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Sierra Nevada Forest Plan Amendment

Draft Supplemental Environmental Impact Statement

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February 2010

This supplemental environmental impact statement (SEIS) to the 2004 Sierra Nevada Forest Plan Amendment (SNFPA or Framework) Final SEIS is being prepared to comply with two orders issued by the Eastern District Court of California on November 4, 2009. These court orders, issued in *Sierra Forest Legacy v. Rey*, No. 2:05-cv-00205-MCE-GGH (E.D. Cal. Nov. 4, 2009) and *People of the State of California v. USDA*, No. 2:05-cv-00211-MCE-GGH (E.D. Cal. Nov. 4, 2009), require the Forest Service to remedy a violation of NEPA relative to the analysis of alternatives presented in the 2004 Framework FSEIS by completing a narrowly focused SEIS by May 1, 2010. Due to the brevity of this SEIS, a summary is not included.

Comment Period: The public comment period on this Draft Supplemental Environmental Impact Statement will run for 45 days after the Notice of Availability is published in the Federal Register on or about February 12, 2010.

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Chapter 1. Purpose and Need

1.1. Introduction

This supplemental environmental impact statement (SEIS) to the 2004 Sierra Nevada Forest Plan Amendment (SNFPA or Framework) Final SEIS is being prepared to comply with two orders issued by the Eastern District Court of California on November 4, 2009. These court orders, issued in *Sierra Forest Legacy v. Rey*, No. 2:05-cv-00205-MCE-GGH (E.D. Cal. Nov. 4, 2009) and *People of the State of California v. USDA*, No. 2:05-cv-00211-MCE-GGH (E.D. Cal. Nov. 4, 2009), require the Forest Service to remedy a violation of NEPA relative to the analysis of alternatives presented in the 2004 Framework FSEIS by completing a narrowly focused SEIS by May 1, 2010.

Specifically, the District Court stated the following:

"The Court orders the Forest Service to prepare another supplemental EIS on the Framework, one that meets the range of alternatives and analytical consistency identified by the Ninth Circuit in its decision on the preliminary injunction portion of this case. That supplemental EIS process is to be completed not later than May 1, 2010." In its ruling on a motion for a preliminary injunction, the Ninth Circuit Court of Appeals concluded that the 2004 Framework's SEIS violated NEPA due to a failure to properly consider alternatives. *See Sierra Forest Legacy v. Rey*, 577 F.3d 1015 (9th Cir. 2009). The Ninth Circuit found two particular errors, as excerpted below:

"First, USFS altered its modeling techniques between the issuance of the 2001 FEIS and the 2004 SEIS. Unfortunately, the 2004 SEIS largely relied on fire risk and timber output figures in the 2001 FEIS, a mistake that was compounded because one of the alternatives that was considered in 2004 was recalculated under the new techniques, whereas the rest of the alternatives to which it was compared were not recalculated. Because USFS failed to account for its changed modeling techniques in the alternatives it considered, Legacy has a strong probability of success on the merits under NEPA."

"Second, the 2004 SEIS introduced substantively new objectives from those contained within the 2001 FEIS. The 2004 SEIS repeatedly stated that its purpose was to 'adjust existing management direction,' 2004 SEIS at 3098 (emphasis added), and to broaden the basic strategy 'to include other management objectives such as reducing stand density for forest health, restoring and maintaining ecosystem structure and composition, and restoring ecosystems after severe wildfires and other large catastrophic disturbance events,' 2004 SEIS at 2994 (emphasis added). The introduction of these new objectives plainly constituted a change in circumstance that is 'relevant to the development and evaluation of alternatives' that USFS 'must account for ... in the alternatives it considers.'"

1.2. Background

The 2001 SNFPA Final EIS and 2004 SNFPA Final SEIS and their associated Records of Decision (ROD) were the result of more than a decade of a regional planning effort aimed at managing species and ecosystems of the Sierra Nevada bioregion. This planning effort specifically addressed management on the 11 Sierra Nevada national forests (the Modoc, Lassen, Plumas, Tahoe, Eldorado, Stanislaus, Sierra, Sequoia, Inyo National Forests; that portion of the Humboldt-Toiyabe National Forest that is in the Sierra Nevada, and the Lake Tahoe Basin Management Unit) in terms of five problem areas:

- old forest ecosystems and associated species;
- aquatic, riparian, and meadow ecosystems and associated species;
- fire and fuels;
- noxious weeds; and
- lower westside hardwood forest ecosystems.

The 2004 Final SEIS and ROD made refinements to the 2001 SNFPA ROD based on direction from the Chief of the Forest Service in his resolution of appeals for the 2001 SNFPA ROD. The 2004 Final SEIS specifically proposed refinements of management direction related to conserving old forest ecosystems and associated species; conserving aquatic, riparian, and meadow ecosystems, and managing fire and fuels as well as refinement of management direction so as to more fully implement the *Herger-Feinstein Quincy Library Group Forest Recovery Act*.

The Record of Decision for the SNFPA Final SEIS, adopting Alternative S2, was signed on January 21, 2004. As described above, the District Court's orders require preparation of this SEIS and set the scope of the analysis conducted for this document.

1.3. Purpose and Need for Action

The purpose of this action is to remedy the two flaws found by the Ninth Circuit, as required in the two District Court orders of November 4, 2009.

1.4. Proposed Action

The Forest Service proposes to provide an objective comparison of all of the alternatives (Alternatives S1, S2 and F2 through F8) considered in detail in the 2004 SNFPA Final SEIS, including those that were carried forward from the 2001 SNFPA Final EIS (Alternatives F2 through F8). Alternatives F2 through F8 will be analyzed using the same modeling baseline data and assumptions used in modeling the outputs and effects of Alternatives S1 and S2. (Refer to the SNFPA FSEIS 2004, Chapter 2). Chapter 2 of this SEIS describes how Alternatives F2 through F8 are modeled to ensure direct comparison between Alternatives F2 through F8 and Alternatives S1 and S2. The results of the revised analysis of Alternatives F2 through F8 are presented in this SEIS. The proposed action also compares the alternatives in terms of the

objectives of reducing stand density for forest health, restoring and maintaining ecosystem structure and composition, and restoring ecosystems after severe wildfires and other large catastrophic disturbance events, which the Ninth Circuit found were introduced by the 2004 SNFPA FSEIS.

This SEIS tiers to the Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement (2001 SNFPA Final EIS) and the Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement (2004 SNFPA Final SEIS). This document uses the 2004 SNFPA Final SEIS as its foundation, replacing text, tables, and charts in Chapters 2, 3, and 4 of the Final SEIS where correction of the errors described above resulted in changes to information presented in the 2004 Final SEIS. In addition, this SEIS includes an analysis of the alternatives in terms of the three management objectives highlighted by the court.

1.5. Responsible Officials and Decision to be Made

The Regional Foresters for the Pacific Southwest Region and the Intermountain Region are the responsible officials for amendment of the SNFPA.

The Responsible Official will decide if a different decision from that reached in the 2004 SNFPA Final SEIS ROD is warranted when the range of alternatives flaws identified by the Ninth Circuit Court are remedied, or if continued implementation of Alternative S2 as originally selected in the ROD for the 2004 SNFPA Final SEIS is warranted.

1.6. Public Participation

Scoping

Extensive public involvement was conducted during development of the 2001 Final EIS and 2004 Final SEIS for the Sierra Nevada Forest Plan Amendment. The two orders issued by the District Court identify the scope of this Draft SEIS. In accordance with 40 CFR 1502.9(c)(4), no additional scoping is required for preparing a supplemental EIS. Hence, no additional scoping was conducted for this SEIS.

Public Comment

Consistent with 40 CFR 1503.1, the public will be invited and encouraged to provide comments on this Draft SEIS during the requisite comment period (40 CFR 1506.10). In order to best effectuate the purposes of NEPA and the public comment process, those commenting on this document will be asked to provide specific and detailed comments, identifying with particularity those portions of the document that need improvement, and the specific nature of any perceived errors and/or gaps in the information presented. In addition, if commenters perceive deficiencies in the document, they will be asked to suggest specific solutions to fix the identified weaknesses. Only by having clear and detailed comment on this document will the Agency be able to provide

appropriate responses and improvements, with the goal of producing both an informative and legally sufficient Final SEIS.

Chapter 2: Alternatives, including the Proposed Action

2.1. Introduction

This chapter describes the steps taken to model Alternatives F2 through F8 to ensure direct comparison of these 2001 Framework alternatives with Alternatives S1 and S2. In addition, the chapter describes the methodology used to assess Alternatives F2 through F8 in terms of objectives for reducing stand density for forest health, restoring and maintaining ecosystem structure and composition, and restoring ecosystems after severe wildfires and other large catastrophic disturbance events.

The final section of this chapter presents the updated modeling results for Alternatives F2 through F8 by comparing data presented in alternative comparison tables in the 2004 Sierra Nevada Forest Plan Amendment (SNFPA) Final SEIS Chapter 2 "Comparison of the Effects of the Alternatives" tables with new tables reflecting the updated modeling results. These updated modeling results were then reviewed to determine whether, and to what extent, they would change the effects analysis for each resource area, for example, old forest ecosystems, fire and fuels, wildlife species, and so forth. These reviews are discussed under each resource section displayed in the "Comparison of the Effects of the Alternatives" section presented in Chapter 2 of the 2004 Final SEIS (Volume 1, pp. 94 through 106).

2.2. Alternatives Considered in Detail

Two alternatives are considered in detail, the proposed action and the no action alternative, as described in the sections below.

2.2.1. Proposed Action

The proposed action addresses the deficiencies outlined in the District Court Order and Memorandum (*Sierra Forest Legacy v. Rey*, No. 2:05-cv-00205-MCE-GGH [E.D. Cal. Nov. 4, 2009] and *People of the State of California v. USDA*, No. 2:05-cv-00211-MCE-GGH [E.D. Cal. Nov. 4, 2009]) by updating the SPECTRUM modeling for Alternatives F2 through F8 to allow a direct comparison with Alternatives S1 and S2 and assessing Alternatives F2 through F8 in terms of the objectives for reducing stand density for forest health, restoring and maintaining ecosystem structure and composition, and restoring ecosystems after severe wildfires and other large catastrophic disturbance events.

2.2.1.1. SPECTRUM Modeling

Both the SNFPA Final EIS (2001) and Final SEIS (2004) used the same modeling tools and analysis methodologies to assess each alternative's outputs and environmental effects. However, as described below, some baseline vegetation and land allocation data, as well as some assumptions regarding the locations and effectiveness of fuels treatments, changed between the modeling conducted for the 2001 Final EIS and the 2004 Final SEIS. The Gamma vegetation simulator and the SPECTRUM allocation model were the primary tools used in both the 2001 and 2004 SNFPA analyses.

The 2001 Final EIS (Volume 4, Appendix B— Modeling, pp. B-23 through B-29) describes the Gamma vegetation simulator and SPECTRUM allocation models in detail. The 2004 Final SEIS also provides information about these models (Volume 1, Appendix B, pp. 396 through 397). As described in the 2004 Final SEIS (Volume 1, Appendix B, pp. 392 through 393, "B-1.2. Changes in Analysis, Assumptions, and Input Data), the vegetation and fire effects modeling for Alternatives S1 and S2 in the 2004 Final SEIS was slightly different than that of the modeling of Alternatives F2 through F8 in the 2001 Final EIS. The modeling for the 2004 Final SEIS used updated baseline forest inventory, land allocation, and treatment data as well as different assumptions regarding the spatial pattern of strategically placed area treatments (SPLATS) and fire effects coefficients. In the analysis presented in this SEIS, the Gamma vegetation simulator and SPECTRUM allocation modeling has been updated for Alternatives F2 through F8 using the same data and assumptions that were used to model Alternatives S1 and S2 in the 2004 Final SEIS as follows:

- The three new forest inventories for the Eldorado, Tahoe, and Plumas National Forests that were used to model Alternatives S1 and S2 have been used to model Alternatives F2 through F8.
- By 2003, each Sierra Nevada national forest had updated its great gray owl, California spotted owl, and northern goshawk Protected Activity Center ((PAC) maps. The 2003 updated and refined PAC boundaries (delineated in accordance with direction in the 2001 SNFPA ROD) on the 11 national forests, which were used to model Alternatives S1 and S2, have been used to model Alternatives F2 through F8.
- By 2003, each Sierra Nevada national forest had updated its Wildland Urban Intermix (WUI) maps, based on locally determined defense and threat zones. The 2003 updated and refined WUI boundaries (delineated in accordance with direction in the 2001 SNFPA ROD) on the 11 national forests, which were used to model Alternatives S1 and S2, have been used to model Alternatives F2 through F8.
- Analysis of Alternatives S1 and S2 accounted for DFPZ and group selection treatments completed as of 2003 within the Herger Feinstein Quincy Library Group (HFQLG) Pilot Project. Alternatives F2 through F8 have been modeled assuming the same set of treatments completed within the HFQLG Pilot Project Area as were assumed for modeling of Alternatives S1 and S2.

