forest Habitat:** The dry forest habitat type is characterized as coniferous forest composed exclusively of ponderosa pine, or dry stands co-dominated by ponderosa pine and Douglas-fir or grand fir (Altman 2000).

It generally occurs at lower elevations and mostly on dry, upland sites with shallow soils. The biological objectives for the focal species representing the dry forest habitat type (Altman 2000) are summarized in the following criteria:

- Old Forest Single Stratum stands,
- a mosaic of forest structural stages,
- openings and burned areas,
- provide 1.4 snags/acre > 8" dbh with >50% of snags >25" in a moderate to advanced state of decay for white headed woodpecker,
- provide at least 10 green trees/acre >21" dbh, and of these, at least 2 green trees/acre >31" dbh for white headed woodpecker,
- and 350 acre patches of Old Forest Single Strata connected to another Old Forest Single Strata patch.

The focal species for this habitat include: white-headed woodpecker, flammulated owl, chipping sparrow, and Lewis' woodpecker. All four species have been observed on the District, and potential habitat for these species occurs in scattered locations throughout the analysis area. The white-headed woodpecker, flammulated owl, and Lewis' woodpecker have been observed infrequently, though the chipping sparrow has been observed more often.

- **Mesic Mixed Conifer Habitat**: Mesic (moist) mixed conifer habitats are primarily Douglas-fir and grand fir sites that are generally higher in elevation, wetter, on northerly aspects, and in draws where soils are mesic (Altman 2000). This habitat occurs at higher elevations in the northern part of the Western Route analysis area. The biological objectives for the focal species representing the riparian shrub habitat type (Altman 2000) are summarized in the following criteria:
  - Old Forest Multi-stratum stands,
  - a mosaic of forest structural stages,
  - high canopy closure (>60%) and dense understory vegetation,
  - a mix of forested stands and shrub/grass dominated openings,
  - provide, maintain, or facilitate creation of snags >27" dbh and >25 meters tall in different stages of decay for Vaux's swift,
  - >75 acre patches of Old Forest Multi-stratum stands connected to other Old Forest Multi-stratum patches.

  The focal species for this habitat type include: Vaux's swift, Townsend's warbler, varied thrush, MacGillivray's warbler, and olive-sided flycatcher. The Western Route analysis area only contains potential habitat for Vaux's swift, Townsend's warbler, and varied thrush.

- **Montane Meadows:** Kenny, North Jones, Matlock, and Balsinger prairies, and numerous smaller meadows associated with streams and other moist areas provide montane meadow habitat in the analysis area. Many of these meadow areas are moderately to lightly grazed during a portion of the year. These meadows are potential habitat for the upland sandpiper (focal species) despite the fact that this species has never been observed on the district. The biological objective for the montane meadow habitat type (Altman 2000) is to provide suitable habitat patches greater than 247 acres.
- **Aspen:** Aspen are usually associated with a stream channel or other area that remains moist year-round. Aspen habitat is considered a high priority habitat due to its high value to bird species and the threat of losing this habitat in the Blue Mountains of Oregon. The biological objectives for the aspen habitat type (Altman 2000) are summarized in the following criteria:
    - Large trees and snags, especially aspen and cottonwood, with adequate representation of younger seral stages (greater than 10% cover of saplings in understory)
    - Greater than 1.5 trees and greater than 1.5 snags per acre that are greater than 39 feet tall and 10 inches in diameter.
    - Canopy cover is 30% to 70%, either clumped with patches or evenly distributed.

  Aspen stands were once widespread throughout the Blue Mountains, however, a combination of factors (including fire suppression, competition with invading shade-tolerant species, overgrazing, and lowering of water tables) have contributed to their decline. Remnant aspen stands are still found along Fivemile, Sugarbowl, Morsay, Taylor, and Silver Creeks in the Western Route analysis area. These stands typically consist of single trees or small groups of decadent trees with little to no regeneration in the understory. Current management of remaining clones uses exclosure fences and conifer removal to maintain and restore these unique habitats.

  The red-naped sapsucker is the focal species for this habitat type. Red-naped sapsucker require large standing aspen snags for nesting.

Environmental Consequences Unique to No Action

Direct and indirect effects:

In the short term (10 years), there would be no direct or indirect effects on the **northern goshawk** or its habitat. The quality, quantity, and distribution of suitable habitat for this species would not change in the short-term. Over the long-term, multi-strata stands would continue to develop, enhancing their value as nesting habitat for goshawk. Dense multi-story stands would be at greater risk of high severity wildfire; a stand replacement fire in the Western Route area would convert suitable nesting and foraging habitat for goshawk to non-suitable habitat.

There would be no direct or indirect effects on any of the **bat species** considered in this analysis. Large snags used by these species for roosting, and the quality,

quantity, and distribution of suitable habitat would not be affected in the short-term. Over the long-term, there would likely be an increase in the number of snags that would be available for bats due to increased incidence of insects and disease (Silvicultutre Report). This increase in snags would also increase the risk of high severity wildfire, which would convert dense forested stands to grass and young tree-dominated areas. For about 20 years after such a fire, snag levels would increase, but after that period there would be few large trees to replace them when they fall.

In the short-term (10 years), there would be no direct or indirect effects on **neotropical migratory birds** or their associated habitats. In the long-term, all neotropical migratory birds dependent on dense multi-story stands with heavy downed fuels and standing snag habitat would be favored. Habitat for birds dependent on open, single-stratum stands and understory shrubs would decrease in the future due to fire suppression and increased stand densities. All focal habitats would have increased risk of loss due to large-scale, high severity wildfire.

- **Dry Forest habitat** stand densities and multi-strata characteristics would increase in the long-term, with a greater proportion of shade-tolerant conifers and fewer dry-site-adapted tree and understory shrub species. In the event of high severity wildfire, this habitat type would be converted to a grassland type with very few overstory trees.
- **Mesic Mixed Conifer habitats** would experience an increase in stand density in the long-term. High severity wildfire would decrease habitat quality for those neotropical bird species that are foliage and crown feeders or eliminate it altogether.
- Unfenced A**spen habitat** would continue to decline in the long-term due to grazing, fire exclusion, and drought. Small remnant stands or single trees would die off, reducing the connectivity of stands. Decadent and dead aspen would die and fall to the ground over time, reducing available aspen snag habitat. Aspen stands within fences would continue to recover, and heavy understory regeneration would produce young, dense stands of aspen to replace old remnant trees. High severity wildfire would likely kill aspen stands in the analysis area, reducing this habitat type.
- Conifers would encroach upon **Montane Meadows** in the long-term due to fire suppression, although the size of these open areas would not change appreciably. High severity wildfire would rejuvenate and stimulate growth in montane meadows, improving the quality of these habitats.

Environmental Consequences Common to All Action Alternatives

Direct and indirect effects:

Commercial harvest, thinning, and fuels treatments would have direct and indirect effects on the **northern goshawk** and its habitat. Commercial and non-commercial

thinning[16] would favor the retention of large trees preferred for nesting and remove smaller understory trees. While treatment activities could take place during the breeding season, no nests have been observed in the analysis area so the potential for disturbance during nesting is low. If a nest were encountered prior to or during treatment activities, the nest site and surrounding area would be protected according to standards in Forest Plan Amendment #8 (also mitigation measure 3 in Chapter 2). Creating more open understories would be enhance the quality of foraging habitat in both the short and long-term, and the risk habitat loss due to high severity wildfire would be reduced. While activities could disturb foraging goshawk during implementation, they would not result in long-term movements outside of the analysis area.

Treatment would have a negligible effect on **bat** roosting habitat. The largest trees and snags in treated stands would be retained (unless a safety hazard), providing potential roosting habitat into the future. In units with the shelterwood, seedtree, sanitation, and salvage prescriptions, some snags that would provide habitat could be removed, though the effect would be negligible since Forest Plan standards for snags would be met. Activities could disturb roosting activity, but bats would likely not stray far from the roost tree due to a shortage of large roost tree habitat elsewhere in the analysis area.

Habitat for **neotropical migratory birds** dependent on open, single-stratum stands (dry forest) and understory shrubs would increase in the future due to reduction of stand densities and re-introduction of fire. Risk of habitat loss due to large-scale, high severity wildfire would be reduced for all focal habitats because of thinning and fuels treatments.

- Many of the proposed treatment units occur in the **Dry Forest habitat** type, impacting both overstory and understory trees. Thinning would reduce stand densities and decrease canopy cover. On the other hand, decreased canopy cover would stimulate growth in ground cover and shrubs that had been inhibited in existing dry forest stands. Underburning would remove some shrubs, grasses, and seedlings from the understory, which would temporarily reduce cover for birds and decrease foraging habitat. However, a year after burning, grasses, forbs and seedlings would re-occupy the burned area. Overall, treatments would favor retention of migratory species characteristic of open single-strata stands in the dry forest habitat type. Restoring open forest characteristics of the frequent fire regime would create a diversity of habitat utilized by neotropical migratory bird species and other species of concern.

  In the short and long term, old growth characteristics would be enhanced, and stand composition and structure would more closely resemble what was historically present. As shown in the Western Route Silviculture Report, the occurrence of Old Forest Single Strata structure is 14 percent below the

[16] The 659 acres of seedtree, shelterwood, sanitation, and salvage harvest are in stands that have open canopies due to insect or disease. Northern goshawk may forage in these stands, but prefer a closed canopy for nesting.

lower end of its historic range (15-55%), while Old Forest Multi Stratum structure is 2 percent above the upper end of its historic range (5-20%). These effects would be consistent with the biological objectives for this habitat type in Altman's Strategy (2000).

- Overstory and understory trees in **Mesic Mixed Conifer habitat** would also be affected by proposed activities. Thinning would reduce stand densities and decrease canopy cover, but this would also stimulate growth in ground cover and shrubs that had been inhibited in existing mesic mixed conifer stands. This would create more habitat for varied thrush. Treatment would reduce overstory cover to a single layer in some stands, though most stands would retain their current multi-storied structure. Fuels treatments (burning and mechanical) would have effects similar to those discussed in the Dry Forest habitat section. In the short and long term, old growth characteristics would be enhanced, and stand composition and structure would more closely resemble what was historically present. These effects would be consistent with the biological objectives for this habitat type in Altman's Strategy (2000).
- There would be no direct or indirect effects on **Montane Meadow habitat** in the analysis area because these habitats are generally outside of treatment units, and those that occur within treatment units would be buffered (Standard Operating Procedure #2). Meadows that fall within units are usually less than an acre.
- **Aspen habitats** on about 20 acres would be treated to remove encroaching conifers, although no conifers greater than 21 inches DBH would be felled. In the short-term, thinning competing conifers would stimulate production of young aspen, providing cover and feeding areas for migratory birds. In the long-term, small, dense stands of aspen would result from these activities and future aspen restoration efforts (fencing). Habitat for migratory birds dependent on aspen stands for foraging and nesting would increase in the short- and long-term. Connectivity of aspen habitat (existing fenced stands and newly thinned stands) would be enhanced through treatment and future fencing of these stands. Treatment of aspen stands and the effects of treatment on these stands would be consistent with the biological objectives for this habitat type in Altman's Strategy (2000).

Cumulative effects:

Past activities and events in the analysis area that have had cumulative effects on northern goshawk, bat species, and neotropical migratory birds in the Western Route analysis area are discussed in Appendix A. Commercial thinning, shelterwood, seedtree, sanitation, and salvage would remove some snags, adding to the cumulative snag reduction on the 65% of the analysis area that was harvested previously. However, snag numbers would still meet Forest Plan standards.

Proposed activities plus future prescribed fire (Wild West Underburn) would begin to reverse the effects of past harvest, encouraging processes that create late old structure and old growth, particularly the old forest single stratum structure in the dry forest habitat type. As more of the analysis area shifts to late and old structure,

species such as the Northern goshawk, bats, white-headed woodpecker and flammulated owl would become more prevalent. Proposed and future burning and mechanical treatment of fuels would reduce a portion of the understory trees, ground cover, shrubs, and downed wood, impacting nesting and foraging habitat for neotropical migratory birds. In particular, underburning would continue to disrupt breeding and nesting if done in the spring, resulting in the loss of nests in treated stands. Measures would be taken to minimize the effects of burning on neotropical migratory birds.

Proposed removal of encroaching conifers and future fencing of aspen stands would combine with past aspen rehabilitation to protect riparian shrubs, herbaceous vegetation, and stream banks from the effects of cattle grazing. Fenced aspen stands would continue to recover, and provide habitat for neotropical migratory birds.

Environmental Consequences Unique to Alternative 1

Direct and indirect effects:
The 1,819 fewer acres of commercial thinning and other harvest would retain more snags in the C4 management area. This would retain more habitat for Northern goshawk, bats, and late/old structure or dense, multi-storied structure-dependent neotropical migratory bird species.

Environmental Consequences Unique to Alternative 2

Direct and indirect effects:
The additional commercial and non-commercial thinning would affect potential nesting habitat for **Northern goshawk** on 37 of the 99 acres due to the presence of late and old structure. Activities could also disturb foraging goshawks while treatment is occurring. As a result, goshawk could avoid the area while treatment activities occur.

Bats could be slightly more affected under this alternative due to the additional 99 acres of commercial thinning. However, the largest trees in the stand and all large snags would be retained, with only a minor risk that a negligible number of existing snags would be removed on these additional acres.

Regarding **neotropical migrants**, all 99 acres would occur in mesic mixed conifer habitat types. Even so, effects would not change from what was described under "Effects Common to All Action Alternatives".

SOILS

This section incorporates by reference the Western Route Vegetative Management Soil Report contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

The Western Route analysis area (Upper Fivemile and Lower Fivemile subwatersheds) serves as the scale of analysis for soils. Specific analysis of effects to soil resources is further detailed to the treatment unit (e.g. Unit K03 for thinning or fuels reduction) as necessary in order to provide site-specificity. Treatment units are used for analysis since these are the areas where measurable effects to soil resources occur, including cumulative effects. Unit of measure is typically by the acre, or a percentage of the unit in question.

Effects to soils can be short-lived (one to three years) - in the case of erosion hazard, soil exposure depends on revegetation processes to determine how long risk of erosion is a concern. Erosion control measures and/or revegetation normally occur immediately with full effectiveness of new vegetation occurring in the first year or two. Other effects to soils such as compaction, rutting and displacement tend to be longer-term impacts that are cumulative in nature if these types of impacts have not fully recovered when new activity occurs in the same locations.

SOIL TYPES

Existing Conditions

Geology

This analysis area lies within the Ukiah Columbia River Basalts Plateau-Continental: Elkhorn and Greenhorn Flanks subsections of the Ecological Unit Hierarchy.

The upper subwatershed is characterized by gentle, rolling plateaus vegetated by meadows to open forest. Deeply confined canyons with basalt outcrops dominate the lower subwatershed. The major rock types in the analysis area are volcanic in origin, dominated by Columbia River flood basalts (Grande Ronde and Picture Gorge), and John Day and Clarno formations (see Table 46 in Hydrology section). Successive lava flows, with differential cooling and periods of weathering between eruptions, left a series of alternating layers of solid rock with soil and rubble layers (cobble to stone-sized rock fragments).

The area is dominated by basalt rock of the Grande Ronde member of the Columbia River Basalts. This rock type is quite stable and relatively unfractured. The Picture Gorge basalt flow on the lower end of the drainage is of very minor extent and of no particular influence beyond the lowest point of the Fivemile Creek at the confluence with Camas Creek. The Clarno Formation in the Northwest part of the analysis area is not typical of the Clarno found further south across the John Day River. There are various layers of sedimentary rock found in this area with the sandstone the most widespread and different in character than the dominant Grande Ronde and Picture Gorge basalt. The relevant characteristic is that of more fractured, more permeable rock (though still quite stable) capable of greater water infiltration.

Soils

A windblown layer of Mt. Mazama volcanic ash has overlain this entire area. The ash layer provides greater water holding capacity and the ability to support coniferous forest found in the area. Much of the ash has been reworked by wind and water action since the time of initial deposition. Soils are deepest in leeward (from the predominant westerly winds) sides of plateaus on lower slope, concave positions and in drainage areas where accumulated soil has stabilized.

Soils in the analysis area (Table 41) are dominantly silt loam, moderately deep or shallow from volcanic ash overlaying basalt. Those in the pyroclastic (volcanic air fall) group are mostly silt loam with silty clay loam subsoil and very deep. The presence of residual soils from the sandstone formation (and other sedimentary layers) in the area is of note as this soil type is limited to this area of the Forest. The deeper, more permeable soils and upper rock layer provide greater rooting depth and increased subsurface water flow. Some chemical differences are also indicated but do not appear to be of particular importance to the project proposal.

Table 41. Summary of Western Route Soil Types

SRI PRIMARY MAP UNIT		SRI PRIMARY MAP UNIT	
Soil Group/Type	**Area (Acres)**	**Soil Group/Type**	**Area (Acres)**
Surface Flow Volcanics		**Tuffaceous Sandstones**	
01	1,952	81	103
02	276	82	779
03	2,363	83	1,352
04	4,716	84	261
05	70	85	565
06	3,964	86	325
07	3,980	87	1,059
Total Area	**17,321**	88	164
		89	142
Pyroclastics & breccias, with surface flow volcanics		**Total Area**	**4,750**
21	1,609	**Alluvial**	
22	985	30	1,279
23	895	31	1,214
24	748	39	411
Total Area	**4,237**	**Total Area**	**2,924**

The number of acres of soil types indicated in the table above is not exact, but has been condensed and rounded to indicate relative amounts of the primary map units (also referred to as soil types). They do not add up to the total acres in the analysis area. Also, most of the mapping units in the area (from the forest's Soil Resource Inventory) are complexes- made up of several of the primary units. Map units shown in the table are the primary components. Complex map units (two or more primary map units) are not included in this table, only primary map unit components. Both

single component (primary) units and complex map units are shown in Table 42 for the treatment units.

The deep to very deep soils in the pyroclastic group are quite distinct from the more common shallow to moderately deep, ash-over-basalt, residual soils. These are the soils that support the moister, forested plant communities in the area. The sandstone soil group is mostly moderately deep to very deep with a silt loam ash layer over sandy loam subsoil that formed from the sandstone rock. The alluvial soils are found in the swales and drainage areas and are mostly deep, but with variable coarse fragment contents. Soil unit 39, for example, is very cobbly with few fines, which is typical of the drainages in the area. These alluvial soil units are where most of the aspen stands are found.

Specific soil types and present condition, relevant to the proposed action by activity unit, are discussed elsewhere in the document. The qualitative description of residual soil disturbance (based on the protocol mentioned earlier) is included in Table 42.

Table 42. Dominant or Special Concern Soil type by Treatment Unit

Soil Type (Map unit)	Unit #	Residual Soil Surface Disturbance*	Compact. Risk Rating**	Displace. Risk Rating**	Erosion Risk Rating**
89, 83	K03	L	H	L	L
83	K04, K06, K07	L	H	L	L
382	K08	L	H	L	L
076	K09	L	H	L	M
382, 89	K10	L	H	L	L
046, 041, 382	K11	L	L, H	L	H, L
87	K12	L	H	L	M
07	K13	L	H	L	M
674	K14	L	H	M	M
07	K15	L	H	L	M
046	K16	L	L	L	H
21	K17	L	H	L	M
30, 31	K19	L	H	L, H	M
83	K20, K21, K22* K23, K23W, K26	L	H	L	L
382	K24	L	H	L	L
83, 382	K24W	L	H	L	L
382	K25	L	H	L	L
87, 041	K27	L	H, L	L	M, H
076, 321	K30	L	H	L, H	M, H
04, 06, 321	K31	L	L, H	L, H	M, H
06	K32	L	L	L	M

Soil Type (Map unit)	Unit #	Residual Soil Surface Disturbance*	Compact. Risk Rating**	Displace. Risk Rating**	Erosion Risk Rating**
046, 07	K33	L	L, H	L	H, M
046	K34	L	L	L	H
07	K35	L	H	L	M
06	K36	L	L	L	M
046, 07	K37	L	L, H	L	H, M
04, 06, 07	K38	L	H, L	L	M, H
046, 06	L03	L	L	L	H, M
064, 076	L04	L	L, H	L	H, M
076	L05	L	H	L	M
07, 321	L06	L	H	L, H	M, H
064	L07	L	L	L	H
076, 064	L08	L	H, L	L	M, H
064, 076	L09	L	L, H	L	H, M
076, 064	L10	L	H, L	L	M, H
076, 046	L11	L	H, L	L	M, H
064, 321	L12	L	L, H	L, H	H
07	L13	L	H	L	M
06, 076	L14	L	L, H	L	M
04	L15	L	L	L	M
22	L16	L	H	M	M
07, 064	L17	L	H, L	L	M, H
046, 064	L18	L	L	L	H
076	L19	L	H	L	M
24	L20	L	L	H	M
064, 376	L21	L	L, H	L	H, M
06, 064	L24	L	L	L	M, H
07, 064, 321	L25	L	H, L	L, H	H, M
85, 891	TP02	L	H	M, H	M
84, 87	TP03	L	H	M, L	M
82, 83	TP05	L	H	L	M, L
85	TP06	L	H	M	M
83	TP07, TP08, TP09	L	H	L	L
86	TP10	L	H	L	M
21	TP11	L	H	L	H
245	TP12	L	L	M	H
212	TP13	L	H	L	M
076	TP14	L	H	L	M

Soil Type (Map unit)	Unit #	Residual Soil Surface Disturbance*	Compact. Risk Rating**	Displace. Risk Rating**	Erosion Risk Rating**
22, 229	TP15	L	H	M, H	M, H
21	TP16	L	H	L	H
076	TP17	L	H	L	M
076, 064	TP18	L	H, L	L	M, H
07	TP19	L	H	L	M
046, 321	TP21	L	L, H	L, H	H
07, 046	TP22	L	H, L	L	M, H
076	TP23	L	H	L	M
21	TP24	L	H	L	H
076	TP25	L	H	L	M
076, 046, 321	TP26	L	L, H	L, H	M, H
07	TP27, TP28	L	H	L	M
07, 321	TP29	L	H	L, H	M, H
046, 076	TP30	L	L, H	L	H, M
076	TP31, TP32	L	H	L	M
076, 321, 046	TP33	L	H, L	L, H	H, M
041	TP34	L	L	L	H
046	TP35	L	L	L	H
046, 076	TP36	L	L, H	L	H, M
064	TP37	L	L	L	H
064	TP38	L	L	L	H
076, 04	TP39	L	H, L	L	M
046, 24	TP40	L	L	L, H	H, M
076, 043, 06	TP41	L	L, H	L	M, H
043, 076, 24	TP42	L	L, H	L, H	H, M
064, 041, 321	TP43	L	L, H	L, H	H
07, 046	TP44*	L	H, L	L	M, H
21	V1		H	L	H
83	V2, V3		H	L	L
85	V4, V5		H	M	M

H=high, M= moderate, L= low

* This rating based on field reconnaissance to identify stand characteristics.

** These ratings based on map units from the Soil Resource Inventory, which was primarily based on interpretation of aerial photos.

SOIL DISTURBANCE

Existing Condition

This area has had relatively high amount of management activity, primarily due to favorable accessibility. The road network is extensive and multiple entries over many decades have occurred for timber harvest and other purposes. Residual soil disturbance is rather wide spread in extent, though not particularly intensive in degree. Much of the harvest in the area selected individual trees for removal. Old skid trails and non-system roads are still evident where soil was compacted, displaced or rutted from continued machinery or recreational traffic.

Grazing has been widespread but had no intense or long-lasting physical effects on soils except where concentration of animals occurred. Soil erosion from overgrazing is still evident in certain of the open range areas, but the amount of topsoil lost was not well documented.

Environmental Consequences Common to All Alternatives

Direct and Indirect effects:
The majority of the area would receive no new soil disturbance (detrimental or total), whether or not action occurs. Mass wasting is not a particular concern in this analysis area relative to the proposed action or need for any remedial treatments, so is not discussed further in this document.

Environmental Consequences Unique to No Action

Direct and Indirect effects:
No added soil disturbance, detrimental or otherwise, would occur. Woody debris and tree density would continue to increase with associated risk of higher severity wildfire and its impacts on soils (such as nutrient volitalization, loss of protective soil cover, water repellency in extreme cases). Gross productivity potential would increase, although species composition, density and stand character are less conducive to long-term sustainability.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:
Soil disturbance would occur with the proposed activities that require large machinery (particularly where mechanical fuels treatment follows mechanical thinning or harvest), but the overall result would be limited in extent. Disturbance could include compaction, displacement, rutting, and exposure of the mineral surface to erosion due to removal of ground cover. The extent, intensity, and duration of disturbance would be kept to a minimum by selection of unit boundaries, type of harvest systems, and contractual controls. Mitigation measures identified in

Chapter 2 and Best Management Practices (both for erosion control and soil impact) in Appendix B would further limit soil disturbance.

For instance, mitigation identifies that ground-based equipment would avoid operation where the average slope is greater than 35 percent in order to reduce the potential for soil movement (Standard Operating Procedures #10). Even though the Erosion Risk Rating is moderate to high for a number of treatment units based on the general soil type (Table 43), the gentle slopes of most units plus the mitigation above would make erosion unlikely. This is also the case for the Compaction Risk Rating and Displacement Risk Rating. To address these risks, mitigation would require equipment to avoid operating in Riparian Habitat Conservation Areas unless soil disturbance can be avoided (Standard Operating Procedures #9 and 10). Cross-ditches and water-spreading ditches would be installed to limit potential for soil displacement (Standard Operating Procedures #11). Soil in ephemeral draws would be protected from compaction and displacement by confining equipment to designated crossings and placing debris in the path of equipment to distribute its weight (Standard Operating Procedures #12). Suspending use of ground-based equipment during wet soil conditions (Standard Operating Procedures #9 and 13) would greatly reduce rutting, surface erosion, and compaction. Monitoring of similar mechanical treatments on like soil conditions has shown that, with the proposed project design, mitigation, and Best Management practices, detrimental soil disturbance within the activity units would occur in the 6-8% range.

Table 43: Erosion Hazard Risk for Proposed Action and its Alternatives*

Erosion Hazard Risk	Proposed Action	Alternative 1	Alternative 2
Low (acres)	428	172	463
Moderate (acres)	3,186	2,581	3,243
High (acres)	2,425	2,350	2,432

* This table includes all proposed treatment acres. Only 6-10 percent of these acres would be exposed to machine operation, so actual area at risk is quite small.

