

## Chapter 2 - Alternatives, Including the Proposed Action

### 2.1 Changes Between the Draft Supplemental Environmental Impact Statement and the Final Supplemental Environmental Impact Statement

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Edits, format changes, along with the inclusion of supplementary figures and maps were completed throughout this Chapter to improve the level of documentation of information previously presented. Edits and further clarification were accomplished based on agency and public review and comments to the November 2007, Watdog Draft Supplemental EIS. Most notable include the deletion of Indicators and Associated Measures (2.1.1 Watdog DSEIS) to reduce repetition of information presented in the latter section in Chapter 2, Comparison of Alternatives, again further discussed in detail in Chapter 3, Affected Environment and Environmental Consequences. Section 2.4 Design Features and Practices Common to All Action Alternatives Considered in Detail was incorporated to enhance clarity of information, discussed previously under Preferred Alternative B in the DSEIS. Supplemental tables, maps and figures were included in the detailed descriptions for Alternatives B, C and D to augment information previously presented.

### 2.2 Introduction

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This chapter presents a full and impartial description of all alternatives considered, so as not to foreclose prematurely any reasonable options to “avoid or minimize adverse impacts or enhance the quality of the human environment” [excerpt 40 CFR 1502.1(2)]. Four action alternatives were developed in response to the Purpose and Need and Relevant Issues, including Alternative B (the Preferred Alternative), Alternative C, Alternative D and an Alternative Considered but Eliminated from Detailed Study.

Federal agencies are required by the National Environmental Policy Act (NEPA) to rigorously explore and objectively evaluate reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 Code of Federal Regulations [CFR] 1502.14).

The following sections contain a comprehensive description of the four alternatives considered in detail, beginning with the No-action Alternative. Immediately following this section is a comprehensive description of design features and practices *common* to Alternatives B, C and D, including monitoring and mitigation measures. The subsequent section describes *unique* design features and practices specific to Alternatives B, C and D. The next section discloses the alternative considered, but eliminated from detailed study, along with the rationale for the determination. The final section includes an introduction to the comparison of the alternatives considered in detail primarily in table format, organized to concisely display how the Alternatives Considered in Detail uniquely fulfill the Purpose while responding to the Need, as stated in Chapter 1.4 (Purpose and Need Section). Tables 2-10 through 2-12 portray comparative information linked to Relevant Issue Categories established in Chapter 1, (Section 1.9 Summary of Issues), displayed by distinct indicators to disclose potential effects associated with the No-action Alternative, and Alternatives B, C and D.

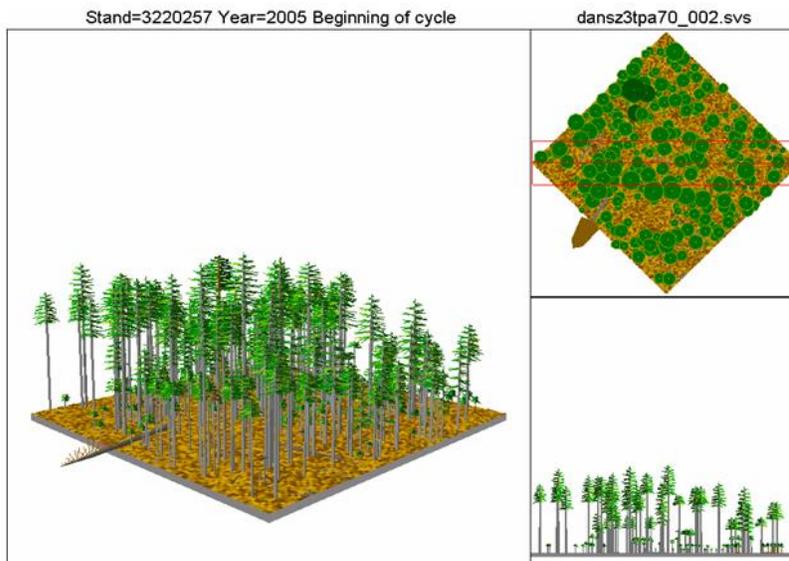
## 2.3 Alternatives Considered in Detail

The IDT analyzed the No-action Alternative (Alternative A), the Proposed Action (Preferred Alternative B) and two additional action alternatives (Alternatives C and D). The No-action Alternative is included in response to National Environmental Policy Act direction, which involves an assessment and disclosure of the environmental consequences associated with deferring land management action at this time.

### 2.3.1 Alternative A (No-action)

Under Alternative A, the application of fuels treatments, DFPZ construction, group selection harvests, transportation system improvements, forest health and watershed restoration would NOT be implemented to accomplish the purpose and need. For this reason, Alternative A would not meet the current land

Alternative A. – No Action (58% Canopy Cover)



management direction, as the desired condition set forth in the HFQLG Act consisting of an uneven-aged (all-aged), multistory, fire-resilient forests. The No Action Alternative would not maintain and/or enhance ecological health or resiliency to wildfire and other naturally-occurring disturbances.

Under this alternative, forest conditions would continue to adapt to ecosystem processes (i.e., climate, disturbances from insects and disease, etc.), and human disturbance factors over time.

**Figure 2-1.** Alternative A (No Action) - With 58 Percent Canopy Cover.

Present vegetative conditions, which developed partially in response to fire exclusion practices, would continue to promote a multistoried stand with moderate to high tree crown densities [currently canopy closure ranges from 49 to 80 percent in California wildlife habitat relationships (CWHR) Size Class 4 and 5 stands]<sup>1</sup>. Species composition in the forest understory layer would continue to stimulate white fir and cedar regeneration and growth, shade-tolerant species vulnerable to scorching and heat produced by wildfire. Tree growth and regeneration would continue to increase the probability of canopy-to-canopy wildfire, due to the abundance and continuity of ladder fuels.

Present vegetative conditions, which developed

<sup>1</sup> **California Wildlife Habitat Relationships (CWHR)** – A system developed jointly by the FS Region 5 and the California Department of Fish and Game that classifies forest stands by dominant species types, tree species, and tree densities and rates the resulting classes in regard to habitat value for various wildlife species or guilds. CWHR Size Class 4 is composed of Small (trees 11-24 inches dbh) and Size Class 5 includes Medium/large (trees >24 inches dbh).

The canopy closure for the plantations and other stands would continue to increase from the existing 22 to 85 percent over time. Encroachment of conifers into meadows would gradually degrade sensitive ecosystem components and processes, by altering species composition and reducing water availability. The development of continuous ladder fuels within riparian area would increase susceptibility to wildfire impacts, indirectly compromising watershed integrity and wildlife habitat quality.

The No-action Alternative would not improve access or facilitate a reduction in transportation system-generated resource impacts to improve aquatic, reduce surface erosion or sedimentation disturbances. Well-designed classified roads would continue to provide access for emergency response, woodcutting, mining, sightseeing, and other recreational activities.

### 2.3.2 Action Alternatives Considered in Detail

The following section provides a summary of proposed management practices by “action alternative.”

**Preferred Alternative B (the Proposed Action)** - Employs Defensible Fuels Profile Zones and Group Selection practices based on <40 percent canopy cover design criteria to address hazardous fuels, while minimizing other potential resource effects. It also incorporates project access improvements and infrastructure upgrades, along with reforestation and restoration of California black oak, meadow and riparian ecosystems.

**Alternative C** – Employs Defensible Fuels Profile Zones and Group Selection practices based on 40 percent canopy cover design criteria to address potential environmental effects to California spotted owl and northern goshawk foraging habitat. It also incorporates project access improvements and infrastructure upgrades, along with reforestation and restoration of California black oak, meadow and riparian ecosystems.

**Alternative D** – Employs Defensible Fuels Profile Zones and Group Selection practices based on a 50 percent canopy closure retention prescription for trees >20” dbh to address potential environmental effects to old forest ecosystems. It also incorporates project access improvements and infrastructure upgrades, along with reforestation and restoration of California black oak, meadow and riparian ecosystems.

## 2.4 Design Features and Practices Common to All Action Alternatives Considered in Detail

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The next section provides additional information about specified design feature and practices methodology. Both were used to concisely organize the presentation of the alternatives and associated predicted effects in Chapter 3.

Alternative design features and elements function to lay the foundation for the development of specified fuels, silvicultural and restoration prescriptions, geographic extent of proposed treatment applications, and the scope of mitigation measures linked to reducing the potential for adverse effects. Practices refer to available land management methods appropriate to the Watdog Project. For instance, the Watdog Project proposes several hazardous fuels reduction practices, including Defensible Fuel Profile Zones, Group Selection and underburning. Each practice is further refined to minimize potential resource effects by employing design features such as canopy closure upper limits, species retention priorities, explicit logging system methods, and standard and special contract provisions (see FSEIS, Appendix E). Although operational design features and elements are discussed separately, in some areas multiple treatments would be phased sequentially over time.

The section below provides a description of operational design features and practices, as *uniformly* integrated and applicable to Alternatives B, C, and D. Refer to subsequent sections 2.5 to 2.7.2 for a description of design features and/or practices *unique* to each action alternative.

### 2.4.1 Defensible Fuel Profile Zone (DFPZ's)

The DFPZ network displayed in the HFQLG FEIS (Figure 2-2) were used to guide the preliminary analysis process and determine specific locations for the action alternatives. The DFPZ treatments are designed to occur outside the designated Wild and Scenic section of the Middle Fork Feather River, Herger Feinstein Quincy Library Group, FEIS off-base and deferred areas, spotted owl and Northern goshawk PACs, SOHAs, and old forest stands (defined as CWHR Size Classes 5M, 5D, and 6) within LSOG rank 4 and 5 stands. Ground-based logging systems and road equipment would be used to construct DFPZs.

Table 2-1 and Map 2-1 includes land allocations described in the SNFPA ROD (Table 1), which summarizes desired conditions and management objectives for lands outside the HFQLG Act Pilot Project area. Although these land allocations do not apply to any part of the Watdog Project area, they were included to help determine the potential impacts of the alternatives on wildlife (goshawk PACs) and Wildland Urban Interface (WUI) areas. In Table 2-1, the land allocations are summarized for DFPZ and group selection units. Group selection is discussed in Section 2.4.2. Within late-successional old-growth (LSOG) rank 4 and 5 stands, only DFPZ construction is proposed. Consistent with the amended 1988 LRMP, timber harvesting would not be conducted within the Feather Falls Scenic area or in Roadless Areas. Prescribed burning, however, is allowed within these allocations.