- Analysis of Alternatives S1 and S2 defined strategically placed area treatments (SPLATS) to resemble a herringbone (or tread) pattern, which more closely corresponded to the pattern developed by Dr. Mark Finney as described in the 2001 SNFPA FEIS (Volume 4, Appendix G, pp. G-30 through G-50). The Forest Service conducted a fire analysis for the Consumnes watershed of the Eldorado National Forest during 2002, and found that fuels treatment pattern modeled in the 2001 SNFPA FEIS (the upper two-thirds of the slopes on south and west facing aspects) did not produce the desired fire behavior modification outcomes, resulting in the need for a more effective approach. A more evenly distributed landscape pattern of area fuels treatment was found to be more efficient when modeled with FARSITE and FLAMMAP fire simulation models. The 2001 alternatives that included management direction for implementing SPLAT treatments (Alternatives F3, F4, F6, F7, and F8) have been modeled in this SEIS assuming the same herringbone treatment pattern used to model Alternatives S1 and S2 in the 2004 Final SEIS.
- Updated fire coefficients used to model the effectiveness of fuels treatments under Alternatives S1 and S2 (2004 SNFPA Final SEIS, Volume 1, Appendix B, pg. 392, "B-1.2. Changes in Analysis, Assumptions, and Input Data.") have been applied to model the effects of Alternatives F2 through F8 in this SEIS.
- The same 2003 costs and values derived from fuel treatments (specifically treatment costs and values derived from the sale of timber and biomass) used in the analysis of Alternatives S1 and S2 were used to model Alternatives F2 through F8.

2.2.1.2. Forest Health and Ecosystem Restoration Objectives

Assessments of Alternatives S1, S2, and F2 through F8 in terms of objectives for reducing stand density for forest health, restoring and maintaining ecosystem structure and composition, and restoring ecosystems after severe wildfires and other large catastrophic disturbance events are presented in Chapter 3 of this SEIS. Factors used to assess these objectives include each alternative's management theme, management emphasis and approach, and standards and guidelines as well as projected treatment acreages and wildfire acreages. The treatment and wildfire acreages used in these assessments are based on the values derived from the updated SPECTRUM modeling effort described in Section 2.2.1.1 above. Chapter 3, Part 3.2 "Forest Vegetation" presents more detailed information regarding the factors used to evaluate the alternatives in terms of each of the three objectives.

2.2.2. No Action Alternative

The no action alternative would not update the SPECTRUM modeling runs for Alternatives F2 through F8, nor would it specifically consider objectives for reducing stand density for forest health, restoring and maintaining ecosystem structure and composition, and restoring ecosystems after severe wildfires and other large catastrophic disturbance events. The no action alternative is the display of the effects of Alternatives F2 through F8 as presented in the 2004 Sierra Nevada Forest Plan Amendment Final SEIS.

2.3. Alternatives Considered but Eliminated from Detailed Analysis

The National Environmental Policy Act (NEPA) requires federal officials to rigorously explore and evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). NEPA further requires that the range of alternatives considered in detail include only those alternatives that would fulfill the purpose and need for the proposed action described in Chapter 1. Due to the narrow scope of the purpose and need established by the court order for this SEIS, no additional alternatives to the proposed action were considered, but eliminated from detailed analysis.

2.4. Comparison of the Effects of Alternatives S1, S2, and F2 through F8

This section compares Alternatives S1, S2, and F2 through F8 by summarizing their environmental consequences, mirroring Section 2.5 of the 2004 SNFPA Final SEIS (Volume 1, pp. 94 through 106). For each resource that summarized effects based on SPECTRUM modeling runs, two tables are displayed: (1) an exact duplicate of the table for Alternatives S1, S2, and F2 through F8 presented in the 2004 Final SEIS and (2) a new table displaying the results of the updated Gamma vegetation simulator and the SPECTRUM allocation model runs, based on the baseline vegetation and land allocation data and analysis assumptions as described in Section 2.2.1.1 above applied to the alternatives that were brought forward from the 2001 SNFPA Final EIS (Alternatives F2 through F8).

The "Comparison of Effects of the Alternatives" section presented in Chapter 2 of the 2004 Sierra Nevada Forest Plan Amendment Final SEIS (Volume 1, pp. 94 through 106) was carefully reviewed in light of the updated modeling results to assess whether, and to what extent, this updated information required changes in each resource's effects analysis. Hence, each set of tables is followed by a discussion that: (1) compares the updated modeling results to those presented in the 2004 Final SEIS; (2) evaluates the extent and magnitude to which these effects are different than those presented in Section 2.5 of the 2004 Sierra Nevada Forest Plan Amendment Final SEIS (Volume 1, pp. 94 through 106); and (3) if necessary, provides additional detailed evaluation of the effects of all of the alternatives (S1, S2, and F2 through F8) in light of the updated modeling results.

2.4.1. Old Forest Ecosystems

As described in the Final SEIS (Volume 1, pg. 94), Alternatives S1, S2, and F2 through F8 are compared in terms of their effects on: (1) amount and distribution of old forest conditions; (2) potential losses of old forests to wildfire; and (3) old forest ecosystem functions and processes.

Amount and Distribution of Old Forest Conditions

Table 2.5.1a (2004 Final SEIS, Volume 1, pg. 95) displays three variables to compare the effects of the alternatives on the amount and distribution of old forest conditions: (1) upper diameter limit for tree removal; (2) percent change in the number of large trees by the second decade; and (3) acreage of old forest allocation. The SPECTRUM modeling results are used only for the "percent change in the number of large trees by the second decade" variable. The other two variables are not derived from SPECTRUM: the "upper diameter limit" for tree removal is defined by each alternative's standards and guidelines while the "acreage of old forest allocation" simply reports the acreage of the old forest emphasis area land allocation under each alternative. Both of these variables are a function of the alternative's design and neither is affected by the modeling update.

In carefully reviewing the values for "percent change in the number of large trees by the second decade" for Alternatives F2 through F8 in Table 2.5.1a of the 2004 Final SEIS (Volume 1, pg. 95), the interdisciplinary team discovered a previously unreported error in the 2001 SNFPA Final EIS, which was inadvertently repeated in the 2004 Final SEIS. Apparently, the 2001 SNFPA Final EIS displayed values for "percent change in the number of large trees" for Alternatives F2 through F8 (2001 SNFPA Final EIS, Volume 1, Chapter 2, pg. 201, Table titled "Old Forest Conservation") that were an exact duplication of the values displayed in the 2000 SNFPA Draft EIS (2000 SNFPA Draft EIS, Volume 1, Chapter 2, pg. 2-177, Table titled "Old Forest Conservation"). However, these values should have changed due to changes in the alternatives as well as in the modeling that occurred between the 2000 Draft EIS and the 2001 Final EIS.

Table 2.4.1a is an exact duplication of Table 2.5.1a presented in the 2004 Final SEIS (Volume 1, pg. 95). Table 2.4.1b corrects the 2001 Final EIS (and 2004 Final SEIS) error in the "percent change in number of large trees by the second decade" and also reflects the changes in modeling baseline vegetation and land allocation data and assumptions described above under Section 2.2.1.1 "SPECTRUM Modeling."

Table 2.4.1a. Comparison of Large Tree Retention and Old Forest Connectivity among the Alternatives (2004 SNFPA Final SEIS).¹

Variable	Alternatives								
	S1	S2	F2	F3	F4	F5	F6	F7	F8
Upper diameter limit for tree removal	30" west 24" east	30" west 30" east	30" west 21" east	30" west 21" east	30" west na east	30" west 21" east	30" west 21" east	defined by CWHR classes	30" west 21" east
Percent change in numbers of large trees by 2nd decade	+5.5%	+5.5%	+4.7%	+4.5%	+3.3%	+5.2%	+5.1%	+3.7%	+5.7%
Acreage of old forest allocation (millions of acres)	1.636	1.636	4.873	1.337	0.713	1.745	1.605	defined at project level	2.319

Note: west = westside; east = eastside

Table 2.4.1b. Comparison of Large Tree Retention and Old Forest Connectivity among the Alternatives (2010 SEIS Update).

Variable	Alternatives								
	S1	S2	F2	F3	F4	F5	F6	F7	F8
Upper diameter limit for tree removal	30" west 24" east	30" west 30" east	30" west 21" east	30" west 21" east	30" west na east	30" west 21" east	30" west 21" east	defined by CWHR classes	30" west 21" east
Percent change in numbers of large trees by 2nd decade	+9.5%	+9.1%	+9.5%	+9.4%	+8.3%	+9.2%	+9.3%	+8.0%	+9.7%
Acreage of old forest allocation (millions of acres)	1.636	1.636	4.873	1.337	0.713	1.745	1.605	defined at project level	2.319

Note: west = westside; east = eastside

While the updated values are higher than those originally presented in the 2004 Final SEIS, the relationships between the effects of the alternatives in terms of the change in the number of large trees remains unchanged: all the alternatives show an increase in numbers of large trees by the end of the second decade, with Alternatives F4 and F7 showing lower increases compared to the other alternatives. The magnitude of change in the updated table does not change the discussion of the effects of the alternatives on the amount and distribution of old forest conditions presented in the 2004 Final SEIS (Volume 1, pp. 94 through 95).

¹ Duplicate of Table 2.5.1a from 2004 SNFPA Final SEIS, Volume 1, pg. 95

Potential Losses to Severe Wildfires

Table 2.5.1b (2004 Final SEIS, Volume 1, pg. 96) displays three variables to compare the annual wildfire acreages between Alternatives S1, S2, and F2 through F8: (1) annual acreage of wildfire in the first decade; (2) annual acreage of wildfire in the fifth decade; and (3) percent change in annual wildfire acreage from the first to fifth decade. SPECTRUM accounts for the condition of the vegetation structure over time, which is affected by growth, mortality, and treatments. For modeling purposes, wildfire frequencies are based on historical fire frequencies by forest type, for example, ponderosa pine, mixed conifer, eastside pine, and so forth. (See 2001 SNFPA Final EIS, Volume 4, Appendix G, pp. G-12 through G-15.) Fire severity coefficients describe the probability of mortality expected to occur when a wildfire burns in a particular forest type, under both treated and untreated vegetation conditions. Fire severity is expressed in terms of whether the fire results in lethal, mixed-lethal, or non-lethal effects, based on the condition of the vegetation. Alternatives F2 through F8 were modeled using the updated fire coefficients that were used to model Alternatives S1 and S2 in the 2004 SNFPA Final SEIS. (See 2004 SNFPA Final SEIS, Volume 1, Appendix B, pg. 392, last bullet statement under B-1.2. "Changes in Analysis, Assumptions, and Input Data.")

In carefully reviewing the values for "percent change in annual wildfire acreage from the first to fifth decade" for Alternatives F2 through F8 in Table 2.5.1b of the 2004 Final SEIS (Volume 1, pg. 96), the interdisciplinary team discovered a previously unreported error in the 2001 SNFPA Final EIS, which was inadvertently repeated in the 2004 Final SEIS. Apparently, the 2001 SNFPA Final EIS miscalculated the values for "percent change in annual wildfire acreage from the first to fifth decade" for Alternatives F2 through F8 (2001 SNFPA Final EIS, Volume 1, Chapter 2, pg. 199, Table titled "Effect on Wildfire") by dividing the difference in wildfire acreage between the first and fifth decades by the annual acres of wildfire in the fifth decade (rather than the annual acres of wildfire in the first decade, as should have been done). The 2004 Final SEIS Table 2.5.1b (Volume 1, pg. 96) erroneously presented the miscalculated values for Alternatives F2 through F8 from the 2001 SNFPA Final EIS. In addition, this same calculation error was applied to Alternatives S1 and S2 as presented in the 2004 Final SEIS.