Monitoring has also shown an additional 0-2% detrimental soil disturbance would be expected following fuel treatments (burning and mechanical). Mechanical fuel treatments would employ large equipment over the same area as the thinning and harvest, with the associated affects discussed above. However, this equipment would often stay in the same travel routes as used previously, which would limit the area of new exposure. Burning piles of debris would concentrate effects to the soil directly underneath the piles. This would result from collecting a large amount of fuels in a small area, which increases the heat intensity and length of burning time in that location. However, these piles would be small in individual size and scattered across the activity units, and mitigation has been identified to seed them as necessary to provide soil cover. Therefore, the magnitude of this outcome would be very small. As a result, erosion would not be expected to increase due to fuel treatments, even on soil types with a high erosion hazard.

Disturbance from proposed actions could be expected to stay within Forest Plan guidelines for detrimental soil impacts. Exposure of 2 to 10 percent of the mineral

soil surface could be expected due to loss of the forest duff (surface litter) layer resulting from machine activity. This could increase erosion depending on soil characteristics, pattern, and extent of the exposed mineral surface, and slope steepness. However, the season of use, physical site restrictions (i.e. no ground-based equipment will operate in units where the average slope is greater than 35 percent), and post-activity rehabilitation would reduce the risk of increased erosion to a negligible amount.

Cumulative effects:

The proposed ground-disturbing activities would add to areas with residual compaction and displacement from past harvest and other management (see Appendix A), thereby increasing the total area of detrimental soil impacts within the activity units. Physical changes could last for decades (ruts), and soil loss (erosion) would be recoverable only over many decades. However, as shown in Table 42, the existing ground disturbance in all treatment units was estimated as "Low". Using the upper range of 10% for new detrimental impacts and 2% residual detrimental impacts for all units with existing 'Low' disturbance, cumulative detrimental soil effects could reach 12% in treatment units, which would easily meet Forest Plan detrimental impacts criteria ("*Maintain a minimum of 80% of an activity area in a condition of acceptable productivity potential*."—Forest Plan page 4-80.). For example, Unit K17 had a landing with evident displacement and compaction effects that would add about 2% to the detrimental total within that unit, creating a 12% detrimental soil condition cumulatively after this action (Table 44). Furthermore, reusing existing trails and landing areas where possible so that new disturbance overlaps residual effects would reduce the amount of area affected.

Table 44: Area subject to detrimental soil effects for Action Alternatives

Treatment	Range of Potential Detrimental Soil Effects (acres)		
	Proposed Action	**Alternative 1**	**Alternative 2**
Thinning and Harvest	389-519	313-417	395-527
Burning and Mechanical Fuels Treatment	0-130	0-104	0-132
Total Potential	389-649	313-521	395-659

WATER

This section incorporates by reference the Western Route Vegetative Management Water Resources Report contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

The Western Route analysis area is located in Fivemile Creek, a tributary to Camas Creek in the lower Camas watershed (Table 45). Analysis was conducted at the

subwatershed scale with consideration of downstream effects to lower Camas Creek (see Fish Habitat section). Fivemile Creek consists of two subwatersheds, Upper Fivemile Creek and Lower Fivemile Creek, with a total of 32,324 acres.

Table 45. North Fork John Day Subbasin, Camas Watersheds, and Fivemile Creek Subwatersheds, Area, and Percent of Subbasin

Hydrologic Unit Code	Hydrologic Unit Name	Area (Acres)	Percent
17070202	North Fork John Day Subbasin	1,171,200	100
170702020	Camas Combined Watersheds	261,678	22
1707020206	Lower Camas Watershed	156,990	13
170702020604 170702020607	Fivemile Creek Combined	32,324	3

SETTING

Fivemile Creek drains a 50.4-square-mile area in the lower Camas Watershed. Elevations range from 5,847 feet at Arbuckle Mountain, the highest point in the watershed, to 2,940 feet at the confluence with Camas Creek (at Camas River Mile 5.4). Camas Creek is a tributary to the North Fork of the John Day River.

Geology and Climate

As discussed in the Soils section, the major rock types in the analysis area are volcanic in origin. The effect of this geology on water is that the Grande Ronde basalts (the majority of the watershed) tend to be less permeable compared to the Clarno formation (headwaters area) (Table 46).

Table 46. Dominant Geology, Landforms, and Disturbance

Formation	Mapping Unit	% Area	General Description
Grand Ronde Basalt	Tcg	81	Uplifted basalt plateau, multibedded, weakly faulted, relatively impermeable, snowmelt-dominated, low base flows and flashy runoff, ice jams may cause stream scour in canyons.
Picture Gorge Basalt	Tcp	3	Moderately dissected rolling mountains and hills, interspersed with structural basins (meadows), mixed volcanics, permeability variable, snowmelt-dominated with moderation of late-season flows.
John Day Formation	Tsfj	<1	
Clarno Formation	Tca	16	

In general, the climate is continental, characterized by warm-dry summers and cold-moist winters. Average annual precipitation ranges with elevation from 15 inches at the mouth of Fivemile Creek to 40 inches in the highest elevations. The majority of

precipitation accumulates between October and March, with snow as the dominant precipitation type above 3,500 feet.

Lower Fivemile Creek in the canyon has a transient snowpack (snow accumulates and melts through the winter months). In summer, occasional isolated convective storms occur, but overall precipitation intensities are low. For example, the 5-year, 24- hour precipitation intensity for the analysis area is less than 0.2 inches (NOAA Precipitation Frequency Atlas). During the months of July and August In Ukiah (the nearest weather station with long-term records representative of overall conditions in the analysis area), the average daily maximum air temperature is 83°F. The average minimum temperature during January is 25°F.

Recent Watershed Disturbances

Multiple natural and human disturbances, including flooding, wildfires, and change in forest cover (harvest, insects and disease) influence watershed hydrology, stream channel stability, and water quality in the Fivemile Creek watershed. Land uses have included timber harvest, roads, livestock grazing, private land uses (harvest, roads, and grazing), and headwater diversion. Specific disturbances are summarized as follows:

Wildfire

No large (> 10 acres) fires have been recorded; 85 small fires have been documented in the analysis area in the last 30 years. Potential for extensive, high severity wildfire is described in the Fire/Fuels section.

Flooding

The highest floods on record at the Camas gage occurred in the years 1932, 1965, 1991, and 1996. These same events also likely occurred within the Fivemile drainage, with associated scour and deposition of stream channels and floodplain areas, and ice scour in the lower canyon. Residual effects (scour, instability, deposition) from the floods in the 1990s are still present in some reaches of middle and lower Fivemile Creek.

Timber Harvest

The Equivalent Treatment Area analysis was used as a measure of change in forest vegetation cover, and a surrogate indicator of potential for alteration of water yield, peak flows, and channel stability (Ager and Clifton, in review). Data used in the analysis included past harvest year, prescription, and potential vegetation community (used for estimating recovery and total potentially forested acres). Results of the analysis show the existing Equivalent Treatment Area at 16 and 10 percent for the upper and lower subwatersheds, respectively (Table 47).

Measurable changes in water yields, peak flows or low flows as a result of harvest alone are unlikely at these levels because of other factors influencing runoff (climate, geology, other land use impacts). For comparison, results from the High Ridge Evaluation area, located approximately 60 miles northeast, in the headwaters of the Umatilla River, did not show detectable increases in water yield or peak flows until 60 to 100 percent of the catchments were in clear-cut condition (Helvey and Fowler, 1996). The High Ridge study area is located in a higher elevation, more snow-

dominated zone, and is less responsive than the Fivemile drainage. The numerous studies of harvest and water yield show a range of response, with no consistent relationship between area removed and hydrologic variables, and, in general, responses occurring above 20 percent of the area harvested (Sherer, 2000, and Stednick, 1996).

Table 47. Current Roads and Harvest in the Fivemile Creek Analysis Area

		Fivemile Creek Subwatershed		
		Upper	**Lower**	**Total**
Drainage Area (Mi^2)		32.5	18.0	50.5
Classified Road Miles	Open	57	27	84
	Closed	71	16	87
	Season/Other	5	0	5
	Total	133	43	176
Road Density (Mi/Mi^2)		4.1	2.4	4.5
Potentially Forested Area (Acres)		19,492	6,420	25,912
ETA Area (Acres)		3,124	662	3,786
ETA Area (%)		16	10	15

Transportation System

The total percent of an area in roads and their density (miles of road per square mile of area), in combination with the Equivalent Treatment Area, are reasonable indicators of watershed condition and potential for accelerated runoff, erosion, and channel instability (Table 47). The total roaded area in the Western Route analysis area is less than 2 percent (assuming an average 20-foot road width), a relatively low figure; however, overall road densities are high, on average 4.1 miles of road per square mile. High road densities indicate increased potential for interception of subsurface flow, channel network extension ("hydrologically-connected" roads), and accelerated sedimentation (erosion and delivery to streams).

Livestock grazing

Impacts to watershed conditions from grazing have been summarized in numerous reports (see for example, Kauffman and Kreuger, 1984, Belsky et al, 1997). These include effects on upland soils and vegetation (compaction, reduced cover), riparian vegetation (woody species browse), stream channel impacts (hoof damage), and water quality impairment (nutrients, bacteria, shade loss). The majority (82 percent) of the Federal lands within the Western Route analysis area are permitted for livestock grazing. Some grazing use also occurs on private lands, however no records are available for these areas (lower Fivemile). Grazing history and current uses are detailed in the Range section and Appendix A. Many miles of perennial stream in the analysis area have been fenced from direct access by livestock. Stream fencing has contributed to improvement in riparian and stream conditions over the last 10 years.

Saylor-Madison diversion

A permitted diversion in the headwaters of Fivemile Creek takes all the flow between May and June, during snowmelt runoff. The area (approximately 3 square miles) above the diversion represents approximately 9 percent of the total drainage area of

the upper subwatershed. All of the snowmelt runoff in Fivemile Creek from above the diversion point is conveyed to Butter Creek, on average, 9 cubic feet per second (cfs), however, this value ranges over the snowmelt period between .01 and 60 cfs. The effect is a dampening of the spring peak flows in upper Fivemile Creek. Lower peak flows and velocities likely reduce sediment transport capacity for some distance downstream.

Overall, watershed condition in the Lower Camas watershed was rated as Class 3 in a broad-scale characterization of conditions using physical and biological indicators (USDA, 2001). Class 3 watersheds are defined as: "*watersheds exhibiting low geomorphic, hydrologic, and biotic integrity relative to their natural potential condition. A majority of the drainage network may be unstable. Conditions suggest that soil, aquatic, and riparian systems do not support beneficial uses*". Condition indicators included: road density, equivalent clearcut acres, intact riparian areas, and resource attributes (listed fish species, critical habitat, and 303(d) listed streams). Riparian photo and stream monitoring provide evidence of stream and riparian recovery in the last 10 years. Recovery is most likely the result of a combination of climatic conditions, riparian corridor fencing, and post-harvest vegetation recovery.

WATER QUANTITY

Existing Condition

Streamflow in the Camas Watershed and its tributaries is dominantly controlled by annual snowmelt, with runoff occurring from March through June. At the Camas Creek stream gage near Ukiah, Oregon (where streamflow has been measured for over 85 years) 66 percent of the annual peak flows occurred in the spring. Winter flooding, caused by rain-on-snow, occurs less frequently (34 percent of the Camas peaks occurred from December through February). Periodic moderate flooding is important in maintaining stream channel form, and transporting sediment and large woody debris. More extreme floods accelerate streambank and floodplain erosion, transport of woody debris, and sediment deposition in lower-gradient areas.

Average annual and peak discharges for specified return intervals were estimated for the Fivemile Creek area using the Camas Creek gage and regional equations (Table 48) (Harris and Hubbard, 1983, and Moffatt et al, 1990). Peak discharge at the mouth of Fivemile for the 2-year-flood (or flood event with a 50 percent chance of occurring in any given year) was estimated at 397 cubic feet per second (cfs). Low flows vary along the stream length; some reaches have very low flows or dry up in late summer. Low flow at the mouth may be under-estimated at less than 1 cfs. Low flows are strongly influenced by groundwater and floodplain extent.

Table 48. Average Annual Stream Discharge (QA) and Peak Flow Estimates for Selected Return Periods, Fivemile Creek (cfs=cubic feet per second)

	Section	
	Upper	**Mouth**
Drainage Area (Mi^2)	32.5	50.5
QA (cfs)	26	40
2-Year (cfs)	324	397
10-Year (cfs)	596	760
50-Year (cfs)	855	1,115
100-Year (cfs)	958	1,263

Runoff and streamflow characteristics for Camas Creek and its tributaries were described in more detail in the Camas Ecosystem Analysis (1995). Precipitation and discharge records from the Camas gage (OWRD#14042500) were analyzed to determine if changes in water yield were detectable over the period 1917 to 1991. None were shown, however, other studies have measured changes in water yields, peak flows, and timing of runoff after harvest (Sherer, 2000, Stednick 1996, and Wemple, 1994). Changes are generally difficult to detect especially at the watershed scale because of background variability and other factors influencing runoff (climate, geology, stream characteristics).

Environmental Consequences Common to all Alternatives

Direct and Indirect effects:
Operation of the headwater diversion would continue, with reduction in snowmelt peaks in the upper subwatershed and reduced velocities in Fivemile Creek downstream to approximately the confluence with Taylor Creek.

High road densities would continue to impact watershed conditions by accelerating runoff and contributing to localized increased peak flows.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:
Vegetation management activities (harvest, thinning, aspen treatments, and underburning) would slightly increase potential for accelerated runoff, increased peak flows, and reduced low flows. This would result from the reduction in forested vegetation, which would lower water use by plants and decrease snow accumulation and melt rates. Opening (clearing and blading) and use of closed roads would contribute to potential increased rates of runoff because of the slight increase in area exposed to runoff. Also roads increase the drainage area through their connection with streams at stream crossings.

Overall, effects on flows would not be measurable because the treated areas are small relative to the drainage area, and other factors influencing flows (soils, climate,

and snow characteristics). Local increases in runoff would be possible but these would be of small magnitude, short duration, and not measurable downstream.

Cumulative effects:

Four harvest units are located upstream of the Saylor-Madison diversion. Two units (TP2, TP3) would be thinned and two units (TP7, TP8) would be harvested or thinned. Less than 10 percent of the total area above the diversion would be treated. A slight increase in streamflow at the diversion as a result of harvest would be possible but unlikely because of other factors influencing peak flows such as soils, climate, and snow characteristics.

Future road decommissioning would reduce effects of existing roads, depending on extent of area treated, location, and methods used.

All alternatives would slightly (3-6 percent) increase the Equivalent Treatment Area over four years following implementation, and delay longer-term (10 years) hydrologic recovery (Figure 4 and Figure 5). Still, change in Equivalent Treatment Area alone would not measurably alter water yield, peak flows, or low flow because the existing condition is at a low level, increases as a result of harvest would be relatively low, and other factors governing streamflow.

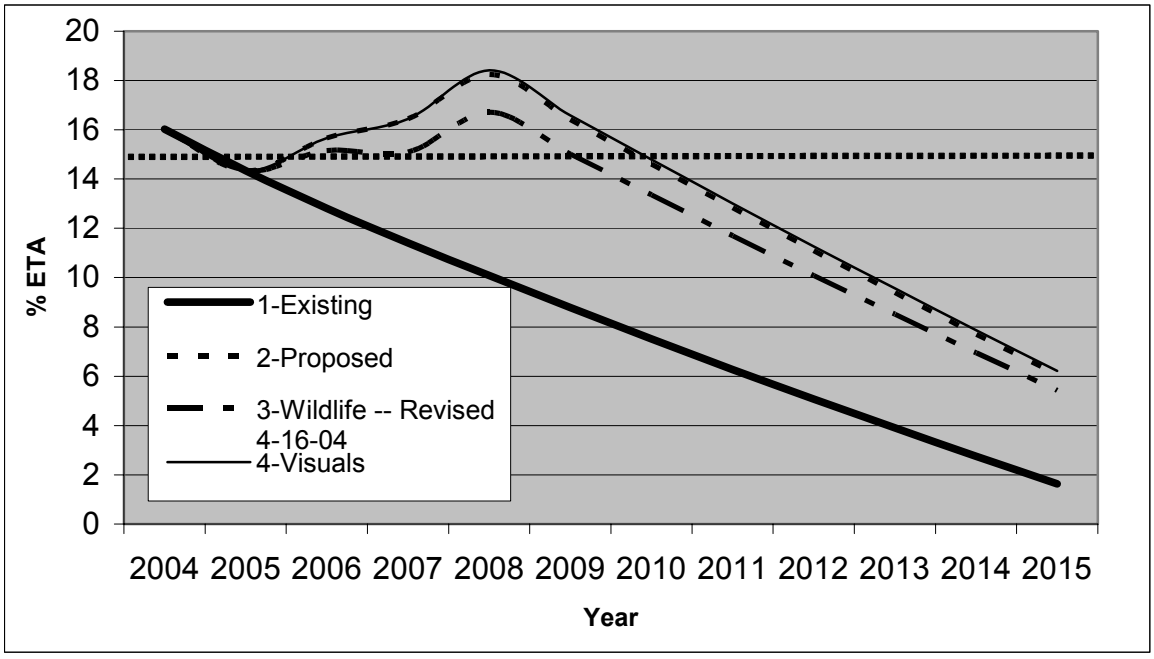

Figure 4. Upper Fivemile Subwatershed Percent Equivalent Treatment Area by Alternative.

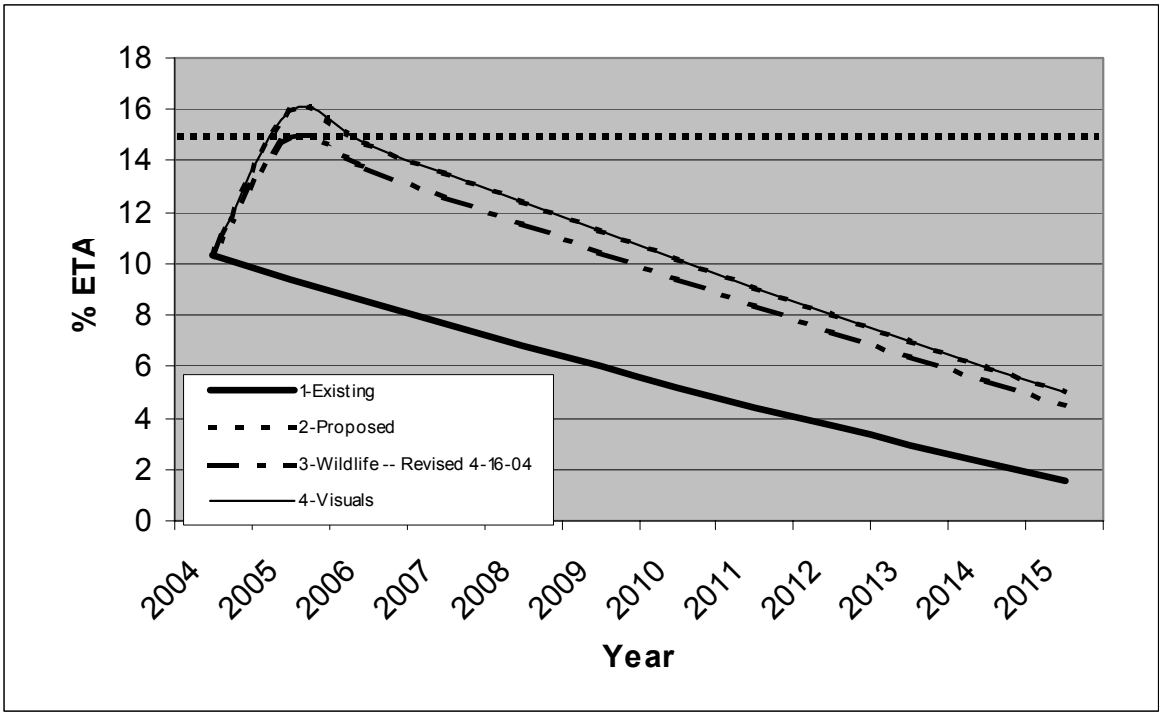

Figure 5. Lower Fivemile Subwatershed Percent Equivalent Treatment Area by Alternative.

The proposed activities, when combined with effects of past harvest, ongoing road treatments, grazing, and water diversion, would result in short-term, localized increases in flows. However, any effects would be of short duration (hours to days), localized (near the activity), and would not be distinguishable from background in Lower Fivemile Creek or in Camas Creek downstream from the confluence with Fivemile Creek.

Environmental Consequences Unique to No Action

Direct and Indirect:

Flow conditions (runoff, peak flows, low flows) would respond primarily to climatic conditions. As existing disturbed areas continue to revegetate and stabilize, a slight reduction in peak flows and increase in low flows would be possible, but not measurable.

In the absence of extensive wildfire or other natural disturbance (wind, insects and disease), Equivalent Treatment Area recovery would continue for the foreseeable future. There would be a slight, non-measurable decrease in overall runoff and peak flows as a result of increased water use by vegetation. Implementation of other foreseeable projects such as the Wild West Prescribed Burn would slightly delay recovery, but these effects would be small, not measurable, and within natural background variability.

Environmental Consequences Unique to Alternative 1

Direct and Indirect:
Treatment would drop 1,271 acres, and 6 fewer miles of road would be reopened. This would result in slightly lower overall effects on runoff compared to the Proposed Action and Alternative 2.

Cumulative:
The Equivalent Treatment Area analysis showed the smallest increase, with potential increases in runoff and peak flows as a result of vegetation treatments least likely under this alternative (Figure 4 and Figure 5).

STREAMS AND RIPARIAN AREAS

Existing Condition

Major streams and tributaries include the mainstem of Fivemile Creek, Sugarbowl Creek, Morsay Creek, Tribble Creek, Taylor Creek, and Silver Creek. Stream types range from lower gradient, meadow types along segments of the upper watershed (tributaries and mainstem Fivemile Creek), to the higher gradient mainstem of Fivemile Creek in the lower confined canyon.

A total of 168 miles of perennial and intermittent stream have been mapped in the drainage, with 68 percent of the stream miles classified as intermittent (seasonally-flowing) non-fish bearing, 10 percent perennial non fish-bearing, and 22 percent classified as perennial, fish-bearing (Table 49).

Table 49. Miles of Stream by Category/Class, Drainage Area (DA), and Stream Density for Fivemile Creek.

		Subwatershed		
		Upper	**Lower**	**Total**
Drainage Area (Mi^2)		32.5	18.0	50.5
Perennial Category 1 Category 2	Class 1, 2 (Miles)	24.8	10.6	35.4
	Class 3 (Miles)	9.7	7.8	17.5
Intermittent Category 4	Class 4 (Miles)	70.0	45.0	115.0
Total Miles		104.5	63.4	167.9
Density (Mi/Mi^2)		3.2	4.5	3.3

A detailed riparian inventory and mapping of Fivemile Creek was conducted in 1992 under a contract with White Horse Associates (Smithfield, UT). A total of 358 acres (representing 1.1 percent of the watershed area) were mapped and classified. A summary of vegetation type and condition illustrates the range of conditions found at that time, with 19 percent in a natural state, 53 percent in a stabilized state, and 29 percent in disturbed state (Table 50).

Table 50. Summary of Riparian Vegetation Condition from 1992 mapping cross-walked with National Riparian Service Team Proper Functioning Condition categories

	Terminology		
White Horse Assoc. National Riparian Service Team	Natural Proper Functioning Condition	Stabilized Functioning At Risk	Dished/Incised Not Functioning
Area	68 acres 19%	186 acres 52%	104.4 acres 29%

Riparian photo monitoring has been conducted at 3 locations in the Western Route analysis area (upper Fivemile, lower Fivemile, and Tribble Creek) since the late 1980s. Permanent photo points were established to track riparian and stream channel changes over time in response to changes in livestock management (riparian fencing, grazing system). In general, photo monitoring shows continuous improvement in stream conditions, narrowing of channels, bank stabilization, and establishment of riparian vegetation including shrubby species (Photos in Range files at North Fork John Day District Office, Ukiah, OR).

In 2000, two long-term stream monitoring sites were established as part of an interagency plan to monitor the condition of fish habitat in grazed lands. Sites were established on upper Fivemile Creek upstream of Forest Road 53, and on Fivemile Creek near the confluence with Taylor Creek. Conditions at these locations were summarized in the Umatilla National Forest Annual Summary Report, prepared by the National Fish and Aquatic Ecology Unit staff (2002). Both sites are low to moderate gradient C-type (Rosgen) channels. Bank stability and effective ground cover rated high at both sites (>90 percent). Streambed fines were high (89 percent) at the site above Forest Road 53, and low (3 percent) at the site near Taylor Creek. Factors influencing streambed fines include gradient and proximity to the Saylor-Madison water diversion. The Forest Road 53 site is a low gradient, depositional meadow, and may be affected by the Saylor-Madison diversion. The Taylor Creek site, downstream, is higher gradient and less influenced by the diversion.

Environmental Consequences Unique to No Action Alternative

Direct and Indirect:

There would be no direct or indirect contribution to accelerated erosion, sediment, or stream channel stability from vegetation treatments or related road activities. Existing road conditions would stay the same or slightly decrease in effect on sediment, as disturbed areas continue to revegetate and stabilize. Riparian and stream recovery trends would continue with gradual improvement in riparian vegetation conditions and channel stability.

Environmental Consequences Common to all Action Alternatives

Direct and Indirect effects:

Small flow increases associated with vegetation treatments would slightly increase potential for upland and channel erosion, and sediment delivery to streams. Opening (clearing and blading) and use of closed roads would also contribute to small increases in erosion rates with localized increases in sediment. Harvest units and roads near or crossing stream channels would pose greater risk to streams (change in channel stability and increased fine sediment). Some of the proposed harvest units have mapped streams and roads within the unit (Table 51). These streams would have higher likelihood of activity-related effects to all water measures. The majority of these "higher risk" units are located in headwater areas where effects would be localized and of short duration.

Table 51. Proposed Treatment Units with Mapped Streamcourses and Roads

Proposed Action and Alternative 2 Units	Alternative 1 Units	Associated Stream
K8, K9, K11, K15, K16, K17, K35	K8, K9, K11, K16, K17, K35	Taylor and tributaries
K24W	K24W	Fivemile
K25, K26, K27	K25, K26 K27	Turpentine Tribble tributary
TP8, TP21, TP23	TP21, TP23	Upper Fivemile tributaries
TP26	TP26	Morsay tributary
TP28, TP29		Sugarbowl tributary
TP30	TP30	Morsay tributary
TP36	TP36	Fivemile/Sugarbowl
TP41	TP41	Fivemile
L6, L9	L6, L9	Silver tributary
L19	L19	Dry Fivemile and tributary
L21	L21	Lower Fivemile tributary

Localized effects would also be possible where heavy equipment is used on roads at or near stream crossings. Effects would be most likely in response to weather events (isolated summer convective storms, fall rain) and include slightly increased rates of erosion and sediment, with slight risk of impact to channel conditions (stability), during and after storm events. Effects would be short duration, localized, and within existing background variability in terms of downstream sediment loads.