**Table 2-1.** Land Allocations Applicable to All Alternatives.

Land Allocation	Acres in DFPZ Units	Acres in Group Selection Units
California Spotted Owl Protected Activity Center (Source: table 1 and table 2)b	0	0
(SOHA (Source: table 2)b	0	0
California Spotted Owl home range core area (HRCA) (Source: table 1)b	681	58
Northern Goshawk Protected Activity Center (Source: table 1)b	0	0
LSOG Rank 4 and 5 stands (Source: table 2)b	301	0
Wildland Urban Interface (Source: table 1)b	550	0
Feather Falls Scenic area (Source: LRMP)b	391	0
Roadless Area (Source: LRMP)b	20	0
Lands available for vegetation and fuels management (Source: table 2)b	3,309	354

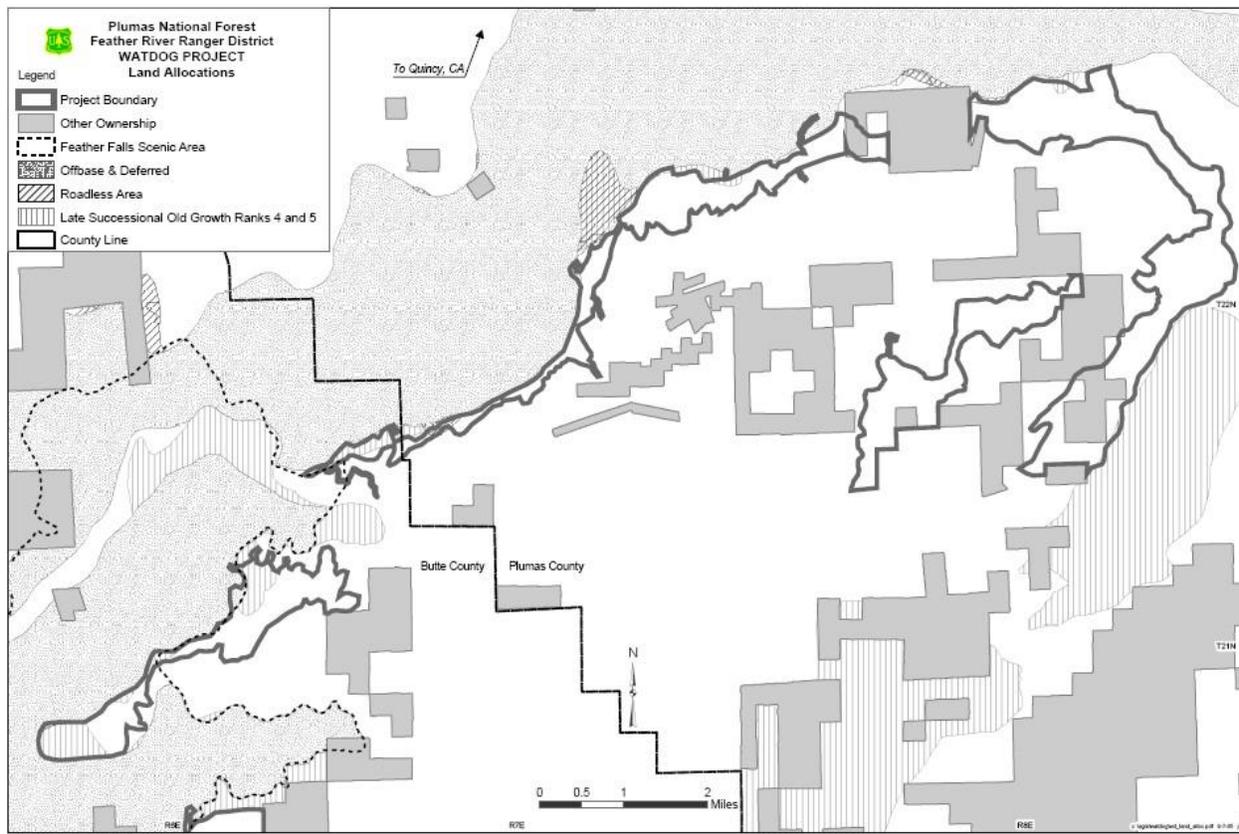
**Notes:**a. a. Table 2-1 is also presented in Chapter 3

b. Table 1 – Desired conditions, management intent, and management objectives by land allocation. From the SNFPA ROD, 2004 and Plumas County Communities Wildfire Mitigation Plan.

Table 2 – Standards and Guidelines applicable to the HFQLG Pilot Project area for the life of the pilot project (see the SNFPA ROD, 2004).

LRMP – Refers to the Plumas National Forest Land and Resource Management Plan, 1988. Tables 1 and 2 are from Rx-8. Semi-Primitive Area Prescription. Consistent with the LRMP, treatment prescription would be underburned only.

c. Late-successional old-growth stages of forest trees, as defined by the Sierra Nevada Ecosystem Project (volume II, appendix 21.1).



**Map 2-1. Management Direction and Land Allocations.**

Treatments throughout the DFPZs would employ a “thin from below” treatment prescription to remove ladder and crown fuels, thereby increasing ground to crown height, spacing between trees, and spacing between tree crowns. Treatment prescriptions would call for removal of the smaller, suppressed, and intermediate-crown-class trees; removal of some co-dominant and dominant trees; and retention of the largest trees to achieve the target canopy cover or spacing guidelines. Species preference for the residual trees would include shade-intolerant species where they exist. Ponderosa pine is most preferable, followed in order by Jeffrey pine, sugar pine, Douglas-fir, black oak, incense-cedar, and true fir.

Underburning, machine pile and burning, or hand piling and burning would be used to treat residual slash, pre-existing fuels, and shrubs. The largest snag trees (>15 inches dbh), both standing and fallen hardwood or conifer trees, will be retained at 4 trees per acre where available to provide for habitat needs of old forest-associated species and to provide habitat in early seral stage vegetation conditions as well.

Hand prune live and dead branches on residual trees to no more than half of live crown height to reduce torching potential; approximately 50 percent or more of the live crown would remain. Hand pile and burn pruned limbs away from residual trees.

Manually cut shrubs and trees 1–6 inches dbh from beneath overstory trees and/or thin aggregations of small diameter conifers or plantation trees through hand-cutting and piling of trees and/or shrubs, and pile burning. Cut trees, shrubs, and existing slash would be piled by hand and burned. Pile placement would minimize damage to residual trees. Spacing of residual conifers would be approximately 18 feet ( $\pm$  25 percent) to allow retention of the healthiest, largest, and tallest conifers and avoid creating openings.

Treatment in Riparian Habitat Conservation Areas (RHCAs) would be limited to underburning, hand piling, and hand thinning except in some plantations where mechanical treatments (mastication) would be utilized on a limited basis. Hand-thinning would be used in certain RHCAs where mechanical equipment is excluded. In such areas, conifers from 3 feet in height to 6 inches in diameter would be hand-thinned to a spacing of 15 feet.

Hardwood trees and riparian vegetation would be retained. Underburns would be ignited along contour strips upslope of the RHCA and fire would be allowed to back down-slope into them. Wherever possible, hand piles would be located away from riparian vegetation to prevent scorching.

## 2.4.2 Group Selection

Groups were considered in those stands or parts of stands designated “Scheduled for Group Selection” per the HFQLG FEIS, (Figure 2-2). Each Group Selection area ranges in size from 0.5 to 2 acres, averaging approximately 1.5 acres. Where possible, black oak concentrations would be avoided in the placement of the groups. Group Selection treatments are located outside HFQLG off-base and deferred areas, spotted owl and northern goshawk PACs, SOHAs, RHCAs, LSOG size class 4 and 5, rocky outcrops, shrubfields, developed recreation sites, and where known historic heritage resource have been identified. Ground-based logging systems and road equipment would be used to implement Group Selection treatments.

Desirable conifer regeneration (that is, undamaged, healthy, and shade-intolerant trees) and black oaks >30” dbh would be retained. As designed, the maximum diameter of trees (including hardwoods) planned for removal would be <30” dbh, except in the event removal is required to ensure operator safety and/or allow for operability as determined by the Plumas National Forest contract administrator.

Reforestation (hand planting) in group selection openings would supplement natural regeneration to achieve desired stocking levels of future stands dominated by shade-intolerant species (for example, ponderosa pine, Jeffrey pine, sugar pine). Release (hand grub or manual release) treatments would occur after tree planting for the control of competing vegetation, including noxious weeds that are present or have re-invaded the area after site preparation treatments, to reduce environmental stress on planted and natural regeneration. To be effective, release treatments would warrant the removal of vegetation for a 5-foot radius around each tree. Release work would be timed and coordinated with fire management staff to reduce burn intensities and improve plantation survival.

## 2.4.3 Prescribed Burning

Prescribed underburning would treat excess live and dead vegetation over 2,800 acres, including hardwoods or conifers. Underburning, machine piling and burning, or hand piling and burning would be used to treat residual slash, pre-existing fuels, and shrubs in group selection openings. This type of burning would be employed when fuel moisture levels are low enough to carry fire and still be within prescription parameters. Burning can only be initiated on “Burn Days” designated by the State Air Quality Control Board.

After burning, residual fuels (<3 inches dbh) would not exceed 5 tons per acre. Where available, an average over the treatment unit of 10–15 tons per acre of large down wood >12 inches dbh would be retained. Where available, 5 well distributed logs, 20 inches in dbh and 10 feet long, preferably in decomposition Classes 3-5 would be maintained. In stands proposed for mastication or stands that would not receive any secondary treatment, handlines would be constructed around machine piles and hand piles to contain prescribed fire.

Firelines would be constructed by mechanical or manual methods. Firelines constructed manually would occur over an estimated 134,640 feet, whereby surface fuels would be scraped to expose mineral soil to approximately two feet. Dead fuel would be scattered away from the handline for approximately six feet either side. Firelines constructed mechanically would occur over 52,800 feet, with surface fuels scraped to mineral soil approximately six feet and vegetation cleared to approximately ten feet either side.

#### **2.4.4 Mastication**

Masticate woody shrubs/trees with mechanical ground based equipment would occur, except in those Riparian Habitat Conservation Areas (RHCA's), where mechanical treatment is prohibited. Masticate trees less than 10 inches dbh unless needed for proper spacing, and masticate shrubs. Most trees masticated would be less than 6 inches dbh. Spacing of residual conifers would range from 18 feet ( $\pm$  25 percent) in smaller tree size aggregations to approximately 25 feet ( $\pm$  25 percent) in larger tree size aggregations.

Where the objective (i.e., flame lengths <4 feet tall) cannot be met using mastication, the use of underburning as a final treatment would be reevaluated. Equipment specifications include: (1) prime power unit—tracked unit with maximum ground pressure that shall not exceed 5–8 psi; (2) machine shall be equipped with a masticating or mulching head with an articulating boom that can reach 20 feet or greater from center of machine; (3) capable of working on slopes continuously on 0 to 45 percent slopes; (4) limit the number of passes the machine makes for soil compaction concerns.

**Mastication Up to 45 Percent Slope**—Mastication would be implemented as described above. The self-leveling cab of the excavator and the articulated arm allows the equipment to treat vegetation on slopes up to 35–45 percent, resulting in little ground disturbance.

#### **2.4.5 Grapple Piling and Pile Burning**

Grapple pile shrubs by machine and burn piles may occur in Group Selection treatments located outside DFPZs. Grapple pile treatments would be limited to 35 percent slope. Debris piles would be placed in openings away from residual trees and designated controlled areas.

#### **2.4.6 Transportation System Improvements: Project Access**

In most cases, the existing transportation system of roads, landings, and skid trails would be used for access to treatment units and for product removal. A small number of temporary road and new skid trails would be needed in treatment areas where they currently do not exist. Forest Service system and non-system roads inside and outside the project area would be used for hauling. Roads used for hauling would need to be reconstructed prior to project use. Reconstruction would consist of brushing, blading the road surface, improving drainage, and replacing/upgrading culverts where needed. Roads would be either left open or closed after project completion determined on a site-specific basis (see table 2-3).