Table 2.4.1c is an exact duplication of Table 2.5.1b presented in the 2004 Final SEIS (Volume 1, pg. 96). Table 2.4.1d corrects the 2001 Final EIS (and 2004 Final SEIS) miscalculation of the "percent change in annual wildfire acreage from the first to fifth decade" and also reflects the changes in modeling baseline data and assumptions described above under Section 2.2.1.1 "SPECTRUM Modeling."

Table 2.4.1c. Comparison of Annual Wildfire Acreage among the Alternatives (2004 SNFPA Final SEIS).²

Variable	Alternatives								
	S1	S2	F2	F3	F4	F5	F6	F7	F8
Annual acreage of wildfire, first decade	64,000	60,000	68,561	65,804	61,730	69,008	65,705	64,800	67,002
Annual acreage of wildfire, fifth decade	63,000	49,000	76,315	48,381	44,380	71,933	49,579	49,340	62,988
Percent change in annual wildfire acreage from first to fifth decade	-2%	-22%	10%	-36%	-39%	4%	-33%	-31%	-6%

Alternative F4 has the greatest reduction in acres expected to burn annually, followed in order by Alternatives F3, F6, F7 and S2.

Table 2.4.1d. Comparison of Annual Wildfire Acreage among the Alternatives (2010 SEIS Update).

Variable	Alternatives								
	S1	S2	F2	F3	F4	F5	F6	F7	F8
Annual acreage of wildfire, first decade	64,000	60,000	68,061	64,734	62,549	66,025	63,115	64,682	65,915
Annual acreage of wildfire, fifth decade	63,000	49,000	75,439	49,834	47,137	67,935	49,207	52,186	61,048
Percent change in annual wildfire acreage from first to fifth decade	-2%	-18%	+11%	-23%	-25%	+3%	-22%	-19%	-7%

The updated values still result in Alternative F4 having the greatest reduction in acres expected to burn annually, followed in order by Alternatives F3, F6, F7 and S2.

While the corrected, updated values show a generally lower level of annual wildfire acreage reduction than indicated in the 2004 Final SEIS, they do not result in a change the relationship between the effects of the alternatives in terms of "percent change in annual wildfire acreage from the first to fifth decade." The updated modeling results do not change the conclusion reached in the 2004 Final SEIS: "Alternative F4 has the greatest reduction in wildfire acreage expected to burn annually, followed in order by Alternatives F3, F6, F7, and S2" (Volume 1, pg. 96).

Table 2.4.1d does show a change from the 2001 values for "percent change in annual wildfire acreage between the first and fifth decades" for some of the alternatives (specifically Alternatives F3, F4, F6, and F7). However, this change is primarily due to the corrected recalculation of percent change in annual wildfire acreage between the first and fifth decades, rather than the modeling update. For example, if the percent change had been correctly calculated for Alternative F3 in the 2001 Final EIS, it would have shown a 26 percent reduction

² Duplicate of Table 2.5.1b from 2004 SNFPA Final SEIS, Volume 1, pg. 96

in annual wildfire acres between the first and fifth decades. The updated modeling results in a 23 percent reduction in wildfire acreage under Alternative F3, which is only slightly less than the correctly calculated percent change in the 2001 Final EIS wildfire acreages for this alternative.

The relative differences and rankings between the effects of the alternatives in terms of potential wildfire acres burned based on the updated modeling remain similar to that presented in the 2004 Final SEIS. Therefore, the analysis of effects of Alternatives S1, S2, and F2 through F8 on old forest conditions as indicated by potential losses to wildfire presented in the 2004 Final SEIS (Volume 1, pp. 95 through 96) remains unchanged by the updated modeling results.

Old Forest Ecosystem Functions and Processes

The updated modeling does not affect the comparison of Alternatives S1, S2 and F2 through F8 in terms of their effects on old forest ecosystem functions and processes presented in the Final SEIS (Volume 1, pg. 96). This section of the Final SEIS is a qualitative comparison of the alternatives, based on their respective standards and guidelines, and remains unchanged.

2.4.2. Aquatic, Riparian, and Meadow Ecosystems

The updated modeling does not affect the comparison of Alternatives S1, S2 and F2 through F8 in terms of their effects on aquatic, riparian, and meadow ecosystems presented in the 2004 SNFPA Final SEIS (Volume 1, pp. 96 through 97). This section of the Final SEIS presents a qualitative comparison of the alternatives, based on several factors, including the balance of acres treated and wildfire risk; treatment intensities based on each alternative's respective standards and guidelines; and requirements for landscape analysis, peer reviews, and special protections for aquatic and riparian ecosystems. This section of the Final SEIS remains unchanged by the updated modeling effort.

2.4.3. Fire and Fuels

Table 2.5.3a (2004 Final SEIS, Volume 1, pg. 98) displays three variables to compare the effects of the alternatives on fire and fuels management: (1) annual acreage of mechanical fuels treatment; (2) annual acreage of prescribed burns; and (3) total acreage treated annually. Treatment acreages under each alternative depend on the alternative's management direction for various land allocations as well as standards and guidelines. As described in Section 2.2.1.1 above, land allocations (specifically protected activity centers for California spotted owls, northern goshawks, and great gray owls as well as wildland urban intermix zones) were updated for modeling Alternatives F2 through F8. In addition, the herringbone pattern of area treatments used to model Alternatives S1 and S2 was also used to model those 2001 SNFPA alternatives with direction for implementing a SPLAT strategy (Alternatives F3, F4, F6, F7, and F8).

Table 2.4.3a is an exact duplication of Table 2.5.3a presented in the 2004 Final SEIS (Volume 1, pg. 98). Table 2.4.3b reflects the modeling results for Alternatives F2 through F8 based on the

changes in baseline vegetation and land allocation data and modeling assumptions described above under Section 2.2.1.1 "SPECTRUM Modeling."

Table 2.4.3a. Comparison of Extent of Mechanical and Prescribed Fire Fuels Treatments among the Alternatives (2004 SNFPA Final SEIS)³.

Annual acreage of mechanical fuels treatment	Alternatives								
	S11	S2	F2	F3	F4	F5	F6	F7	F8
	51,345	72,200	7,022	30,081	86,168	9,858	33,381	70,045	13,867
Annual acreage of prescribed burns	49,560	42,020	15,457	53,582	46,760	39,356	82,747	60,113	69,038
Total acreage treated annually	100,905	114,220	22,479	83,663	132,928	49,214	116,128	130,158	82,905

1 acres based on gross treatment acres

Table 2.4.3b. Comparison of Extent of Mechanical and Prescribed Fire Fuels Treatments among the Alternatives (2010 SEIS Update).

Annual acreage of mechanical fuels treatment	Alternatives								
	S11	S2	F2	F3	F4	F5	F6	F7	F8
	51,345	72,200	8,099	25,084	84,273	10,509	31,388	67,112	15,801
Annual acreage of prescribed burns	49,560	42,020	20,486	63,483	50,987	45,591	73,250	45,487	61,176
Total acreage treated annually	100,905	114,220	28,585	88,567	135,260	56,100	104,638	112,599	76,977

1 acres based on gross treatment acres

As shown in Table 2.4.3b above, the updated values for most of the alternatives show a slightly higher acreage of treatments than those displayed in the 2004 SNFPA Final SEIS (Table 2.4.3a above). However, the relationship between the effects of the alternatives in terms of "total acreage treated annually" presented in the 2004 SNFPA Final SEIS remains essentially unchanged. The updated values move Alternative S2 above Alternatives F7 and F6 in terms of "total acreage treated annually"; however, Alternatives F4, S2, F7, F6, and S1 continue to be the alternatives projected to most modify fuel loadings and change fire behavior. Hence, the updated values do not change the discussion of the effects of the alternatives on fire and fuels management presented in the 2004 Final SEIS (Volume 1, pp. 97 through 98).

2.4.4. Focal Species

Old Forest Associated Species

The 2001 SNFPA Final EIS and 2004 SNFPA Final SEIS analyze the following focal species associated with old forest ecosystems: California spotted owl, northern goshawk, marten, fisher, Sierra Nevada red fox, and wolverine. The 2004 Final SEIS discusses potential effects of

³ Duplicate of Table 2.5.3a from 2004 SNFPA Final SEIS, Volume 1, pg. 98

Alternatives S1, S2, and F2 through F8 on these old forest associated species based on several factors, including management standards and guidelines; projected changes in suitable habitat (as indicated by California Wildlife Habitat Relationship, CWHR, types) over time; extent of mechanical treatments; and potential reductions in habitat due to wildfire (2004 Final SEIS, Volume 1, pp. 98 through 101). The 2004 Final SEIS discussions of changes in suitable habitat over time are based on quantitative habitat acreage values presented in the 2001 Final EIS. However, the 2004 Final SEIS does not duplicate the suitable habitat acreages that are reported in the 2001 Final EIS for Alternatives F2 through F8.

The updated SPECTRUM modeling effort (described in Section 2.2.1.1 "SPECTRUM Modeling" above) would change the acreages in CWHR types over time reported for Alternatives F2 through F8 in the 2001 Final EIS. The results from the updated SPECTRUM modeling for Alternatives F2 through F8 were carefully reviewed to determine whether the updated values would change the effects on suitable habitat (as indicated by CWHR type) discussed in the 2004 Final SEIS.

CWHR types 4M, 4D, 5M, 5D, and 6 define suitable habitat for the California spotted owl, northern goshawk, marten, fisher, and wolverine. Table 2.4.4a below presents the acreages of CWHR types 4M, 4D, 5M, 5D, and 6 at 50 years into the future under Alternatives F2 through F8. (See 2001 SNFPA Final EIS, Volume 3, Chapter 3, Part 4.4, Table 4.4.2.1f, pg. 92.) The values presented in Table 2.4.4a below provided the basis for assessing the effects of Alternatives F2 through F8 in the 2004 Final SEIS. Table 2.4.4b reflects the changed acreages in CWHR types for Alternatives F2 through F8 resulting from the changes in baseline vegetation and land allocation data and modeling assumptions described above under Section 2.2.1.1 "SPECTRUM Modeling."

Table 2.4.4a. Comparison between Alternatives of Moderate Suitability Habitat (CWHR 4M and 4D) and High Suitability Habitat (CWHR 5M, 5D, and 6) for Old Forest Associated Species 50 years into the future (from the 2001 SNFPA Final EIS)⁴.

CWHR Type	Current (thousands of acres)	Alternative (thousands of acres)						
		F2	F3	F4	F5	F6	F7	F8
4M	1,206	780	856	890	814	830	857	802
4D	1,145	702	666	599	661	666	680	676
5M	662	1,065	1,221	1,372	1,110	1,249	1,229	1,143
5D	166	801	1,083	810	887	997	831	833
6	1,120	1,388	1,229	1,104	1,299	1,271	1,268	1,340
Total acres	4,301	4,740	5,058	4,774	4,766	5,019	4,873	4,791

Table 2.4.4b. Comparison between Alternatives of Moderate Suitability Habitat (CWHR 4M and 4D) and High Suitability Habitat (CWHR 5M, 5D, and 6) for Old Forest Associated Species 50 years into the future (2010 SEIS Update).⁵

CWHR Type	Current (thousands of acres)	Alternative (thousands of acres)								
		S1	S2	F2	F3	F4	F5	F6	F7	F8
4M	1,097	691	735	880	877	969	867	891	890	849
4D	1,140	775	797	838	812	776	811	805	907	1,107
5M	757	1,170	1,281	1,010	1,137	1,185	999	1,071	1,036	921
5D	166	2,205	2,208	703	867	787	707	807	737	784
6	955			1,304	1,204	1,150	1,183	1,163	1,305	1,431
Total acres	4,115	4,841	5,021	4,735	4,898	4,868	4,567	4,737	4,875	4,868

As shown in the tables above, the difference between the acreage values for CWHR types 4M, 4D, 5M, 5D, and 6 at 50 years into the future assumed in the analysis of effects for Alternatives F2 through F8 in the 2004 Final SEIS (Table 2.4.4a) and the updated values (Table 2.4.4b) are nominal given the current available acreages of each CWHR type (as indicated in the first column in Table 2.4.4b above). (Note that the updated vegetation data resulted in different existing acreages in each CWHR type, as indicated by comparing the first columns labeled "Current" in Tables 2.4.4.a and 2.4.4b above.) As discussed in the 2004 Final SEIS, the quantity of suitable habitat for old forest associated species is projected to increase over 50 years under all of the alternatives, with Alternatives F3 and S2 showing the highest increases and Alternatives F2 and F5 showing the lowest increases. The updated CWHR acreages do not change the discussion of the effects of the alternatives on the California spotted owl, northern

⁴ Source: Table 4.4.2.1f from 2001 SNFPA Final EIS, Volume 3, Chapter3, Part 4.4, pg 92. Acreages are calculated from the current acreage and the percent changes in habitat from the current conditions to 50 years into the future under each alternative.