Full implementation of Best Management Practices would reduce adverse effects of proposed vegetation treatment activities and associated temporary opening of closed roads. Past evaluations of Best Management Practices indicate high rates of implementation and effectiveness of riparian buffers. Verifying streams during layout and adjusting unit boundaries to avoid sensitive areas would reduce potential for effects to channel stability and instream sediment. Specific practices such as designated skid trails, erosion control, wet season limitations, and protection of

streamside areas would reduce potential for accelerated erosion, sediment delivery to riparian and stream areas, and downstream stream channel impacts.

Cumulative effects:
The proposed activities, when combined with effects of past harvest, ongoing road treatments, grazing, and water diversion, and the future Wild West prescribed burn, would result in variable effects to streams as follows: Future road decommissioning has potential for short-term, localized increases in sediment delivery to streams depending on extent and location of treatments. Fencing additional miles of stream and riparian areas would contribute to improvement in streamside vegetation conditions, channel stability, and reduce instream sediment loads. Effects would not likely be distinguishable from background in Lower Fivemile Creek or in Camas Creek downstream from the confluence with Fivemile Creek in the short term. However, decreased sediment and improvement in overall watershed conditions (quantity, stream channels and riparian areas, water quality) may be detectable over the long term (>10 years).

Environmental Consequences Unique to Proposed Action

Direct and Indirect:
A total of 6,483 acres would be treated by harvest, thinning, and or underburning activities. A total of 25 miles of closed roads would be reopened. Compared to Alternatives 1 and 2, this alternative would be intermediate in overall effect, but differences between alternatives would be slight and non-measurable.

Environmental Consequences Unique to Alternative 1

Direct and Indirect:
Treatment would drop 1,271 acres from treatment and 6 fewer miles of road would be reopened. This would result in slightly lower overall effects on erosion, sediment transport, and stream channels compared to the Proposed Action and Alternative 2.

Environmental Consequences Unique to Alternative 2

Direct and Indirect:
This alternative would add 99 acres of combined commercial and non-commercial thinning to the treatments described under the Proposed Action, with the same miles of road reopened. This increase in acres treated would produce slightly (not measurable) greater effects than the Proposed Action.

WATER QUALITY

Existing Condition

Overall watershed conditions influence water quality in Fivemile Creek and its tributaries. Specifically, high summer water temperatures are a concern in the

mainstem of Fivemile Creek, and sedimentation may be locally of concern in low gradient meadow reaches of Fivemile and its tributaries. Other parameters of possible concern include: bacteria, pH, nuisance algae and weeds.

Stream temperature data collected at three locations on Fivemile Creek and two tributaries are summarized in the Fish and Aquatic Habitat Report. Over a 10-year period, maximum summer water temperatures were consistently high on the three Fivemile Creek stations and one tributary (Taylor Creek), and did not meet state standards. Morsay Creek, above Sugarbowl Creek, is a relatively cool stream, and met state standards.

Instream sediment conditions were previously discussed under Streams and Riparian areas, and are also summarized in the Fish and Aquatic Habitat Report. Specific reaches where fine sediment is a concern include upper Fivemile Creek and Morsay Creek.

Environmental Consequences Unique to No Action

Direct and Indirect:
There would be no direct or indirect contribution from vegetation treatments or related road activities to water quality impairment. Existing road conditions would stay the same or slightly decrease in effect on water quality, as disturbed areas continue to revegetate and stabilize and future road decommissioning is implemented. Riparian and stream recovery trends would contribute to water quality improvement, particularly as future additional stream fencing is implemented.

Overall water quality conditions (stream temperature and fine sediment) would continue improving trends as currently disturbed areas revegetate. It is unlikely, however, that State water quality standards for temperature would be met in the near future given the residual effects of past management and natural background conditions (climate, geology). Improvement (decrease) in stream temperatures would occur at a slightly faster pace compared to the action alternatives, but differences would be non-measurable within the analysis area and indistinguishable from background downstream in Camas Creek

Environmental Consequences Common to all Action Alternatives

Direct and Indirect effects:
No vegetation treatments[17] or new roads are proposed within Riparian Habitat Conservation Areas. As a result, there would be no direct effect on water temperature because no direct change to stream shade conditions on perennial streams would occur. Implementation of Best Management Practices, particularly buffers of streamside areas, would make indirect effects due to changes in stream morphology (widening) highly unlikely.

[17] Aspen treatments would have no direct or indirect effect on water quality because the areas treated are in non-perennial headwater areas, and best management practices would be applied.

Cumulative effects:
The proposed activities, when combined with effects of past harvest, ongoing road treatments, grazing, and water diversion, and the future Wild West prescribed burn, would result in variable effects to water quality as follows: Road decommissioning has potential for short-term, localized increases in sediment delivery to streams depending on extent and location of treatments. Fencing additional miles of stream and riparian areas would contribute to improvement in streamside shade and reduced water temperatures. Effects would not likely be distinguishable from background in Lower Fivemile Creek or in Camas Creek downstream from the confluence with Fivemile Creek over the short term. In the long term (>10 years), decreased sediment and improvement in shade conditions (decreased water temperatures) may be detectable.

FISH AND AQUATIC HABITAT

This section incorporates by reference the Western Route Vegetative Management Aquatics Report contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

The scale used for analysis includes two sub-watersheds (Upper Fivemile and Lower Fivemile) located within the Fivemile Watershed. The Fivemile Watershed (a tributary to Camas Creek, which is a tributary to the North Fork John Day River) covers about 32,326 acres, of which 26,667 acres are within the National Forest boundary. This scale was selected because effects from the proposed projects would not be distinguishable at a larger scale.

WATER TEMPERATURE

Existing Conditions

The Western Route Vegetation Management analysis area contains approximately 36.7 miles of fish-bearing streams. The vast majority of these streams go dry in the summer but many of them still retain fish in pools scattered throughout the stream.

Water temperatures at several locations within the analysis area have been recorded since 1992. The 7-day maximum daily water temperature for each monitoring site within the analysis area is displayed in Table 52 below. Over the period from 1992-2002, the 7-day moving average of maximum daily water temperatures at active sites within the analysis area have varied from 60 to 75 degrees Fahrenheit. The State of Oregon has listed Fivemile Creek from the mouth to the headwaters on the 303d list as water quality limited due to high summer water temperatures.

High water temperatures within the analysis area are likely having negative impacts on fish. Water temperatures at the Fivemile Creek and Taylor Creek monitoring

sites commonly exceed temperatures ideal for the survival and growth of juvenile and adult salmonids, although Morsay Creek typically does not. For instance, redband trout/steelhead trout require temperatures in the range of 57°-64° F during migration and rearing (Bell 1986, Beschta 1987). The upper portion of Lower Fivemile Subwatershed and all of Upper Fivemile Subwatershed has a south-facing aspect, which may contribute to these high water temperatures. Low elevation (approximately 3,000 feet at the mouth of Fivemile Creek) may also contribute to high water temperatures. In addition, portions of Fivemile, Taylor, Sugarbowl, and Morsay creeks are dry in the summer months.

Table 52: 7-day maximum water temperatures at active monitoring sites within the analysis area.

Year Data Collected	Sample Sites				
	Fivemile Cr. @ mouth	**Fivemile Cr. @ forest boundary**	**Fivemile Cr. above 53 rd.**	**Taylor Cr. above 5312**	**Morsay Cr. above Sugarbowl**
1992	74	No Data	No Data	No Data	No Data
1993	No Data	No Data	No Data	No Data	No Data
1994	73	No Data	No Data	75	No Data
1995	71	No Data	No Data	No Data	66
1996	No Data	No Data	No Data	75	No Data
1997	72	71	71	No Data	63
1998	74	73	74	73	64
1999	71	68	No Data	72	65
2000	71	67	69	72	60
2001	72	71	69	71	63
2002	74	72	No Data	73	60
2003	73	70	No Data	No Data	61

Environmental Consequences Unique to No Action

Direct and Indirect effects:

Because fuels would remain untreated under this alternative, there could be indirect effects to stream temperatures should a large wildfire burn over riparian areas. Loss of shade providing trees adjacent to streams would directly increase stream temperatures. Indirectly, more sediment could increase width-to-depth ratios, which would raise stream temperatures by increasing the surface area exposed to solar radiation.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:
Proposed activities that could affect stream shade and hence stream temperature are the same for all action alternatives.

All aspen stands proposed for treatment occur on Class 4 intermittent streams. Removal of conifers in these stands could result in a small, short-term (1-5 years) increase in exposure of these reaches to solar radiation through the reduction of shade. However, effects would be expected to be un-measurable and would not affect downstream water temperatures because very little shade would be removed, the aspen sites are dispersed and small, and the intermittent streams have ceased flow during the warmest months of the year.

Proposed underburning, while not ignited in riparian areas, could back into them and remove some riparian vegetation that currently provides shade. However, since the backing fire would be used in controlled conditions, vegetation loss near streams is unlikely. Overall vegetation mortality in riparian areas should be low and vegetation that does burn would be expected to recover quickly. Shrubs and grasses would recover by the following year and seedlings, the size of tree most likely to be affected, would recover in 3-5 years. Existing roads would aid in retaining riparian vegetation in some areas by providing a break in fuels so that the applied fire cannot back into the riparian area. In treated aspen stands, the burning would help stimulate aspen regrowth, which would create more dense riparian vegetation and increase shade within a couple of years.

No other activities would occur in Riparian Habitat Conservation Areas, so there would be no other loss of shade or increase in water temperatures.

Cumulative effects:
Some past activities, grazing, the Saylor-Madison water diversion, road construction in riparian areas, harvest, restoration of aspen stands, fencing riparian areas, and thinning in riparian areas have all likely affected stream temperatures. The contribution of proposed activities under all action alternatives to cumulative effects would be a short-term loss of shade. Since the streams that would be affected do not run water during the summer months, there would be no cumulative effect to stream temperatures.

Since aspen are a highly desired food for both cattle and wildlife, ongoing grazing could retard the aspen regrowth initiated by the proposed conifer removal. However, fencing of these aspen stands has been proposed as a future project, which would protect the treated stands from ungulate grazing. Refer to Appendix A of the EA for a detailed discussion of effects associated with past, ongoing, and reasonably foreseeable future projects in the analysis area.

SEDIMENT/SUBSTRATE

Existing Conditions

No consistent measurement of fines was made during 1991 stream surveys in the analysis area. During these surveys, substrate embeddedness within the reach was estimated as being above or below 35% (Table 53). These estimates were averaged over the entire reach. Unstable or raw banks were not measured during this survey.

Morsey Creek was surveyed in 1995. Embeddedness was not recorded during this survey though percent fines were estimated visually. Fifteen percent of the banks were found to be unstable with an average of 66 percent fines throughout the reach.

Table 53: Average embeddedness in stream reaches within the analysis area.

Stream	Reach	Embeddedness
Fivemile	1	<35%
	2	<35%
	3	<35%
	4	>35%
	5	>35%
	6	>35%
Taylor	1	<35%
	2	<35%
Sugarbowl	1	<35%

High levels of sediment loading (>35% embeddedness or >20% fines[18]) within the stream can lead to reduced quality of spawning substrate, the smothering of incubating fish eggs and can indirectly affect eggs and fry by reducing water flow through stream gravels leading to high levels of mortality (Hartman et al 1997). The data in Table 53 indicates that the less steep, upper portion of Fivemile Creek (reaches 4, 5, and 6) has a higher proportion of fines than does the higher gradient, lower portion of the stream (reaches 1, 2, and 3). This increase in fines is consistent with what would be expected for a lower gradient stream. This data shows that Taylor Creek and Sugarbowl Creek were not embedded.

Environmental Consequences Unique to No Action

Direct and Indirect effects:
Because fuels would remain untreated under this alternative, there could be indirect increases in sediment if a large wildfire were to occur within the analysis area. These increases would be related to transport of fine ash, a loss of soil cover, death of stabilizing roots, and increased water run-off rates.

[18] Fines are defined as particles >6mm in diameter.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:
Alternatives were compared using information about the amount of soil disturbance (Table 54), which is indirectly linked with sediment deposition in streams. All action alternatives would involve some level of soil disturbance.

Table 54: Soil Disturbance associated with the Action Alternatives.

	Harvest & Fuels Treatment acres	Additional Non-commercial thinning & Fuels Treatment acres	Acres of Road Reopened	Total Acres of disturb	RHCA* aspen rehab. acres
Proposed Action	4,792	1,692	61	6,545	20
Alternative 1	2,973	2,240	42	5,275	20
Alternative 2	4,891	1,692	61	6,644	20

*RHCA=Riparian Habitat Conservation Area (acres duplicated under harvest column.)

Reopening currently closed roads would pose some risk to increased sediment runoff. Roads to be reopened that are made of native surface could need blading to improve drivability. In addition, a number of these native surface roads include stream crossings and low water fords. Blading these roads would loosen soil, which could potentially increase the amount of sediment, particularly at the stream crossings and low water fords. Blading would be limited in Riparian Habitat Conservation Areas to reduce the potential for loose sediment to runoff into streams. Also, mitigation would require installation of cross-ditches to spread water wherever needed, as well as require that use of low water fords be avoided unless the channel is dry.

Harvest and non-commercial thinning could result in soil exposure because ground-based equipment would be used and debris would be burned. The only harvest activities that would occur within Riparian Habitat Conservation Areas are in 20 acres of aspen stands. However, mitigation which:

- Limits operation of ground-based equipment to slopes that average 35 percent or less
- Requires pre-approval of skid trails, forwarder trails, and other log transportation routes by the Forest Service to meet the Best Management Practices
- Confines operation of equipment within ephemeral draws to designated crossings containing a layer of debris

- Suspends use of ground-based equipment when conditions would otherwise result in excessive soil displacement
- Excludes equipment operation within Riparian Habitat Conservation Areas, unless soil disturbance can be avoided

would minimize soil disturbance and keep it far enough away from streams so potential sediment from these sources would not negatively impact streams In general, filter strips on the order of 200 to 300 feet in width are effective in controlling sediment that is not channelized (Belt et al. 1992).

Underburning could mobilize sediment if large debris piles burn hot enough to expose mineral soil or if fire moves into the floodplain of a stream channel. However, no ignition would take place within Riparian Habitat Conservation Areas, so the likelihood of sediment production associated with this project would be very low. The duration for this potential effect would be brief (<1 year). Burn intensities would be expected to be low and localized, and re-sprouting of vegetation could occur within two weeks of soil exposure (Agee 1993). Because of the distance from the burn piles to the creek and intact vegetation between them, no sediment would reach the stream.

Removal of conifers in Riparian Habitat Conservation Areas associated with the 20 acres of aspen stand rehabilitation would not be expected to have any affect on streams. Grapple piling of material thinned in aspen stands would have little to no impact on soils as this machinery will be selected as to minimize soil displacement. The machinery would typically make only one pass, and would operate over slash where possible. Equipment could be permitted in Riparian Habitat Conservation Areas under the condition that no soil displacement would occur. As a result, there again would be no sediment transported to nearby creeks as a result of this project.

Cumulative effects

Some past activities, grazing, the Saylor-Madison water diversion, road construction in riparian areas, harvest and fencing riparian areas, have all likely affected sediment transport to streams. The contribution of activities under all action alternatives to cumulative effects may be the mobilization of sediment but since riparian buffers will remain intact and mitigation measures will be in place there will be no cumulative effect to stream sediment. Refer to Appendix A of the EA for discussion of effects associated with past, ongoing, and reasonably foreseeable future projects in the analysis area.

Environmental Consequences Unique to Alternative 2

Direct and Indirect effects:

This alternative would include an additional 99 acres more than the Proposed Action of thinning, but since these acres are outside of Riparian Habitat Conservation Areas, no additional impacts would occur.

POOL FREQUENCY AND QUALITY

Existing Conditions

Pool frequency data was collected during stream surveys within the analysis area and is displayed in Table 55 below. These surveys classified channel habitat units into riffles, pools, and glides. Conversion of this data into the SMART database in 2000 required the reclassification of all glides as either pools or riffles. The data presented here reflects data that has gone through this conversion.

Pool densities in this table are compared to the median pool density of unmanaged streams in the Blue Mountain province. The residual pool depths displayed in Table 55 indicate that streams in the analysis area have habitat available for fish during the low flow period. The proportion of pools having at least one piece of large woody debris is unknown.

Table 55: Pool frequency, average wetted width, and residual pool depths for stream reaches within the analysis area.

Stream	Reach	Pools/Mile	Wetted Width of Riffles (ft)	ICBEMP Standard	Residual Depth
Fivemile	1	17.9	14.3	10.7	3.4*
	2	20.7	10.2	15.4	3.0*
	3	16.5	7.8	18.7	2.9*
	4	16.9	5.0	29.6	0.9
	5	13.6	3.3	39	1.0
	6	5.2	4.2	39	1.0
Taylor	1	14	5.2	28.4	1.0
	2	16.9	3.3	39	0.8
Sugarbowl	1	0.9*	4.1	39	1.6*
Morsay	1	27.6*	2.5	39	0.7*

*Data calculated using unconverted data. Does not accurately describe the abundance of pools in these reaches, and skews residual depth calculations due to the small sample size in unconverted data.

Pool frequency is an indication of habitat quantity where pool depth can be good indicator of habitat quality. Only the first two reaches of Fivemile Creek have a sufficient number of pools to meet standards; all others were below standards. Since the number and quality of pools can determine the habitat availability for fish species; this data indicates limited habitat for resident fish. Fivemile Creek downstream of Taylor Creek, and Taylor Creek between Forest Roads 5312 and 5316 have numerous man-made structures (included in Table 55). Some of these structures are still functioning and are providing deep, slow-water pool habitat and refugia where fish are able to survive summer low water and high water temperatures.

Environmental Consequences Unique to No Action

Direct and Indirect effects:
As discussed in the Sediment/Substrate section, the risk of a large severe wildfire is greater due to untreated fuel loads and sediment deposition in streams could increase due to a loss of ground cover and increased water run-off rates. If an excessive amount of sediment were transported to streams, sediment could settle in pools reducing pool quality and possibly pool frequency.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:
The only activity that could affect pool frequency is the aspen treatments. These aspen stands are located along Class 4 stream channels that are dry following spring runoff. Though felling of conifers into the creek bed could increase pool formation, this would only occur in the spring. These streams do not contain fish, so there would be no impact to instream fish habitat.

Cumulative effects:
Some past activities, grazing, restoration of aspen stands, fencing riparian areas, and thinning in riparian areas have all likely affected pool frequency. The contribution to cumulative effects of activities under all action alternatives would be a short-term (5-10 years) loss of potential large wood that could lead to a delay in additional pool formation. However, since the streams that will be affected do not run water during the summer months there will be no cumulative effect fish habitat during these months. Refer to Appendix A of the EA for discussion of effects associated with past, ongoing, and reasonably foreseeable future projects in the analysis area.

LARGE WOODY DEBRIS

Existing Conditions

Table 56: Large woody debris (large and small size class) within the analysis area.

Stream	Reach	LWD/Mile
Fivemile	1	6.3
	2	11.3
	3	21.3
	4	18.7
	5	12.2
	6	1.7
Taylor	1	10.1
	2	15.2
Sugarbowl	1	2.8
Morsay	1	12.9

Of the surveyed streams in Table 56, only Reach 3 on Fivemile Creek exceeds PacFish standards[19] for large woody debris (20 pieces per mile). The lack of wood suggests that channel complexity and habitat quality is lower in the streams that do not meet the standard. This, in turn, limits the amount of habitat available for fish and, consequently, population sizes. The lack of large wood also indicates a reduced food supply), since large wood serves as a foundation for macroinvertebrates, the primary food source for fish.

Environmental Consequences Unique to No Action

Direct and Indirect effects:

Because fuels would remain untreated under this alternative, there could be indirect increases in sediment due to a loss of ground cover and increased water run-off rates. If there is an excessive amount of sediment that is transported to streams, pools could be filled in and there could be a loss of pools or at least a reduction in pool quality. The amount of large wood could decrease along with potential large wood. Width to depth ratios could increase due to excessive amounts of sediment entering the stream.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:

The majority of the activities would occur outside of Riparian Habitat Conservation Areas and so would not impact large wood. Only the treatment of aspen stands could impact the recruitment of large wood. Falling conifers into the creek bed would directly increase the large wood component. Opening up aspen stands so that young trees can grow would help increase large wood recruitment in the future. However, because the streams affected do not contain fish, there would be no impact to instream fish habitat.

Cumulative effects:

Some past activities, grazing, road construction in riparian areas, harvest in RHCAs, restoration of aspen stands, fencing riparian areas, and thinning in riparian areas have all likely affected large woody debris in the streams. The contribution to cumulative effects of activities under all action alternatives would be a short term loss of potential large wood in aspen stands with the removal of conifers. The remaining aspen would continue to grow eventually replacing this loss of large wood. Refer to Appendix A for discussion of effects associated with past, ongoing, and reasonably foreseeable future projects in the analysis area.

[19] The component of large wood was not represented in ICBEMP summary values.

WIDTH TO DEPTH RATIOS

Existing Conditions

Width to depth ratio was calculated for Fivemile Creek during 1991 stream surveys (Table 57). The wetted width presented below is the average wetted width of riffles. The residual pool depth is the pool depth if no water was flowing out of the pool. To get actual pool depth, the pool tail crest depth[20] needs to be added in. Therefore these data represent the maximum width to depth ratio for pools. All reaches meet the standard of wetted width to maximum pool depth of less than 10. These low width to depth ratios indicate narrow deep channels that provide cover and greater habitat availability than do shallower and wider channels, which is an indication of good habitat quality.

Table 57. Width to depth ratios for Fivemile Creek surveyed in 1991.

Stream	Reach	Wetted Width	Residual Depth	Maximum W:D Ratio
Fivemile	1	13.8	3.4	4.1
	2	9.6	3.0	3.2
	3	7.9	2.9	2.7

Environmental Consequences Unique to No Action

Direct and Indirect effects:
Because fuels would remain untreated under this alternative, there could be indirect increases in sediment due to a loss of ground cover and increased water run-off rates. If there is an excessive amount of sediment that is transported to streams, pools could be filled in and there could be a loss of pools or at least a reduction in pool quality. The amount of large wood could decrease along with potential large wood. Width to depth ratios could increase due to excessive amounts of sediment entering the stream.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:
No activities would occur that would affect width to depth ratios. Some sediment could reach streams associated with the blading of native surface roads that cross streams, but this would not be of a volume necessary to change width to depth ratios.

Cumulative effects:
While some past activities, primarily grazing and the Saylor-Madison water diversion, have likely affected width-to-depth ratios, no cumulative effects would occur from the activities proposed under any of the action alternatives. Refer to

[20] Pool tail crest is the depth of water flowing out of the pool.

Appendix A of the EA for a discussion of effects associated with past, ongoing, and reasonably foreseeable future projects in the analysis area.

ROAD DENSITY AND LOCATION

Existing Conditions

Roads have potentially affected surface runoff and groundwater flow within the analysis area. Roads have also increased the drainage area within the Fivemile Watershed, and continue to contribute sediment to streams. This sediment can fill interstitial spaces in spawning gravel reducing spawning success. Increased suspended sediments can have negative health impacts on both juvenile and adult fish. Road density and location data for the upper and lower Fivemile subwatersheds is summarized in Table 58 below. The upper portion of the analysis area (Upper Fivemile subwatershed) is heavily roaded.

Table 58: Road density and location within Fivemile Watershed.

	Road density (miles/square mile)			
	within 300' of Class 1&2 streams	**within 150' of Class 3 streams**	**within 100' of Class 4 streams**	**Total within RHCAs**
Analysis Area	1.59	3.16	1.82	3.83

Environmental Consequences Common to All Alternatives

Direct and Indirect effects:
The miles of road and their location would not change under any alternative. While the action alternatives would temporarily reopen some closed roads, these roads were already included in the road density calculations and density does not vary among the alternatives.

Cumulative effects:
No cumulative effects would occur under any of the alternatives as road densities will not change. Refer to Appendix A of the EA for a discussion of effects associated with past, ongoing, and reasonably foreseeable future projects in the analysis area.

FISH POPULATIONS

Existing Conditions

The John Day River is the largest Columbia River tributary with no major dams or reservoirs acting as passage barriers for migrating salmonids (though dams do occur downstream on the Columbia River). This is part of the reason it supports the largest remaining wild stock of spring Chinook salmon in the Columbia River Basin. The North Fork John Day and its tributaries account for about 70 percent of the

salmon production in the John Day Basin. The John Day River Basin once supported substantial runs of both spring and fall chinook salmon and summer steelhead.

Streams within the analysis area host two species of salmonids—steelhead and redband trout. The Interior Columbia Basin Ecosystem Management Project (ICBEMP) has identified both of these species as key salmonids—important indicators of aquatic integrity.

The Forest Service's Pacific Northwest Region has listed Mid-Columbia steelhead, redband trout, and Chinook salmon as sensitive aquatic species present in the analysis area. Another sensitive species that may be in the analysis area is the California floater (a fresh water mussel). Sensitive species are species designated by the Regional Forester for special management consideration to reduce the likelihood of their becoming listed under the Endangered Species Act.

In March 1999, the National Marine Fisheries Service listed mid-Columbia steelhead as Threatened under Endangered Species Act authority (Federal Register 1999). Federally designated fish Species of Concern present in or near the analysis area include interior redband trout.

Redband (Oncorhynchus mykiss)
Redband trout potentially spawn and rear in all fish bearing streams within the analysis area.

Steelhead (Oncorhynchus mykiss)
Steelhead may be found in the lower section of Fivemile Creek below the falls. Since 1999 when the fish ladder was destroyed during high flows upper Fivemile has been inaccessible to Steelhead.

Chinook Salmon (O. tshawytscha)
Mid-Columbia Chinook salmon are found downstream of the project area in Camas Creek. Spawning ground surveys in Camas Creek indicate that there are still a few Chinook moving up this stream to spawn. Juvenile Chinook could use lower Fivemile Creek below the falls as rearing habitat.

Other
Pacific lamprey (*Lampetra tridentata*) are known to occur downstream of the project area in Camas Creek and were historically an important tribal food. Although numerical data on Pacific lamprey in the John Day basin are not available, Pacific lamprey throughout the interior Columbia Basin have declined dramatically. Causes for the decline include: loss of suitable habitat, extensive poisonings, and migration barriers created by dams.