## 2.4.7 Transportation System Improvements: Fish Passage

Within the Project Area, fish barriers exist at road-stream crossings, most commonly where culverts are used. Some culverts are placed above stream level, and the height is too great for fish to pass through them. Some culverts are too small, which results in velocities too great for upstream fish passage, prevents bedload transport and deposition, creates wider stream channels and channel instability downstream, and subjects culverts to blockage. Removing or upgrading these fish barriers would restore habitat connectivity for riparian and aquatic-dependent species. To improve watershed connectivity and remove fish barriers, culverts would be upgraded or removed and associated streambanks stabilized. These improvements would open up 3.5 miles of spawning and rearing habitat for rainbow trout.

## 2.4.8 Black Oak Stand Restoration

Due to past land use and management practices, the number and extent of black oak ‘stands’ existing today has been reduced compared to what was present prior to pre-fire exclusion practices. Individual oaks and oak communities profoundly affect the variety and abundance of wildlife. While food is a primary resource produced by oaks, of greater overall significance is the fact that oaks contain nooks, crannies, perches, and passages where animals live, breed, and rest. The physical structure of oak communities determines the availability of shelter, nesting sites, and corridors for travel. To promote a more natural forest ecosystem with a higher abundance of hardwoods, encroaching conifers <30 inches dbh would be removed from approximately 40 acres of oak stands to maintain and enhance oak growth and mast production. In some instances, past timber harvest and fire suppression have created dense stands of scrub oak. In these cases, suppressed oaks would be removed to reduce competition and improve growing conditions for the remaining oaks.

## 2.4.9 Streambank Stabilization

Streambank erosion is a natural wearing away of soil and rock that form streambanks. Poorly maintained or improperly designed roads, stream crossings, or access for recreation activities have accelerated this natural process in some areas, leading to an alteration of streamflow, sediment loading, sediment transport and deposition, channel morphology, channel stability, substrate composition, and riparian conditions. These conditions have degraded both water quality and aquatic habitat. To address known problems in the Project Area, the Proposed Action includes an element of streambank stabilization to restore bank stability to approximately 1,100 feet of streambank on the South Branch of the Middle Fork of the Feather River, downstream of the low water crossing on Road 22N94. To restore hydrologic function, streambanks would be stabilized with logs, rocks, willow cuttings and/or coir logs, thereby maintaining and improving this habitat type.

## 2.4.10 Meadow Restoration

Meadow habitats within the project area are desirable for plant and wildlife diversity and sediment retention. However, conifer encroachment has led to a loss of meadows in these areas. To help reverse the loss of meadow habitat, competing conifers <10 inches dbh would be removed by hand cutting and/or underburning to encourage desired late seral meadow vegetation. Approximately 25 acres of meadow habitat are proposed for treatment.

## 2.4.11 Monitoring and Mitigation Measures

The design features, mitigations, and monitoring would be applied to avoid, minimize, or rectify impacts on affected resources from implementation of any of the alternatives. Their purpose and effectiveness is described in specific resource sections of Chapter 3. Mitigations are common to all action alternatives unless otherwise noted.

Appendix E further details the design features, mitigations, and monitoring analyzed in “Chapter 3: Affected Environment (Existing Conditions)” and “Environmental Consequences” of this FSEIS. Two stages of monitoring are discussed in “Appendix E: Implementation and Effectiveness.” Implementation monitoring is used to determine the degree and extent to which the application of Standards and Guidelines and mitigation measures are meeting management direction and intent. Effectiveness monitoring is used to determine the degree to which implemented resource management activities are meeting objectives. The effectiveness of standards, guidelines, or mitigations cannot be assessed without first confirming that those standards and guidelines were actually implemented. Information from monitoring will help guide future activities and/or adjust current management practices.

The overall goals of monitoring activities are to:

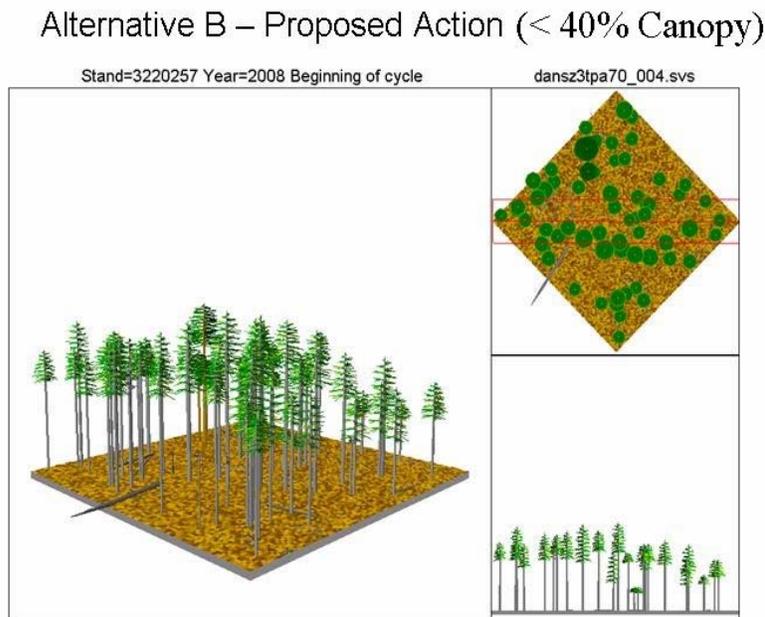
- Provide information useful to managers responsible for applying the principles of adaptive management.
- Assist the public in gauging the success of implementing the resource management activities as designed.
- Assess the effectiveness of the resource management activities in achieving resource objectives.

Programmatic HFQLG monitoring will occur at the same time as project-specific monitoring (HFQLG FEIS 1999). Since the main HFQLG monitoring sites are determined randomly, it is not known yet how many of these sites would be included in the Watdog Project area.

## 2.5 Alternative B – Preferred Alternative

Alternative B, the Preferred Alternative for the Watdog Project, would meet the intent of the Plumas National Forest LRMP, as amended by the 2004 SNFPA ROD and the HFQLG ROD, and would help to achieve the desired future condition set forth in the HFQLG Act to establish an uneven-aged, multistory, fire-resilient forest. It would also improve and maintain the ecological health of the forest, as displayed on Figure 2-2 and Map 2-2., Alternative B Vegetation & Fuel Treatments.

Alternative B includes treating fuels by underburning in 20 acres of a portion of the Middle Fork Roadless Area, which is part of the Semi-Primitive Area (Rx-8) land prescription defined by the 1988 Plumas National Forest's LRMP (p. 4-88:90). The Middle Fork Roadless Area is identified on the Plumas National Forest Roadless Conservation Area inventoried roadless map of September 15, 2000. Consistent with current interim guidelines, no other treatments with the exception of underburning would be implemented in the Roadless Area. DFPZ construction is proposed within LSOG Size Class 4 and 5 stands consistent with the Standards and Guidelines in Table 2 of the 2004 SNFPA ROD. DFPZs have been designed to avoid old forest stands (CWHR Classes 5M, 5D, and 6) within this allocation.



**Figure 2-2** Alternative B (less than 40 % canopy cover)

DFPZ construction would be implemented on approximately 24 miles of DFPZs averaging approximately 0.25 mile wide on approximately 4,000 acres along the ridges. Both CWHR Size Class 4 and 5 stands are subject to basal area retention standards under SNFPA. For the CWHR Size Class 4 stands and the plantations, residual spacing of conifers would be approximately 25 feet ( $\pm$  25 percent), to allow retention of the healthiest, largest, and tallest conifers.

Where California black oak is present in DFPZs, an average basal area of 25 to 35 square feet per acre would be retained for oaks over 15 inches dbh.

Smaller oaks may be retained if determined necessary for future recruitment. CWHR Size Class 4 stands would be thinned to 70 trees per acre. In CWHR Size Class 4 stands and plantations, at least 30 percent of existing basal area, generally comprised of the largest trees, would be retained.

Thinning would allow for the retention of the healthiest, largest, and tallest conifers, and avoid creating openings, without going below a minimum of 40 percent canopy cover for the CWHR Size Class 5 stands. Sawlog diameter limits are from 9 to 29.9 inches dbh and biomass limits are from 3.0 to 8.9 inches dbh. Treatments would be designed to retain all trees 30 inches dbh or larger, except as allowed for operability.

## 2.5.1 Alternative B (Preferred Alternative) — DFPZ and Group Selection Treatments

The following table provides a comprehensive description of Defensible Fuel Profile Zone and Group Selection (GS) treatments as proposed under Alternative B. Proposed treatments are organized to display information relative to CWHR classifications, percent slope criteria, biomass and prescribed fire applications (see Map 2-2).

**Table 2-2.** Alternative B. Proposed DFPZ & GS Primary and Secondary Treatments

Proposed Primary Treatments (Including Group Selection)	Secondary Treatment	Fuels Treatment Acres	Group Acres within DFPZs	Total Stand Acres
Thinning and Biomass Removal (CWHR Size Class 5)	Underburning	632	46	678
Thinning and Biomass Removal (CWHR Size Class 4)	Underburning	1,044	113	1,157
Thinning and Biomass Removal (CWHR Size Class 4)	Mastication	173	12	185
Thinning and Biomass Removal (Plantations)	Mastication	288	0	288
Mastication (Plantations)	Pruning	319	0	319
Mastication up to 35 percent Slope	None	257	0	257
Mastication up to 45 percent Slope	None	53	3	56
Grapple Pile Brush	Burn Piles	19	0	19
Hand Cut and Pile	Burn Piles	31	0	31
Underburning (areas without pre-treatment) *	None	908	30	938
No Treatments (i.e., rocky, steep, poor access)	None	94	0	94
<b>Totals</b>		<b>3,818</b>	<b>203**</b>	<b>4,021</b>

\* **Underburning** – An additional 1,834 acres of underburning is proposed in areas with pre-treatment to reduce excessive existing fuels to assure safe operations within design parameters.

\*\* An additional 29 acres of **Group Selection** is proposed outside DFPZs.