⁵ Values for "current conditions" are from the 2004 Final SEIS, Volume 1, Table 4.3.2.3d, pg.268. Values for Alternatives S1 and S2 are from the 2004 Final SEIS, Volume 1, Table 4.3.2.3f, pg. 268. Note that values for acres of CWHR 5D and 6 are combined.

goshawk, marten, fisher, Sierra Nevada red fox, and wolverine presented in the 2004 Final SEIS (Volume 1, pp. 98 through 101).

Aquatic, Riparian, and Meadow Associated Species

The 2004 SNFPA Final SEIS analyzes the effects of Alternatives S1, S2, and F2 through F8 on the following focal species associated with aquatic, riparian, and meadow ecosystems: willow flycatcher, foothill yellow-legged frog, mountain yellow-legged frog, Yosemite toad, Cascades frog, and northern leopard frog (2004 Final SEIS, Volume 1, pp. 98 through 99 and pp. 101 through 102). This section of the Final SEIS presents a qualitative comparison of the alternatives, based on the degree of protection for known species sites as well as aquatic, riparian, and meadow ecosystems in general provided by each alternative's management standards and guidelines. These sections of the 2004 Final SEIS remain unchanged by the updated modeling effort.

2.4.5. Socio-Economic Concerns

Economy

Table 2.5.7a (2004 Final SEIS, Volume 1, pg. 103) displays two variables to compare the effects of the alternatives on the economy: (1) estimated average annual jobs from commercial timber harvest on Sierra Nevada national forest lands in the first decade and (2) estimated total annual earnings from commercial timber harvest on Sierra Nevada national forest lands in the first decade. The updated SPECTRUM modeling (described under Section 2.2.1.1 "SPECTRUM Modeling" above) resulted in changes to the timber volume produced under Alternatives F2 through F8, which then resulted in changes to these economic variables.

Table 2.4.5a is duplicate of Table 2.5.7a presented in the 2004 Final SEIS (Volume 1, pg. 103), as corrected by the Final SEIS errata, dated October 8, 2004. The errata corrects the 2004 Final SEIS socio-economic values presented for Alternatives S1, S2, and F6; changes the label for "average annual earnings" to "total annual earnings;" and adds footnotes on sources for the values presented in the table. Table 2.4.5b reflects the modeling results for Alternatives F2 through F8 based on the changes in baseline vegetation and land allocation data and modeling assumptions described above under Section 2.2.1.1 "SPECTRUM Modeling."

Table 2.4.5a. Comparison of Estimated Average Annual Employment and Total Annual Earnings from Commercial Timber Harvests on National Forests among the Alternatives in the First Decade (2004 SNFPA Final SEIS).⁶

Estimated average annual jobs	Alternative								
	S1	S2	F2	F3	F4	F5	F6	F7	F8
	459	1,894	145	566	3,467	322	525	2,730	222
Estimated total annual earnings (thousands \$, 1995)	22,854	57,159	7,458	26,099	116,023	14,345	26,136	89,913	12,212

Table 2.4.5b. Comparison of Estimated Average Annual Employment and Total Annual Earnings from Commercial Timber Harvests on National Forests among the Alternatives in the First Decade (2010 SEIS Update).⁷

Estimated average annual jobs	Alternative								
	S1	S2	F2	F3	F4	F5	F6	F7	F8
	459	1,894	176	473	3,206	360	765	2,527	435
Estimated total annual earnings (thousands \$, 1995)	22,854	57,159	6,084	16,311	110,551	12,411	26,384	87,125	14,998

The updated modeling results do show changes from the 2004 Final SEIS values (brought forward from the 2001 Final EIS) for "estimated average annual jobs" and "estimated total annual earnings" for Alternatives F2 through F8. However, the relative differences and rankings between the effects of the alternatives in terms of jobs and earnings related to commercial timber harvest on national forest lands remain similar to those presented in the 2004 Final SEIS. The updated values for "estimated average annual jobs" and "estimated total annual earnings" do not change the conclusion reached in the 2004 Final SEIS: "Alternatives F4, F7, and S2 would provide the largest number of jobs annually in the commercial logging sectors. Consequently, these alternatives would also result in the highest estimated annual earnings in these economic sectors." (Volume 1, pg. 103).

Commercial Forest Products

Table 2.5.7b (2004 Final SEIS, Volume 1, pg. 104) displays the modeled annual yield of green and salvage harvests by alternative for the first two decades. These estimates include the timber volumes produced under the Herger Feinstein Quincy Library Group (HFQLG) Pilot Project. SPECTRUM modeling outputs include timber harvest volumes, based on projected treatments under each alternative.

⁶ Values for average jobs generated from stumpage and milling (2001 FEIS, Volume 2, Chapter 3, Part 5.1, pp. 390 and 392. Values for total wages generated from logging (2001 FEIS, Volume 2, Chapter 3, Part 5.1, pg. 393).

⁷ Values for average jobs generated from stumpage and milling (2001 FEIS, Volume 2, Chapter 3, Part 5.1, pp. 390 and 392. Values for total wages generated from logging (2001 FEIS, Volume 2, Chapter 3, Part 5.1, pg. 393).

Table 2.4.5c is an exact duplication of Table 2.5.7b presented in the 2004 Final SEIS (Volume 1, pg. 104). Table 2.4.5d reflects the modeling results for Alternatives F2 through F8 based on the changes in baseline vegetation and land allocation data and modeling assumptions described above under Section 2.2.1.1 "SPECTRUM Modeling."

Table 2.4.5c. Comparison of Estimated Annual Timber Harvest Volume (Green and Salvage) Offered for Sale from National Forests among the Alternatives (MMBF/yr) (2004 SNFPA Final SEIS).

	Alternative								
	S1	S2	F2	F3	F4	F5	F6	F7	F8
First Decade									
Salvage timber	30	90	17	33	238	29	91	142	42
Green timber	70	329	22	84	534	49	80	414	33
Total timber	100	419	39	117	722	78	171	556	75
Second Decade									
Salvage timber	30	90	17	33	238	29	91	142	42
Green timber	20	132	7	21	294	7	57	210	14
Total timber	50	122	24	54	522	36	148	352	56

Table 2.4.5d. Comparison of Estimated Annual Timber Harvest Volume (Green and Salvage) Offered for Sale from National Forests among the Alternatives (MMBF/yr) (2010 SEIS Update).

	Alternative								
	S1	S2	F2	F3	F4	F5	F6	F7	F8
First Decade									
Salvage timber	30	90	17	32	207	27	85	140	42
Green timber	70	329	22	73	502	52	84	418	50
Total timber	100	419	39	105	709	80	169	558	96
Second Decade									
Salvage timber	30	90	17	31	214	27	82	138	46
Green timber	20	132	6	59	258	52	86	102	14
Total timber	50	122	23	90	472	80	168	240	60

As shown in Table 2.4.5d above, the updated values for most of the alternatives show either a slightly higher timber volume in the first decade (Alternatives F5, F7, and F8) or slightly lower timber volume in the first decade (Alternatives F3, F4, and F6) compared to the values displayed in the 2004 SNFPA Final SEIS (Table 2.4.5c above). Total timber volume produced in the second decade show Alternatives F3, F5, F6, and F8 with higher values compared to those displayed in the 2004 Final SEIS and Alternatives F2, F4, and F7 with lower values. However, the relationship between the effects of the alternatives in terms of total annual timber harvest presented in the 2004 SNFPA Final SEIS remains unchanged. The updated values for timber

volume produced do not change the discussion of the effects of the alternatives on commercial forest products presented in the 2004 Final SEIS (Volume 1, pp. 103).

The 2004 Final SEIS also summarizes the estimated commercial biomass output that could be available for sale under each alternative in the first decade (2004 SNFPA Final SEIS, Volume 1, Table 2.5.7c, pg. 104). Table 2.4.5e below is an exact duplication of Table 2.5.7c presented in the 2004 Final SEIS (Volume 1, pg. 104). Table 2.4.5f reflects the modeling results for Alternatives F2 through F8 based on the changes in baseline vegetation and land allocation data and modeling assumptions described above under Section 2.2.1.1 "SPECTRUM Modeling."

Table 2.4.5e. Comparison among the Alternatives of Potential Commercial Biomass Output from National Forests in the First Decade (1,000s of bone dry tons) (2004 SNFPA Final SEIS).

Alternative								
S1	S2	F2	F3	F4	F5	F6	F7	F8
4,385	7,021	660	2,440	6,200	1,710	2,910	6,680	1,720

Table 2.4.5f. Comparison among the Alternatives of Potential Commercial Biomass Output from National Forests in the First Decade (1,000s of bone dry tons) (2010 SEIS Update).

Alternative								
S1	S2	F2	F3	F4	F5	F6	F7	F8
4,385	7,021	900	2,830	5,720	2,170	2,830	7,430	2,040

While the updated values for commercial biomass output for Alternatives F2 through F8 are generally higher than the values presented in the 2004 Final SEIS (with the exception of Alternatives F4 and F6, which declined slightly), the updated values do not alter the relationship between the alternatives in terms of projected commercial biomass output from the Sierra Nevada national forests in the first decade. As disclosed in the 2004 Final SEIS, Alternatives S2, F7, F4, and S1 are projected to produce the largest amounts of commercial biomass compared to the other alternatives (2004 Final SEIS, Volume 1, pg.104). (Note that the ordering of Alternatives S2 and F7 changes with the updated modeling; however, the degree of change is minor.)

Grazing

Analysis of potential effects of the alternatives on livestock grazing is based on a spatial assessment of the extent to which each alternative's standards and guidelines would limit grazing opportunities. (See the 2001 Final EIS, Volume 2, Chapter 3, Part 5.3, pg. 404.) The updated SPECTRUM modeling does not affect this analysis process; hence, the grazing effects

comparison of Alternatives S1, S2, and F2 through F8 presented in the 2004 Final SEIS (Volume 1, pp. 104 through 105) remains unchanged.

Roads

Analysis of the effects of the alternatives on national forest roads is a qualitative assessment based on the degree of active management under the alternatives. The updated SPECTRUM modeling does not affect this assessment; hence, the effects of Alternatives S1, S2, and F2 through F8 on roads presented in the 2004 Final SEIS (Volume 1, pg. 105) remains unchanged.

Air Quality

Emissions of particulate matter larger than 10 microns (PM10) would be expected to differ by alternative in proportion to the acreages of wildfire and prescribed burning that would occur under each alternative. As described in Section 2.2.1.1 and under the "Old Forest Ecosystems" and "Fire and Fuels" sections above, the updated SPECTRUM modeling resulted in different acreages of wildfire and prescribed burning treatments, which in turn affect the emissions values.

Table 2.4.5.g below is an exact duplicate of Table 2.5.7f (2004 Final SEIS, Volume 1, pg. 106), which displays annual emissions of PM10, based on acreages of wildfire and prescribed burning projected for each alternative. Table 2.4.5h displays particulate matter emissions for Alternatives F2 through F8 based on the changes in baseline vegetation and land allocation data and modeling assumptions described above under Section 2.2.1.1 "SPECTRUM Modeling."

Table 2.4.5g. Comparison of Particulate Emissions among the Alternatives in the First Decade (Tons of PM10) (2004 SNFPA Final SEIS).

Annual wildfire emissions	Alternative								
	S1	S2	F2	F3	F4	F5	F6	F7	F8
	23,700	22,600	25,300	24,300	22,800	25,500	24,200	24,000	24,700
Annual prescribed fire emissions	2,000	2,400	3,500	12,600	11,900	9,200	18,100	13,900	14,500
Total annual emissions	25,700	25,000	28,800	36,900	34,700	34,700	42,300	37,900	39,200

Table 2.4.5h. Comparison of Particulate Emissions among the Alternatives in the First Decade (Tons of PM10) (2010 SEIS Update).