Eastern brook trout (*Salvelinus fontinalis*) are exotic to the John Day Basin and have just recently been observed in Taylor Creek.

California floater, (*Anodonta californiensis*) a fresh water mussel, has been reported in the Blue Mountains of Washington and Oregon; however, little is known about its life history and distribution. This invertebrate is listed as a Sensitive aquatic species located within the Umatilla National Forest. No surveys of the analysis area have been conducted. The habitat requirements are shallow areas of clean, clear lakes,

ponds, and large rivers. They prefer soft silty substrate for burrowing. Some of these characteristics occur within the analysis area

Environmental Consequences Unique to No Action

Direct and Indirect effects:
This alternative would not directly affect fish species (redband trout and steelhead) in the analysis area. However, the potential for a large, high severity fire would increase as woody fuels continue to increase. A large wildfire could potentially remove all fish from a burned over stream (as documented in the 1996 Bull, Tower, and Summit fires, 2000 Meadow Fire, and 2003 Bull Springs Fire which occurred locally in similar stand conditions). Fish that remain would have to survive in a habitat degraded by loss of shade, increased sediment from ash and unprotected soil, loss of future large wood, etc. In such an event, spawning and rearing success would be reduced.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:
Because most activities would occur outside of Riparian Habitat Conservation Areas, there would be little impact to aquatic habitat and the fish populations these habitats support. The analysis of aquatic habitat discussed above indicated that only sediment could affect fish populations. Such sediment could result from the use of heavy machines, blading and use of currently closed roads, and burning of activity-related debris. However, analysis also concluded that mitigation would minimize soil disturbance, that activities would occur away from streams, and intact vegetation between activities and the streams would capture any mobilized sediment. Of biggest concern was the blading of currently closed roads, because blading would remove existing soil cover, roads tend to channelize water, and some of the roads to be bladed cross streams so sediment could eventually find its way to stream channels. Increases in fine sediments could decrease reproductive success of fish by filling interstitial spaces between spawning gravel, so a determination was made that this increased sediment “May Impact” native redband trout. Such impacts to redband trout populations would be minimized by limiting blading in Riparian Habitat Conservation Areas to reduce the potential for loose sediment to runoff into streams and restricting use of low water fords to times when the channel is dry. Sediment from these streams is not expected to reach areas occupied by Mid-Columbia Steelhead, so a “No Effect” determination has been made for this species.

This alternative is consistent with Forest Plan direction regarding fish. None of the potential combined effects are expected to adversely affect PacFish Riparian Management Objectives or steelhead or redband trout population viability. Application of PacFish direction would maintain or improve fish habitat conditions in the analysis area. Riparian and stream channel conditions would be expected to improve with the proposed aspen restoration activities and with future road decommissioning and riparian fencing activities.

These alternatives are also consistent with the Basinwide Salmon Recovery Strategy (All-H Strategy) as it requires following existing management direction in the short-term and following ICBEMP science in the long-term. These alternatives are also consistent with *Wy-Kan-Ush-Mi Wy-Kish-Wit*—The Columbia River Anadromous Fish Restoration Plan of the Nez Perce, Umatilla, Warm Springs and Yakama Tribes. This restoration plan recommends that federal agencies follow existing land use and water quality laws and regulations; this would include PacFish.

Consultation with NOAA Fisheries or Fish and Wildlife Service is not necessary for fisheries because there are no listed species or critical or essential habitat within the analysis area due to a natural barrier on lower Fivemile Creek. The Magnuson-Stevens Fishery Conservation and Management Act as amended (1996) does not apply for the same reason.

Cumulative effects:

Threatened and Endangered species in the analysis area include Mid-Columbia Steelhead and Management Indicator Species include redband trout and steelhead. Most activities discussed under cumulative effects for aquatic habitat have affected fish populations in these streams. Increases in temperature can lead to increased stress to fish and reduction in spawning and rearing success. An increase in sediment yields could potentially add to degradation of aquatic habitat and fish populations by:

- Increasing suspended sediment, which can have detrimental effects on fish health
- Filling interstitial spaces, which reduces escape and hiding cover for fish
- Increasing width/depth ratios, which can increase solar heating of water and also decrease fish hiding and escape cover and fish mobility
- Decreasing the quality of spawning substrate, which reduces reproductive success
- Reducing pool volumes, which decreases the amount of hiding, escape and resting habitat available and makes fish more vulnerable to predators

Increases in sediment can increase stress on fish reducing spawning success, although whether the changes would be biologically significant would depend on many factors, including the amount and particle size of sediment produced, the size of the stream, amount of available refuge, including side channels and tributaries, and the conditions in the stream before the introduction of additional sediment. Fish in streams in good condition could tolerate more such changes than fish already stressed by poor habitat conditions.

When combined with past, ongoing, and foreseeable future activities, the proposed activities in all of the action alternatives would increase of stress to redband trout (a Management Indicator Species) due to the potential for sediment to be mobilized into creeks.

Biological Evaluation Determination of Effects and Rationale:
Mid-Columbia steelhead: The Western Route Vegetation Management project would have **No Effect** on Mid-Columbia steelhead or essential fish habitat for spring chinook salmon.

Any sediment generated from activities in this project would be localized small amounts within the immediate project area. By the time waters reach the falls near the mouth of Fivemile (at the downstream end of the analysis area) any sediment entering the stream from the project would be undetectable. Since steelhead and essential fish habitat are not found above the falls within the immediate project area, there would be **No Effect** to these fish or their habitat. No other habitat conditions would be affected by this project.

Redband trout: This thinning project **May Impact** individuals or habitat for redband trout, but would **not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.**

The reopening and blading of some native surface roads in Riparian Habitat Conservation Areas would require some soil disturbance near creeks. Though mitigation measures would minimize the amount of soil that reaches the stream channel, there would be a possibility of a negligible localized increase in sedimentation. These effects would be short lived and there would not be a large enough quantity of sediment to change any habitat parameters. There would be no other effect to habitat parameters associated with this project.

Environmental Consequences Unique to Alternative 2

Direct and Indirect effects:
This alternative would thin an additional 99 acres, but since these units are not near any streams there would be no additional affects to fish species. Effects would otherwise be the same as those discussed under "*Effects Common to All Action Alternatives.*"

NOXIOUS WEEDS

This section incorporates by reference the Western Route Vegetative Management Noxious Weeds Report contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

The analysis area for evaluating existing noxious weed populations is consistent with the Western Route Vegetative Management analysis area. A few noxious weed sites near the mouth of Five Mile Creek were not included in the discussion as they are separated from any alternative geographically.

PRIORITY NOXIOUS WEEDS

Table 59 shows noxious weeds of concern within the Western Route Vegetative Management analysis area and their associated priority category. Several categories are used to prioritize noxious weed species on the Forest list for treating and inventorying:

1. "Potential Invaders" are noxious weed species that occur on lands adjacent to the Umatilla National Forest but which have not been documented on lands administered by the Forest;
2. "New Invaders" are noxious weed species that occur sporadically on the Umatilla National Forest and which may be controlled by early treatment. This category has been split into two subcategories due to changes in weed populations on the Forest in the last two years:
    a. “New Invaders” are of limited distribution and can probably be eradicated if early treatment can be implemented.
    b. “New Invaders/Established are those species that are presently controllable but which are approaching “Established” and which are prioritized for early treatment.
3. "Established" species are widespread across the Forest in large populations and containment strategies are used to prevent their further spread.

Table 59: Noxious Weed Species and Treatment Priority

Species	Common Name	Treatment Priority
Centaurea diffusa	diffuse knapweed	New Invader/ Established
Centaurea biebersteinii	spotted knapweed	New Invader/Established
Cynoglossum officinale	hound’s tongue	New Invader/Established
Hypericum perforatum	St. Johnswort	Established
Cirsium arvense	Canada thistle	Established
Cirsium vulgare	bull thistle	Established

CURRENT WEED POPULATIONS

Existing Conditions

Existing high priority weed sites are relatively small in size and low in density within the Western Route analysis area. There are currently 12 high priority (New Invader/Established) sites, including Table 60, which corresponds to the noxious weed site map (Map 10 in Appendix C). Gross acres are derived from the GIS Forest database and should not be mistaken as population density or threat, or used for prioritizing sites. For instance, while the weed population at Site #003 appears large (Map 10 in Appendix C and Table 60), this population includes only 26 documented plants of spotted and diffuse knapweed. The number of plants

described in this table represents the total number of plants inventoried in 2003 at each site.

Of these 12 sites, 7 are approved for treatment under the Umatilla National Forest Environmental Assessment for the Management of Noxious Weeds (1995 Forest EA). Five sites were identified after the 1995 Forest EA was completed and so are not currently treated.

Table 60: Current Weed Presence within Western Route Analysis Area.

Site #	Species	Type of Treatment	Gross Acres	# of Plants
002	Diffuse knapweed/Spotted knapweed	Manual/Chemical	65	30
003	Diffuse knapweed/Spotted knapweed	Manual/Chemical	109	26
004	Diffuse knapweed/Spotted knapweed	Manual/Chemical	91	26
013	Spotted knapweed	Manual/Chemical	9	3
115	Diffuse knapweed	None	11	3
169	Diffuse knapweed	Manual/Chemical	5	0
187	Diffuse knapweed	Manual/Chemical	0.5	0
188	Spotted knapweed	Manual/Chemical	0.4	9
206	Diffuse knapweed	None	98	2
269	Hound's tongue	None	40	350
311	St. Johnswort	Biological	22	UNK
313	St. Johnswort	Biological	5	UNK
385	Diffuse knapweed	None	38	12
557	Diffuse knapweed	None	2	1

Three low priority "established" weeds—Canada thistle, bull thistle, and St. Johnswort—are fairly widespread within the analysis area and are so extensive Forest-wide that they are not generally inventoried. St. Johnswort and bull thistle are less invasive and/or persistent than the high priority weeds and generally give way to or do not out-compete desirable vegetation. It can be assumed that these three weed species can be found throughout the analysis area.

Overall, the current noxious weed presence within the analysis area is of relatively very low concern compared to the higher weed density areas throughout the Forest.

DISTURBANCE AND SPREAD

Existing Condition

Most of the noxious weed sites described in Table 60 are found along road corridors. From these points of initial infestation, weed species become opportunistic in invading suitable microhabitats adjacent to the initial infestation site. Most of the noxious weed species of the Umatilla National Forest thrive in open full sunlight in disturbed soils in which native species have been diminished or displaced

(conditions commonly associated with roads). Conversely, a few noxious weed species will tolerate shade (most notably hound's tongue, and to a lesser extent, spotted knapweed) and can invade understory habitat. Most of the noxious weed species found in the analysis area are easily spread by vehicle traffic making road corridor weed sites of high concern.

Spotted knapweed, diffuse knapweed, and hound's tongue are of most concern within the analysis area. Spotted and diffuse knapweed are spread by animals, wind, and vehicles, are extremely competitive, and are generally found along roads and right of ways. However, inventory has shown the spread of these species to be relatively slow due to current treatment practices. Hound's tongue seed is spread by clothing, vehicles, animals, and water. Hounds tongue is highly invasive where soils and plant associations have been disturbed. There are only approximately 125 inventoried knapweed plants and approximately 350 hounds tongue plants within the 32,324-acre analysis area. Due to the low amounts of weeds within the analysis area, current threat of spread is low.

Low priority weed species, such as Canada thistle and bull thistle, also readily establish where soil and plant associations have been disturbed. These species, however, are not highly persistent and populations usually decline as the tree canopy closes and/or with competition from seeded/native species.

Environmental Consequences of All Alternatives

Direct, and Indirect effects:

Table 61 describes acres of disturbance by treatment method by alternative and includes a Probability Index. The Probability Index is a rating system of the likelihood of an increase in establishment and spread of noxious weeds relative to each alternative. This is based on my experience with the weeds involved and the amount of disturbance proposed. A strategy for preventing the invasion of noxious weeds is contained in the Noxious Weed Report in the Western Route analysis file.

Table 61: Disturbance and Noxious Weed Spread by Alternative

	Acres of Disturbance			
	No Action	**Proposed Action**	**Alternative 1**	**Alternative 2**
Treatment Acres	0	6,484	5,213	6,583
Road reopening	0	109	104	109
Probability of increase in establishment and spread of noxious weeds. (0=low, 5= high)	1	2+	2	3

The potential for noxious weed establishment and spread from vehicles not associated with the project along open road corridors would continue to exist in all alternatives.

Treatment of the existing noxious weed sites covered in the 1995 Forest EA within and adjacent to the analysis area would receive continued effective treatment throughout the length of the project.

Low priority weed species that are not inventoried would continue to be found throughout the analysis area and would not be treated.

The potential for livestock and wildlife to transport noxious weed seed from within or from outside the analysis area would exist in all alternatives.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:

There are currently 12 high priority weed sites located within the analysis area, of which seven were approved for treatment under the 1995 Forest EA (the other five sites having been located after 1995). There is only one hound's tongue site (350 plants) in the Western Route analysis area and it is not located on any road or in any unit associated with any action alternatives. The other 11 high priority noxious weed sites consist of spotted or diffuse knapweed. The 2003 inventory of these sites identified a total of 112 plants. In an analysis area of 32,324 acres, this could be considered a small concern compared to other areas on the District and Forest.

The proposed activities could increase the potential for noxious weed invasion where the surface duff layer is disturbed and exposed down to bare mineral soil. The highest risk of infestation would be in disturbed forest areas (even shaded understory habitats), where disturbance exists along transportation corridors. However, compared to the other areas of the North Fork John Day Ranger District and the Umatilla National Forest, the Western Route area does not have high densities of noxious weeds.

Many methods would be used to reduce the potential of noxious weed establishment and spread. All known noxious weed sites would be treated before any project activities begin. This would include approving and initiating manual treatment (i.e. hand pulling) of the five populations that were not approved for treatment under the 1995 Forest EA. This mitigation would eliminate existing known weed sources, which would effectively reduce the spread of noxious weeds. Noxious weed maps also would be given to local personnel working on the Western Route project to increase awareness of noxious weeds for early detection of unknown sites in the area.

All equipment associated with treatment would be cleaned prior to arriving on site. If equipment were to arrive on site without having met this requirement, the equipment would be required to leave the site until this requirement is met. This would reduce the potential for noxious weed seeds to be transported on site by equipment associated with the project.

Heavy equipment would be required to stay on designated trails to reduce total soil disturbance within treatment units. Low ground pressure machines would also be used where appropriate to minimize soil compaction and soil disturbance. Equipment would only be allowed to work when soils are dry or frozen to reduce soil erosion and disturbance. If mineral soil becomes exposed, it would be seeded, where appropriate, using noxious weed-free seed to establish vegetative competition that would reduce the potential for establishment and spread of noxious weeds.

All of the above mitigation measures as well as the Prevention Strategies described in the Noxious Weed Report (in the project analysis file) would help avoid conditions that favor the invasion and establishment of noxious weeds. Early treatment of noxious weed sites would be limited to manual treatment methods (as defined in the 1995 Forest EA). Corrective and maintenance strategies (as defined in the 1995 Forest EA and the R6 Guide to Vegetation Management Projects) would be generally employed in established infestations (as defined in the 1995 Forest EA). As a result, all the action alternatives would be consistent with the Forest Plan, Regional FEIS for Managing Competing and Unwanted Vegetation, the associated Mediated Agreement, the Guide for Conducting Vegetation Management Projects in the Pacific Northwest Region (R6 Guide to Vegetation Management Projects), and the Umatilla National Forest Environmental Assessment for the Management of Noxious Weeds (1995 Forest EA).

Cumulative effects:
Past road construction and maintenance, grazing, timber harvest and other soil disturbance have provided:

- Environments for noxious weed species establishment
- Vectors for noxious weed dispersal
- Infestations of noxious weeds for seed sources

See Appendix A of the Western Route Vegetative Management EA for a complete list of past, present, and future projects that could cumulatively interact with the action alternative treatments.

The cumulative effects of all action alternatives on the establishment and spread of high priority noxious weeds would be low. Past activities within the analysis area have resulted in extremely low densities of high priority noxious weeds (a total of 462 total plants inventoried in 2003 in the 32,324 acre analysis area, of which 350 are not in or near any action alternative treatment units). In addition, these known sites would be treated before seed is produced and before additional disturbance occurs to reduce the potential spread by equipment associated with this project and other vectors (such as livestock, recreationists, wildlife). Treatment of the five currently untreated populations would result in a small decrease in the risk of spread from ongoing and future projects not associated with the proposed treatments.

The cumulative effects of all action alternatives on the establishment and spread of low priority noxious weeds is greater than that of high priority noxious weeds, due to the lack of treatment on those species. Low priority noxious weeds are those species that are considered widespread throughout the forest and generally are less

competitive. Low priority noxious weeds within the analysis area (bull thistle, Canada thistle, and St. Johnswort) are generally less persistent than high priority weeds and are out competed by forest canopy and competing understory vegetation, resulting in a reduction of these weed species in higher seral stage plant associations. The proposed treatment methods and mitigation would minimize ground disturbance, which would allow the existing competing vegetation to reduce the spread and establishment of low priority weeds.

As identified in the Range Report for Western Route, all action alternatives could increase the accessibility and distribution of livestock (as well as wildlife and recreationists). Since these are vectors for transport of weed seeds, this increased accessibility could result in cumulative spread of noxious weed populations. However, mitigation identified under the proposed activities would inventory for new sites, minimize soil disturbance, and monitor for weed populations for five years after proposed treatments are completed. As a result, there should be little opportunity for transported seeds to become established.

Environmental Consequences Unique to No Action

Direct and Indirect effects:
Existing native vegetation would continue to stabilize soil and consume resources (i.e. nutrients, water, and space), which would help deter invasion by opportunistic noxious weed species.

Under this analysis, five existing noxious weed sites are not analyzed/approved for treatment under the 1995 Forest EA. These sites would continue to go untreated until new noxious weed direction occurs, which would allow for spread by ongoing and future activities (recreation, livestock and big game grazing, road maintenance, firewood collection, etc.).

Environmental Consequences Unique to Alternative 2

Direct and Indirect effects:
As shown in Table 61, this alternative would result in 99 more acres of potential disturbance by treatment method than the other action alternatives. Therefore, the probability of increase in establishment and spread of noxious weeds would be slightly higher than the Proposed Action or Alternative 1.

Cumulative effects:
Cumulative effects are the same as the discussion in Common to all Action Alternatives section.

THREATENED, ENDANGERED, & SENSITIVE PLANTS

This section incorporates by reference the Biologic Evaluation for Plants Listed as "Sensitive and Biological Assessment for *Silene spaldingii* for the Western Route Vegetative Management project contained in the project analysis file at the North

Fork John Day Ranger District. Analysis methodologies and other details are contained in the report and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

There are no known populations of Threatened", Endangered, or Sensitive plant species within the or adjacent to the project area. While known to occur on the Umatilla National Forest, *Silene spaldingii* (federally listed as Threatened) occurs primarily in open grasslands with deep Palousian soils. This habitat does not exist in the Western Route analysis area.

Carex crawfordii and *Carex interior* are two Sensitive species of sedges that are suspected to occur on the District. Due to the timing and strategy of plant surveys prior to May 1999, these species may not have been identified. If funding permits, additional surveys will be conducted during the 2004 field season, specifically targeting the potential habitats for these two sedges.

Even if populations exist within the project area, both species and their habitats would be protected from mechanical disturbance through Standard Operating Procedure #1. Both sedges grow in sunny, wet habitats that are unlikely to be directly affected by prescribed fire. As a result, this project would **Not Impact** any currently listed Region 6 Sensitive plant species. This project would also have **No Effect** on *Silene spaldingii.* As a result, this project would comply with Federal regulations pertaining to the management of Threatened, Endangered, and Sensitive plant species.

RANGE

This section incorporates by reference the Western Route Vegetative Management Range Report contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

The Western Route Vegetative Management Analysis Area is located within portions of the F.G. Whitney Cattle Allotment and the Matlock Cattle Allotment. These two allotments are located both inside and outside of the Western Route Management Analysis Area. For the purpose of discussing domestic livestock grazing, all of the area located within the FG Whitney and Matlock Allotments will be included in the area of analysis for this document.

GENERAL HISTORY OF GRAZING

Little historical information about domestic livestock grazing is available prior to European settlement. Cayuse Indians kept horses in their camps as early as the mid-1700's, which most likely had effects on vegetation. The earliest recorded domestic livestock grazing within the analysis area was 1915. Prior to use records, domestic livestock grazing within the analysis area was season long and unregulated. Season long grazing and poor range management practices left

riparian areas and open rangelands generally in poor condition. From the late 1920's through the late 1940's, allotments were identified, boundaries were fenced, term grazing permits were issued to local ranchers and regulated by Forest Rangers, and stocking rates were continually reduced. By the late 1940's, stocking rates decreased from 2.2 acres/AUM to 19 acres/AUM. During the 1950's and 1960's, pasture division fences were constructed and rotational grazing strategies were implemented to defer and rotate pastures and improve upland and riparian condition. By the mid 1970's, upland range conditions were improving and many areas were in fair to good range condition.

In the 1970's and 1980's, riparian pastures were constructed to address riparian grazing management. The Five Mile Creek riparian pasture and Kinzua riparian pasture were created during this era. These pastures managed about 4 miles of Five Mile Creek and about 2 miles of Matlock Creek. In the 1990's, major streams were riparian corridor fenced to exclude livestock from fish bearing streams (Camas Ecosystem Analysis, 1995).

The Range Report (in the project analysis file) shows the historical domestic livestock use for the FG Whitney and Matlock Allotments.

CURRENT MANAGEMENT

FG Whitney Cattle Allotment

The FG Whitney Cattle Allotment is approximately 51,229 acres. There are currently 501 cow/calf pairs permitted on the allotment from June 16th through September 30th at a stocking rate of 29.2 acres/AUM. The FG Whitney Allotment is divided into 6 pastures: Johnson Creek, West Gopher, East Gopher, Five Mile Riparian Pasture, Log Springs, and Wolf Springs. Portions of all of the pastures except West Gopher are located within the Western Route Vegetative Management Analysis Area. (AOI, 1998 AMP, District Range files)

The FG Whitney Cattle Allotment is currently operating under a 1995 Environmental A ssessment (1995 EA), a 1998 Allotment Management Plan (1998 AMP), and Annual Operating Instructions (AOI). The FG Whitney Allotment is currently managed under a 6-pasture deferred rest-rotational grazing strategy. A Deferred Rotation Grazing System is used to minimize impacts on upland and riparian vegetation rotating season of use in pastures. The Forest Plan defines Deferred Rotation as withholding livestock from a range to allow the forage to reach a certain stage of growth, stocking, and vigor for those species that govern utilization. This helps improve plant vigor and maintains or improves vegetation composition or associations. (1995 EA and 1998 AMP)

Matlock Cattle Allotment

The Matlock Cattle Allotment is approximately 10,070 acres and is divided into three pastures or units: East Matlock, West Matlock, and Kinzua Riparian Pasture. 315 cow/calf pairs are permitted on the allotment for approximately 45 days during a

grazing season from June 11th through September 30th.[21] Livestock are currently permitted during early season use to promote upland use before the hot season to reduce grazing in and near riparian areas. An EA was completed on this allotment in 1995 and operates under a functioning Annual Operating Instructions. (District Range files, AOI)

Range management techniques, numbers of livestock turned out, salting, water developments and timing of use, are currently used to meet riparian and upland goals. Riparian objectives include maintaining and/or increasing the bank stability and shade along streams and upland objectives include fair to good range condition and static to upward trends (Forest Plan). A grazing system using specific distribution techniques is used to maintain water quality and protect riparian vegetation. Improvements also have been located to encourage livestock use away from streamside vegetation and increase distribution on the uplands.

UPLAND CONDITIONS

Existing Conditions

In general, range vegetation within the Western Route Vegetative Management Analysis Area includes open pine and bluebunch wheatgrass stands, wet and dry meadow types, open Sandberg's bluegrass and one-spike oatgrass plant communities, and mostly transitory rangeland consisting of fir/mixed conifer/lodgepole timber types. Many areas of transitory rangeland were created since the 1930's by timber harvest and seeded to nonnative species such as orchard grass and fescues. These areas improved the amount of forage available for livestock grazing and helped improve livestock distribution. Transitory rangeland has been decreasing in available forage and accessibility as tree canopy has increased (Camas Ecosystem Analysis, 1995).

Stocking rates have decreased from 2.2 acres/AUM in the 1920's to 29.2 acres/AUM in 2003 (see Range Report). A total of 112 ponds and 6 spring developments have been constructed on the FG Whitney Allotment. A total of 32 ponds have been constructed on the Matlock Allotment. These ponds and troughs were constructed and/or used to help improve livestock distribution within pastures reducing the concentration of livestock. Division fences, riparian fences, and rotational and deferred grazing strategies have also been used to improve range condition within these allotments.

RIPARIAN CONDITIONS

Existing Conditions

Throughout the 1990's major streams were riparian corridor fenced to exclude domestic livestock (Table 62). Within the FG Whitney Allotment, approximately 11.9

[21] Even though the season of use is from June 11th through September 30th, livestock only graze on USFS lands for 45 days and then move onto private land.

miles of stream have been excluded from livestock by constructing hard fence. In addition to the riparian corridor hard fences, there is approximately 3 miles of stream along portions of Morsay Creek, Tribble Creek, and Taylor Creek that are excluded from livestock with the use of electric fence to increase livestock distribution. Water gaps are used for livestock movement and as a water source. In the future, water gaps along Sugarbowl Creek may be fenced to divide Wolf Springs into two pastures and division fences will be reconstructed.

Table 62: Riparian Corridor Hard Fences

Name of Stream	Allotment	Miles of Stream Fenced
Sugarbowl Creek	FG Whitney Allotment	3.2 Miles
Five Mile Creek	FG Whitney Allotment	3.3 Miles
Taylor Creek	FG Whitney Allotment	3.9 Miles
Five Mile Creek	Matlock Allotment	1.5 Miles
TOTAL		**11.9 Miles**

Livestock grazing is also monitored and managed using riparian stubble-height standards. The Matlock and FG Whitney allotments have met these riparian standards since these standards were implemented in 1999 (Range Monitoring Records).