## 2.5.2 Alternative B — Transportation and Restoration Improvements

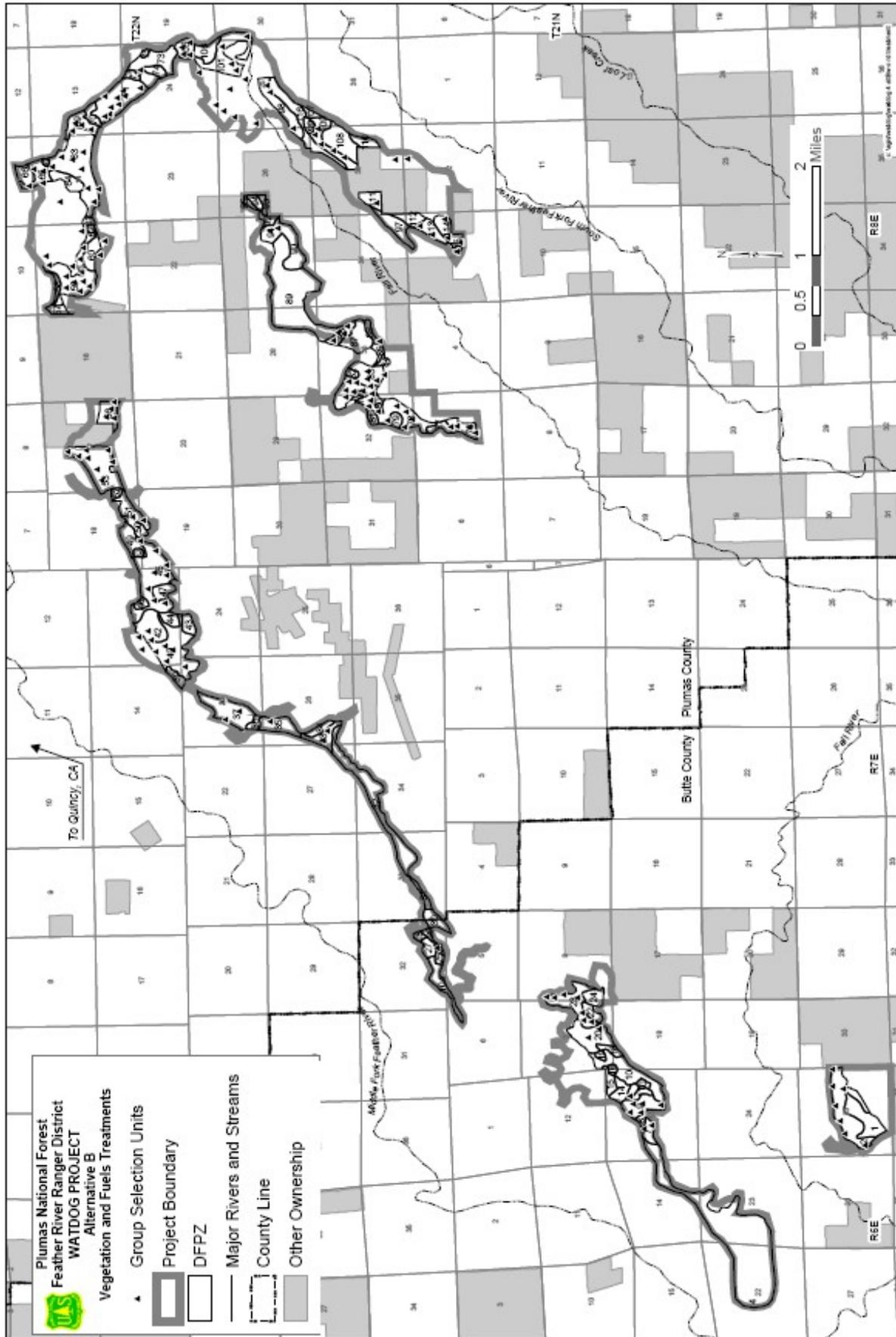
The following table displays all proposed transportation system improvements and restoration opportunities as proposed under Alternative B (see Map 2-3).

**Table 2-3.** Alternative B proposed transportation and restoration treatments

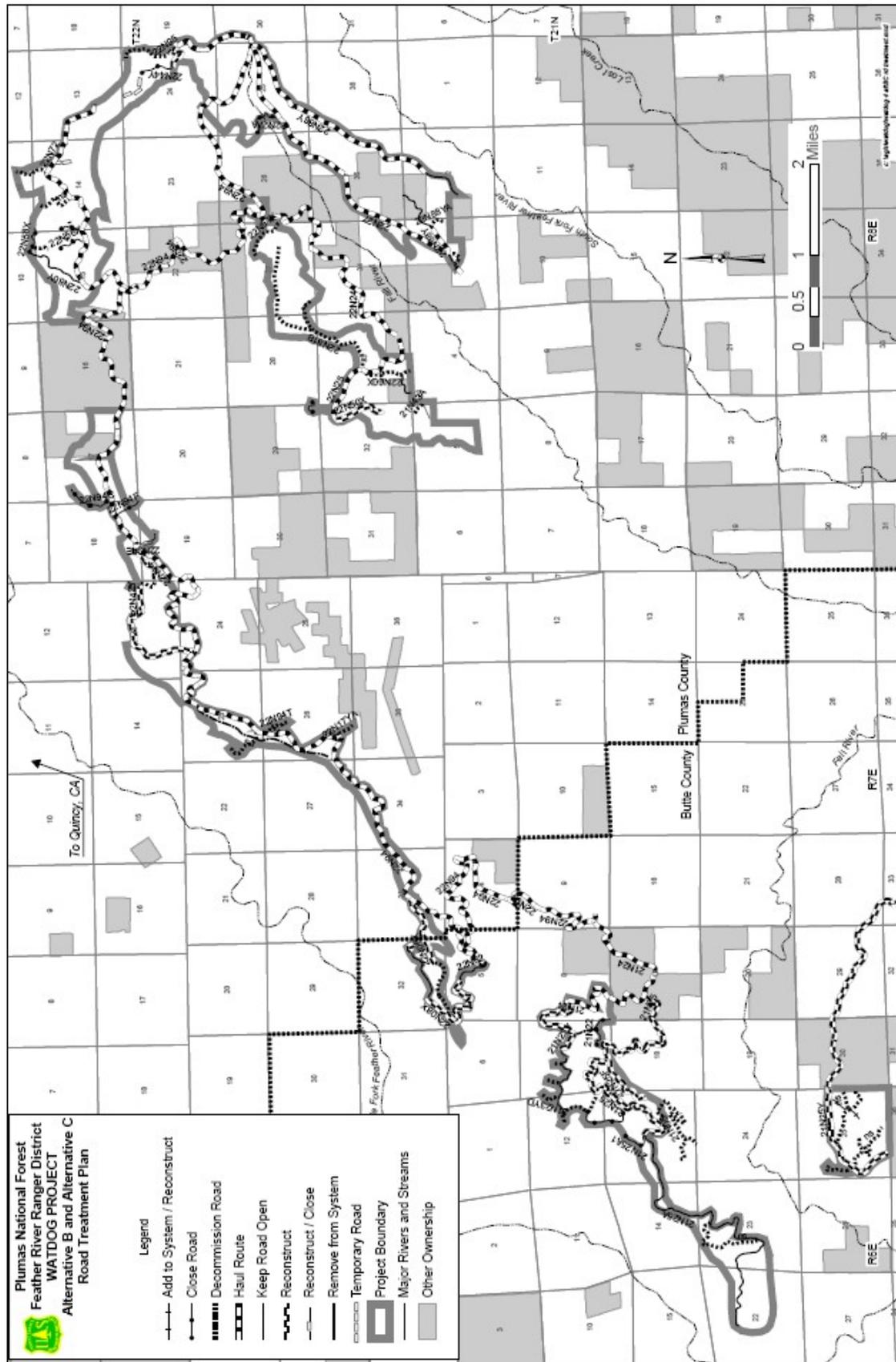
Proposed Treatments	Alternative B
Existing Classified and Non-System Roads decommissioned	12.7 miles
Existing Roads Removed from the Forest Service Classified Roads System Program	1.8 miles
Existing Classified and Non-System Roads Closed Post-Operations	4.6 miles
Existing Classified and Non-System Road Reconstruction; Access Open Post-Operations	17.1 miles
Existing Classified and Non-System Road Reconstruction; Closed Open Post-Operations	0.3 miles
Temporary Road Construction; Decommissioned Post-Operations	0.5 mile
New Classified Road Construction; Closed Post-Operations	1.2 miles
Classified Road Reconstruction; Closed Post-Operations	0.7 miles
*Road 21N05	Remove 1 culvert
*Road 21N25	Remove 2 culverts
*Road 22N94	Replace or reconstruct water crossing
*Road 22N24	Upgrade culvert
*Road 22N27A	Upgrade culvert
Streambank Stabilization	1,100 feet
Black Oak Restoration	40 acres
Meadow Restoration	25 acres

\* **Fish Passage Improvements** designed to open up 3.5 miles of habitat

Map 2-2. Alternative B - Vegetation & Fuel Treatments



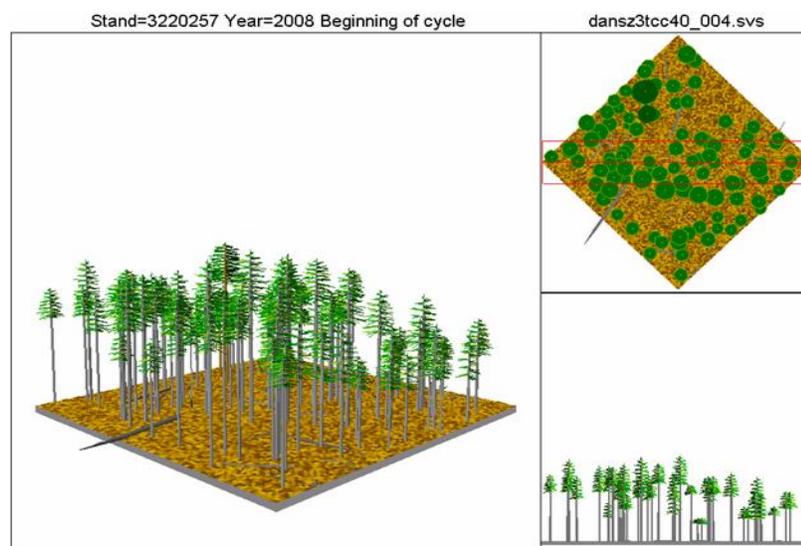
Map 2-3. Alternatives B & C - Road Treatments Plan



## 2.6 Alternative C

This alternative was developed in response to the following issues: Taking the canopy cover to less than 40 percent may create “non-suitable foraging habitat” for the California spotted owl and goshawk as displayed on Figure 2-3 and Map 2-4.

### Alternative C. – Modified Action (40% Canopy)



**Figure 2-3.** Alternative C Modified Action With 40 Percent Canopy Cover.

Alternative C proposes DFPZ and group selection treatment methods as described under Alternative B, except for CWHR Size Class 4 stands<sup>2</sup>.

CWHR Size Class 4 stands would be thinned to a 40 percent canopy cover instead of thinning to 70 trees per acre at 25-foot spacing. Group acres would be reduced to 151 acres to maintain an average of 40 percent canopy cover within each of the stands

<sup>2</sup> **California Wildlife Habitat Relationships (CWHR)** – a system developed jointly by the FS Region 5 and the California Department of Fish and Game that classifies forest stands by dominant species types, tree species, and tree densities and rates the resulting classes in regard to habitat value for various wildlife species or guilds. CWHR Size Class 4 is composed of Small (trees 11-24 inches dbh).

## 2.6.1 Alternative C — DFPZ and Group Selection Treatments

The following table provides a comprehensive description of Defensible Fuel Profile Zone and Group Selection treatments as proposed under Alternative C. Proposed treatments are organized to display information relative to CWHR classifications, slope criteria, biomass and prescribed fire applications (see Map 2-4).