Annual wildfire emissions	Alternative								
	S1	S2	F2	F3	F4	F5	F6	F7	F8
	23,700	22,600	25,100	23,900	23,100	24,400	23,200	24,000	25,800
Annual prescribed fire emissions	2,000	2,400	4,400	13,300	12,100	10,500	14,900	12,000	13,500
Total annual emissions	25,700	25,000	29,500	37,200	35,200	34,900	38,100	36,000	39,300

Comparison of Tables 2.4.5g and 2.4.5h above show that the updated modeling effort for Alternatives F2 through F8 resulted in nominal changes in the values for particulate matter emissions. The updated values do not change the discussion of the effects of the alternatives on air quality presented in the 2004 Final SEIS (Volume 1, pp. 106).

Recreation

Effects on recreation are assessed in qualitative terms based on each alternative's management theme and emphasis. The updated SPECTRUM modeling does not affect this assessment; hence, the effects of Alternatives S1, S2, and F2 through F8 on recreation presented in the 2004 Final SEIS (Volume 1, pg. 106) remains unchanged.

Chapter 3. Affected Environment and Environmental Consequences

3.1. Introduction

Chapter 3 "Affected Environment" of the 2004 SNFPA Final SEIS has been reviewed in light of the updated modeling results for Alternatives F2 through F8 as well as the need to assess Alternatives F2 through F8 in terms of objectives for reducing stand density for forest health, restoring and maintaining ecosystem structure and composition, and restoring ecosystems after severe wildfires and other large catastrophic disturbance events. Neither the updated modeling results nor the analysis of the three ecosystem management objectives require changes to Chapter 3 of the 2004 SNFPA Final SEIS.

Chapter 4 "Environmental Consequences" of the 2004 SNFPA Final SEIS has been reviewed in light of the updated modeling results for Alternatives F2 through F8. As discussed in Chapter 2 of this SEIS, the updated modeling values do not indicate a need to update or revise the effects analyses for Alternatives F2 through F8. Hence, the sections of the 2001 SNFPA Final EIS Chapter 4 that referenced specific effects analyses for Alternatives F2 through F8 in Chapter 3 of the 2001 SNFPA Final EIS remain unchanged.

This chapter of the SEIS presents: (1) an analysis of the effects of Alternatives S1, S2, and F2 through F8 in terms of objectives for reducing stand density for forest health, restoring and maintaining ecosystem structure and composition, and restoring ecosystems after severe wildfires and other large catastrophic disturbance events; and (2) an update to Part 4.5 "Environmental Consequences for Alternatives F2 through F8" presented in Chapter 4 of the 2004 SNFPA Final SEIS (pp. 328 through 333) based on the updated modeling results.

3.2. Forest Vegetation

This section of the SEIS addresses the Eastern District Court's finding that the 2004 Final SEIS does not provide a complete evaluation of the alternatives in terms of the following objectives introduced in the 2004 SEIS: (1) reducing stand density for forest health; (2) restoring and maintaining ecosystem structure and composition; and (3) restoring ecosystems after severe wildfires and other large catastrophic disturbance events.

3.2.1. Reducing Stand Density for Forest Health

Factors Used to Evaluate the Alternatives

The density of a forest stand is a key factor in determining its vulnerability to mortality from

prolonged drought conditions, insects, and pathogens. An extensive body of scientific literature (including Rabin et al. 2009, Oliver 2005, Oliver 1979) shows that lower tree densities increase individual tree growth rates and result in lower tree mortality rates as trees gain improved access to soil moisture, sunlight, and soil nutrients.

The alternatives can be compared in terms of the level of opportunities they provide for forest managers to take action to reduce the densities of forest stands at risk of mortality due to overcrowding. Two indicators are combined to assess the degree to which each alternative provides opportunities for reducing forest stand density to improve forest health: (1) the amount of projected mechanical thinning acres, (recognizing that thinning allows managers to select specific trees to retain in the residual stand, whereas prescribed fire does not provide this level of control and may kill the desired leave trees) and (2) the degree to which the alternative's standards and guidelines allow managers to sufficiently reduce stand density to address local forest health problems. While prescribed fire can reduce stand densities, projected prescribed fire acreages under each alternative are not included as an indicator for this analysis because application of prescribed fire in dense stands is not realistic given the potential for the fire to cause excessive tree mortality as well as the potential for the fire to escape.

Environmental Consequences

Table 3.2.1 below displays the projected annual acres of mechanical thinning treatments under each alternative. Alternatives F4, S2, and F7 have the highest projected annual acreages of mechanical thinning treatments. Alternatives F2, F5, and F8 have the least projected acreages of mechanical thinning treatments, while Alternatives S1, F3, and F6 fall between the alternatives with the highest and lowest projected amounts of mechanical treatments.

Table 3.2.1. Comparison of Extent of Mechanical and Prescribed Fire Fuels Treatments among the Alternatives.

Annual acreage of mechanical fuels treatment	Alternatives								
	S11	S2	F2	F3	F4	F5	F6	F7	F8
	51,345	72,200	8,099	25,084	84,273	10,509	31,388	67,112	15,801

acres based on gross treatment acres

In addition to the projected acreages of mechanical treatments, each alternative's standards and guidelines for managing forest stands must also be considered. The management themes of both Alternatives F4 and F7 speak to the need to address forest health problems (2001 Final EIS, Volume 1, Chapter 2, pg. 104 and pg. 144). Stand-level management standards and guidelines for Alternative F4 and F7 reflect these alternatives' themes of developing and maintaining forest ecosystems that are highly resilient to severe disturbances, including insects, pathogens, and droughts. The standards and guidelines for these alternatives provide managers with a high degree of local flexibility to reduce stand density for forest health. For example, Alternatives F4 and F7 do not have stand-level canopy closure or basal area retention requirements, but instead

use desired conditions for a landscape vegetation mosaic to guide project design. This approach allows managers maximum flexibility to tailor stand-level density reduction treatments to address local forest health problems (2001 Final EIS, Volume 1, Chapter 2, pp. 106 through 107 and pp. 146 through 147). These alternatives' stand structure standards and guidelines, combined with their projected mechanical thinning acreages, make them the most responsive alternatives to the objective of reducing stand density to address forest health.

Alternative F2 lies at the opposite end of the spectrum compared to Alternatives F4 and F7. Alternative F2 responds to the view that natural processes may be the most effective means for sustaining forest ecosystems. As such, this alternative establishes an extensive network of large forest reserves across the Sierra Nevada (approximately 70 percent of the national forest lands would be in reserves). Active forest management is largely avoided within the reserves, in which only wildland fire and prescribed fire can be used (2001 Final EIS, Volume 1, Chapter 2, pg. 83 and 85). Of all the alternatives, Alternative F2 provides the least opportunities for forest managers to actively treat forest stands to address forest health problems. This, combined with the low projected mechanical thinning acreages, makes Alternative F2 the least responsive alternative for reducing stand density to address forest health.

Alternatives F5 and F8 provide managers with limited opportunities for using mechanical thinning to reduce stand density. Under Alternative F5 a relatively high proportion of the Sierra Nevada national forest land base falls within land allocations that are generally managed using prescriptive standards and guidelines that limit the intensity of mechanical thinning treatments. For example, approximately 40 percent of national forest lands fall within old forest emphasis areas, where mechanical thinning treatments would focus on removing only excessive small diameter fuels. Nearly 30 percent of Sierra Nevada national forest lands would be managed in unroaded area reserves, in which timber harvest would be prohibited (2001 Final EIS, Volume 1, Chapter 2, pg. 75 and pp. 113 through 115). Alternative F8 responds to uncertainty about the possible adverse effects of mechanical forest thinning treatments on habitat for old forest associated species. As such, its standards and guidelines require managers to retain dense stand structures where they currently exist. Alternative F8's stand structure standards and guidelines are designed to ensure that mechanical thinning treatments do not reduce the quality and quantity of existing dense stands which are considered suitable nesting and foraging habitat for the California spotted owl and other old forest associated species; hence, managers have very limited opportunities for reducing stand density to address forest health (2001 Final EIS, Volume 1, Chapter 2, pp. 154 through 158). Given the land allocations, stand structure standards and guidelines, and relatively low acreages of projected mechanical thinning treatments, Alternatives F5 and F8 provide very limited opportunities to reduce stand density to respond to local forest health problems. After Alternative F2, these alternatives rank the lowest for providing managers with opportunities for reducing stand density to address forest health problems.

Alternative S1 ranks slightly higher than Alternatives F2, F5, and F8 in terms of providing opportunities to reduce stand density to address forest health problems. While Alternative S1

does not have the extensive network of reserved areas under Alternatives F2 and F5, its stand structure standards and guidelines are similar to those proposed under Alternative F8. Under Alternative S1, mechanical thinning treatments are generally limited to removing trees less than 12 inches diameter at breast height (dbh) and reducing canopy cover in dominant and codominant trees by no more than 10 percent (2004 Final SEIS, Volume 1, pg. 46). There are exceptions to these standards and guidelines for thinning in defense zones of the urban intermix zone and under specific stand conditions; however, opportunities for reducing stand density to address forest health are limited under this alternative. Although the projected acreage of treatments appears to place this alternative higher in the ranking, its restrictive standards and guidelines for mechanical thinning treatments mean that treatments would not sufficiently reduce stand densities to respond to forest health issues.

Alternatives F3 and F6 rank higher than Alternatives F2, F5, F8, and S1 in terms of providing opportunities to address forest health problems. Alternative F3's vegetation structure standards and guidelines are generally applied at a landscape scale, with collaborative, landscape-level planning used to determine desired amounts of forest cover and other vegetation conditions. Alternative F6 has standards and guidelines based on achieving landscape- and patch-scale vegetation mosaic desired conditions for different forest types. Under both Alternatives F3 and F6, standards and guidelines provide managers with opportunities to reduce high stand densities to respond to forest health problems (as prescribed under site-specific, locally determined conditions), provided that overall vegetation mosaic desired conditions are achieved. This landscape-level approach allows managers the flexibility to respond to stand-by-stand forest health problems. However, because both Alternatives F3 and F6 place a heavy emphasis on using prescribed fire to achieve desired conditions, they would be less responsive to forest health concerns than alternatives that rely more on mechanical thinning with standards and guidelines that allow sufficient stand density reduction (Alternatives F4, F7, and S2).

Alternative S2 is next in the ordering, above Alternatives F2, F5, F8, S1, F3, and F6 and below Alternatives F4 and F7, in terms of opportunities for responding to local forest health issues. The stand structure standards and guidelines of Alternative S2, while retaining important habitat elements for old forest associated species (including large trees, canopy cover, stand basal area), provide opportunities for managers to remove some medium-sized trees to reduce stand densities to address stand-level forest health problems. While Alternative S2 has the second highest acreage of mechanical thinning treatments (after Alternative F4), the mechanical thinning standards and guidelines limit the extent to which thinning treatments can address forest health problems, compared to those of Alternatives F4 and F7.

In summary, the alternatives that provide the greatest degree of opportunities to reduce stand densities to address forest health are Alternatives F4, F7, and S2. Alternatives with the fewest opportunities to reduce stand density to address forest health are Alternatives F2, F5, F8, and S1.

3.2.2. Restoring and Maintaining Ecosystem Structure and Composition

Factors Used to Evaluate the Alternatives

All of the alternatives are aimed at the goal of restoring and maintaining ecosystem structure and composition. What differentiates them is the approach they use to achieve this goal. Some alternatives envision that natural processes proceed to the greatest extent possible to achieve this goal while other alternatives emphasize the need for active human management to restore and maintain ecosystems that have been extensively altered by human intervention, or lack thereof (as in the case of fire exclusion in Sierra Nevada national forests over the past century),

Each alternative has an overall management theme, which provides the foundation for its approach for restoring and maintaining ecosystem structure and composition. The projected acreage of different types of treatments (for example, mechanical thinning versus prescribed fire) further reflects the alternative's overall management theme. The sections below discuss each alternative in terms of: (1) the approach for achieving the goal of restoring and maintaining ecosystem structure and function; (2) the acreage of projected treatments and wildfire effects, and (3) the degree to which the alternative provides opportunities for active, intentional human management to achieve ecosystem maintenance and restoration goals.