Riparian Photopoints were established on Upper Fivemile, Lower Fivemile (at the confluence of Silver Creek), and Taylor creeks during the late 1980's (photos on file at the North Fork John Day Ranger District). These riparian photopoints have shown continuous improvements in bank stabilization, stream width, and vegetation. In general, stream channels are narrowing, bank stabilization has improved, vegetation has become established in and along stream channels, and some shrubs have become established. These changes since the late 1980's have shown that the streams within these two allotments have upward trends. Rotational grazing strategies, corridor fences, electric fences, division fences, and improving livestock distribution has most likely helped to improve riparian area conditions. (Range Monitoring Records)

Environmental Consequences Common to All Alternatives

Table 63: Increase in Transitory Range by Alternative

	No Action	Proposed Action	Alternative 1	Alternative 2
Acres of increased access and forage	0	6,484	5,213	6,583

Direct, and Indirect effects:
Livestock grazing would continue to occur within the analysis area with current stocking levels and management techniques.

Environmental Consequences Unique to No Action

Direct and Indirect effects:
Livestock grazing distribution on the uplands would stay the same or continue to decrease as stocking in timber stands grows more dense and wood continues to accumulate on the ground. Livestock access would stay the same or continue to decrease due to down wood, continuous small regeneration, and visibility. Forage would also stay the same or continue to decrease due to the reduction of sunlight on the forest floor reducing forest floor vegetation.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:
All action alternatives would increase livestock distribution on the two allotments by increasing access and/or increasing available forage for livestock. This would spread utilization of vegetation more evenly through the allotments and reduce soil and vegetation disturbance in areas of concentrated use. Proposed burning could reduce the amount of forage in a one to two year period, however, after that forage would be expected to be higher than the existing condition due to the reduction in competition from small trees and/or shrubs. Proposed noncommercial thinning, commercial thinning, fuels reduction projects, and harvest could increase the amount of sunlight on the forest floor, stimulating grass growth and increasing the amount of available forage (transitory range) for domestic livestock. These treatments would also remove down wood and decrease stand densities, which currently limit access and visibility for both livestock and livestock managers in portions of the analysis area. Management of livestock would improve with all action alternatives due to increased visibility and access for livestock herding.

An increase in distribution of livestock on the uplands could decrease the amount of use on riparian areas that are not fenced and near water gaps.

Proposed harvest, commercial thinning, fuels treatments, and burning could reduce the effectiveness of fences (which are used as a tool to manage livestock in portions of the allotment at specific times). However, the identified mitigation under all the action alternatives would protect fences in their existing condition to prevent livestock movement between pastures.

Cumulative effects:
The proposed treatments in all action alternatives could permit more frequent and widespread use of prescribed fire in the future. This could result in long term improvements in forage and accessibility for livestock.

TREATY RIGHTS

The Forest Service, through the Secretary of Agriculture, is vested with statutory authority and responsibility for managing resources of the National Forests. Commensurate with this is the obligation to consult, cooperate, and coordinate with

Indian Tribes in developing and planning management decisions regarding resources on National Forest System lands that may affect tribal rights. Elements of respective Indian cultures, such as tribal welfare, land, and resources were entrusted to the United States Government as a result of treaties. Because tribal trust activities often occur in common with the public, the Umatilla National Forest strives to manage ceded land in favor of the concerns of the respective tribes, as far as is practicable, while still providing goods and services to all people.

Locally, the Western Route analysis area lies within the area ceded to the United States Government by the Confederated Tribes of the Umatilla Indians (CTUIR) as a result of the Treaty of 1855. Specific treaty rights applicable to this land base are generally articulated in Article I of the CTUIR Treaty of 1855 and include:

> *"The exclusive right of taking fish in all the streams where running through or bordering said reservation is further secured to said Indians; as also the right of taking fish at all usual and accustomed places in common with citizens of the Territory; and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land."*

Although the 1855 Treaties do not specifically mandate the federal government to manage habitats, there is an implied assumption that an adequate reserve of water be available for executing treaty-related hunting and fishing activities.

Trust responsibilities resulting from the treaties dictate, in part, that the United States Government facilitate the execution of treaty rights and traditional cultural practices of the CTUIR by working with them on a government to government basis in a manner that attempts a reasonable accommodation of their needs, without compromising the legal positions of the respective tribes or the federal government. As a result, CTUIR was contacted via letter on July 23, 2003 to identify any concerns or alternatives they might have regarding the proposed action. No response was received, so the interdisciplinary team considered effects on the following treaty rights based on past discussions with CTUIR over similar activities:

- Fish habitat and populations, including Pacific lamprey and salmonids
- Water quality
- Big game habitat
- Traditional cultural properties

Environmental Consequences Common to All Action Alternatives

The potential effects of proposed timber harvest, thinning, and fuel treatments have are discussed under the Fish Habitat, Water, Wildlife, and Cultural Resources sections. In summary, none of the alternatives would affect fish habitat, water or cultural resources due to project design, identified standard operating procedures, and Best Management Practices. Big game habitat would be affected to varying degrees under the action alternatives, although Alternative 1 would not reduce cover below the Forest Plan standards or further affect HEI in the C4 management area.

Alternative 1 would also provide for more long-term habitat protection than the No Action alternative by reducing the threat of severe wildfire and by improving growing conditions and health of remaining trees. The Proposed Action and Alternative 2 would result in greater long-term protection of big game habitat, due to a larger area treated, but there would also be a greater reduction in short-term habitat quality. The big game population has been above State management objectives except for the last 2 years, so exercise of hunting rights should not be affected. See respective sections for a more thorough discussion of effects on water, fish habitat, and wildlife.

CULTURAL RESOURCES

This section incorporates by reference cultural resource surveys contained in the Heritage at the North Fork John Day Ranger District.

Existing Condition

A review of the the North Fork John Day Ranger District heritage files indicates that the majority of the Western Route Analysis area has been surveyed.

Approximately 73 heritage properties were located on National Forest System lands within the Western Route Analysis Area. Forty-two of these properties are isolated artifacts and are not considered eligible for inclusion in the National Register of Historic Places. The remaining 31 properties consist of 20 Euro-American sites, and 11 Native American sites. The Euro-American site types are generally related to homesteading and grazing activities and include cabins and other dwellings. Additionally, several hunting lodges and one Forest Service administrative site (Ellis Guard Station) are represented. The Native American sites include evidence of tool manufacturing activities that may be related to hunting and root and berry collecting camps. The distribution of sites and isolates also indicates a possibility of routinely used travel routes or corridors within the area, probably to access food resources, camps, and other special interest areas.

Minthorn's report, *Mits Qooi Nux Kin Na Noon Im Watsus Pa*: *A Partial Traditional Use Area Inventory of the Umatilla National Forest and the Wallowa-Whitman National Forest*, (Minthorn 1994), has been reviewed to identify areas within the analysis area boundary identified as cultural areas of interest to the Confederated Tribes of the Umatilla Indian Reservation. Besides the initial scoping with the tribe, a call was made to the Assistant Tribal Historic Preservation Officer on March 16, 2004 to ask about any concerns or issues concerning the Western Route analysis area; no additional comments were made.

Of the 31 properties, the Ellis Guard Station has been determined eligible for the National Register of Historic Places. The remaining properties have not been evaluated for their National Register eligibility and thus are considered eligible to the National Register of Historic Places and will be protected from all project activities.

Environmental Consequences Common to All Alternatives

The remaining sites are considered eligible for inclusion in the National Register of Historic Places and would be protected from project activities associated with the Western Route Timber Sale project. Avoidance measures would be implemented where necessary, per Stipulation III.B.2 (a-d) of the Programmatic Agreement between the Advisory Council on Historic Preservation, the Oregon State Historic Preservation Office, and the Forest Service Region 6, signed March 1997. Because heritage resources would not be affected by proposed activities under any of the alternatives, there would be **No Effect** to any historic property listed in, or eligible to the National Register of Historic Places. Documentation to this effect will be forwarded to the Oregon State Historic Preservation Office, in compliance with the National Preservation Act of 1966 (as amended), 36 CFR 800.4 and the Programmatic Agreement.

VISUAL QUALITY

Existing Conditions

The Forest Plan identifies Visual Quality Objectives as standards for each management area (Table 64). Within these management areas, many forest stands have become dense with vegetation resulting in unhealthy forest conditions. Visually these stands have also lost scenic integrity (little diversity in colors, tree sizes, stand densities, etc.).

Table 64: Visual Quality Objectives by Management Area Type

Management Area	Retention*	Partial Retention*	Modification*	Maximum Modification*
A4-Viewshed 2		(in foreground)	(in middleground)	
C1-Dedicated Old Growth	X			
C2- Managed Old Growth	X	X	X	X
C3-Big Game Winter Range	X	X	X	X
C4- Wildlife Habitat	X	X	X	X
C5-Riparian	X	X	X	
E2-Timber and Big Game				X

*(Forest Plan GL-45)

The Blue Mountain Scenic Byway falls within Management Area A4 (Viewshed 2). The desired condition for this management area is an attractive, near natural landscape. Management activities would be done with sensitivity to people's concern for scenic quality, with vegetation manipulation visually subordinate in the foreground of the scenic byway. This would include occasional logging in order to maintain long-term health and vigor, and to encourage a park-like, near natural appearance with big trees in the immediate foreground (Forest Plan 4-105 and 106). Visual standards call for a Visual Quality Objective of *"Partial Retention in the foreground and Modification in the middleground…Changes of landscape should be of such size, amount, intensity, direction, and pattern that they continue to provide a natural appearing or slightly altered appearance, except for short-term changes to meet long-term objectives…Landscapes containing negative visual elements will be rehabilitated. Landscapes will be enhanced by opening views to distant peaks, unique rock forms, unusual vegetation, or other features of interest."* Timber standards for this management area[22] call for an emphasis "*on viewing large diameter trees and multi-age stands; both vertical and horizontal diversity will also be emphasized. The large tree component should be dispersed as necessary to give the overall character of large trees to the area...Thinnings…in the foreground will leave irregularly spaced trees. Mixed conifer stand regeneration in foregrounds will be planned for at least two species with no more than 65% in a single species.*""

Figure 6. Dense band of young trees limits depth of viewing along Scenic Byway

[22] Note: the proposed treatments within A4 would not include regeneration harvests or group selection harvests, so Visual Resource Standards in Tables 4-26 and 4-27 of the Forest Plan would not apply.

The viewshed along the Blue Mountain Scenic Byway is currently lacking diversity in color, line, and form. Increased vegetation densities have reduced the open park-like quality of the forest and obscured unique views to the north. A dense band of young trees borders both sides of the road, blocking views of larger trees of varying species (**Figure 6**. Dense band of young trees limits depth of viewing along Scenic Byway). The band is about 10 to 15 feet wide, composed primarily lodgepole pine that is about 10-20 feet tall. Form has been reduced in the immediate foreground with no visual depth into the forest. Stand densities beyond the lodgepole border have also become dense, resulting in uniform color and texture with few openings or variation in vegetation. Large trees, while present, are not noticeable. Forest floor vegetation has been out-competed by the larger trees and closed canopy. This area also lacks visual diversity.

Environmental Consequences Unique to No Action

Direct and Indirect effects:

Present viewsheds and their Visual Quality Objectives would not be altered by management activities; changes would be shaped by natural events. Scenic character would be subject to cyclical, natural disturbance processes such as insect and disease, fire, wind, drought, and vegetation succession. The current state of the forest vegetation and its related density and species composition could contribute towards insect and disease susceptibility, to a scale that would be out of proportion with a natural appearance of tree mortality. This could ultimately alter the scenic quality of the byway. Color, line, and texture along the scenic byway would remain homogeneous, with little visual diversity and no openings. Standards of viewing large diameter trees and multi-age stands would not be met because the existing border of young trees obscures views beyond the road. This negative visual element would not be rehabilitated.

Environmental Consequnces Common to All Action Alternatives

Direct and Indirect effects:

Thinning in A4 (Table 65) would increase diversity of color, line, and texture along the Blue Mountain Scenic Byway. Removal of saplings throughout this area would increase the average stand age class and size making large trees more visually dominant. Ponderosa pine and larch would be preferred trees for retention, which would provide color contrasts (orange bark on older trees and yellow needles on larch in the fall). Treatments would also move stands toward a healthier forest, directing form back toward the historically more open landscape. This improvement in health would contribute to the long-term scenic integrity of the viewshed. However, the proposed treatments would have little immediate affect on visual quality because few units extend all the way to the road and an existing dense band of young trees constricts viewing in many areas. In the long-term, views of open grown forest would become more obvious as the band of trees along the road naturally thins through competition mortality and growth.

Table 65: Comparison of treatments in Management Area A4.

Activity within Management Area A4	Proposed Action	Alternative 1	Alternative 2
Commercial Thinning	190 acres	86 acres	255 acres
Non-commercial thinning	16 acres	118 acres	16 acres

Opening closed roads and harvest of trees would have the largest potential impact on visual quality in all management areas due to contrasts between the current landscape and new evidence of management. Soil would be exposed by temporary reopening closed roads for access to treatment units (see Transportation section for details), increasing the visual contrast due to the roads' line and color. Removal of vegetation could change form, line, color, and texture of the remaining stand. Standard operating procedures would reduce the intensity of negative visual conditions by controlling skid trail placement, limiting operations during wet conditions, and requiring grass seeding of any exposed soil. Returning temporarily opened roads to their former closed status would allow vegetation to re-establish itself, causing these areas to blend with the surrounding landscape.

As a result of project design and mitigation, all proposed Western Route activities would meet the Visual Quality Objectives identified in the Forest Plan and would comply standards and guides for visual resource management (Forest Plan page 4-51).

Cumulative Effects:
Past forest management practices have left much of the Western Route analysis area with less desirable views of dense stands, resulting in the lack of texture and line. All action alternatives would distribute vegetation manipulation over an extended period resulting in various visual contrasts and improved scenic character. Periodic prescribed fire in the future would continue to create temporary changes within all areas of scenic integrity and help shift treated areas to a more open character with larger trees. Future road decommissioning activities would reduce the visual contrast created by the large road system in this area.

Environmental Consequences Unique to Alternative 2

Direct and Indirect effects:
Non-commercial thinning would fragment the current dense, narrow band of lodgepole pine that runs on both sides of the road, allowing for greater depth of viewing, increased diversity of color, line, and texture, and views of open grown forest. Visual diversity would increase as a result.

Thinning would occur on 65 additional acres of A4, bringing the boundary of several units down to the road. Mitigation would require stand density to increase farther away from the road, which would increase textural (structural) diversity in the foreground and middleground. This would also blend treatments with untreated stands so that the reduced densities appear more natural, meeting the Visual Quality Objective of Partial Retention in the Foreground. Two units, V4 and V5, would open

views of Arbuckle Mountain in the background, with a larch stand in the more immediate middleground providing striking fall color.

Mitigation for stump heights would reduce evidence of management activity, while line and color of stumps would be softened as grass and shrub layers become more dominant. Mitigation would also require slash to be placed outside of skid trails within the foreground of units along the Blue Mountain Scenic Byway to avoid unnatural deviations in line and color. Skid trails within the foreground would parallel the roadway to disguise their presence and landings would be located on other roads, away from the scenic byway. Hand piling and burning of the resulting debris would reduce the length of time that the dead vegetation is visible. Piles would be kept small so as to limit the length of time it takes to revegetate the burned areas (estimated at one growing season). In units V2 and V3 and where non-commercial thinning occurs along the byway, debris would be piled and burned in the immediate foreground (200 to 300 feet of the roadway).

As a result of project design and mitigation, all proposed Western Route activities would meet the Visual Quality Objectives identified in the Forest Plan and would comply standards and guides for visual resource management (Forest Plan page 4-51).

RECREATION

This section incorporates by reference the Western Route Vegetative Management Recreation Report contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

The scale of analysis for recreation resources is the Fivemile Creek Drainage.

RECREATION OPPORTUNITY SPECTRUM

Existing Recreation Uses and Conditions

Each Forest Plan Management Area within the Western Route Analysis Area is assigned a class under the Recreation Opportunity Spectrum (ROS). Each class is defined in terms of the degree to which it satisfies certain recreation experience needs, based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. The ROS classes pertaining to the Western Route analysis area are identified in Table **66**. See the Forest Plan page GL-32 for a definition of these classes.

Table 66: ROS Class by Forest Plan Management Area

Management Area	ROS Class
A4	Roaded Natural to Roaded Modified
C1	Primitive to Roaded Natural
C2	Roaded Modified
C3	Roaded Modified
C4	Roaded Natural to Roaded Modified
C5	Roaded Natural to Roaded Modified
E2	Roaded Modified

Environmental Consequences Common to All Alternatives

Direct, Indirect, and Cumulative effects:
None of the alternatives would change the ROS class as described in the Forest Plan.

CAMPING

Existing Conditions

There are 116 inventoried dispersed camping sites and one developed recreation site—Divide Well Campground—within the analysis area (Table 67). Dispersed camping has traditionally been a popular activity in the area, particularly during the big game hunting seasons. A generic description of a dispersed campsite consists of a user-made area that is generally adjacent to a developed road. The site often has a meat pole in the trees, a rock fire ring and a hardened parking/camping surface for one to three families.

Divide Well Campground is located on Forest Road 5327, approximately 20 miles west of Ukiah. This site has three group and eight single campsites, two single vault toilet facilities, and a travel information board. Hunters are the primary users of the campground.

Table 67: Inventoried Dispersed Campsites by Management Area

Management Area	Number of Sites
A4	7
C4	34
C5	13
E2	60
Private	2
Total	**116**

Environmental Consequences Unique to No Action

Direct and Indirect effects:
Divide Well Campground and all dispersed campsites would remain in their existing condition. Accessibility to the campsites would not change. In the long term, campers may not be able to enjoy the same quality experience if the landscape continues along the current trends described in the Silviculture and Fuels specialist reports. Continued build-up of wood on the ground could result in a reduction in mobility surrounding campsites and possibly high severity fire, which would decrease the attractiveness (shade, beauty, amount of debris) of both developed and dispersed campsites.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:
Proposed thinning, harvest, underburning, and fuel treatments could reduce access or cause disturbance (noise, dust) of up to 26 known dispersed campsites that are located within treatment units (Table 68). The duration of this effect would only last for the duration of implementation (seasonally and for 3-5 years). It is unlikely that all 26 sites would be affected at the same time because treatments in all proposed units would not occur simultaneously. More likely, only a few dispersed campsites would be affected concurrently because available machinery and labor limit implementation to about 4 units (or less) at one time. Also, temporary displacement from affected campsites would be offset by the availability of numerous other dispersed campsites within the analysis area and surrounding lands. After treatment, visual appearance and debris could make specific sites less desirable for use, but this would be reduced over time as vegetation recovers and debris decays.

Table 68: Dispersed Campsites within Treatment Units

Management Area	Proposed Action # of Sites	Alternative 1 # of Sites	Alternative 2 # of Sites
A4	0	0	0
C4	5	5	5
C5	0	0	0
E2	21	21	21
Private	0	0	0
Total # of Sites within units	**26**	**26**	**26**

Unit L05 lies adjacent to Divide Well Campground and disturbance (noise, dust, smoke) would likely occur during implementation. Such disturbance would not make the campground unusable; however it could cause some campers to avoid that particular campground during implementation, moving their camping activities

elsewhere. This disturbance would likely last a month or less. In the long-term, the treatments under all action alternatives would increase protection of Divide Well Campground and dispersed campsites by lessening the likelihood of high severity fire within the analysis area.

Cumulative effects:
A review of the Past, Present and Future projects as listed in the project analysis file indicates that the cumulative effects from the proposed treatments would be extremely small. The future replacement of the vault toilet at Divide Wells Campground would improve the accessibility and desirability of the camping experience on those persons utilizing this campground, which could combine with the improved mobility and protection created by the proposed actions to enhance the recreation experience in the future.

TRAILS AND DISPERSED RECREATION

Existing Condition

There are approximately 29 miles of snowmobile trails in the analysis area. These miles are part of an existing system that runs from the analysis area west to the Heppner Ranger District. All of the designated trails are on existing open roads, however, cross-country travel is also allowed throughout the analysis area (except C3 management area). A volunteer snowmobile group grooms some of the designated trails, dependant upon snow levels. At one time there was approximately 18 miles of designated cross-country ski trails in the Ellis and Sturdevant Spring areas, however, these trails have not been maintained for several years due to funding shortfalls and lack of use. There are no developed hiking or equestrian trails within the analysis area.

In addition to trails, there are a number of other dispersed recreation activities that are popular in the area: All Terrain Vehicle (ATV) riding, mushroom picking, firewood gathering, hunting, and sight seeing. ATV use includes riding of motorcycles (Class III) and four-wheelers (Class I) on open roads in the analysis area. All roads are considered open to ATV travel unless signed as closed under the District's Access and Travel Management Plan. The analysis area contains a portion of the Heppner Big Game Management Unit (designated by the Oregon Department of Fish and Wildlife). Hunting is one of the most popular recreation activities in this area. Hunting season typically begins in late August and extends through November. Also, about 8 miles of the Blue Mountain State Scenic Byway bisects the northern part of the Western Route Analysis Area. This paved route is open to vehicles all year; however use is limited during winter months due to snow (usually November-May).

Environmental Consequences Unique to No Action

Direct and Indirect effects:
Overall recreation use within the analysis area would remain near the same levels as previous years with this alternative. Snowmobile use would remain the same and those roads that are groomed by the club would continue to be groomed. In the long term, recreationists may not be able to enjoy the same quality experience if the landscape significantly alters due to non-treatment of tree stands, which could result in catastrophic fire and/or a reduction in mobility within stands because of the down trees.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:
Overall recreation use would remain near the same levels as previous years with implementation of any of the action alternatives. The Western Route analysis area has been heavily managed in the past and coming upon projects being implemented is expected. Public safety hazards, such as increased vehicle traffic and decreased visibility due to smoke and/or dust, would cause a short-term decrease in the quality of the recreation experience. The impact would be reduced, though not eliminated, by placing safety signs along roads warning the public of the activity.

If timber harvest should occur in the winter, roads used as part of the snowmobile trail system could be plowed, making them unusable for the duration of implementation. However, the agreement that the Forest Service has with the snowmobile club states that trail roads may be used for other activities. Also, an alternate route within the analysis area could be used as a substitute. Cross-country skiing would not likely be affected, since trails have not been groomed in a number of years.

Hunting could be affected if implementation occurs during hunting seasons because increased traffic (from laborers, administration, machinery, and log trucks) would increase disturbance of big game along roads, equipment working in treatment units would create noise, and burning would create smoke. Such disturbance could occur to the extent that big game would temporarily relocate away from the disturbance. Again, this would not occur simultaneously across all treatment areas, but would be concentrated in up to 4 units at a time. ATV use and firewood gathering could be affected by increased traffic and closure of some roads to collection, but this would be limited in duration to a month or less. Also, the proposed fuel treatments could decrease the opportunity of firewood gathering in the immediate area. Sightseeing, especially along the Blue Mountain Scenic Byway, could be less desirable during and immediately after implementation due to alteration of visual quality or dust and smoke, though this would be short-lived (see Visuals Report for further details). It is least likely that mushroom collection would be affected by activities, because collection typically occurs when the ground is too wet for use of machinery. During fall burning operations, all recreationists could experience some inconvenience due

to smoke in the air. However, this effect would be of short duration and is a management practice that forest visitors expect during this season.

Cumulative effects:
In the long-term, the proposed treatments, past harvest and prescribed burning, and the future Wild West fuel treatments would benefit recreationists by creating a healthier forest environment, with fewer obstructions on the ground. A healthy forest setting is an important attribute for recreationists and would contribute to the overall experience for a visitor. Even with extensive past management in the analysis area, outdoor recreation use, in general, has steadily increased over the years. Ultimately, the likelihood of high severity fire would be reduced, which would preserve recreation opportunities in this area.

TRANSPORTATION

This section incorporates by reference the Western Route Vegetative Management Transportation Report and Western Route Harvest Plan contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in these reports and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

The analysis area is within the Fivemile Creek drainage in what is traditionally called the "Western Route Area" on the North Fork John Day Ranger District. The area analyzed for Transportation purposes is contained within the Forest Boundary. A Roads Analysis has been completed, which identified closed roads that are no longer needed for management of the area and may be decommissioned. Results are in the analysis file for this project and will be analyzed and implemented under a separate environmental document.

ACCESS

Existing Road System

The Fivemile Creek drainage has had numerous timber sales and many old roads and unclassified roads[23] exist in the area. Most unclassified roads in the area have been reclaimed and are naturally decommissioned and there are no known resource concerns.

Existing roads within the area are showing signs of wear due to lack of maintenance. A majority of use occurs during hunting seasons with many hunters camping next to or within close proximity to open roads.

[23] **Unclassified Roads:** A road that is not constructed, maintained or intended for long-term highway vehicle use, such as roads built for temporary access and other remnants of short-term-use roads associated with fire suppression; timber harvest; and oil, gas, or mineral activities; as well as travel-ways resulting from off-road vehicle use.

This area is consistent with the North Fork John Day Ranger District Access and Travel Management Plan (ATM), current and future use needs. Table 69 shows the existing roads on National Forest System lands within the Western Route Analysis Area. The Forest Plan identified a desired condition of 2 miles of open/seasonal road per square mile of area.

Table 69: Western Route Roads on National Forest System Lands

Roads	Miles	(Mi/Mi^2)
Roads Open/Seasonal	87	2.1
Roads Closed	87	2.1
Total Roads	174	4.2

Environmental Consequences Common to All Alternatives

Direct, and Indirect effects
No change is proposed to the existing District Access and Travel Management Plan under this document.

Cumulative effects:
Through the Roads Analysis associated with the Western Route project (see project file), the interdisciplinary team identified around 49 miles of closed roads within the analysis area that could be decommissioned. This future action would be analyzed under a separate environmental document. Elimination of these roads would decrease the deferred maintenance responsibility of the Forest.

Environmental Consequences Unique to No Action

Direct, Indirect and Cumulative effects:
Use of open roads within the area would remain the same. Any maintenance completed would be in an emergency situation. The only road that would continue to receive long-term maintenance dollars would be Forest Road 53 because of the amount of money invested (paved road, etc.).

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:
A number of roads within the analysis area would be used to access treatment units and haul commercial timber (**Error! Not a valid bookmark self-reference.**). Roads used for timber haul would receive heavy use, with several log trucks and contractor vehicles going to and from units daily. Use of roads for non-timber haul activities would be intermittent and of a limited scale entailing the movement of equipment or personnel into an area and then out.

Table 70: Road Use Associated with the Action Alternatives*

	Proposed Action	Alternative 1	Alternative 2
Open roads used for timber haul	61 miles	54 miles	61 miles
Closed roads used for timber haul	25 miles	17 miles	25 miles
Open roads used for other treatment access	13 miles	17 miles	13 miles
Closed roads used for other treatment access	7 miles	9 miles	7 miles
Total roads used for implementation	106 miles	97 miles	106 miles

*Associated road numbers are listed in the Transportation Report in the analysis file.