**Table 2-4.** Alternative C. Proposed DFPZ and Group Selection Primary and Secondary Treatments

Proposed Primary Treatments (Including Group Selection)	Secondary Treatment	Fuels Treatment Acres	Group Acres within DFPZs	Total Stand Acres
Thinning and Biomass Removal (CWHR Size Class 5)	Underburning	632	46	678
Thinning and Biomass Removal (CWHR Size Class 4)	Underburning	1113	43	1156
Thinning and Biomass Removal (CWHR Size Class 4)	Mastication	184	2	186
Thinning and Biomass Removal (Plantations)	Mastication	288	0	288
Mastication (Plantations)	Pruning	319	0	319
Mastication up to 35 percent Slope	None	257	0	257
Mastication up to 45 percent Slope	None	53	3	56
Grapple Pile Brush	Burn Piles	19	0	19
Hand Cut and Pile	Burn Piles	31	0	31
Underburning (areas without pre-treatment) *	None	908	30	938
No Treatments (i.e., rocky, steep, poor access)	None	94	0	94
Totals		4530	123	4653

\* **Underburning** – An additional 1,834 acres of underburning is proposed in areas with pre-treatment to reduce excessive existing fuels to assure safe operations within design parameters.

\*\* An additional 29 acres of **Group Selection** is proposed outside DFPZs.

## 2.6.2 Alternative C — Transportation and Restoration Improvements

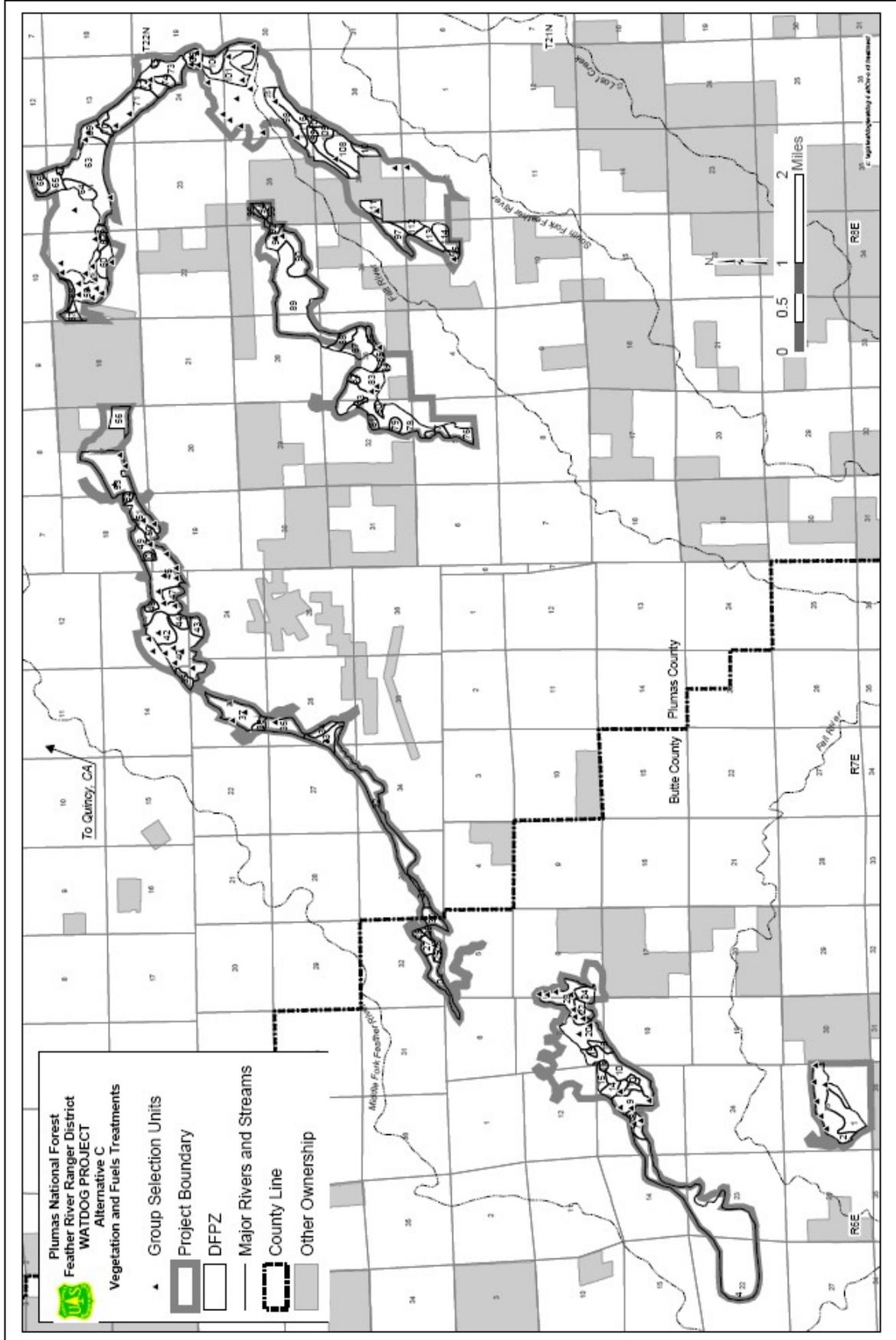
The following table displays all proposed transportation system improvements and restoration opportunities proposed under Alternative C (see Map 2-4).

**Table 2-5.** Alternative C proposed transportation and restoration treatments

Proposed Treatments	Alternative C
Existing Classified and Non-System Roads decommissioned	12.7 miles
Existing Roads Removed from the Forest Service Classified Roads System Program	1.8 miles
Existing Classified and Non-System Roads Closed Post-Operations	4.6 miles
Existing Classified and Non-System Road Reconstruction; Access Open Post-Operations	17.1 miles
Existing Classified and Non-System Road Reconstruction; Closed Open Post-Operations	0.3 miles
Temporary Road Construction; Decommissioned Post-Operations	0.5 mile
New Classified Road Construction; Closed Post-Operations	1.2 miles
Classified Road Reconstruction; Closed Post-Operations	0.7 miles
*Road 21N05	Remove 1 culvert
*Road 21N25	Remove 2 culverts
*Road 22N94	Replace or reconstruct water crossing
*Road 22N24	Upgrade culvert
*Road 22N27A	Upgrade culvert
Streambank Stabilization	1,100 feet
Black Oak Restoration	40 acres
Meadow Restoration	25 acres

\***Fish Passage Improvements** designed to open up 3.5 miles of habitat

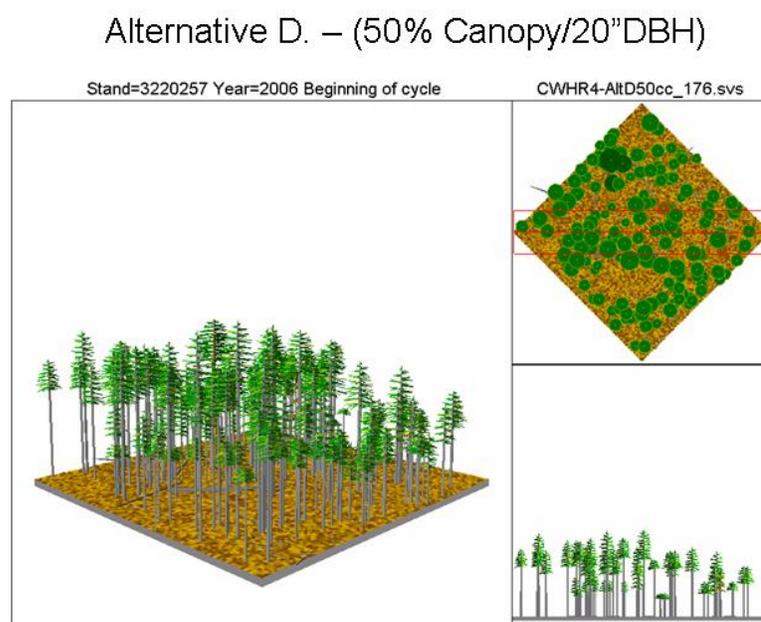
Map 2-4. Alternative C – Vegetation and Fuels Treatments



## 2.7 Alternative D

This alternative was developed in response to the following issues: Taking the canopy cover to less than 50 percent and removing trees greater than 20 inches dbh would substantially reduce adverse impacts to old forests and the species that inhabit them, as displayed on Figure 2-4 and Map 2-5.

Alternative D proposes DFPZ and Group Selection treatment methods as described in Alternative B for all treatments, except the CWHR Size Class 4 and 5 stands would be thinned to a 50 percent canopy cover with a maximum 20-inch dbh harvest limit. Group acres would also be reduced to 105 acres (see Table 2-6 below) to maintain an average of 50 percent canopy within each of the stands.



**Figure 2-4.** Alternative D With 50 Percent Canopy Cover.

Compared to Alternative B, nine out of ten stands in CWHR Size Class 5<sup>3</sup> would change from thinning / biomass / prescription to mastication. Of the 26 total stands in the CWHR Size Class 4, 16 would change from thinning / biomass / prescription to mastication.

<sup>3</sup> **California Wildlife Habitat Relationships (CWHR)** – a system developed jointly by the FS Region 5 and the California Department of Fish and Game that classifies forest stands by dominant species types, tree species, and tree densities and rates the resulting classes in regard to habitat value for various wildlife species or guilds. CWHR Size Class 4 is composed of Small (trees 11-24 inches dbh) and Size Class 5 includes Medium/large (trees >24 inches dbh).

### 2.7.1 Alternative D — DFPZ and Group Selection Treatments

The following table provides a comprehensive description of Defensible Fuel Profile Zone and Group Selection treatments. Proposed treatments are organized to display information relative to CWHR classifications, slope criteria, biomass and prescribed fire applications (see Map 2-6)

**Table 2-6.** Alternative D. Proposed DFPZ and Group selection Primary and Secondary Treatments.

Proposed Treatments (Including Group Selection)	Secondary Treatment	Fuels Treatment Acres		Group Acres within DFPZs	Total Stand Acres
		Alt. D	Alt D <sup>1</sup>		
Thinning and Biomass Removal (CWHR Size Class 5)	Underburning	65	590 (632-65)	24	679
Thinning and Biomass Removal (CWHR Size Class 4)	Underburning	304	832	21	1157
Thinning and Biomass Removal (CWHR Size Class 4)	Mastication	185	0	1	186
Thinning and Biomass Removal (Plantations)	Mastication	288	0	0	288
Mastication (Plantations)	Pruning	319	0	0	319
Mastication up to 35 percent Slope	None	257	0	0	257
Mastication up to 45 percent Slope	None	53	0	3	56
Grapple Pile Brush	Burn Piles	19	0	0	19
Hand Cut and Pile	Burn Piles	31	0	0	31
Underburning (areas without pre-treatment) *	None	908	0	30	938
No Treatments (i.e., rocky, steep, poor access)	None	94	0	0	94
<b>Totals</b>		2429	1422	79	3930

<sup>D<sup>1</sup></sup> - Compared to Alternatives B and C, which propose harvest and biomass as primary treatments in CWHR Size Class 5, Alternative D is unique in that 590 acres in CWHR Size Class 5 are proposed for mastication only as the primary treatment.