Environmental Consequences

Alternative S1

Alternative S1's approach for conserving old forest ecosystems and associated species and for managing fire and fuels responds to concerns that impacts from mechanical fuels treatments may pose greater risks to habitats than the risks posed by potential wildland fires. Similar to the management emphasis of Alternative F8, Alternative S1 applies a cautious approach for managing fuels and forest vegetation in habitats for sensitive species, particularly species associated with old forest ecosystems.

Alternative S1 is projected to mechanically thin approximately 51,345 acres annually across the Sierra Nevada national forests and treat approximately 49,560 acres with prescribed fire. The level of prescribed fire use is nearly the same as the levels projected under Alternatives F4 and F3, with similar public concerns about adverse air quality impacts and the potential for escaped fires as well as limited opportunities to use prescribed fire in dense stands due to the potential for excessive tree mortality. The mechanical thinning and prescribed fire treatments under Alternative S1 results in a projected reduction in the wildfire acreage burned annually, a small decrease (2 percent) in wildfire acres burned from the first to fifth decade, and thus would not make significant progress toward moving fire regimes closer to their historic ranges.

Alternative S1 would increase old forest patches with high and moderate canopy closure (cover) in the short term; however, these increases could be offset by future wildfire projected under this alternative. Alternative S1 retains canopy cover and limits the sizes of trees that can be removed during fuels treatments. These restrictions limit the effectiveness that treatments would have in reducing stand density. Likewise, few areas would be suitable for the establishment of pine species due to the limited ability to create openings. The greatest restrictions on mechanical thinning treatments apply in denser stands generally comprised of medium to large sized trees, which would be subject to loss due to high severity wildfire.

Alternative S1 provides a low to moderate level of intentional, guided active management to achieve ecosystem restoration and maintenance goals based on: (1) an emphasis on using prescribed fire, which has operational obstacles, particularly impacts from smoke on air quality, inability to safely use fire in dense forest stands without excessive tree mortality, and risk of fire escape; (2) a low degree of management flexibility to respond to changing local conditions, e.g., forest health problems such as pests, disease, and catastrophic fire events; and (3) restrictive stand structure standards and guidelines that limit options for mechanically thinning stands to achieve ecosystem restoration and maintenance goals.

Alternative S2

Alternative S2 provides for the use of thinning, salvage, and prescribed and natural fires to make forests less susceptible to the effects of uncharacteristically severe wildfires, as well as invasive pests and diseases. This alternative also provides for reducing stand density and regenerating shade intolerant species. Alternative S2 adopt an integrated vegetation management strategy with the primary objective of protecting communities and modifying landscape-scale fire behavior to reduce the size and severity of wildfires.

Alternative S2 is projected to mechanically thin approximately 72,200 acres annually across the Sierra Nevada national forests and treat approximately 42,020 acres with prescribed fire. The extensive amount of fuels treatment under Alternative S2 results in a projected reduction in the wildfire acreage burned annually, an 18 percent decrease in wildfire acres burned from the first to fifth decade, and thus would move fire regimes closer to their historic ranges.

Like Alternative's F5, F8 and S1, Alternative S2 has standards and guidelines to ensure that mechanical thinning treatments retain important old forest habitat elements (for example, canopy cover and medium to large sized trees). However, Alternative S2's stand structure standards and guidelines provide greater flexibility to local managers to design projects to respond to local conditions, while meeting desired future conditions unique to each land allocation. The standards and guidelines for mechanical thinning treatments under Alternative S2 allow managers to rapidly alter forest structure and species composition under more controlled conditions as compared to using prescribed fire or natural processes to achieve ecosystem maintenance and restoration goals.

Alternative S2 provides a moderate to high level of intentional, guided active management to achieve ecosystem restoration and maintenance goals based on: (1) an emphasis on active management across forest landscapes; (2) a moderate to high degree of management flexibility to respond to changing local conditions, e.g., forest health problems such as pests, disease, and catastrophic fire events; and (3) a variety of silvicultural tools available for managers to apply to restore and maintain ecosystem structure and composition.

Alternative F2

Alternative 2 establishes large reserves across the Sierra Nevada national forests in which active management is very limited. The theme of this alternative is consistent with the view that natural processes, without human intervention, are most effective at restoring and maintaining ecosystem structure and function. This alternative proposes minimal active management, primarily within urban wildland intermix zones, and does not propose active management as an approach for restoring or maintaining ecosystem structure and composition.

Under Alternative F2, an average of 8,099 acres would be treated by mechanical thinning on an annual basis across the 11.5 million acres of Sierra Nevada national forest lands, and 20,486 acres would be treated with prescribed fire. The limited treatment acreage under this alternative results in the greatest wildfire acreage burned annually compared to the other alternatives, an 11 percent increase in annual wildfire acres from the first to fifth decade.

Though Alternative F2 establishes approximately 4,900,000 acres in large reserves, a low degree of confidence exists that there would be no adverse effect on old forest habitats because wildfire losses are likely to increase and would offset gains in old forest habitat. Concern about the potential management effects on old forest function would be minimized under this alternative due to the limited amount of mechanical treatments.

Alternative F2 allows for only minimal intentional management actions aimed at maintaining and restoring ecosystem structure and composition due to its extensive acreage in reserves; its low degree of flexibility to respond to changing local conditions, e.g., forest health problems such as pests, disease, and catastrophic fire events; and the limited ability for managers to use all silvicultural methods.

Alternative F3

The management theme for Alternative F3 calls for active management in some areas and protection of other reserved areas in order to maintain and restore ecosystem structure and composition.

Under Alternative F3, an average of 25,084 acres would be mechanically thinned on an annual basis and 63,483 acres would be treated by prescribed fire annually. The fuels strategy would be determined on a watershed rather than a larger landscape scale, and would increase the use of prescribed fire, emphasizing fuels reductions in areas of high fire hazard and risk, focused in urban wildland intermix zones. The level of prescribed fire use is approximately the same as under Alternative S1, accompanied by the uncertainty that managers would be able to implement this amount of prescribed burning due to public concerns about the potential adverse impacts of smoke and the potential for escaped fires. The extent of fuels treatments would reduce the acreage of burned annually by wildfire, a 23 percent decrease in annual wildfire acres from the first to fifth decade, and thus would move fire regimes closer to their historic ranges. Restoration of structure and function would be largely limited to coincidental changes resulting from prescribed fire, as described for Alternative S1 below.

Alternative F3 establishes nearly 2 million acres of old forest emphasis areas and ecologically significant areas in which management would be focused on restoring low to moderate intensity fires through the use of prescribed fire. As explained above, the level of prescribed fire treatments projected under this alternative would likely not be achieved. Concerns about the potential adverse effects of mechanical treatments on old forest function would largely be avoided due to this alternative's emphasis on using prescribed fire in areas of high quality late successional forest.

Alternative F3 provides a moderate level of intentional, guided active management to achieve ecosystem restoration and maintenance goals based on: (1) the protection of unroaded areas; (2) an emphasis on re-introducing fire in old forest emphasis areas and ecologically significant areas; (3) a moderate degree of management flexibility to respond to changing local conditions, e.g., forest health problems such as pests, disease, and catastrophic fire events; and (4) a somewhat limited ability for managers to use all silvicultural tools, particularly in unroaded areas, old forest emphasis areas, and ecologically significant areas.

Alternative F4

The management theme of Alternative 4 is focused on active human management to develop ecosystems that are resilient to large-scale, severe disturbances caused by fire, drought, insects, and diseases.

Alternative F4 is projected to mechanically thin approximately 84,273 acres annually across the Sierra Nevada national forests and treat approximately 50,987 acres with prescribed fire. The level of prescribed fire use is nearly the same as the levels projected under Alternatives S1 and

F3, with similar public concerns about adverse air quality impacts and the potential for escaped fires. The extensive amount of fuels treatment under Alternative F4 results in a projected reduction in the wildfire acreage burned annually, a 25 percent decrease in wildfire acres burned from the first to fifth decade, and thus would move fire regimes closer to their historic ranges.

Alternative F4 would maintain 20 percent of watersheds in old forest patches with high and moderate canopy closure (cover). Of all the alternatives, Alternative 4 would have the highest potential to protect old forest patches from wildfire losses. Moderately-sized blocks of old forest would be widely distributed and hence more limited in terms of providing habitat continuity for wide-ranging wildlife species associated with old forest conditions. Concerns about the potential effects of mechanical thinning treatments on old forest function would be highest under Alternative F4 as it projects the highest level of mechanical thinning treatments compared to the other alternatives.

Alternative F4 provides a high level of intentional, guided active management to achieve ecosystem restoration and maintenance goals based on: (1) an emphasis on active management across forest landscapes; (2) a high degree of management flexibility to respond to changing local conditions, e.g., forest health problems such as pests, disease, and catastrophic fire events; and (3) a wide range of silvicultural tools available for managers to apply to restore and maintain ecosystem structure and composition.

Alternative F5

Alternative F5 focuses on preserving existing undisturbed areas and restoring other areas to achieve ecological goals through a low to moderate degree of active management. While this alternative's prescriptive standards and guidelines result in a low degree of local flexibility to adjust treatments to respond local conditions, they are designed to ensure management consistency across the Sierra Nevada national forests.

Alternative F5 is projected to mechanically thin approximately 10,509 acres annually across the Sierra Nevada national forests and treat approximately 45,591 acres with prescribed fire.

Alternative F5 emphasizes treating forests with prescribed fire to achieve goals for restoring ecosystem structure and composition. Due to the uncertainty in the ability to carry out the level of burning called for under this alternative and the associated public concerns regarding smoke impacts and the potential for escaped fires, the ability to restore forest structure on a large scale would likely be less effective compared to alternatives with higher acreages of mechanical thinning treatments, such as Alternatives F4, F7, and S2. Only a limited portion of the landscape would be available for mechanical treatments, whereby activities can be more controlled to achieve site-specific structural and species composition goals. Annual wildfire acres from the first to fifth decade are projected to increase by 3 percent under Alternative F5, and this alternative would not be expected to move fire regimes closer to their historic ranges. Concerns about the potential adverse effects of severe wildfire on old forest habitats are higher under this alternative compared to all alternatives, except Alternative F2, due to the projected increased losses to wildfire.

Alternative F5 could increase acreages in old forest patches with high and moderate canopy closure (cover) in the short term; however, because of this alternative's less effective landscape-scale fuel treatment strategy (Alternative F5 does not have direction for strategically placed area treatments, SPLATS), the increased acreage in old forest patches could be offset by increased future losses to severe wildfire. This alternative would have high likelihood of connectivity between large blocks dedicated to old forests, and minimal concerns associated with the potential adverse effects of mechanical treatment on old forest function.

Alternative F5 provides a low to moderate level of intentional active management to achieve ecosystem restoration and maintenance goals based on: (1) the protection of unroaded areas, including smaller ecologically significant unroaded areas, in which natural processes shape desired conditions; (2) an emphasis on using prescribed fire in areas where active management can be conducted; (3) a low degree of management flexibility to respond to changing local conditions, e.g., forest health problems such as pests, disease, and catastrophic fire events; and (4) a limited ability for managers to use all silvicultural methods, particularly in unroaded areas and old forest emphasis areas.

Alternative F6

Alternative F6 is designed to integrate desired conditions for old forest and hardwood ecosystems with fire and fuels management strategies. With a moderate degree of active management and local flexibility, this alternative emphasizes re-introducing fire into Sierra Nevada forest ecosystems.

Alternative F6 is projected to mechanically thin approximately 31,388 acres annually across the Sierra Nevada national forests and treat approximately 73,250 acres with prescribed fire. The projected fuels treatments under this alternative would reduce the wildfire acreage burned annually by 22 percent from the first to fifth decade, and thus would move fire regimes closer to their historic ranges. As in the other alternatives that emphasize prescribed fire as the primary ecosystem maintenance and restoration tool (Alternatives F3 and F5), restoration of ecosystem structure and function is less precise and less predictable compared to alternatives that provide managers with the ability to apply a broader array of treatment types, particularly mechanical thinning treatments.

Alternative F6 would likely result in increased acreage in old forest patches with high and moderate canopy closure (cover). The integration of the old forest and fire and fuels management strategies in the alternative provide a high degree of certainty, compared to the other alternatives, that more old forest patches could be protected from wildfire losses. This alternative's emphasis on prescribed fire (combined with a substantial proportion of mechanical treatments) results in a low to moderate level of concern associated with the potential adverse effects of mechanical treatments on old forest function.