On all open timber haul roads, the timber sale contractor (under direction from the Forest Service) would complete the following treatments before and after hauling: surface blading, culvert cleanout, brushing, and slough disposal. Potential hazard trees located along the haul road would need to be cut, and such material could be included in the timber sale. Completion of this work would alleviate some of the road maintenance backlog that currently exists in the area.

All haul routes would have safety signs installed to inform the public. Design and placement of signs would follow the "Manual on Uniform Traffic Control Devices" published by the Federal Highway Administration. Dust generated by timber haul could cause a safety problem for other motorists and increase sediment where the road location is next to streams. This effect would last for a brief period after trucks pass until the dust settles. To minimize hazards, standard operating procedures would require the contractor to apply water to roads to reduce creation of dust (the Forest Service would approve all water-drafting sites before they are used). In the long-term, maintenance of open haul roads through the contract would improve road condition and overall public safety.

Closed roads used to access treatment units would be cleared of any down trees, with some surface treatment done to allow safe use. Surface treatment would include blading with a road grader and cleanout of existing ditch relief culverts, if needed. There would also be some cutting of roadside brush to allow passage of work vehicles. Cut brush would be piled at designated disposal areas for burning by the Forest Service. During implementation, closed roads would continue to be closed to public access via "For Logging Use Only" signs. Once implementation is completed, the road would be closed again to vehicle access.

Snowplowing of roads to access treatment units during the winter months could increase sediment that is delivered to streams by channeling snow melt down the plowed road. However, implementation of the snowplowing requirements listed in the Biological Opinion associated with the "North Fork John Day River Sub-basin, Multi-specie Biological Assessment" would minimize such risk. If winter haul is used and roads that are part of the snowmobile trail system are plowed, they would

become unusable for snowmobiling. An alternate route would be identified within the analysis area for snowmobilers to use, since not all roads would be plowed.

Proposed fuels treatment would require construction of fire control line using bulldozers in some locations. Since most bulldozer-constructed fire lines terminate at roads and all open roads (except Forest Road 53) can be traveled by ATV's under Forest and State rules, unauthorized off-road ATV use could increase. Usually an ATV rider that travels a bulldozer fire line is more curious as to where the fire line goes then in causing resource damage. As a result, increased use of "No ATV's" signs near fire line locations and public education has greatly reduced problems associated with this unauthorized use, although it has not been eliminated.

All of the effects, with the exception of unauthorized ATV use, would be within those described in the Umatilla Forest Plan. Unauthorized ATV use is a national issue that the Chief of the Forest Service has delegated to a team of employees to address and is outside the scope of this project.

Cumulative effects:
Road maintenance completed by implementation of the action alternatives, together with future road decommissioning, would decrease the amount of deferred maintenance costs for the Forest.

SOCIO-ECONOMIC

This section incorporates by reference the Western Route Vegetative Management Economic Report contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

SCALE OF ANALYSIS

The impact zone for the Umatilla National Forest consists of Grant, Morrow, Umatilla, Union, Wallowa, and Wheeler counties in Oregon, and Asotin, Garfield, Columbia, and Walla Walla counties in Washington. These counties are included within the Pendleton and Spokane Bureau of Economic Analysis regions. The Umatilla National Forest, Land and Resource Management Plan, Final Environmental Impact Statement, Appendix B (Page B-46), also provides further detailed description of the main social and economic characteristics of the area.

VIABILITY OF HARVEST

Existing Condition

The viability of harvest is dependent upon the market prices for raw wood fiber (both sawtimber and non-sawtimber) and the costs of harvest that are identified in the above *Methodology and Assumptions* section. Market prices are determined by the supply and demand relationships that exist for wood fiber on a global scale.

Local sawmills that could bid on the sawtimber from this project are located in La Grande, Pilot Rock, and John Day. In addition to local sawmills, three to four large logging contractors usually bid on local timber sales, and if successful, could sell the sawtimber to the same local sawmills. A particle board mill in La Grande uses the chip by-products of the La Grande sawmill for its raw materials. Local markets also more directly exist for the non-sawtimber component of this project. "Clean white" chips are also shipped down the Columbia River from the Port of Boardman where they enter global markets, primarily for paper production. The non-sawtimber portion of the commercial harvest was assumed to be of the "clean white" variety.

Environmental Consequences Unique to No Action

Direct and Indirect effects:
The No Action alternative would not harvest any timber, so would not affect harvest viability.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:
The TEA_ECON program[24] was run for each alternative. The results of each program run, and the effects of all alternatives on harvest viability, are shown in Table 71.

Table 71. Estimated Average Bid Prices and Net Present Value for Commercial Units by Alternative ($/ccf)

	Proposed Action	Alternative 1	Alternative 2
Base Rate ($/Ccf)	11	11	11
Average Bid Price ($/Ccf)	28	28	28
Discounted Sale Revenues	$76,000	$47,00	$78,000
Discounted Sale Costs	$111,000	$69,000	$112,000
Present Net Sale Value	- $35,000	- $22,000	- $34,000

Average bid rates are the same per unit volume for each action alternative. Commercial harvests show bid rates above the base rate (the lowest rate that the government would accept for the sale, based on regional transaction data). This means that the purchaser would make an income (i.e. viable harvest). However, each alternative would have a negative Present Net Value, which indicates the sale would be "below cost." This means that the Forest Service would spend more money on planning, implementing, and administering the commercial harvest than the harvest earned. The purpose of this project ("*…to improve vigor, health, and fire resistance in upland forests that are outside their historic, pre-fire-exclusion*

[24] TEA ECON is a computer program that compares the cost of the timber sale with the revenue generated by the sale to determine financial viability.

conditions…") focuses on non-economic objectives, so Table 71 illustrates what it would cost to use the tool of timber harvest to achieve this objective.

Cumulative effects:
Estimates for tentative advertised sawtimber bid rates for the proposed action and its alternatives are within the range of rates experienced by the three Blue Mountain forests (Malheur, Umatilla, and Wallowa-Whitman) within the last two years (Musgrove, 2004). Because of the competitiveness of the market, and its global nature, none of the alternatives would in themselves affect prices, costs, or harvest viability of other present or future timber sales in the economic impact zone. There are also no residual effects from past timber sales that would cumulatively add to the viability of harvest of the action alternatives.

Although fiber from local Forest Service timber sales has recently been of lower quality because it has come from salvage sales, the prices for the higher quality sawtimber and non-sawtimber components of this sale are reflected in the regional price database used in this analysis. The TEA_ECON program allows for value deductions for lower quality fiber. These deductions were not applied in this analysis because the sawtimber harvested from the commercial units is expected to be of good quality. There would be no additional cumulative effects unique to any individual action alternative.

EMPLOYMENT AND INCOME

Existing Condition

Agriculture, manufacturing (particularly wood products), and food processing are important sources of employment and income in this region. Reliance on timber and forage from federal lands is moderate to high in several counties in the impact zone (Haynes et al. 1997). Many communities in the impact zone are closely tied to the forest in both work activities and recreation. Several communities such as Heppner, Ukiah, Fossil, Canyon City, and Enterprise are geographically isolated from the closest larger cities such as Pendleton, Walla Walla, and La Grande (Reyna et al. 1998). This isolation limits options for local workforces. Refer to the *Umatilla National Forest, Land and Resource Management Plan, Final Environmental Impact Statement*, Appendix B for further detailed description of the main social and economic characteristics of the area (USDA 1990). Annual timber-related employment supported by timber harvested from the Umatilla National Forest for the years 1995 to 1997 averaged 394 jobs.

Environmental Consequences Unique to No Action

Direct and Indirect effects:
This alternative would not harvest any timber and therefore, would not support direct, indirect, and induced employment, or increased income to local economies. Declining trends in timber harvesting from National Forest lands would continue in the future and contribute to declines in wood products employment over the next two

decades. Changes in the economic base and wood products infrastructure for the impact area would also continue to be influenced by fluctuations in market prices, international market conditions, changes in technology, and industry restructuring.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:
In general, the primary effect on timber harvest-related employment would occur from commercial harvesting associated with the alternatives over the next two years. Financially viable sales (as indicated in the previous section) would provide opportunities for timber harvest-related employment. Based upon the harvest data and the IMPLAN multipliers provided, small increases in employment would be expected (Table 72).

Table 72. Estimated Direct and Indirect Impacts on Regional Employment and Income by Alternative

	Proposed Action	**Alternative 1**	**Alternative 2**
Employment (2-year period)			
Direct (Jobs)	9	5	9
Indirect (Jobs)	5	3	5
Total (Jobs)	**14**	**8**	**14**
Contribution to Annual Average of Timber-Related Employment(1994-1997) from the Umatilla National Forest	**3.5%**	**2%**	**3.5%**
Income (2-year period)			
Commercial Units			
Volume (ccf)	2,954	1,833	3,015
Direct ($)	$248,000	$154,000	$253,000
Indirect & Induced ($)	$160,000	$99,000	$163,000
Total ($)	$408,000	$253,000	$416,000
Non-Commercial Units			
Direct ($)	$846,000	$1,120,000	$846,000
Indirect & Induced ($)	$546,000	$720,000	$545,000
Total ($)	$1,392,000	$1,840,000	$1,391,000
Total Income by Alternative	**$1,800,000**	**$2,093,000**	**$1,807,000**

Employment coefficients are 0.0029 direct jobs per ccf and 0.0018 indirect jobs per ccf.
The direct income coefficient is $83.84 per ccf and $54.12 indirect and induced income per ccf
Employment Coefficients for non-commercial thinning projects are unavailable.

Other treatments, such as non-commercial thinning and mechanical fuel treatment, would provide material that could be sold for fiber (chips, hog fuel, etc.) Although employment coefficients are not available for these types of treatment, the activities

would be expected to provide more jobs per acre than commercial timber harvest simply because the volume of non-sawtimber fiber per acre is higher than commercial sawtimber. However, wood processing (mill) employment would be less per Ccf with chips or hog fuel than with a commercial sawtimber harvest.

The distribution of economic impacts would depend on the location of the timber purchaser/contractor awarded the contracts at the time of the sale, the availability of equipment and skills in the impact area, and the location and availability of the wood processing facilities and related infrastructure. Processors outside of Northeast Oregon could also potentially bid on the sales or contracts and distribute the jobs and income effect to other counties in the Blue Mountains or outside of the area entirely.

The total amount of local income would depend on the alternative selected and whether (and to what extent) the stewardship program funding that would be needed to accomplish the activity on the non-commercial units of the project would occur.

Cumulative effects:
No other past, ongoing, or foreseeable future activities would affect, or be affected by any employment or income effects not already described.

ECONOMIC EFFICIENCY

Existing Condition

Volumes, costs, and revenues from both the commercial and non-commercial units were analyzed for cost effectiveness. The derivation of the commercial unit data is described in the *Harvest Viability* section of this report. The cost of harvest of the volume from the non-commercial acres for each alternative is proposed to be funded by the federal stewardship program[25]. Non-sawtimber volumes from non-commercial thinning units were based on preliminary cruise data and estimated at 500 ccf (approximately 10 tons at 40 pounds per ccf) per acre. The cost of removing material from non-commercial units was estimated at $500 per acre (or $1 per ccf).

It is possible that some or all of the non-commercial volumes removed from the non-commercial units could be sold to local chip markets and used as the "offset" against the cost of services received in the non-commercial units. The non-commercial units were assumed to produce lower quality chips. There is a buyer of low quality chips in Heppner, Oregon where they could be used in for the production of electricity and ethanol. The price paid in local chip markets was estimated to average $300 per acre or $30 per ton ($0.60 per Ccf).

[25] Section 323 of the Consolidated Appropriations Resolution of 2003 (Public Law 108-7) grants the Forest Service authority to enter into stewardship contracting projects with private persons or public or private entities to perform services to achieve land management goals for the National Forests that meet local and rural community needs. The value of timber or other forest products removed may be used as an offset against any services received (Federal Register, Vol. 68, No. 124, p. 38285, June 27, 2003).

Environmental Consequences Unique to No Action

Direct and Indirect effects:
The public would incur no costs, nor realize any benefits of timber harvest in this area. No Action would yield a present net value of 0 due to the data limitations (described in the "Methodology and Assumptions" section) for quantifying economic benefits and costs beyond those identified at the project level. This value ignores the risks to forest health, vigor, and fire resistance that would increase without implementation of this project, and the resulting losses in timber values and non-market benefits. Data limitations do not allow for the quantification of this risk, however, this risk would negatively affect present net value.

Ongoing costs associated with management of the area, including the continuation of economic losses in stand values from recurring forest health problems, would continue.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:
When the commercial and non-commercial units are aggregated, all action alternatives illustrate a negative present net value due to the combination of low value and large amount of the non-sawtimber wood fiber being removed (Table 73).

Table 73. Estimated Net Present Value for All Units by Alternative

	Proposed Action	**Alternative 1**	**Alternative 2**
Total Project Area (Acres)	6,484	5,213	6,583
Commercial Units (from previous section on Harvest Viability)			
Average Bid Price ($/ccf)	28	28	28
Discounted Revenues	$76,000	$47,000	$78,000
Discounted Costs	$111,000	$69,000	$112,000
Present Net Value	-$35,000	-$22,000	-$34,000
Non-Commercial Units			
Chip Price ($/ccf)	0.60	0.60	0.60
Discounted Revenues	$470,000	$621,000	$470,000
Discounted Costs	$782,000	$1,036,000	$782,000
Present Net Value	-$312,000	-$415,000	-$312,000
All Units Present Net Value	-$347,000	-$437,000	-$346,000
Present Net Value per Acre	-$54	-$84	-$53

Market benefits that could occur as a result of the proposed activities include increases in forest productivity (tree growth) and value for the remaining trees by eliminating competitive stress and reducing the risk of growth-limiting insect attack.

Externalized costs (such as those resulting from damage to soils, losses in wildlife habitat, and mobilized sediment in local streams) are not well defined or measurable at the project level in terms that provide comparison of assigned dollar values. Refer to other sections on environmental consequences in this document for a discussion whether these external effects would occur. The other sections of this document also discuss the non-economic benefits to human and environmental resources for a relative comparison between alternatives.

Cumulative effects:
The economic efficiency of other past, ongoing, or foreseeable future activities would not affect, and not be affected by any effects not already described.

COMPLIANCE WITH OTHER LAWS, REGULATIONS, AND POLICIES

This section describes how the action alternatives comply with applicable State and Federal laws, regulations, and policies.

NATIONAL HISTORIC PRESERVATION ACT

Before project implementation, State Historic Preservation Office consultation will be completed under the Programmatic Agreement among the United States Department of Agriculture, Forest Service, Pacific Northwest Region (Region 6), The Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Officer regarding Cultural Resource Management on National Forests in the State of Oregon, dated March 10, 1995. Identified sites will be protected from all project activities associated with the Western Route Timber Sale project. Should additional sites be found during ground disturbing activities, contract provisions will provide protection and the Zone Archaeologist will be immediately notified. These measures resulted in a determination of **No Effect** on cultural heritage sites. Because heritage resources would not be affected by proposed activities under any action alternative, there would be **No Effect** to any historic property listed in or eligible to the National Register of Historic Places.

ENDANGERED SPECIES ACT AND REGIONAL FORESTER'S SENSITIVE SPECIES

The Endangered Species Act requires protection of all species listed as "threatened" or "endangered" by federal regulating agencies (Fish and Wildlife Service and National Marine Fisheries Service). Biological Evaluations for "Endangered", "Threatened", and "Sensitive" plant, wildlife, and fish species have been completed. Determinations were made that none of the proposed projects would adversely affect, contribute to a trend toward Federal listing, nor cause a loss of viability to the listed plant and animal populations or species. Details regarding the actual species found within the Western Route analysis area and the potential effects of proposed

activities on those species and their habitat are contained under the Wildlife Habitat, Fish Habitat, and Non-Forest Vegetation sections of this EA.

INVENTORIED ROADLESS AREAS AND WILDERNESS

There are no inventoried roadless areas or wilderness in the Western Route analysis area.

CLEAN AIR ACT

This section incorporates by reference the Western Route Vegetative Management Fire/Fuels Report contained in the project analysis file at the North Fork John Day Ranger District. Methodologies, assumptions, and limitations of analysis and other details are contained in the report and the affected environment and predicted effects of the Proposed Action and its alternatives are discussed in this section.

Existing Condition

The airshed over and around the Western Route analysis area currently meets air quality standards for Class II Airsheds (Oregon Smoke Management Annual Report, 2001). The closest Class I Airshed-designated Wilderness Areas are the Strawberry Mountain Wilderness, approximately 60 air miles away, near John Day, Oregon, and the Eagle Cap Wilderness about 70 air miles away, east of La Grande, Oregon. Due to these distances and prevailing wind patterns, smoke intrusion into these areas is not likely.

Special Protection Zones are areas established around cities that are not meeting the federal Clean Air Act standards for PM-10 and PM-2.5[26]. The closest Special Protection Zone to the analysis area is La Grande, Oregon, with a distance of approximately 55 air miles from the project area. The zone boundary is approximately a 20-mile radius around the city of La Grande. Again, distance and prevailing wind patterns would likely result in no effects to this area. Pendleton, Oregon, (a sensitive area due to its population) is approximately 40 air miles away. This location could be affected by smoke; however, using smoke dispersal prescriptions from the Smoke Management Forecast (Oregon Department of Forestry) should minimize impacts.

Environmental Consequences Common to All Action Alternatives

Direct and Indirect effects:
All action alternatives would have a prescribed fire component that would create emissions. The emissions created could have an effect on public health. To minimize emissions, prescribed burning would take place under conditions favorable to effective mixing and dispersal of the smoke created to the greatest extent possible. The effects associated with prescribed burning would be of short duration

[26] PM 10 refers to particulate matter that is 10 micrometers and smaller in size; PM 2.5 is particulate matter 2.5 micrometers and smaller in size.

and have little impact on surrounding communities and Class I Airsheds due to the remoteness of the project area from those areas.

Table 74. PM10 and PM2.5 emissions by alternative

Current Condition		Proposed Action		Alternative 1		Alternative 2	
PM 10 (tons)	PM 2.5 (tons)	PM 10 (tons)	PM 2.5 (tons)	PM 10 (tons)	PM 2.5 (tons)	PM 10 (tons)	PM 2.5 (tons)
1,519	1,289	1336	1132	1112	942	1359	1151

Any prescribed burning operations within the project areas would comply with the State of Oregon's Smoke Management Implementation Plan, and would be implemented within guidelines of the Smoke Management Program. The State would implement restrictions on burning when wind predictions indicate smoke could be carried into sensitive areas. A listing of additional requirements is available in the Oregon Smoke Management Plan. In conclusion, this project will comply with the requirements of the Clean Air Act and be conducted in accordance with the operational guidelines agreed to by the Forest Service and the Oregon Department of Environmental Quality.

Environmental Consequences Unique to No Action

Direct and Indirect effects:
Currently within the analysis area it is estimated that the area within the proposed units would produce approximately 2,808 tons of particulate matter if burned.

CLEAN WATER ACT

This section incorporates by reference the Western Route Vegetative Management Water Resources Report contained in the project analysis file at the North Fork John Day Ranger District.

General designated beneficial uses, as defined by the State of Oregon for the John Day River Basin, include: public and private domestic water supply, industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, and aesthetic quality. Table 75 lists the water quality criteria associated with these general beneficial uses. Revised rules for specific designated fish uses, recently approved by Environmental Protection Agency (March 2, 2004) identify salmon and trout rearing and migration in the Western Route vicinity within the John Day Basin.

Beneficial uses potentially affected by the Western Route proposed actions are: Salmonid Fish Rearing, Salmonid Fish Spawning, and Resident Fish and Aquatic Life. Water quality criteria potentially affected by the proposed actions are: temperature and sedimentation.

Table 75. General Designated Beneficial uses and water quality criteria for the John Day Basin

Beneficial Use	Water Quality Criteria
Public Domestic Water Supply	Turbidity, chlorophyll a
Private Domestic Water Supply	Turbidity, chlorophyll a
Industrial Water Supply	Turbidity, chlorophyll a
Irrigation	None
Livestock Watering	None
Fish and Aquatic Life[1]	Dissolved oxygen, pH, sedimentation, temperature, toxics, turbidity
Wildlife and Hunting	None
Fishing	Aquatic weeds or algae, chlorophyll a, nutrients
Boating	None
Water Contact Recreation	Aquatic weeds or algae, bacteria, chlorophyll a, nutrients, Ph
Aesthetic Quality	Aquatic weeds or algae, chlorophyll a, nutrients, turbidity

[1] See Oregon Department of Environmental Quality Fish use designations for this basin

Under the new temperature standard, streams in the analysis area are designated as salmon and trout rearing and migration, with a temperature standard of 18°C (64.4°F)

Streams in the vicinity of the Western Route analysis area listed on the State of Oregon's Water Quality Limited Streams Database include:

- Fivemile Creek, River Mile 0-21.3, summer temperature, 1998 and 2002 303(d) List,
- Camas Creek, River Mile 0-36.7, summer temperature, 1998 303(d) List, and temperature March 1 – July 15, 2002 303(d) List. Streams were listed using 1997 temperature criteria (64°F).

Total Maximum Daily Loads have not been completed in the John Day Basin and are scheduled for 2006. A Water Quality Management plan will be prepared as part of Total Maximum Daily Load development.

The Western Route Vegetation Management project would be consistent with the Clean Water Act because associated activities were designed to avoid any increases in sedimentation or stream temperatures (i.e. standard operating procedures, Best Management Practices), and no activities that could modify aquatic habitat would take place in the Riparian Habitat Conservation Areas.

WATER RIGHTS AND USE

This section incorporates by reference the Western Route Vegetative Management Water Resources Report contained in the project analysis file at the North Fork John Day Ranger District.

There are approximately 110 livestock ponds in the analysis area. The majority are small upland developments that store snowmelt runoff. Water use of ponds associated with live stream channels are under permit by the State Water Resources Department. The diversion on Fivemile at Gurdane, previously discussed, is under State permit.

EXECUTIVE ORDERS 13186; NEOTROPICAL MIGRATORY BIRDS

This section incorporates by reference the Western Route Vegetative Management Wildlife Report contained in the project analysis file at the North Fork John Day Ranger District.

Activities under all action alternatives would be designed using the *Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington* (Altman 2000), and therefore would be consistent with Executive Order 13186. See Wildlife Habitat, Species of Concern section for further discussion of effects on neotropical migratory birds.

EXECUTIVE ORDERS 11988 AND 11990: FLOODPLAINS AND WETLANDS

This section incorporates by reference the Western Route Vegetative Management Water Resources Report contained in the project analysis file at the North Fork John Day Ranger District.

Executive Order 11988 requires government agencies to take actions that reduce the risk of loss due to floods, to minimize the impact of floods on human health and welfare, and to restore and preserve the natural and beneficial values served by floodplains. Proposed treatments would not occur within 100-year floodplains due to mitigation measures detailed in Chapter 2 (see Riparian Habitat Conservation Area measures).

Executive Order 11990 requires that government agencies take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. Streamside riparian areas, seeps, springs, and other wet habitats exist within the analysis area. These areas would be avoided according to Riparian Habitat Conservation Area boundaries defined in PACFISH and mitigation measures identified in Chapter 2.

As a result, the proposed treatments would be consistent with Executive Orders 11988 and 11990.

EXECUTIVE ORDER 12898: ENVIRONMENTAL JUSTICE

This section incorporates by reference the Western Route Vegetative Management Economic Report contained in the project analysis file at the North Fork John Day Ranger District.

Executive Order 12898 requires that federal agencies adopt strategies to address environmental justice concerns within the context of agency operations. With implementation of the Proposed Action or any of its alternatives there would be no disproportionately high and adverse human health or environmental effects on minority or low-income populations. The actions would occur in a remote area and nearby communities would mainly be affected by economic impacts as related to contractors implementing harvest, thinning, fuels treatment, and burning activities. Racial and cultural minority groups could also be prevalent in the work forces that implement prescribed fire, tree planting, or thinning activities. Contracts contain clauses that address worker safety.

NATIONAL FOREST MANAGEMENT ACT

All proposed harvest units are planned on suitable land, and will be capable of re-stocking within 5 years of harvest by either natural or artificial means. All units were considered for potential uneven-aged management. Proposed commercial and non-commercial thinning would increase the rate of growth of remaining trees and would favor species or age classes that are most valuable for wildlife. The resultant reduced stress on residual trees would make treated stands less susceptible to pest-caused damage. Mitigation has been identified to protect site productivity, soils, and water quality.

The prescribed burning of natural and activity fuels would reduce long-lasting hazards from wildfire, while air quality would be maintained at a level that would meet or exceed applicable Federal, State, and local standards. All proposed activities would provide sufficient habitat to maintain viable populations of fish and wildlife and critical habitat for threatened or endangered species would be protected.

Proposed activities are designed to accelerate development of forest habitats that are currently deficient within the analysis area, enhancing the diversity of plant and animal communities in the long-term. See discussions under the applicable resource sections above for further support that proposed activities would comply with the seven requirements associated with vegetative manipulation (36 CFR 219.27(b)), riparian areas (36 CFR 219.27(e)), and soil and water (36 CFR 219.27(f)).

FOREST PLAN CONSISTENCY

The Umatilla National Forest produced the Forest Plan in accordance with the National Forest Management Act of 1976. This plan provides guidelines for all natural resource management activities and establishes management standards.

Current Forest Plan direction identifies fuel standards by management area across the forest. Proposed activities would move treated units toward the Forest Plan

standard of an average of 8 or 12 tons per acre in the 0-3-inch size class (depending on management area). These treatments alone would not likely reach the Forest Plan identified averages due to the current volume of fuels, however, the proposed treatments would combine with future activities (such as Wild West Underburn) to reach these levels.

The vegetative manipulation (commercial and non-commercial thinning) associated with the Western Route Vegetation Management project is consistent with the Umatilla National Forest Land and Resource Management Plan FEIS and Record of Decision (see Silviculture Report for details).

Forest Plan Amendment #11 (Eastside Screens) incorporated additional wildlife habitat measures. To address this amendment, patterns of stand structure by biophysical environment have been compared to the Historic Range of Variability (HRV) for the analysis area. The amount and distribution of dry forest in the Old Forest Single Stratum structural stage is currently deficit as compared the historic range of variability. Late and old structural stage stands would be maintained and enhanced as a result of planned activities in the analysis area. No green trees greater than or equal to 21 inches dbh would be removed by timber harvest. Stands would be thinned under the Proposed Action, Alternative1, and Alternative 2 to move their condition towards the Old Forest condition. Salvage harvest and other fuel reductions would also indirectly aid achievement of Historic Range of Variability for vegetation structure and species composition by reducing future fire intensities within the treated areas. Connectivity would be maintained between Late Old Structure stands to the extent possible, by following recommendations in the Camas Ecosystem Analysis “Old Forest Strategy” (1995). Snags, green tree replacements, and down logs would be maintained as recommended in the District letter based on this Forest Plan Amendment. Goshawk surveys were completed and no nests are known in the analysis area.