## 2.7.2 Alternative D — Transportation and Restoration Improvements

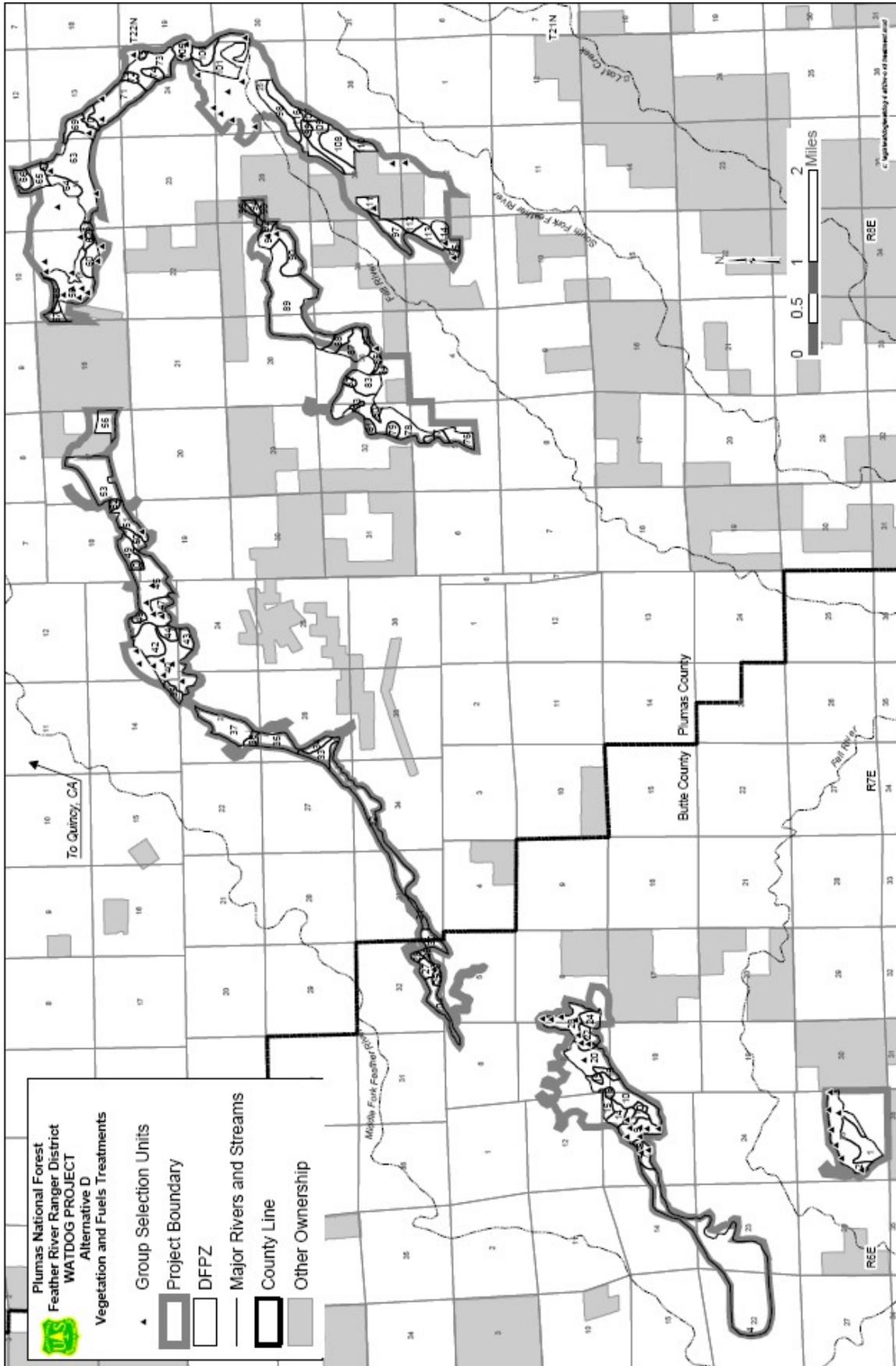
The following table displays proposed transportation system improvements and restoration opportunities as proposed under Alternative D. Road 22N44Y (0.4 mile) would not be proposed for reconstruction, as it is not needed to access any DFPZ or group selection treatment units. This road would, however, be closed upon project completion. This alternative does not include new system road construction to access proposed treatment units. Refer to Map 2-6.

**Table 2-7.** Alternative D proposed transportation and restoration treatments

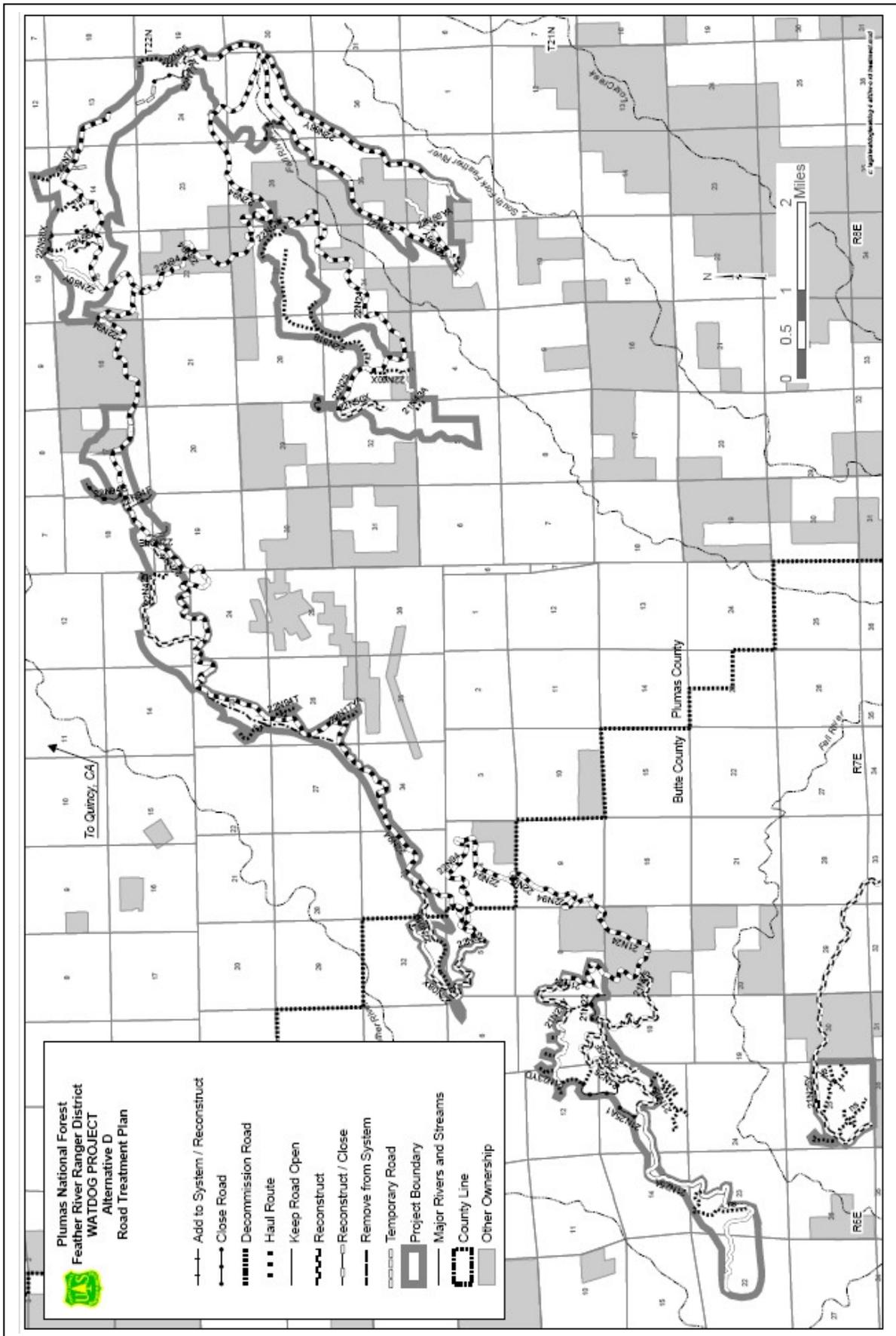
<b>Proposed Treatments</b>	<b>Alt. D</b>
Existing Classified and Non-System Roads decommissioned	12.7 miles
Existing Roads Removed from the Forest Service Classified Roads System Program	1.8 miles
Existing Classified and Non-System Roads Closed Post-Operations	4.6 miles
Existing Classified and Non-System Road Reconstruction; Access Open Post-Operations	17.1 miles
Existing Classified and Non-System Road Reconstruction; Closed Open Post-Operations	0.3 miles
Temporary Road Construction; Decommissioned Post-Operations	0.5 mile
New Classified Road Construction; Closed Post-Operations	0
Classified Road Reconstruction; Closed Post-Operations	0.3 miles
*Road 21N05	Remove 1 culvert
*Road 21N25	Remove 2 culverts
Road 22N94	Replace or reconstruct water crossing
*Road 22N24	Upgrade culvert
*Road 22N27A	Upgrade culvert
Streambank Stabilization	1,100 feet
Black Oak Restoration	40 acres
Meadow Restoration	25 acres

\* **Fish Passage Improvements** designed to open up 3.5 miles of habitat

Map 2-5. Alternative D - Vegetation & Fuel Treatments



Map 2-6. Alternative D - Road Treatment Plan



## 2.8 Alternatives Considered but Eliminated from Detailed Study \_\_\_\_\_

Federal agencies are required by NEPA to rigorously explore and objectively evaluate reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the Proposed Action provided suggestions for alternative methods for achieving the Purpose and Need. The one alternative suggested by the public that did not meet the Purpose and Need for the project is summarized below.

### **Implementation of 2001 Sierra Nevada Forest Plan Amendment.**

During the scoping period for the Watdog Project, one commenter suggested analyzing an alternative that would fully implement the 2001 SNFPA ROD. The commenter stated that maintaining 50 percent canopy cover and not removing trees greater than 20 inches dbh—as called for by the 2001 ROD—would meet fire objectives and reduce impacts to species like the spotted owl and marten.

In response to the commenter's concern, the interdisciplinary team developed an alternative that would:

- Apply the standards and guidelines of the 2001 ROD for fuel treatments within 1.5 miles of communities at risk, an area that roughly corresponds with the Wildland Urban Interface established by the 2001 ROD.
- Retain a minimum of 50 percent canopy cover in DFPZ thinning units, as established by the 2001 ROD for several land allocations, including the General Forest Zone and Wildland Urban Interface Threat Zone (area from 0.25 to 1.5 miles from structures).
- Retain trees 20-inches dbh and larger in DFPZ and ITS thinning units, as established by the 2001 ROD for several land allocations, including the General Forest Zone and Wildland Urban Interface Threat Zone.
- Drop all group selection treatments in the project area.