Alternative F6 provides a moderate level of intentional, guided active management to achieve ecosystem restoration and maintenance goals based on: (1) integration of the old forest and fire

and fuels strategies; (2) an emphasis using prescribed fire to achieve ecosystem restoration goals; (3) a moderate degree of management flexibility to respond to changing local conditions, e.g., forest health problems such as pests, disease, and catastrophic fire events; and (4) the ability for managers to use an array of silvicultural tools to actively manage forest ecosystems.

Alternative F7

Alternative 7 employs a whole forest approach in which entire landscapes are actively managed to establish and maintain a mosaic of forest conditions approximating patterns expected under natural conditions.

Alternative F7 is projected to mechanically thin approximately 67,112 acres annually across the Sierra Nevada national forests and treat approximately 45,487 acres with prescribed fire. The level of prescribed fire use is similar to the levels projected under Alternatives S1 and F3, so this alternative would have similar public concerns about adverse air quality impacts and the potential for escaped fires. The extensive fuels treatments under this alternative would reduce the wildfire acreage burned annually by 19 percent from the first to fifth decade, and thus would move fire regimes closer to their historic ranges.

Alternative F7 does not establish old forest emphasis areas; rather, the amount and distribution of moderate-sized blocks dedicated to old forests would be determined at the landscape scale, based on defined desired conditions for vegetation mosaics in different forest types. Thus, this alternative has some uncertainty about the development and maintenance of old forest patches. Concerns about the potential effects of mechanical thinning treatments on old forest function would be high under Alternative F7 as it has among the highest levels of mechanical thinning treatments compared to the other alternatives: only Alternatives F4 and S2 project higher acreages of mechanical treatments.

Alternative F7 provides a high level of intentional, guided active management to achieve ecosystem restoration and maintenance goals based on: (1) an emphasis on active management across forest landscapes; (2) a high degree of management flexibility to respond to changing local conditions, e.g., forest health problems such as pests, disease, and catastrophic fire events; and (3) a wide range of silvicultural tools available for managers to apply to restore and maintain ecosystem structure and composition.

Alternative F8

Alternative F8 applies a cautious approach to managing sensitive wildlife habitats, particularly for species associated with old forest conditions. This alternative responds to concerns about the potential adverse effects of thinning treatments on habitats for these species, and relies on stand structure retentions standards and guidelines to ensure thinning treatments do not reduce habitat quality or quantity.

Alternative F8 is projected to mechanically thin approximately 15,801 acres annually across the Sierra Nevada national forests and treat approximately 61,176 acres with prescribed fire. The

projected fuels treatments under this alternative would reduce the wildfire acreage burned annually by 7 percent from the first to fifth decade, and thus would move fire regimes closer to their historic ranges. As in the other alternatives that emphasize prescribed fire as the primary ecosystem maintenance and restoration tool (Alternatives F3, F5, and F6), restoration of ecosystem structure and function under Alternative F8 would be less precise and less predictable compared to alternatives that provide managers with more opportunities for altering forest structure and species composition under more controlled conditions (specifically through mechanical thinning). The high level of prescribed fire use under Alternative F8 increases the risk of fire escape and potentially adverse effects on air quality and scenic conditions.

Alternative F8 would increase old forest patches with high and moderate canopy closure (cover) in the short term; these large blocks are dedicated to old forests, with their extent determined through analysis of habitat needs. However, these increases could be offset by increased future losses to severe wildfire. The most restrictions on mechanical fuel treatments would apply in areas likely to contain concentrations of old forests, which would be subject to loss due to high severity wildfire.

Alternative F8 provides a low to moderate level of intentional, guided active management to achieve ecosystem restoration and maintenance goals based on: (1) an emphasis on using prescribed fire, which has operational obstacles, particularly impacts from smoke on air quality, inability to safely use fire in dense forest stands without excessive tree mortality, and risk of escapes; (2) a low degree of management flexibility to respond to changing local conditions, e.g., forest health problems such as pests, disease, and catastrophic fire events; and (3) restrictive stand structure standards and guidelines that limit options for mechanically thinning stands to achieve ecosystem restoration and maintenance goals.

3.2.3. Restoring Ecosystems after Severe Wildfires and Other Large Catastrophic Disturbance Events

Factors Used to Evaluate the Alternatives

The goal of restoring ecosystems, whether they have become altered slowly over time or due to an extreme, immediate disturbance event, is a goal of all the alternatives. Some alternatives, for example Alternatives F2 and F5, emphasize relying on natural processes to restore disturbed ecosystems. Other alternatives, for example Alternatives F4 and F7, are designed to facilitate active human intervention to restore disturbed ecosystems. For this analysis, alternatives are compared in terms of the relative ability for managers to take active steps to restore ecosystems after severe wildfires and other large catastrophic events.

The relative ability for managers to take active steps to restore ecosystems after severe wildfires and other large catastrophic events under each alternative can be evaluated by comparing the following three characteristics of each alternative: (1) management emphasis (based on its overall management theme), (2) degree of active management, and (3) degree of local flexibility

to respond to local events. Further, several alternatives have standards and guidelines that either facilitate or discourage active management following catastrophic, large scale disturbance events.

Environmental Consequences

Management Emphasis. Each alternative has management emphases, which generally includes one or two of the following types of strategies: (1) protection strategies, where large areas are designated as reserves where natural processes shape desired conditions; (2) restoration strategies, where varying levels of human management are used to create and maintain desired conditions; and (3) resiliency strategies, where a high degree of human management is used to create and maintain ecosystems resilient to severe disturbances. Alternatives that emphasize restoration and resiliency strategies, as opposed to protection strategies, are designed to provide managers with the ability to actively restore ecosystems following severe disturbance events. Table 3.2.3 below displays the management emphases for each alternative. Based on this indicator, Alternatives S2, F4, F6, and F7 have management strategies that provide opportunities for managers to take management actions to restore ecosystems following large disturbance events. While Alternatives S1, F3, F5, and F8 include restoration strategies, they also have extensive protection strategies that either prohibit or discourage active management in certain land allocations, many of which in total occupy an extensive proportion of national forest lands in the Sierra Nevada. Hence, opportunities for active restoration under these alternatives are generally limited. In addition, restoration strategies under these alternatives tend to focus on ecosystems that have been altered over time, rather than large, catastrophic events. Alternative F2's reliance on a protection strategy provides minimal opportunities for active restoration following large disturbances.

Active Management. Depending on the management emphasis, the alternatives rely on varying degrees of active human management to achieve desired environmental conditions. Alternatives with higher degrees of active management generally provide managers with a broader array of management tools (as defined by land allocations and management standards and guidelines) to respond to catastrophic disturbance events. As shown in Table 3.2.3 below, Alternatives S2, F4, and F7 provide moderate to high levels of active management, while Alternatives F2 and F5 provide the lowest degrees of active management. Alternatives S1, F3, F6, and F8 provide moderate levels of active management.

Local Flexibility. The alternatives differ in the degree of flexibility accorded local managers to tailor forest management activities to local environmental conditions. The degree of local flexibility associated with each alternative falls generally into one of three categories: (1) region-wide management direction with prescribed goals and associated methods to achieve goals; (2) region-wide direction that allows managers local discretion to choose among alternative methods; and (3) local discretion for managers to set goals and use methods that respond to local ecological and socioeconomic conditions. Alternatives with higher degrees of local flexibility

provide greater options for managers to respond to large, catastrophic disturbance events. As shown in Table 3.2.3 below, Alternatives S2, F3, F4, F6, and F7 provide moderate to high levels of local flexibility. Alternatives F2 and F5 provide the lowest degrees of local flexibility, while Alternatives S1 and F8 provide low to moderate levels of local flexibility.

Table 3.2.3. Comparison the Alternatives by Characteristics that Indicate the Degree to which Managers have Opportunities to Implement Restoration Actions Following Large, Severe Disturbance Events.

Characteristic	Alternatives								
	S1	S2	F2	F3	F4	F5	F6	F7	F8
Management Emphasis	protection, restoration	restoration, resiliency	protection	protection, restoration	resiliency	protection, restoration	restoration	restoration resiliency	protection, restoration
Degree of Active Management	moderate	moderate to high	low	moderate	high	low to moderate	moderate	moderate to high	moderate
Degree of Local Flexibility	low to moderate	moderate to high	low	moderate to high	high	low	moderate	moderate to high	low to moderate

Standards and Guidelines. Alternatives S1 and S2 are the only alternatives with standards and guidelines that provide specific direction for restoration actions following severe wildfires or other catastrophic events. (Alternatives F5, F6, F7, and F8 do however have a standard and guideline aimed at promoting existing hardwood aggregations or stands following stand-replacing events.) Alternative S2 has a set of standards and guidelines directing managers to design restoration projects following large, catastrophic disturbance events (wildfire, drought, insect and disease infestation, windstorm, and other unforeseen events) to meet such objectives as reducing soil erosion and loss of ground cover, protecting and maintaining critical wildlife habitat, and managing the development of fuel profiles over time as well as recover the value of the timber killed or severely injured by the disturbance (2004 SNFPA ROD, Standards and Guidelines # 13 through 17, pp. 52 through 53). Alternative S1 has a standard and guideline for old forest emphasis areas and California spotted owl home range core areas that focuses on allowing natural processes to proceed in these areas following severe wildfires and other stand-replacing events by requiring the retention of all snags 15 inches dbh and larger (2001 SNFPA ROD, Appendix A, pg. A-42 and A-44).

In summary, Alternatives F4, F7, and S2 provide the highest level of opportunities to take management actions to restore ecosystems following severe wildfires or other large catastrophic disturbance events. Alternatives F2, F5, F8, and S1 provide the least opportunities for taking active management to restore ecosystems following large disturbance events. Alternatives F3 and F6 fall between these two alternative groupings in terms of providing opportunities for managers to actively restore ecosystems affected by large, catastrophic disturbances.

3.3. Environmental Consequences for Alternatives F2 through F8

The 2004 SNFPA Final SEIS summarizes the environmental consequences for Alternatives F2 through F8 in Chapter 4, Part 4.5 "Environmental Consequences for Alternatives F2 through F8" (Volume 1, pp 328 through 333). This part of the 2004 Final SEIS was reviewed in light of the updated modeling results presented in Chapter 2 of this SEIS as well as the assessments presented in Part 3.2 "Forest Vegetation" above. Based on this review, the first paragraph of each alternative's section needs to be updated; the remaining four paragraphs under each alternative heading remain unchanged. The updated paragraph for each alternative is provided below.

Alternative F2: Establish large reserves where management activities are very limited.

With a management emphasis of protection and a low degree of active management and local flexibility, Alternative F2 treats annually (first decade) approximately 8,000 acres mechanically and 21,000 acres by prescribed burning, about 30 percent of the total effective acreage treated under Alternative S1 (approximately 51,000 acres of mechanical and 50,000 acres of prescribed burning). There is no strategic approach to fuel treatments; fuels treatments are conducted primarily to protect communities and reserves, relying mostly on suppression. The reduced use of prescribed burning from S1 would limit the possibility of escaped fires and air quality impacts. The limited amount of fuel treatments would result in the greatest number of acres burned annually at lethal levels by wildfire, an 11 percent increase in annual wildfire acres from the first to fifth decade (confidence is low that treatments would reduce wildfire extent and severity), and thus would not move fire regimes closer to their historic range and condition class 1.

Alternative F3: Actively manage to restore ecosystems. Use local analysis and collaboration.

The management emphasis of protection and restoration, a moderate degree of active management, and a moderate to high degree of local flexibility for Alternative F3 would result in about 25,000 acres treated mechanically and about 63,000 acres treated by prescribed fire annually in the first decade, about 13,000 fewer acres than effectively treated in Alternative S1. The fuels strategy would be determined on a watershed rather than a larger landscape scale, and would increase the use of prescribed fire, emphasizing fuels reductions in areas of high fire hazard and risk, focused in urban wildland intermix zones. Uncertainties exist about the effectiveness of treatments in altering the fire regime (confidence is low). The use of prescribed fire is higher than the level projected under Alternative S1, including the attendant risk of escaped fire and concerns about adverse air quality impacts due to smoke from prescribed fire. The extent of fuels treatments would reduce the number of acres burned annually by wildfire, a

23 percent decrease in annual wildfire acres from the first to fifth decade, and thus would move fire regimes closer to their historic range and condition class 1.