Fivemile Creek does not meet state water temperature standards. The State of Oregon has placed Fivemile Creek on the 303(d) list of water quality limited streams as a result. The Proposed Action, Alternative1, and Alternative 2 would have no effect on stream bank stability, stream shade, stream temperature, and dispersion of units would be less than the stated guideline (see Equivalent Treatment Area analysis percentages), so activities would be consistent with the Forest Plan.

Guidelines developed to provide and maintain riparian and fish habitat (Forest Plan 4-59 to 4-62) are presented in Table 76.

Table 76: Forest Plan Standards and Guidelines for riparian and fish habitat.

Resource Parameter	Standard and Guideline
Stream Bank Stability	80% of length in stable condition
Stream shade for class 1,2,and 3 streams	Ecological potential if known, else 80%
Water Temperature	Meet state standards
Dispersion (0-10 year age class)	<30% of subwatershed area

The Umatilla Forest Plan was amended in 1995 to incorporate PACFISH. PACFISH defines Riparian Habitat Conservation Areas surrounding streams and other riparian features, and identifies associated Riparian Management Objectives. Within the Western Route analysis area, Riparian Habitat Conservation Area boundaries extend 300 feet from fish bearing streams, 150 feet from perennial, non-fish bearing streams, and 150 feet from wetlands larger than one acre, and 100 feet from intermittent streams or wetlands smaller than one acre. Salvage harvesting within Riparian Habitat Conservation Areas is an option; however, this was not pursued due to fish habitat and sediment concerns. Aspen rehabilitation is the only activity proposed within Riparian Habitat Conservation Areas and would comply with PACFISH Riparian Management Objectives. The project is consistent with the Forest Plan and amendments for water resources and riparian management because applicable standards and guidelines would be met, best management practices would be mandatory as part of project implementation, and monitoring of conditions and trends would continue.

OTHER JURISDICTIONS

There are a number of other agencies responsible for management of resources within the Western Route analysis area. The Oregon Department of Fish and Wildlife is responsible for management of fish and wildlife populations, whereas the Forest Service manages the habitat for these animals. The Oregon Department of Fish and Wildlife has been contacted regarding this analysis.

The Environmental Protection Agency is responsible for enforcement of environmental quality standards, such as those established for water resources, while the Oregon Department of Environmental Quality sets standards, identifies nonpoint sources of water pollution, and determines which waters do not meet the goals of the Clean Water Act. The Environmental Protection Agency has certified the Oregon Forest Practices Act as Best Management Practices. Oregon State compared Forest Service practices used to control or prevent non-point sources of water pollution with the Oregon Forest Practices Act and concluded that Forest Service practices meet or exceed State requirements. These are periodically reviewed as practices change. The Forest Service and Oregon Department of Environmental Quality have signed a Memorandum of Understanding (2/12/79 and 12/7/82) outlining this. The Oregon Department of Environmental Quality listed Fivemile Creek as water quality limited for 2002.

Oregon Department of Environmental Quality and the Oregon Department of Forestry are responsible for regulating all prescribed burning operations. The USDA Forest Service Region 6 has a Memorandum of Understanding with Oregon Department of Environmental Quality, Oregon Department of Forestry, and the USDI Bureau of Land Management regarding limits on emissions, as well as reporting procedures. All burning will comply with the State of Oregon's Smoke Management Implementation Plan and, for greater specificity, the memorandum of understanding mentioned above.

Before project implementation, State Historic Preservation Office consultation will be completed under the Programmatic Agreement dated March 10, 1995.

ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Some form of energy would be necessary for proposed projects requiring use of mechanized equipment: Non-commercial thinning would involve small machines, while projects such as road repair could require heavy machinery for a small amount of time. Both possibilities would result in minor energy requirements. Alternatives that harvest trees would create supplies of firewood as a by-product, which would contribute to the local supply of energy for home space heating.

PRIME FARMLAND, RANGELAND, AND FORESTLAND

No prime farmland, rangeland, or forestland occurs within the analysis area.

CONSUMERS, MINORITY GROUPS, AND WOMEN

Effects on civil rights, including those of minorities and women, would be minimal. Activities associated with the action alternatives would be governed by Forest Service contracts, which are awarded to qualified purchasers regardless of race, color, sex, religion, etc. Such contracts also contain nondiscrimination requirements. While the activities identified here would create jobs and the timber harvest would provide consumer goods, no quantitative output, lack of output, or timing of output associated with these projects would affect the civil rights, privileges, or status quo of consumers, minority groups, and women.

UNAVOIDABLE ADVERSE EFFECTS

Implementation of any of the alternatives, including the No Action alternative, would inevitably result in some adverse environmental effects. The severity of the effects would be minimized by adhering to the direction in the management prescriptions and Standards and Guidelines in Chapter IV of the Forest Plan and additional mitigation proposed in Chapter 2 of this document. These adverse environmental effects are discussed at length under each resource section.

SHORT-TERM USE AND LONG-TERM PRODUCTIVITY

Short-term uses are generally those that determine the present quality of life for the public. In the Pacific Northwest, this typically includes: timber harvest, livestock grazing, recreation, transportation, utility corridors, and wildlife habitat. Long-term productivity refers to the land's capability to support sound ecosystems producing a continuous supply of resources and values for future generations.

Management activities associated with short-term uses (i.e. burning, use of machinery, or removal of wood fiber) could reduce the productivity of some portions of the Western Route Analysis Area. The magnitude that long-term productivity would be reduced is not known because investigations of these effects have only recently begun. However, general comments can be made regarding potential effects caused by the proposed activities. For purposes of this analysis, the duration of this project would be at least five years. Under all alternatives, the long-term productivity of the National Forest System lands and resources would be protected from unacceptable degradation by the standards and guidelines in the Forest Plan,

specific project design, and mitigation measures for the alternatives described in Chapter 2 of this document.

Structural improvements contribute towards the opportunity to use the potential productivity of the analysis area. Roads and trails provide necessary access, and roads are considered as long-term improvements that provide for continued use over time. No new construction would occur, although 99 to 106 miles of road would be repaired depending on the selected alternative. Proposed repair of open roads would improve accessibility for the public, and proposed repair of closed roads would amend drainage and erosion concerns. Wildlife use the created openings resulting from the presence of roadways. Animals that use roads open to the public or OHV trails are at risk of hunting, harassment, and injury or death by vehicular collision during their life cycle. Proposed thinning along roads could modify future use by animals, particularly relating to big game during hunting seasons.

Late/Old structure, particularly Old Forest Single Stratum, has been greatly diminished within the analysis area. Proposed thinning would accelerate development of these habitats within treated stands, shortening the time that dependent wildlife species are extirpated from the area or are stressed due to less ideal habitats.

Treatment of insect and disease damaged stands by removing susceptible tree species would improve the long-term forest productivity of affected areas and reduce the risk of spread to adjacent stands.

Preserving long-term soil productivity is essential for maintaining a healthy ecosystem and allowing the sustained yield of timber and other renewable resources from the Forest. Conclusive evidence relative to short-term impacts of timber harvest and prescribed fire adversely affecting long-term site productivity does not exist. Considerable research suggests, however, that nitrogen reserves, organic residues, and soil physical properties are critical elements of the ecosystem that must be carefully managed to ensure long-term productivity (Little and Klock, 1985; Sachs and Sollens, 1986; Harvey et. al., 1987; Powers and Weatherspoon, 1984; and Amaranthus and Perry, 1987). These researchers suggest that the various components of the site should be maintained to ensure that potential losses of nutrients and changes in soil physical and biological properties do not occur. This is addressed through mitigation in Chapter 2 that relates to designation and location of skid trails and retention of slash and down wood.

No long-term effects to water or its beneficial uses are expected from the proposed management activities under any alternative.

Effective fire prevention and suppression, while minimizing damage to existing timber stands and other resources, resulted in long-term changes in vegetative composition and reduced timber productivity, altering the overall ecosystem. Removal of wood fiber and disposal of slash, if done through a proper prescription, would have little effect on long-term site productivity. However, productivity could be adversely affected if large wood is not removed, or slash resulting from harvest is not treated or is inadequately treated. Burning at the wrong time or allowing for a

high intensity, long duration fire would result in loss of soil fertility. Most other effects of slash disposal would be short-term and have little effect on productivity.

Unnatural fuel accumulations have developed due to fire exclusion and could result in unacceptable impacts on air quality, as witnessed during recent large fires on the District. Harvest, thinning, and prescribed fire can be utilized both effectively and efficiently to reduce fuel loadings and otherwise manipulate the various fuel complexes in the analysis area. This would greatly reduce the consequences of a wildfire within and adjacent to the manipulated fuels complexes. It would also enhance the long-term productivity of wildlife habitat, increase stream flows, provide more visual diversity, and provide the disturbance necessary for the perpetuation of important plant species. The temporary impacts of smoke from prescribed fire under the action alternatives would have minor effects on the short-term use of Forest resources such as recreation sites and visual resources. The use of prescribed fire to reduce the flammability of activity fuels would affect long-term forest productivity by reducing the risks and consequences of a major wildfire. The long-term benefits of prescribed fire in natural fuels more than outweigh the short-term impact to air quality.

IRREVERSIBLE AND IRRETRIEVABLE EFFECTS

An **"Irreversible"** commitment of resources refers to a loss of future options with nonrenewable resources. An **"Irretrievable"** commitment of resources refers to loss of opportunity due to a particular choice of resource uses.

No new construction of temporary or permanent roads is planned. Log landings would produce irretrievable changes in the natural appearance of the landscape as well. Rock used to surface roads would be an irreversible commitment of mineral resources.

The soil and water protection measures identified in the Forest Plan Standards and Guidelines, standard operating procedures in Chapter 2, and Best Management Practices in Appendix B are designed to avoid or minimize the potential for irreversible losses from the proposed management practices.

Concerning threatened and endangered plant, wildlife, and fish species, a determination has been made that the proposed actions will not result in irreversible or irretrievable commitment of resources that foreclose formulation or implementation of reasonable or prudent alternatives.

Environmental Consequences Unique to No Action:

There would be an irretrievable loss of growth within the untreated, overstocked forest. Potentially, the ability to protect forest within the analysis area from catastrophic fire could be irretrievably lost, as well.

There would be an irreversible loss of timber value due to poor tree grow related to crowded conditions and insects and disease. This is particularly true for aspen stands.

Environmental Consequences Common to All Action Alternatives:

Tree removal would result in an irretrievable loss of the value of removed trees for wildlife habitat, soil productivity, and other values. Log landings would produce irreversible changes in the natural appearance of the landscape. The visual effect of log landings would be somewhat reduced by mitigation designed to reduce soil compaction and erosion (i.e. seeding). Little irreversible loss of soil should occur due to extensive mitigation associated with timber harvest and prescribed fire (harvest only on slopes less than 35 percent, full log suspension, etc.).

There would be an irretrievable loss of growth and fuels reduction within untreated, overstocked forest outside of treatment units.

CHAPTER 4 – SUPPORTING INFORMATION

PERSONS, ORGANIZATIONS, AND AGENCIES CONSULTED

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APPENDIX A –CUMULATIVE ACTIVITIES

PAST ACTIVITIES

Dates	Activity Description	Residual Effects
Wildlife		
1999 2003	Woodpecker surveys- Goshawk surveys	• No effect on wildlife---surveys would be done on foot or from vehicles on system roads.
1995	Bat box installation - 12 boxes within analysis area.	• No ground disturbance. Monitoring in 1998 showed no signs of use at any of the boxes.
1993	Aerial fertilization of winter range- 340 acres in T4S, R30E, sections 17, 20-22, 27, 28.	• Effects of fertilization only last 3 years, so are now dissipated
1900's-2003	Fire Suppression	• Fuel loads above normal due to suppression of fire cycle. • Throws other ecological processes off track: - reduces nutrient cycling - increases other disturbances (insects, disease, fire mortality) • Some soil exposure, but recovered in a year so no longer a concern • Change in tree species to more fire-intolerant Douglas-fir and grand fir. • Change in stand structures to multi-canopied, dense forest

Dates	Activity Description	Residual Effects
1993	Gopher Prescribed burn – 250 acres	• Removed invading grand fir and Douglas-fir • Enhanced natural tree regeneration • Decreased activity fuel loads • Sterilized soil in small areas (landing decks and large piles). Effects should be almost gone due to passage of time • Some mortality of big game cover, though in small patches so little residual effect • Created small openings, edge habitat for birds but likely not large enough for big game • Created some snags/down wood habitat • Stimulated growth of shrubs, creating additional shrub habitat • Forage production was likely stimulated but short-lived and no longer occurring
	Firewood cutting throughout analysis area within 300 feet of open roads.	• Reduced number of snags available for wildlife (particularly cavity nesting birds and mammals) along roads, although snags generally are not lacking in most stands • Large snags protected by regulations • Driving off forest roads to gather firewood has displaced a small amount of soil in localized areas (same as dispersed recreation) • Gathering prohibited in riparian areas, so

Dates	Activity Description	Residual Effects
		no loss of shade/future instream wood
	Post and pole cutting — 200 acres	• Concentrated in lodgepole and some larch stands • Reduced tree competition has resulted in improved tree vigor and health • Increased fuels on the ground • Created openings in the forest canopy which stimulated growth of grasses and forbs in the understory, providing forage for wildlife and livestock • Increased vulnerability of animals by increasing visibility • Reduced some short-term woodpecker habitat, but moved stands toward long-term old growth • Some units continue to show quite a bit of soil exposure due to debris piling • Reduced riparian vegetation and potential large instream wood in places.
	Mushroom gathering throughout analysis area	• Foot access, so no ground impact • Not many growing sites due to lodgepole, lack of fire
1970-1990 pre-1975 1975	Commercial Harvest — 19,162 acres total (65% of the analysis area) Specific sales as follows: 867 acres - Unknown sale names 30 acres - Rock #2, Five Mile 2, Five Mile 3	• Shifted tree species composition from predominance of ponderosa pine to mixed conifer and lodgepole • Changed stand structure and size class, particularly late/old structure, many large trees (>21” dbh) were removed in harvested areas

Dates	Activity Description	Residual Effects
1978	24 acres - Five-Mile	• Largely reduced big game cover due to removal of overstory, area now very open • Increased transitory range for livestock and big game. • Reduced snag habitat and snag replacement trees • Increased vulnerability of wildlife to hunting and disturbance due to roads • Soil compaction from timber harvest and existing roads • Decreased stream shade due to riparian harvest→increased stream temperatures • Increased road densities→continued elevation of stream sediment • Harvest in riparian areas led to an overall reduction in potential large wood that could have otherwise fallen into creeks. • Loss of potential large instream wood led to the loss of potential pools in affected creeks. • Increased accessibility for recreation due to roads, landings used for dispersed camping
1979	582 acres - Deerhorn, Table, Five Mile 3, Sugar Salvage 05, and Wolf	
1980	85 acres - Deerhorn, Five Mile 2, and Five Mile	
1981	4,344 acres - Sugar Salvage 05, Ellis, Log, Log Salvage, Deerhorn, Gopher, Under Dog	
1982	3,203 acres - Smile Salvage, Round, Tribble, Terpentine	
1983	6,074 acres - Smile Salvage, Pilsner, Tribble, Heckle, Jeckle, Sturdevant, Von Drake, Round, Deadhorse, Dry 5, Sulpher III, Boo Boo, Under Dog, Yogi	
1984	1,984 acres - Deerhorn, Ellis, Tribble, Pilsner, Round, Sturdevant, Sugar Sal Sub23, Log, Louse IV, Tweety	
1985	433 acres - Artesian Salvage, Hamms, Stout, Matlock, Gopher	
1986	799 acres - Ellis, Matlock, Hamms, Lite, Stout, Waterhole II, Singer, W.B. Lodgepole	
1987	146 acres Hamms, Stout, Matlock, Fliver Salvage, Penn LP Rail	

Dates	Activity Description	Residual Effects
1988 1989 1990	117 acres - Matlock, CFW 708 SSTS, Reading LP Rail 403 acres - Biscuit, Odo SSTS, CPP #4 Reoffer SSTS, CFW Arrow SSTS, CFW687, CFW705 SSTS, CFW 756 SSTS, CFW859 SSTS, Silver A SSTS, Silver C SSTS, Silver D SSTS, Silver E SSTS, , Morsay SSTS Reoffer, Deep Creek, Tammy SSTS 71 acres - Owens, Odo SSTS, Willow Wood	
Silviculture Note: Reliable records for past silviculture projects do not exist prior to 1970.		
1970-Present	Reforestation — 3,811 acres	• Changed species composition to ponderosa pine and larch • Will replace wildlife cover in the long-term (stands that are already 20 years old are now providing hiding cover)
1970-Present	Non-commercial thinning — 2,474 acres	• Changed species composition to pine and larch • Changed stand structure • Enhanced tree growth, resiliency • Untreated debris remain a fire hazard for up to 10 years post-treatment • Decreased big game hiding cover • Briefly reduced shade in riparian areas, then encouraged remaining trees to grow larger providing more shade than the original stand

Dates	Activity Description	Residual Effects
		• Improved tree growth increased for potential large instream wood in the long-term, increasing the likelihood of pool formation
late 1980's - present	Aspen restoration (clones at Sugarbowl Cr, Morsay Cr, Thompson Cr) including : • Fence construction around 50 acres • Aspen planting of 15 acres • Conifer removal on 51 acres • Prescribed burn on 30 acres at Sugarbowl (1992) and 30 acres at Morsay (1994)	• Stimulated regeneration of a tree species that has been in decline • Changed tree species composition • Decreased fuel loads • Openings created by conifer removal relatively small, fenced aspen regenerated quickly to fill openings • No effect of fences on big game distribution or accessibility of habitat due to minor amount of habitat fenced • Increased use by grouse and other birds due to dense aspen growth • Conifer removal briefly reduced riparian shade, then encouraged remaining trees to grow larger providing more shade than the original stand • Increased vegetation increased streambank stability • Increased nutrients in streams
	Subsoiling — unknown, records unreliable	• Reduced soil compaction created by harvest • Reduced overall run-off/erosion because water soaks into soil
1984-present	Gopher/vole baiting — 1,203 acres (outside Evaluation Plantations)	• Increased seedling/sapling survival • Reduced prey for small predators/raptors

Dates	Activity Description	Residual Effects
		for the year treated
1985-present	Porcupine control — 1,004 acres	• Increased seedling/sapling survival
1993-present	Vexar tubing — 722 acres	• Increased seedling/sapling survival • Plastic tubes litter units where overlooked during collection
1998	Evaluation Plantations — 69 acres. Treatments have include: harvest, fencing, reforestation with genetic stock, herbicide application, hazard tree removal along fences, and gopher/vole baiting	• Provides opportunity to monitor genetic tree characteristics • Other effects similar to harvest, reforestation, gopher/vole baiting
1985-1992	Placement of instream structures in Five Mile and Taylor Creeks: • 48 log structures, • 29 rock weirs, • 51 deflectors, • 41 instream log placements, • 493 boulder placements	• Increased the number of pools per mile • Many structures now failing or no visible water flow, trapping fish in small pools that reach lethal temps. in summer • Dysfunctional structures causing streambank instability, increased sediment, reduced quality of fish habitat
1903	Saylor/Madison Water Diversion	• Several hundred acre feet of water diverted from headwaters of Fivemile Creek (John Day Basin) to Butter Creek in another watershed (Umatilla Basin) • Decreased peak flow, base flow, and total water yield in Fivemile Creek • Decreased flows also decreased pool

Dates	Activity Description	Residual Effects
		depth, reducing the quality of fish habitat • Reduced ability of stream to transport sediment, so sediment concentrates in the floodplain, keeping width to depth ratios high and contributing to reduced quality of fish habitat • Fivemile Creek supports fewer fish and spawning has been degraded
Noxious Weeds Note: All sites along roads and rock pits in Western Route. Approximately 7 sites eradicated since 1993.		

1992	1 site of diffuse knapweed (5 gross acres), treated both manually and with herbicides. No plants when inventoried in 2003	• Knapweed doesn't carry fire well, so prescribed burning less effective • Reduced native vegetation that provide forage for ungulates • Reduced number of animals supported by habitat • No herbicide use within 100 feet of the streambank, so no effects on water • Some weeds poisonous to livestock
1993	3 sites of diffused and spotted knapweeds (265 gross acres), treated both manually and with herbicides. 82 plants when inventoried in 2003.	
1994	One site of diffuse knapweed and whitetop (0.5 acres), treated both manually and with herbicides. No plants when inventoried in 2003	
1996	2 sites of spotted knapweed (9.4 gross acres), treated both manually and with herbicides. 12 plants when inventoried in 2003	
1997	1 site of diffuse knapweed (11 gross acres), not treated. 3 plants when inventoried in 2003	
1997	1 site of diffuse knapweed (98 gross acres), not treated. 2 plants when inventoried in 2003	
1998	1 site of hounds tongue (40 gross acres), not treated. 350 plants when inventoried in 2003	
1998	2 sites of St. Johnswort (27 gross acres), treated biologically. Not inventoried in 2003	
1998	1 site of diffuse knapweed (38 gross acres), not treated. 12 plants when inventoried in 2003	

2002	1 site of diffuse knapweed (2 gross acres), not treated. 1 plant when inventoried in 2003	
Range		
Late 1800's-1920's 1920's-1940's	Grazing: Occurred season-long and unregulated on 3 allotments—Silver Creek and Matlock sheep allotments (2,500 sheep total or 1.3 ac/AUM) and the FG Whitney Cattle Allotment (1,797 cattle or 2.2 ac/AUM) Boundary fences constructed, stock driveways established, allotments identified and regulated, stocking rates began to decline from 2,400 to 2,175 to sheep and from 1,049 to 500 cattle. Acres per AUM increased to 3.4 for sheep and 10.9 for cattle. Between 1943 and 1949, the FG Whitney Cattle Allotment almost doubled in size, increasing acres per AUM to 18.9.	• Browse and trampling of planted trees stunted tree growth and deformed trees (aspen and other species) • Reduced riparian vegetation decreased stream shade, which increased stream temperatures • Reduced riparian vegetation and hoof action destabilized streambanks where not fenced, increasing sediment in streams • Sediment from unstable banks filled in pools, reducing the amount and quality of fish habitat • Sediment also caused higher stream width to depth ratios, creating a larger surface exposed to solar radiation leading to warmer stream temperatures. • Decreased fine herbaceous fuel loading, reduced spread of fire

1950's-1960's	Pasture division fences constructed & rotational grazing strategies implemented. FG Whitney Allotment increased in size, supporting 545-707 cattle (18.9-22.1 ac/AUM). In 1949, Silver Creek and Matlock sheep allotments combined into Matlock Cattle Allotment. New allotment was rested from 1950-1956. When cattle returned, numbers ranged 70-290 (37.9-19.9 ac/AUM)	
1970's-1980's	Riparian pastures constructed. 606-751 cattle (25.2-20.4 ac/AUM) on FG Whitney Allotment and 310-325 (18.9-17.1 ac/AUM) on Matlock Allotment. In 1980's, FG Whitney Allotment reduced to current size. Private land included by permit into Matlock Allotment, doubling its size.	
1990's	Fences constructed to exclude livestock from fish-bearing streams. 501-563 (29.2-22.3 ac/AUM) cattle in FG Whitney Allotment and 315 (17.7 to 27.4 ac/AUM) in Matlock Allotment. Though numbers remained the same, acres/AUM changed due to varied seasons of use and allotment size. Private land fenced out of Matlock Allotment, reducing allotment by half.	
2000-2003	Implementation of the NFJD River summer steelhead Biological Opinion in 2003 deferred grazing from spawning habitat until after July 15th. Cattle numbers in FG Whitney Allotment remained at 501 (29.2 ac/AUM). Matlock Allotment stayed at 315 (22.7 to 25 ac/AUM).	

prior to 1990	Water source construction – F.G. Whitney Allotment 112 ponds 6 spring developments Matlock Allotment 32 ponds	• Provided habitat for wildlife • Diverted cattle from streams, reducing impacts on riparian vegetation and streambanks • Provided fishing opportunities
	Riparian Corridor Fence Construction – F.G. Whitney Allotment (hard fence) 3.2 miles of Sugarbowl Creek 3.3 miles of Five Mile Creek 3.9 miles of Taylor Creek Matlock Allotment (hard fence) 1.5 miles of Five Mile Creek 3 miles of electric fence along portions of Morsay, Taylor, and Tribble creeks	• Allowed riparian vegetation to recover in portions of Fivemile, Taylor, Sugarbowl, Morsay, and Tribble creeks, providing more shade to the streams. • Allowed stream bank stability to recover, reducing sediment and associated width-to-depth ratios • Concentrated cattle use on parts of the stream that are not fenced.
	Claims: 3 that are closed, never developed	
	Gravel Pits	• Created water for livestock, wildlife, fishing • Diverted livestock use of streams, reducing sediment and loss of riparian vegetation • Created soil disturbance that led to noxious weed invasion

Dates	Activity Description	Residual Effects
Transportation		
	Road construction/maintenance	• Decreased fire suppression response time • Improved human access to wildlife, increasing disturbance and hunting vulnerability of animals • Created openings, edge habitat for wildlife • Reduced area of soil/forest productivity • Increased drainage network due to stream crossings • Increased drainage area allowed sediment to be transported directly to streams from roads (no filtering) • Where construction occurred along or crossing creeks, all riparian vegetation was removed along the roadbed, in some cases leaving long stretches of creek without shade. • Loss of trees along creeks reduced potential large wood, indirectly decreasing pool formation and quality of fish habitat. • Increased fish passage barriers (culverts) • Soil disturbance and vehicle use spread noxious weeds • Increased recreational use • Created maintenance costs

Dates	Activity Description	Residual Effects
	Road decommissioning/obliteration	• Increased sediment until revegatated • Decreased soil compaction • Returned land to soil/forest productivity • Increased riparian vegetation/stream shade which reduced stream temps. • Returned vegetation traps sediment • Decreased overall road maintenance cost • Increased use and associated maintenance of other roads • Poorly closed/decommissioned roads→ increased road use violations, damage
early 1980's	Development of Divide Wells Campground - Approximately 3 acres including 3 group sites, 8 single camp sites (picnic table, Iron fire ring), and 2 single vault toilets	• Reduced vegetation/increased soil disturbance/compaction locally, but not near water • Decreased snag and down wood habitat • Increased recreation use
	Snowmobile trails — 29 groomed miles	• Increased disturbance of wildlife; no effect on lynx or big game due to location • Increased recreational use • Increased economic benefits locally
1990's	Cross-country ski trails — 18 miles	• Discontinued, no longer any effects
1998	Aspen Interpretive site — approximately 2 acres	• See aspen under Silviculture
	Designation of Blue Mountain National and State Scenic Byway — 8 miles within analysis area	• Increased recreational use • Increasedeconomic benefits locally

NATURAL DISTURBANCE PROCESSES

1970-2002	Wild Fires (85 small fires under a ten acres each), no large fires in last 30 years	• Fuel loads above normal due to suppression of fire cycle. • Created some snags/down wood and instream wood, burned others • Burned some riparian vegetation, leaving small portions of stream without shade. • Created small openings that serve as forage for big game and wildlife • Some soil exposure, recovered in a year • Fires of this size likely show no residual effects now beyond some black snags.
	Tree Dseases: Increase in annosus and other root rots	• Increase in snags and down wood • Increase in instream wood • Increase in fuels
	Forest Insects: Spruce Budworm epidemic in late 1980's/early 1990's	• Insect epidemic more intense due to changed tree species composition • Increase in snags and down wood • Loss of Late/Old structure and big game satisfactory cover • Increase in instream wood • Increase in fuels
	Landslides: slides in lower 2 miles of Fivemile Creek due to geology.	• Sediment deposited in creek • Increase in suspended sediments can stress juvenile and adult fish
Mid-90s	Major flood	• Took out private road along lower Five Mile Creek and contributed to loss of fish ladder that provided access for steelhead. No other major effects noted.