The 2001 SNFPA ROD Alternative would not fully meet the purpose or resolve the need for the project. This recommendation is based on the following:

**Reduced economic contribution.** Preliminary economic analysis of this alternative indicates that this alternative would result in a cost to the Treasury of more than \$412,000 (total harvest value) while implementing the service contract work would cost an additional \$2.0 million. The total project value would cost more than \$2.4 million to implement. These costs are driven by:

**A 20-inch dbh limit in DFPZ and ITS thinning units.** Trees in the size range of 20 to 30 inches dbh have over twice the value of smaller trees and much greater board foot volume. Though fewer of these large trees have to be removed compared to smaller diameter trees, they greatly increase the economic feasibility and efficiency of the project by providing much-needed value.

Elimination of group selection harvest means potential harvest value cannot be used to offset the cost of the fuel treatments. Implementation of biomass removal to treat existing fuels and activity-generated slash can be very costly, depending on the market at the time of implementation and hauling costs (distance to market). Standards and Guidelines limit the ability of fire managers to construct effective DFPZs. Several projects planned under the Standards and Guidelines of the 2001 SNFPA are currently being implemented on the Feather River Ranger District. As these projects are implemented, fire

managers are finding that the restrictions on upper diameter limits, canopy minimum limits, and canopy cover reduction are limiting their ability to construct effective DFPZs in some cases.

In order to retain 50 percent canopy, for example, fire managers have had to leave trees that connect fuels on the forest floor to the tree crowns. These are often trees located beneath the drip lines of larger trees or immediately adjacent to the canopies of other trees which could increase the probability of crown fire behavior.

Because of the heavy understory regrowth in the treatment units, especially in the southern part of the project area, retaining 50 percent canopy cover in these stands would compromise DFPZ effectiveness, in part, because it would not allow adequate treatment of ladder fuels.

Alternative D is very similar to the 2001 SNFPA ROD in terms of diameter limit (20-inches) and canopy cover limit (50 percent). Alternative D was rigorously explored and objectively evaluated during the analysis for the Watdog Project.

The Watdog Project “Silviculture Report,” Appendix A, Table A-35 displays a comparison of the SNFPA 2004 ROD, SNFPA 2001 ROD, and the CASPO Guidelines of 1993.

## 2.8.1 Comparison of Alternatives

This section provides a summary of the proposed treatments (Table 2-8) and the effects of implementing each alternative (Table 2-12). Information in the table focuses on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

**Table 2-8. Hazardous Fuels Practices Common to the Action Alternatives Considered in Detail.**

Proposed Treatments (Including Group Selection)	Secondary Treatment	Fuels Treatment Acres				Group Acres within DFPZs			Total Stand Acres
		Alt. B	Alt. C	Alt. D	Alt D <sup>1</sup>	Alt. B	Alt. C	Alt. D	
Thinning and Biomass Removal (CWHR Size Class 5)	Underburning	632	632	65	590 (632-65)	46	46	24	678
Thinning and Biomass Removal (CWHR Size Class 4)	Underburning	1,044	1113	304	832	113	43	21	1,157
Thinning and Biomass Removal (CWHR Size Class 4)	Mastication	173	184	185	0	12	2	1	185
Thinning and Biomass Removal (Plantations)	Mastication	288	288	288	0	0	0	0	288
Mastication (Plantations)	Pruning	319	319	319	0	0	0	0	319
Mastication up to 35 percent Slope	None	257	257	257	0	0	0	0	257
Mastication up to 45 percent Slope	None	53	53	53	0	3	3	3	56
Grapple Pile Brush	Burn Piles	19	19	19	0	0	0	0	19
Hand Cut and Pile	Burn Piles	31	31	31	0	0	0	0	31
Underburning (areas without pre-treatment) *	None	908	908	908	0	30	30	30	938
No Treatments (i.e., rocky, steep, poor access)	None	94	94	94	0	0	0	0	94
<b>Totals</b>		<b>3,818</b>	<b>3,898</b>	<b>2,523</b>	<b>1,422</b>	<b>203</b>	<b>123</b>	<b>77</b>	<b>4,021</b>

\* **Underburning** - An additional 1,834 acres of is proposed in areas with pre-treatment to reduce excessive existing fuels to assure safe operations within design parameters.

\* **D<sup>1</sup>** - The 590 acres were changed from harvest and biomass to mastication as the primary treatment.

**Table 2-9. Other Improvement/Restoration Practices Common to the Alternatives Considered in Detail.**

<b>Proposed Treatments</b>	<b>Alt. A (No Action)</b>	<b>Preferred Alt. B</b>	<b>Alt. C</b>	<b>Alt. D</b>
Existing Classified and Non-System Roads decommissioned	0	12.7 miles	12.7 miles	12.7 miles
Existing Roads Removed from the Forest Service Classified Roads System Program	0	1.8 miles	1.8 miles	1.8 miles
Existing Classified and Non-System Roads Closed Post-Operations	0	4.6 miles	4.6 miles	4.6 miles
Existing Classified and Non-System Road Reconstruction; Access Open Post-Operations	0	17.1 miles	17.1 miles	17.1 miles
Existing Classified and Non-System Road Reconstruction; Closed Open Post-Operations	0	0.3 miles	0.3 miles	0.3 miles
Temporary Road Construction; Decommissioned Post-Operations	0	0.5 mile	0.5 mile	0.5 mile
New Classified Road Construction; Closed Post-Operations	0	1.2 miles	1.2 miles	0
Classified Road Reconstruction; Closed Post-Operations	0	0.7 miles	0.7 miles	0.3 miles
*Road 21N05	0	Remove 1 culvert	Remove 1 culvert	Remove 1 culvert
*Road 21N25	0	Remove 2 culverts	Remove 2 culverts	Remove 2 culverts
*Road 22N94	0	Replace or reconstruct water crossing	Replace or reconstruct water crossing	Replace or reconstruct water crossing
*Road 22N24	0	Upgrade culvert	Upgrade culvert	Upgrade culvert
*Road 22N27A	0	Upgrade culvert	Upgrade culvert	Upgrade culvert
Fish Passage Improvements (miles)	0	Open up 3.5 miles of habitat	Open up 3.5 miles of habitat	Open up 3.5 miles of habitat
Streambank Stabilization	0	1,100 feet	1,100 feet	1,100 feet
Black Oak Restoration	0	40 acres	40 acres	40 acres
Meadow Restoration	0	25 acres	25 acres	25 acres

**\*Fish Passage Improvements**

All of the action alternatives propose DFPZ and group selection treatment methods as described under Alternative B. They differ only by the number of acres of group selection harvest treatments and the canopy cover and diameter limits in the DFPZ treatments, except Alternative D, which has no new system road construction and a decrease of 0.3 mile of road reconstruction.

The canopy cover and diameter limits are the same for all of the action alternatives, except in specific size classes shown in Table 2-1. All of the action alternatives propose the same restoration opportunities (black oak, aquatic and riparian ecosystem restoration activities).

The acreages in tables are derived from a geographic information system and have been rounded and are subject to change, based on data collection with a global positioning system. An example of a proposed treatment schedule for typical DFPZ and group selection units is displayed in “Appendix A: Proposed Vegetation Treatment Schedules.”

When averaged across the stands, canopy cover under Alternative B differs only slightly from that of Alternative C. However, at the stand level, post-treatment canopy cover in 20 of the 26 CWHR Size Class 4 stands would be less than 40 percent to increase crown separation (i.e., 5 stands would be thinned to a 25–30 percent canopy cover, 6 stands would be thinned to a 30–35 percent canopy cover and 9 stands would be thinned to a 35–40 percent canopy cover) (Table 2-4).

**Table 2-10.** Alternative Comparison of Canopy Cover by CWHR Size Classes.

CWHR Size Class 4 Stands Canopy Cover Range	Number of Stands		
	Alternative B	Alternative C	Alternative D
25% – 30%	5	0	0
30% – 35%	6	0	0
35% – 40%	9	0	1
40% – 45%	1	21	1
45% – 50%	0	0	4
50% – 55%	4	4	19
55% – 60%	1	1	1
Total Stands	26	26	26
Average DFPZ Canopy Cover	38.6%	42.5%	49.2%
Average DFPZ, RHCA, and Group Canopy Cover	37.1%	42.7%	49.5%
CWHR Size Class 5 stands Canopy Cover Range			
40% – 45%	10	10	3
45% – 50%	0	0	2
50% – 55%	0	0	5
55% – 60%	0	0	0
Total Stands	10	10	10
Average DFPZ Canopy Cover	40.6%	40.6%	46.5%
Average DFPZ, RHCA, and Group Canopy Cover	41.3%	41.3%	47.4%

**Notes:**

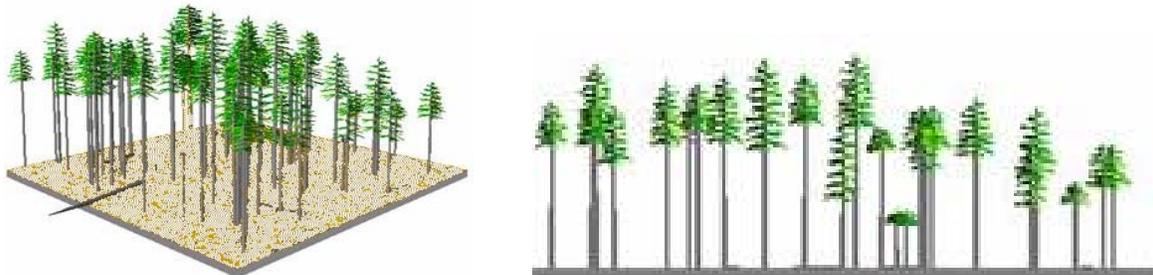
Average DFPZ canopy cover refers to the canopy cover within the Defensible Fuel Profile Zone (DFPZ) only. It does not include canopy cover in group selection harvest areas or Riparian habitat conservation areas that are within the treatment unit. Average DFPZ, RHCA, and Group Canopy Cover have been averaged across the entire treatment unit. This includes post-treatment canopy cover in DFPZ, groups, and RHCAs.