Alternative F4: Develop ecosystems that are resilient to large-scale, severe disturbances.

With a management emphasis of maintenance and resiliency and a high degree of active management and local flexibility, Alternative F4 would treat annually about 84,000 acres mechanically and about 51,000 acres by prescribed burning, about 134 percent of the total effective acres treated in Alternative S1. Following landscape analysis, the fire and fuels treatment strategy emphasizes strategically placed area treatments and defensible fuel profile zones. The use of prescribed fire is nearly of the same as Alternative S1, with similar risk of escaped fire and concerns about adverse air quality impacts due to smoke from prescribed fire. The extensive amount of fuels treatment would reduce the number of acres burned annually at lethal levels by wildfire, a 25 percent decrease in wildfire acres from the first to fifth decade (confidence is high), and thus would move fire regimes closer to their historic range and condition class 1. Because treatments used to achieve management goals would be determined locally, the risk exists that the diversity of management actions employed would not lead to desired conditions.

Alternative F5: Preserve existing undisturbed areas and restore others to achieve ecological goals. Limit impacts from active management through range-wide management standards and guidelines.

Alternative F5's management emphasis is protection and restoration, with a low to moderate degree of active management and a low degree of local flexibility. Annual mechanical and prescribed burning treatments would be about 11,000 acres and 46,000 acres, respectively, about 56 percent of the total effective acres treated in Alternative S1. The priority of the fire and fuels treatment strategy is to reduce hazard in the urban wildland intermix zone; the treatment emphasis is prescribed fire with some mechanical treatment. The increased use of prescribed fire (about 92 percent the amount of acres of Alternative S1) and would have similar risk of escaped fire and concerns about adverse air quality impacts due to smoke from prescribed fire. Annual wildfire acres from the first to fifth decade are projected to increase by 3 percent because of the lack of strategic placement of fuels treatments (confidence is low that treatments would reduce wildfire extent and intensity), and thus would not move fire regimes closer to their historic range and condition class 1. Confidence is low that there would be no adverse effect on old forest habitats because of the increased losses to wildfire.

Alternative F6: Integrate desired conditions for old forest and hardwood ecosystems with fire and fuels management goals. Reintroduce fire into Sierra Nevada forest ecosystems.

With a management emphasis of restoration, and a moderate degree of active management and local flexibility, Alternative F6 would treat annually about 31,000 acres mechanically and about 73,000 acres by prescribed burning, nearly the same total of effective acres treated in Alternative S1. The fire and fuels treatment strategy emphasizes strategically placed area treatments; landscape-scale structural requirements allow fuel treatments to be fully implemented. With approximately 23,000 more acres of prescribed burning than Alternative S1, there is a higher risk of escaped fire and concerns about adverse air quality and scenic quality impacts due to smoke from prescribed fire. The extensive amount of fuels treatment would reduce the number of acres burned annually at lethal levels by wildfire, with a 22 percent decrease in wildfire acres from the first to fifth decade (confidence is high), and thus would move fire regimes closer to their historic range and condition class 1. However, there is the uncertainty and risk that focal ecosystems and species are at greater risk from fire and fuel treatments than they are from degradation by high severity wildfire.

Alternative F7: Actively manage entire landscapes to establish and maintain a mosaic of forest conditions approximating patterns expected under natural conditions.

With a management emphasis of restoration and resiliency, and a moderate to high degree of active management and local flexibility, Alternative F7 would treat annually about 67,000 acres mechanically and about 45,000 acres by prescribed burning, about 11,000 more acres than effective acres treated in Alternative S1. Using landscape analysis, the fire and fuels treatment strategy emphasizes high hazard and risk areas and generally strategically placed area treatments. The increased use of prescribed fire (about 5,000 more acres than Alternative S1) increases the risk of escaped fire and concerns about adverse air quality impacts due to smoke from prescribed fire. The extensive amount of fuels treatment would reduce the number of acres burned annually at lethal levels by wildfire, with a 19 percent decrease in wildfire acres from the first to fifth decade (confidence is high), and thus would move fire regimes closer to their historic range and condition class 1. The greatest risk associated with this alternative is not achieving desired conditions across the landscape. A low degree of confidence exists that there would be no adverse effect on old forest habitats because of the concern that extensive reliance on mechanical treatment would damage resource values.

Alternative F8: Manage sensitive wildlife habitat cautiously. Develop new information to reduce uncertainty about the effects of management on sensitive species.

The management emphasis of protection and restoration, a moderate degree of active

management, and a low to moderate degree of local flexibility for Alternative F8 would result in about 16,000 acres treated mechanically and about 61,000 acres treated by prescribed fire annually in the first decade, about the 23,000 fewer effective acres treated than in Alternative S1. The fuels strategy is strategically placed area treatments, with limited use of mechanical treatments. Stand-level standards for retention of old forest structure may not allow fuels treatments to be fully implemented. The increased use of prescribed fire (about 11,000 more acres than Alternative S1) increases the risk of escaped fire and concerns about adverse air quality impacts due to smoke from prescribed fire. The extent of fuel treatments would reduce the number of acres burned annually at lethal levels by wildfire, a 7 percent decrease in annual wildfire acres from the first to fifth decade (confidence is moderate that treatments would reduce wildfire extent and intensity), and thus would not tend to move fire regimes much closer to their historic range and condition class 1. There is a higher short-term risk of high severity wildfire while waiting for the results of studies before implementing fuel reduction. A moderate to high degree of confidence exists that there would be minimal adverse effect on old forest habitats from mechanical treatments due to the cautious approach of this alternative.

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Since 2004, he has served as the Pacific Southwest Region Assistant Regional Silviculturist. He is the silviculturist on the Regional Strategic Decision Support Cadre. He gained Certification as a Silviculturist in 1983 and became a Regional Forester Representative for Silviculturist Certification Program in 1990. He has been a member of the Society of American Foresters since 1974.

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Distribution of the Draft Supplemental Environmental Impact Statement

This environmental impact statement has been distributed to individuals who specifically requested a copy. In addition, copies have been sent to the following Federal and State elected officials, Federal agencies, federally recognized tribes, State and local governments, organizations, and individuals:

Federally Elected Officials

U.S. Senate

Barbara Boxer (CA)
Dianne Feinstein (CA)
Harry Reid (NV)
Dina Titus (NV)

U.S. House of Representatives

California Districts 2, 3, 4, 19, 21, 22, 25
Nevada District 2

State Elected Officials

California Senate Districts 1, 4, 12, 14, 18
California Assembly Districts 2, 3, 4, 10, 25, 19, 32, 34
Nevada Senate Districts 2, 3, Capitol, Central NV
Nevada Assembly Districts 26, 32, 36, 38, 39

Federal Agencies

Advisory Council on Historic Preservation
Federal Aviation Administration
Federal Highway Administration
National Marine Fisheries Service
Rural Utilities Service
US Army Engineer Division
US Coast Guard
US Department of Energy
US Environmental Protection Agency
USDA APHIS PPD/EAD
USDA National Agricultural Library
USDA Natural Resources Conservation Service
USDA Pacific Southwest Research Station
USDI Bureau of Indian Affairs
USDI Bureau of Land Management
USDI Fish and Wildlife Service
USDI National Park Service

Tribal Government and Organizations

Alturas Rancheria
American Indian Center of Central California
American Indian Council of Mariposa County
Big Pine Paiute Tribe
Big Sandy Rancheria
Bishop Reservation
Blue Lake Rancheria
Buena Vista Rancheria
California Indian Basketweavers Association
California Indian Forest and Fire Management Council
California Indian Lands Office
Calaveras Band of MiWuk Indians
California Valley Miwok Tribe
Cedarville Rancheria
Central Sierra Me-Wuk Cultural and Historic Preservation Committee
Chicken Ranch Rancheria
Choinumni Tribe
Cold Springs Rancheria
Colfax Todd's-Valley Consolidated Tribes
Dumna Tribe
Dunlap Band of Mono Indians
El Dorado County Indian Council
Enterprise Rancheria
Fallon Paiute-Shoshone Tribes
Fort Bidwell Reservation
Fort Independence Paiute Tribes
Fort McDermitt Paiute-Shoshone Tribes
Greenville Rancheria
Haslett Basin Traditional Committee
Ione Band of MiWok Indians
Jackson Rancheria
Kern River Paiute Council
Kern Valley Indian Community
Klamath Tribes
KonKow Valley Band of Maidu
Lone Pine Paiute-Shoshone Reservation
Lovelock Paiute Tribe
Mechoopda Indian Tribe of the Chico Rancheria
Miwok Tribe of the El Dorado Rancheria
Mono Lake Indian Community
Mono Nation
Mooretown Rancheria
North Fork Rancheria of Mono Indians
Picayune Rancheria of Chukchansi Indians

Pit River Tribal Council
Pyramid Lake Paiute Tribal Council
Redding Rancheria
Reno Sparks Indian Colony Tribal Council
Shingle Springs Rancheria
Sierra Native American Council
Sierra Nevada Native American Coalition
Susanville Indian Rancheria
Table Mountain Rancheria
Timbisha Shoshone Tribe
Tule River Indian Tribe
Tuolumne Band of Me-Wuk Indians
Tyme Maidu Tribe - Berry Creek Rancheria
United Auburn Indian Community
United Maidu Nation
Utu Utu Gwaitu Paiute Tribe - Benton Paiute Rsvn
Walker River Paiute Tribe
Washoe Tribe of Nevada and California
Wukchumni Nation
Yerington Paiute Tribal Council

California State Agencies

California Air Resources Board
California Board of Forestry
California Conservation Corps
California Department of Fish & Game
California Department of Food and Agriculture
California Department of Forestry and Fire
California Department of Parks and Recreation
California Department of Parks and Recreation,
OHV
Division
California Department of Transportation
California Energy Commission
California Environmental Protection Agency
California Fish and Game Commission
California Public Utilities Commission
California Regional Water Quality Control Boards
California Natural Resources Agency
California State Association of Counties
California State Water Resources Control Board
CALFED Bay Delta Program
Nevada Department of Wildlife
Nevada Division of Environmental Protection
Nevada Division of Forestry
Nevada Division of State Parks

County/Local Government

Alpine County Board of Supervisors
Amador County Board of Supervisors
Butte County Board of Supervisors
Calaveras County Board of Supervisors

Carson City Board of Supervisors
Douglas County Board of Commissioners
East Bay Municipal Utility District
El Dorado County Board of Supervisors
Esmeralda County Board of Commissioners
Fresno County Board of Supervisors
Inyo County Board of Supervisors
Kern County Board of Supervisors
Lahontan Water Quality Central Board
Lassen County Board of Supervisors
Lassen County Fire Safe Council
Los Angeles Department of Water and Power
Lyon County Board of Commissioners
Madera County Board of Supervisors
Mariposa County Board of Supervisors
Mineral County Board of Commissioners
Modoc County Board of Supervisors
Mono County Board of Supervisors
Nevada County Board of Supervisors
North Coast Regional Water Board
North Sierra Air Quality Management District
Placer County Board of Supervisors
Plumas County Board of Supervisors
Regional Council of Rural Counties
Ridgecrest Chamber of Commerce
Sacramento Municipal Utility District
Shasta County Board of Supervisors
Sierra County Board of Supervisors
Tahoe Regional Planning Agency
Tehema County Board of Supervisors
Truckee Meadows Regional Planning Agency
Tulare County Board of Supervisors
Tuolumne County Board of Supervisors
Washoe County Board of Commissioners

Organizations

American Land Conservancy
Associated California Loggers
Blue Ribbon Coalition
California Association of 4Wheel Drive Clubs
California Cattlemen's Association
California Farm Bureau Federation
California Forestry Association
California Native Plant Society
California Off-Road Vehicle Association
California State Association of Counties
California Trout, Inc.
California Wilderness Coalition
California Wool Growers Association
Center for Biological Diversity
Central Sierra Environmental Resources Center
Defenders of Wildlife
Forest Issues Group
Friends of the River

John Muir Project
League to Save Lake Tahoe
National Audubon Society
National Forest Homeowners
National Wildlife Federation
Natural Resources Defense Council
Pacific Rivers Council
Points Reyes Bird Observatory
Quincy Library Group
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E-mail Notification

A total of 255 e-mail addresses have been notified of the availability of this Draft Supplemental Environmental Impact Statement on the Forest Service's website:
www.fs.fed.us/r5/snfpa/2010seis/

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