PRESENT ACTIVITIES

Activity Description	Effects
Wildlife	
Goshawk surveys:	• No ground disturbance-surveys would be done on foot or from vehicles on system roads. No effect on wildlife.
Fire Suppression	• Fuel loads above normal due to suppression of fire cycle. • Some soil exposure, but recovered in a year • Change in tree species to more fire-intolerant Douglas-fir and grand fir. • Change in stand structures to multi-canopied, dense forest
Prescribed fire: Wild West	• Same as discussed under past activities
Mechanical Fuel Treatment:	• Reduce risk of large natural fires • Encourage increased growth in remaining trees • Change tree species composition and structure from removal of ladder fuels • In riparian areas, increased tree growth would increase stream shade and the potential for future large instream wood, leading to an increase in pool formation and improved quality of fish habitat • Increase soil compaction, though within Forest Plan standards • Decrease down wood habitat for wildlife • Removal of down wood could also improve animal mobility and change big game travel corridors • Increase livestock forage and distribution

Activity Description	Effects
Timber	
Firewood cutting: throughout the Western Route area within 300 feet of open roads.	• Same as discussed under past activities
Post and pole cutting: 65 acres	• Same as discussed under past activities
Commercial Harvest: None	• No maintenance of roads resulting in more potential for erosion, sedimentation, road/stream crossing failures • Increased potential for vehicle accidents due to reduced road maintenance
Reforestation: None	• None
Non-commercial thinning: None	• None
Gopher/vole baiting: None outside Evaluation Plantations	• None
Porcupine control: None	• None
Vexar tubing: None	• None
Subsoiling: None	• None
Maintenance of Evaluation Plantations — 69 acres. Treatments to include: herbicide application and gopher/vole baiting, and insect control (pheromone strips or spray)	• Same as discussed under past activities

Activity Description	Effects
Aspen restoration: Maintenance of 13 fences In 2004 and 2005, fence and plant 10 acres annually, thin conifers on 30 acres annually, and burn slash on 10 acres in 2004 and 30 acres in 2005	• Same as discussed under past activities
Instream structures: None	
Noxious Weeds	
Sites will continue to be inventoried and/or treated as described in the Past Activities table, unless the noxious weed site is eradicated or new direction for weed treatment is approved.	• Noxious weed populations that are approved for treatment will continue to decline and be eradicated. • Noxious weed populations not approved for treatment will continue to be inventoried and would be expected to increase in density and size due to no treatments.
Grazing: <u>F.G. Whitney Allotment:</u> Stocking Rate will be 501 cow/calf pairs and season of use will be June 16th through September 30. <u>Matlock Allotment</u>: Stocking Rate will be 315 cow/calf pairs during portions of the 6/11 through 9/30 grazing season.	• Grazed pastures and riparian areas that remain unfenced, there is no difference from discussion under past activities. Class 4 stream channels would still be affected by grazing, but since these do not run water in the hottest time of the year little impact to stream temperatures should be seen. • In riparian areas that are fenced, vegetation and streams continue to recover as described under “Past Activities-Riparian Corridor Fencing”
Water source maintenance:	• Same as discussed under past activities

Activity Description	Effects
Riparian Corridor Fence Maintenance: F.G. Whitney Allotment (hard fence) 3.2 miles of Sugarbowl Creek 3.3 miles of Five Mile Creek 3.9 miles of Taylor Creek Matlock Allotment (hard fence) 1.5 miles of Five Mile Creek Electric fence along 3 miles of Morsay, Taylor, and Tribble creeks	• Same as discussed under past activities
No filed claims	
Transportation	
Road maintenance	• Same as discussed under past activities
Maintenance of Divide Wells Campground —	• Same as discussed under past activities
Dispersed campsites — 116 mapped (meat pole, rock fire ring)	• Reduced vegetation and snags in local area around campsite • Slight increase in soil compaction from vehicles and foot traffic • Sites along streams reduce shade, potential large instream wood • Excess nutrient input in streams • Increased potential for noxious weed spread • Potential for uncontrolled fire starts
Snowmobile trails — 29 groomed miles	• Same as discussed under past activities
Maintenance of Aspen Interpretive site	• Same as discussed under past activities
Blue Mountain National and State Scenic Byway — 8 miles	• Same as discussed under past activities

FUTURE ACTIVITIES

Dates	Activity Description	Predicted Effects
Wildlife		
	Goshawk surveys	• No ground disturbance-surveys would be done on foot or from vehicles on system roads. No effect on wildlife.
	Prescribed fire: Wild West Pile burning of 20 acres in administrative use post and pole area	• Fire could burn into riparian areas, removing some riparian vegetation that currently provides shade, but fire temperatures will be cool so shade should quickly recover.
	Mechanical Fuel Treatment	• Effects similalr to non-commercial thinning discussed under Past Activities.
	Personal use firewood cutting: throughout the Western Route area within 300 feet of open roads.	• Same as discussed under past activities
	Post and pole cutting: 678 acres at 60 ac./year	• Same as discussed under past activities
	Commercial Harvest: None planned	• None
	Reforestation: None	• None
	Non-commercial thinning: None	• None
	Gopher/vole baiting: (outside Evaluation Plantations)	• Same as discussed under past activities

Dates	Activity Description	Predicted Effects
	Porcupine control: None	• None
	Vexar tubing: None	• None
	Subsoiling: None	• None
	Maintenance of Evaluation Plantations: 69 acres. Treatments to include: herbicide application and gopher/vole baiting, and insect control (pheromone strips or spray)	• Same as discussed under past activities
2006	**Aspen restoration:** Maintenance of existing fence New fencing of 10 acres, conifer thinning on 25 acres, and slash burning on 30 acres.	• Same as discussed under past activities
	Instream structures: None	• None
	Sites will continue to be inventoried and/or treated as described in the Past Activities table, unless the noxious weed site is eradicated or new direction for weed treatment is approved.	• Noxious weed populations that are approved for treatment will continue to decline and be eradicated. • Noxious weed populations not approved for treatment will continue to be inventoried and would be expected to increase in density and size due to no treatments.
	Grazing: No anticipated changes to the present livestock grazing activities.	• Same as discussed under past activities
	Water source maintenance:	• Same as discussed under past activities

Dates	Activity Description	Predicted Effects
	Riparian Corridor Fence: About 0.5 miles of Sugarbowl Creek	• Riparian fencing of the remaining flowing stretch of Sugarbowl Creek would increase effects of fencing discussed under past activities
Mining		
	No claims anticipated	• None
Transportation		
	Road Maintenance	• Same as discussed under past activities
	Road Decommissioning/Obliteration (from Roads Analysis in project file) – 49 miles	• Short-term effects same as discussed for construction under past activities, but effects reverse in 1-2 years • Where soil is disturbed, sediment transport to creeks could increase due to the loosened soil • When treated roads are revegetated, sediment should be filtered by plants before it reaches streams, increasing quality of fish habitat • Decrease maintenance costs • 17 miles proposed for treatment are near or cross streams— decommissioning would help restore riparian vegetation, increase stream shade, decrease stream temperatures • Begin to reverse the affects of lost potential large instream wood, increasing pool formation and fish habitat quality in the long term.

Dates	Activity Description	Predicted Effects
Recreation		
	Replacement of Vault Toilet at Divide Wells Campground and Ellis G.S.	• Local soil disturbance • Increase user accessibility • Reduce possibility for water contamination at Turpentine Creek
	Inclusion of Ellis Guard Station in Cabin Rental Program	• Increased recreation use, • Increased economics for local communities • Increase maintenance funds • Increased wildlife disturbance
	Maintenance of Divide Wells Campground - 3 acres, including 3 group sites, 8 single camp sites (picnic table, Iron fire ring), and 1 single vault toilet	• Same as discussed under past activities
	Continued use of Dispersed campsites - 116 mapped (meat pole, rock fire ring)	• Same as discussed under past activities
	Maintenance of Aspen Interpretive site - 2 acres	• Same as discussed under past activities
	Continued use of Blue Mountain National and State Scenic Byway	• Same as discussed under past activities
	Continued use of snowmobile trails - 29 groomed miles	• Same as discussed under past activities

APPENDIX B – BEST MANAGEMENT PRACTICES

Best Management Practices are the primary mechanisms used to enable the achievements of water quality standards (Environmental Protection Agency 1987). The Environmental Protection Agency has certified the Oregon Forest Practices Act and Washington Forest Practices Rules and Regulations as best management practices. The States of Oregon and Washington compared Forest Service practices with these State practices and concluded that Forest Service practices meet or exceed State Requirements.

Every year since 1996, the Umatilla National Forest has monitored a selection of projects for implementation and effectiveness of best management practices. The results of this monitoring have been published in annual Umatilla National Forest's Forest Plan Monitoring and Evaluation Reports, which were combined with the Wallowa Whitman and Malheur National Forests' reports in 1998 into Monitoring and Evaluation Reports for the National Forests of the Blue Mountains. A substantial record of results exists. Some of these results are summarized in a poster which has been published on the internet. The poster is available on the Umatilla NF's web site (http://www.fs.fed.us/r6/uma/water/), scroll down to Best Management Practices Monitoring Poster. The poster reports monitoring of timber sale riparian area boundaries, skid trail rehabilitation, and road decommissioning. Specific findings include:

- Implementation of Riparian Habitat Conservation Area buffers on harvest units generally met objectives, need improved documentation of stream category during layout,
- Use of harvester-forwarder systems results in more slash on skid trails, less ground disturbance, and reduces need for structural erosion control (waterbars),
- Road decommissioning activities were properly implemented and effective; some sites need revegetating,
- Documenting best management practices effectiveness still poses challenges, requires longer time frame for monitoring, and integration with instream water quality monitoring programs

The following Best Management Practices apply to the Bologna Basin Salvage Project.

TIMBER MANAGEMENT

T-1. Timber Sale Planning Process

- Description - Introduce hydrologic considerations into timber sale planning process.
- Location - Harvest units and haul routes.
- Effects - Avoidance of potential damage during and following the sale layout and subsequent logging operation.
- Application - Detrimental impacts to soil, riparian areas, and downstream water sources are reduced.

T-2. Timber Harvest Design

- Description - Design timber harvest to secure favorable conditions of water flow, water quality and fish habitat.
- Location - All harvest units.
- Effects - Where adverse impacts on the water resource can result, the harvest unit design is modified, and/or watershed treatment measures are applied to accelerate the natural recovery rate.
- Application - Detrimental impacts to soil, riparian areas, and downstream water sources are reduced through location of units and mitigation measures 1, 3 through 11.

T-3. Use of Erosion Potential Assessment for Timber Harvest Unit Design

- Description - Identify areas with high erosion potential and adjust harvest unit design as necessary.
- Location - All harvest units.
- Effects - Modify or eliminate harvest activities on areas with high erosion potential.
- Application - Unit location modified to avoid areas of high concern, mitigation measures 3, 4, 10, and 11, reduce effects of erosion associated with harvest.

T-4. Use of Sale Area Map for Designating Water Quality Protection Needs

- Description - Delineate the location of protection areas and available water sources for both the Purchaser and the Sale administrator to ensure their recognition and proper consideration and protection on the ground.
- Location - Entire sale area.
- Effects - Detrimental impacts to protected areas are reduced.
- Application - Protected areas are identified on the Sale Area Map.

T-5. Limiting the Operating Season

- Description - Ensure that the purchaser conducts operations in a timely manner, within the period specified in the timber sale contract.
- Location - All harvest units and haul routes.
- Effects - Detrimental impacts to soils, water, and other resources are reduced.
- Application - Mitigation measure 10 was identified to limit operation periods in order to protect soils.

T-7. Streamside Management Unit Design

- Description - Harvest is designed to ensure protection of streambanks and streamside vegetation.
- Location - All harvest units.
- Effects - Minimize potential adverse effects of logging and related land disturbance activities on water quality and beneficial uses.
- Application - Units were identified in uplands, and mitigation measures 1, 5, 8, 9, and 11 would avoid activities within Riparian Habitat Conservation Areas.

T-8. Streamside Protection (Implementation and Enforcement)

- Description - (1) Protect the natural flow of streams, (2) Provide unobstructed passage of streamflows and (3) Prevent sediment and other pollutants from entering streams.
- Location - All harvest units.
- Effects - Potential adverse effects to streams from harvest activities would be minimized to maintain water quality.
- Application - Mitigation measures 1, 5, 8, 9, and 11 would be monitored by the District Aquatics Specialist, and/or Timber Sale Administrator.

T9. Determining Tractor Loggable Ground

- Description - Tractor logging is restricted to lands that can be harvested with a minimum of soil compaction and erosion. Factors considered when selecting tractor operable land are: slope, topography, soil texture, soil drainage, and drainage patterns.
- Location - Land suitable for tractor logging is identified in the pre-sale (planning) phase of the timber sale planning process. Provisions in the Timber Sale Contract (TSC) specify the areas and conditions upon which tractors can operate. Requirements governing tractor operations are incorporated in the Timber Sale Contract (TSC).

- Effects - Detrimental impacts (compaction, displacement, erosion) to soils and potential impacts to downstream water quality are reduced by determining the most effective logging operational method.
- Application – Alternative 2 specifies the units located on land harvestable by tractor, and mitigation measures 3 and 4 further restrict harvest options to protect soil and water quality.

T-10. Logging Landing Location

- Description - Locate landings to minimize creation of hazardous watershed conditions.
- Location - All harvest units.
- Effects - Detrimental impacts (compaction, displacement, erosion) to soils and potential impacts to downstream water quality are reduced.
- Application - As per mitigation measure 4, the Timber Sale Administrator approves landings, using existing landings where possible. Landings will not be located inside PACFISH Riparian Habitat Conservation Areas, cultural sites, or in-place emergency rehabilitation structures.

T-11. Tractor Skid Trail Location and Design.

- Description - Locate and approve skid trails in advance of skidding to minimize soil compaction, erosion, and water runoff .
- Location - All harvest units.
- Effects - Careful control of skidding patterns can minimize on-site compaction and off-site soil movement.
- Application - Mitigation measures 4 and 10 would reduce soil disturbance and compaction due to skid trails. As per mitigation measure 4, the Timber Sale Administrator approves skid trails, using existing trails where possible. Skid trails will not be located inside PACFISH Riparian Habitat Conservation Areas, cultural sites, or in-place emergency rehabilitation structures.

T-12. Suspended log Yarding in Timber Harvesting

- Description - Yarding is designed to protect soils from excessive disturbance and maintain the integrity of sensitive watershed areas.
- Location - Units 1, 2, 3, 4, 7, 8, 11, 12, 13, 20, 32, and 33 in Alternative 2 and all units in Alternative 3.
- Effects - Detrimental impacts to soils and water quality are reduced.
- Application - Mitigation measure 3 requires full log suspension in designated units.

T-13. Erosion Prevention and Control measures During Harvest Operation

- Description - Ensure that the purchaser's operations shall be conducted to minimize soil erosion.
- Location - All harvest units.
- Effects - Prevent/control erosion and sediment movement.
- Application - The Timber Sale Contract sets forth Purchaser's responsibilities, including mitigation measures 3, 4, 5, 7, 8, 9, 10, and 11 and the Timber Sale Administrator monitors operations for compliance.

T-14. Revegetation of Areas Disturbed by Harvest Activities

- Description - Where soil has been severely disturbed by the Purchaser's operation, and the establishment of vegetation/cover is needed to minimize erosion and protect water quality, the Purchaser shall take appropriate measures normally used to establish an adequate cover of grass or other vegetation (i.e. seeding) as necessary, or take other agreed upon stabilization measures.
- Location - All harvest units.
- Effects - Vegetative cover will be established on disturbed sites to prevent erosion and sedimentation.
- Application - Mitigation measure 12 details when and how revegetation will occur.

T-15. Log Landing Erosion Prevention and Control

- Description - Landings will be monitored for erosion and compaction, and treated where necessary.
- Location - All harvest units.
- Effects - Soil erosion and compaction are reduced.
- Application - Mitigation measure 11 would require water bars, subsoiling, and seeding as necessary, to be monitored by the Timber Sale Administrator or Aquatics Specialist.

T-16. Erosion Control on Skid Trails

- Description - Design skid trails to protect water quality by minimizing erosion and sedimentation.
- Location - All skid trails.
- Effects - Water quality is protected by minimizing erosion and sedimentation derived from skit trails.

- Application - Mitigation measure 4 would require review and approval of skid trail locations and mitigation measure 11 would require rehabilitation of skid trails after harvest.

T-18. Erosion Control Structure Maintenance

- Description - Ensure that constructed erosion control structures are stabilized and working.
- Location - All harvest units.
- Effects - Long-term soil productivity is maintained and impacts to downstream water quality are reduced.
- Application - Mitigation measures 11 and 15 would require that erosion control structures on haul routes be maintained.

T-19. Acceptance of Timber Sale Erosion Control Measures Before Sale Closure

- Description - Ensure purchaser completes adequate erosion control work on timber sales.
- Location - All harvest units.
- Effects - Detrimental impacts to water quality are eliminated by reducing erosion and sediment movement to downstream water sources.
- Application - Timber Sale Administrator would perform inspections before the sale is closed to check for effectiveness of erosion control work (including mitigation measures 4 and 11) completed by the purchaser.

T-20. Reforestation

- Description – Reforest all suitable land harvested within five years after the regeneration cut and to promptly reforest all other suitable areas not harvested but in need of reforestation.
- Location – Units 13, 16, 19, 20, 22, 23, and 33.
- Effects – Detrimental impacts to water quality are mitigated by stabilizing soils, increasing ground cover, and improving infiltration.
- Application – During the timber sale planning process, the interdisciplinary team assesses the capability of proposed areas to achieve reforestation within the prescribed period.

T-21. Servicing and Refueling of Equipment

- Description - Prevent pollutants from being discharged into or near rivers, streams, and impoundments or into natural or man-made channels leading to such areas.
- Location - All harvest units.

- Effects - Detrimental impacts to water quality will be reduced by restricting fueling locations to certain areas.
- Application - Servicing of all equipment would be done only in areas approved by the Forest Service so that any spills would not reach a stream course or wet area. The District has a Hazardous Spill Plan in place. The timber sale contract will prohibit the spillage of hazardous substances, will require the purchaser to have a hazardous material plan. The timber sale contract will require the purchaser to have a fuel spill prevention plan if on-site quantities are greater than 660 gallons in one container or a total of more than 1320 gallons.

T-22. Modification of Timber Sale Contract

- Description - Modify the Timber Sale Contract if new circumstances or conditions arise that indicate that the timber sale will irreversibly damage soil, water, or watershed values.
- Location - All harvest units.
- Effects - Watershed values are placed ahead of timber harvest.
- Application - The Chief of the Forest Service could modify the Timber Sale Contract if watershed values are unacceptably compromised.

ROAD SYSTEM

R-4. (Temporary) Road Slope Stabilization (Planning)

- Description – Road stabilization considerations begin in the reconnaissance and location of temporary roads. Stabilization measures will be planned for completion on all disturbed ground prior to the winter season, when erosion is most severe.
- Location – Construction of temporary roads to units 16, 21, 24, 26, and the northern portion of Unit 33.
- Effects – Reduce sedimentation by minimizing erosion from road slopes and minimizing the chances for slope failure along roads.
- Application – Mitigation measure 15 would minimize the sedimentation from the temporary roads.

R-7. Control of Road Surface Drainage

- Description - Minimize possible detrimental effects of surface drainage of road.
- Location – All haul routes.
- Effects - Reduce sedimentation associated with roads.
- Application - Mitigation measures 10 and 15 would minimize the erosive effects of water concentrated by road drainage features and disperse runoff

from the road using water spreading ditches, drivable dips, and road surface grading.

R-18. Maintenance of Roads

- Description - Provide for water quality protection by maintaining roads through the control of waste material placement, keeping drainage facilities open, and by repairing ruts and failures.
- Location - All Level 1 and above roads.
- Effects - Detrimental impacts to water quality from road maintenance activities are reduced.
- Application - Mitigation measure 15 would maintain proper drainage of affected roads.

R-19. Road Surface Treatments to Prevent Loss of Material

- Description - Minimize the erosion of road surface materials and consequently reduce the likelihood of sediment production from those areas.
- Location - All Level 1 and above roads.
- Effects - Detrimental impacts to the road prism from erosion and adjacent water sources are prevented.
- Application - Standard road surface treatments required in the Timber Sale Contract would control dust during dry periods.

R-20. Traffic Control During Wet Periods

- Description - Reduce road surface damage and rutting of roads to lessen sediment washing from road surfaces.
- Location - All haul routes.
- Effects - Detrimental impacts to forest road surfaces and forest road users are reduced.
- Application - Mitigation measures 10 and 15 would protect roads during wet conditions.

R-23. Obliteration of Landings

- Description - Repair soil damage or disturbance and revegetate landings.
- Location - All landings used by the timber sale purchaser.
- Effects - Downstream water sources are not affected, big game species are not harassed, and soil productivity is maintained.

- Application - Mitigation measure 11 would obliterate landings upon completion of sale activities through subsoiling, waterbarring, and/or seeding (subsoiling must alleviate compaction without churning the soil).

FIRE SUPPRESSION AND FUELS MANAGEMENT

F-1. Fire and Fuel Management Activities

- Description - Reduce the public and private losses that could result from wildfire and/or subsequent flooding and erosion by reducing the frequency, intensity, and destructiveness of wildfire.
- Location - All treatment units.
- Effects - Increase of fire-tolerant species in the stands, and create a break in fuels to facilitate prescribed natural fire, fire suppression activities, and fuels reduction, and reduce erosion and sediment related to severe wildfire.
- Application - Alternatives 2 and 3 contain design elements that would reduce activity-related and natural fuels and mitigation measure 20 would reduce fire intensity in thinning debris.

F-2. Consideration of Water Quality in Formulating Prescribed Fire Prescriptions

- Description - Maintain water quality by limiting the amount of soil exposed by prescribed burning.
- Location - All treatment units.
- Effects - Limited soil erosion and reduced water quality impacts.
- Application - Mitigation measures 20 would ensure that fire prescriptions use factors such as fire weather, slope, aspect, soil moisture, and fuel moisture to maintain prescribed flame lengths and maintain desired soil and vegetative cover. Mitigation measure 21 would limit effects on soils due to fire control lines.

F-3. Protection of Water Quality During Prescribed Burning Operations

- Description - Maintain soil productivity, minimize erosion, and prevent ash, sediment, nutrients, and debris from entering water bodies.
- Location - All treatment units.
- Effects - Water quality will be maintained; downstream users of water will not be affected.
- Application - Weather and fuel conditions will be checked during prescribed burning to ensure that soil and water protection parameters set by the burn prescription (including mitigation measure 20) are met; otherwise burn techniques will be adjusted accordingly.

WATERSHED MANAGEMENT

W-3. Protection of Wetlands

- Description - Avoid adverse water quality impacts associated with destruction or modification of wetlands by excluding activities within wetlands.
- Location - All harvest units.
- Effects - Wetlands are protected from degradation.
- Application - Mitigation measure 1 will exclude ground-disturbing activities within wetlands; the fire prescription will address maintaining vegetative cover in wetlands during prescribed burning.

W-4. Hazardous Substance Spill Contingency Plan and Spill Prevention Control & Countermeasure Plan

- Description - Prevent contamination of Umatilla National Forest from accidental spills.
- Location - entire sale area; spill plan is located at the Umatilla N.F. Supervisor's Office.
- Effects - Oil products are prevented from entering the navigable waters of the United States.
- Application - Standard language in the sale contract addresses fueling and maintenance of equipment.

W-5. Cumulative Watershed Effects

- Description - Protect the beneficial uses of water from the cumulative effects of past, present, and future management activities that could result in degraded water quality or stream habitat.
- Location - Entire project area.
- Effects - Activities that could result in cumulative damage to water quality are altered or eliminated as appropriate.
- Application - A cumulative watershed effects analysis was conducted for the Bologna Basin Salvage analysis area and beneficial uses that comply with applicable State requirements for protection of waters have been identified in the Environmental Assessment.

W-7. Water Quality Monitoring

- Description - Determine the effects of the proposed action on the beneficial uses of water, monitor baseline watershed conditions for comparison with State Water Quality and Forest Plan standards and estimate long-term

trends, ensure the health and safety of water users, and evaluate BMP effectiveness.

- Location - Entire project area.
- Effects - Monitoring would ensure that mitigation to protect water quality is effective, and, if not, would recommend changes for future activities.
- Application - Monitoring item 1 on page 47 applies to this BMP.

W-8. Management by Closure to use (Seasonal, Temporary, and Permanent)

- Description - Exclude activities that could result in damage to either resources or improvements, such as roads and trails, resulting in impaired water quality.
- Location - All harvest units.
- Effects - Maintain downslope water quality, sustain the current condition of the watershed, and exclude activities that may result in additional resource damage and impair healthy water systems.
- Application - Mitigation measures 10 and 23 would limit management activities to protect soil and wildlife during sensitive periods.