Each of the action alternatives constructs the same number of miles of DFPZ. The number of acres of Group Selection is the most in Alternative B and the least in Alternative D. The number of acres of road construction is less in Alternative D than in the other two action alternatives. However, the number of roads decommissioned, miles of fish habitat opened up and feet of streambank stabilized is the same for each of the action alternatives. Similarly, the number of acres of black oak restoration and meadow restoration remains the same for each action alternative

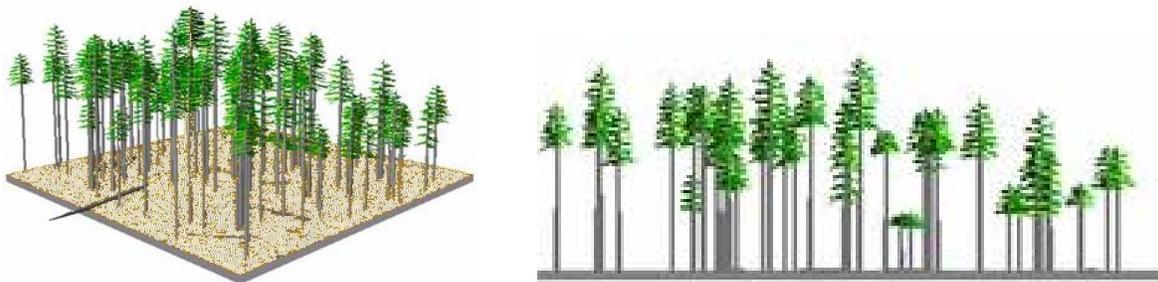
Alternative A. No Action (Existing Condition: 58% Average Canopy Cover)



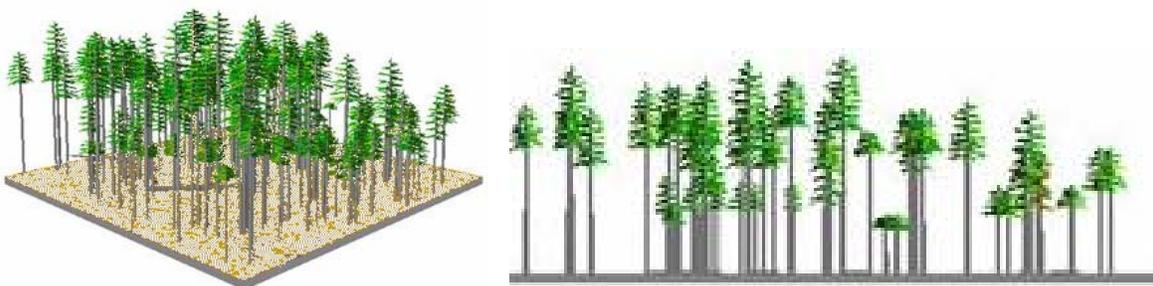
Alternative B. Proposed Action (Simulated 32% Canopy Cover) *Note: Canopy cover across treatment units ranges from 25% to 58%. Average canopy cover in DFPZs is approximately 39%.*



Alternative C. (40% Canopy Cover)



Alternative D. (50% Canopy Cover / 20 inch dbh limit)



**Figure 2-5.** Comparison of DFPZ treatments (thinning from below) by alternative using stand visualization simulator (SVS).

**Table 2-11.** Alternative Comparison of Proposed Group Selection Treatments

	Total Stand Acres	Approximate Group Acres		
		Alternative B	Alternative C	Alternative D
Proposed groups inside DFPZs	4,021	203	123	77
Proposed groups outside DFPZs	360	29	29	29
Totals	4,381	231	151	105

**Table 2-12.** Alternative Comparison by Indicator

	Alternative A	Alternative B	Alternative C	Alternative D
<b>Fuels and Fire Behavior</b>				
Predicted mortality	78–98%	16–36%	25–36%	25–44%
Flame length	5–7 feet	1–3 feet	1–3 feet	1–3 feet
Fire type	Predominately passive crown	Surface	Surface	Surface, with a component of passive crown
Crown base height (feet)	7 feet	32 feet	28 feet	20 feet
<b>Landscape Structure</b>				
Species Composition (also see Group Selection Harvest)	Decrease in shade-intolerant, fire-resistant species	Increased species composition to more shade-intolerant, fire-resistant species such as ponderosa and Jeffrey pine	Same as alternative B, except slightly less species composition	Same as alternative B, except slightly less species composition
Forest Health	Moderate to high susceptibility to bark beetle infestations due to high tree densities	Low susceptibility to bark beetle infestations due to lower tree densities	Same as alternative B, except slightly higher tree densities in CWHR 4 size classes	Low to moderate susceptibility to bark beetle infestations due to higher tree densities
Tree density may be expressed in terms of stand density index (SDI), basal area (BA) per acre or trees per acre (TPA)	CWHR 5 BA = 223 and TPA = 953 CWHR 4 BA = 275 and TPA = 786	CWHR 5 BA = 177 and TPA = 93 CWHR 4 BA = 187 and TPA = 70	CWHR 5 BA = 177 and TPA = 93 CWHR 4 BA = 206 and TPA = 89	CWHR 5 BA = 201 and TPA = 132 CWHR 4 BA = 234 and TPA = 126.
Stand Structure (also see figure 2-1)	Highest densities of smaller tree sizes and high fuel ladder potential	Lowest density of small tree sizes and lowest fuel ladder potential	Same as alternative B, except low to moderate fuel ladder potential	Moderate density of small trees and moderate fuel ladder potential
Tree Size Classes (diameter at breast height)	CWHR 4 Canopy Cover Percent			
Sapling (0–6 inches)	19.7	0.1	0.3	0.0
Poles (6–11 inches)	16.7	0.3	1.2	6.9
Small Trees (11–20 inches)	27.7	15.8	19.4	22.8
Medium Trees (20–30 inches)	17.2	16.8	16.9	17.2
Large Trees (>30 inches)	11.8	11.8	11.8	11.8
Total non-overlapping canopy	64.4	38.7	42.5	48.6

**Table 2-12. Alternative Comparison By Indicator *continued*.**

Issue / Resource	Alternative A	Alternative B	Alternative C	Alternative D
<b>Cost Effectiveness</b>				
Net harvest revenues (sawlog and biomass removal)	\$0	\$624,763	\$43,093	-\$269,234
<b>Community Stability</b>				
Number of direct and indirect jobs	0	302	253	161
Total employee related Income	0	\$13,006,611	\$10,868,351	\$6,929,967
Products – biomass tons	0	Biomass – 33,000 tons	Biomass – 33,000 tons	Biomass – 15,000 tons
Products – sawlog volume	0	Sawlogs – 16.3 million board feet	12.7 million board feet	4.4 million board feet
<b>Wildlife Concerns</b>				
Risk of wildlife habitat loss to wildfire	Current conditions (potential high risk)	Lower risk than C Lower risk than D	Higher risk than B Lower risk than D	Higher risk than B Higher risk than C
Acres of suitable CA spotted owl foraging habitat affected (% of habitat retained)	0 (100%)	680 (85%)	127 (97%)	110 (98%)
Acres of suitable CA spotted owl nesting habitat affected (% of habitat retained)	0 (100%)	127 (98%)	75 (99%)	56 (99%)
Acres of suitable northern goshawk foraging habitat affected (% of habitat retained)	0 (100%)	245 (96%)	114 (98%)	60 (99%)
Acres of suitable northern goshawk nesting habitat affected (% of habitat retained)	0 (100%)	686 (92%)	88 (99%)	108 (99%)
Acres of suitable forest carnivore forage/travel habitat affected (% of habitat retained)	1,309	923	2,020	1,902
Acres of suitable forest carnivore den/rest habitat affected (% of habitat retained)	711	0	0	0
Acres of low suitable forest carnivore habitat	0	1,097	0	108
Subwatershed #23 approaching TOC (% ERA)	83%	95%	94%	91%

**Table 2-12. Alternative Comparison By Indicator *continued***

Issue / Resource	Alternative A	Alternative B	Alternative C	Alternative D
<b>Post-Treatment Vegetative Response, Maintenance, and Monitoring</b>				
Risk of noxious weed invasion	Low	Moderate	Moderate	Moderate
Competing vegetation	Continued trend to older ages classes of shrubs without disturbance. Older brush more fire prone.	Improved mix of age classes and seral stages. Younger brush less fire prone. (~38% canopy cover)	Same as alternative B, except slightly less brush regrowth under moderate canopy cover (~40%)	Least amount of brush regrowth under higher canopy cover (~50%)

**Fuels and Fire Behavior.**

There are many uncertainties associated with predicting fire behavior. While the models can be used to show a relative difference in predicted fire behavior between the no-action and action alternatives, there are limitations to the models themselves and the coarse-scale data used to predict fire behavior. Although alternatives B, C, and D were modeled reflecting the respective differences in stand conditions, the fire behavior prediction outputs were the same, except for the percentage of tree mortality, which was highest in alternative D and lowest in alternative B.

**Landscape Structure**

**Species Composition.** Under the no-action alternative (alternative A) would continue decreasing in the number of shade intolerant species, such as ponderosa pine or Jeffrey pine and in the amount of fire resistant tree species. Alternative B would result in an increased composition in the number of shade-intolerant, fire resistant species. Alternatives C and D would have a similar increase in species composition, however not to the same degree as alternative B.

**Forest Health.** Stands would remain moderately susceptible to bark beetle infestations in the no-action alternative, while the action alternatives would lower the susceptibility of stands to bark beetle infestation due in large part to lower stand densities. Stands treated using alternative D prescriptions would be more susceptible to beetle infestation than alternative B stands. The basal area (BA) of trees would be much lower in alternative B than alternative D, 177 and 201 respectively; and have lower trees per acre, 93 and 132 respectively.

**Stand Structure.** Size class 4 canopy cover averages approximately 64 percent under the no-action alternative. Small trees (11–20 inches dbh) make-up almost a third of the canopy cover, while the additional saplings (0–6 inches dbh) and pole sized trees (6–11 inches dbh) make up the other third. Trees <20 inches in diameter make up 64 percent of the canopy cover in the no-action alternative. The action alternatives almost completely remove saplings. However, action alternatives, treat the trees in the 6–30 inches very differently. Alternative D would leave almost 7 percent more canopy cover of pole and small sized trees and 1 percent more canopy cover of trees in the 20–30 inches dbh than alternative B.

**Cost Effectiveness.** The revenues that the project would bring to the Treasury (or net harvest revenues) are substantially more for alternative B than for alternative D. The portion the government would pay to have the work completed (non-harvest costs) associated with alternative D are also substantially more than alternative B and C. The net project value which takes both the timber sale

receipts and the service contract costs into consideration would be over \$2.2 million dollars in alternative D, versus less than \$1 million dollars in alternative B.

**Community Stability.** The number of direct and indirect jobs would be much higher in alternative B than alternative C or D. The amount of employee related income would similarly be much more with alternative B. This is in large part due to the amount of sawlog volume. Sawlog volume in alternative B is almost 12 million board feet (mbf) than alternative D. The amount of biomass tons is the same in both alternatives B and C, but substantially less in alternative D.

**Wildlife Concerns.** Alternative D retains the most foraging habitat for the California spotted owl, while alternative B retains the least. Alternative C and D retain the same amount of owl nesting habitat, just one percent more than alternative B. Alternative B retains just slightly less Northern goshawk foraging habitat than alternative C and D however, there is a larger loss of suitable nesting habitat under alternative B. The amount of suitable forest carnivore forage/travel habitat in alternatives C and D increases, while the amount in alternative B decreases. The amount of suitable forest carnivore denning/resting habitat would be reduced in suitability for all action alternatives. Habitat of low suitability would be created as a result of alternative B and a few acres under alternative D.

**Post-Treatment Vegetative Response, Maintenance, and Monitoring.** Because there are not very many noxious weed seed sources in the Watdog project area, the risk of noxious weed spread, in the absence of fire, from fuel treatments and group selection openings is considered moderate. Although the no-action alternative expresses the risk as being low, the risks would be higher if and when a stand-replacing fire was to burn through the area. As far as competing vegetation is concerned, the no-action alternative has a continued trend toward older age classes of shrubs without disturbance. Older shrubs are considered more fire prone than younger ones. The action alternatives would improve the mix of age classes and seral stages of shrubs. Alternative D would have a decreased amount of brush re-growth under the higher canopy cover stand conditions that would remain.