# Fed. Defs.' Ex. A
# Part 1 of 3

# Sierra Nevada Forest Plan Amendment
# Volume 1, Summary, Chapters 1 & 2

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The Record of Decision for the Sierra Nevada Forest Plan Amendment EIS will amend management direction in national forest land management plans and regional guides to address the five problem areas. The relevant parts of the selected alternative will become part of the amended plans and will guide activity-level decision making until replaced through subsequent amendment or revision. Management direction and land allocations in existing plans will remain in effect unless superceded by or in conflict with decisions made from this planning effort.

The Regional Foresters for the Pacific Southwest Region and Intermountain Region will be the deciding officials. Both Regional Foresters will sign one Record of Decision.

## Public Involvement

An extensive public involvement process for this FEIS began in September 1998, prior to issuing the Notice of Intent to amend the Land and Resource Management Plans for national forests in the Sierra Nevada and Modoc Plateau. Meetings and workshops were held throughout the Sierra Nevada and in San Francisco and Los Angeles so that individual citizens, private groups, tribes, elected officials, and public agencies could provide their perspectives to help frame the purpose and need and proposed action for the FEIS. A Statewide meeting was held in Davis, California in October. A Sierra Nevada tribal summit was held at Tahoe City, California in September 1998, and meetings with several American Indian tribes were held in Clovis, Bishop, Placerville, Susanville, Big Pine, and Oroville, California. Tribal members also attended several of the public meetings. This collaborative effort, completed prior to the development and analysis of alternatives, was important in identifying key problem areas facing the Sierra Nevada. Further, the USDI Fish and Wildlife Service (FWS), U.S. Environmental Protection Agency, and other State and Federal agencies were active participants in development of the FEIS.
FWS personnel are members of the interdisciplinary team.

On November 20, 1998, using information and ideas gathered during the preceding ten months, the Pacific Southwest Region and Intermountain Region published a Notice of Intent to prepare an Environmental Impact Statement in the Federal Register (Federal Register, November 1998), beginning a 60-day formal public scooping period. During the scooping period another series of public information meetings and workshops were held. Most were held in the same locations as the earlier meetings. Consultations with Native American tribes also continued during this period. To date, about 3,500 comments have been received and analyzed to help develop ways to improve national forest management. Significant issues were identified from these comments and used in the development of alternatives.

## Issues

Comments received during the public involvement process revealed important issues or public concerns, which then became influential considerations in the design and evaluation of the alternatives. Issues were also identified by reviewing published scientific, administrative, and policy documents, including internal direction affecting management of the national forests, the California Spotted Owl RDEIS, the Sierra Nevada Ecosystem Project Report, the Final Report of the California Spotted Owl Federal Advisory Committee, and the Report of the California Forest EIS Review Committee.

Several issues were clearly dominant in many people's minds. These issues are addressed in detail in this FEIS and summarized below.

## Ecosystem Management

There are different views about how to manage ecosystems to achieve the purpose and need for the Sierra Nevada Forest Plan Amendment Project. Some people advocate a preservation approach, essentially letting nature decide future ecosystem conditions and their associated societal benefits. Others believe that more active management is essential to achieve desired environmental conditions that best meet people's needs, and recommend that timber harvesting and prescribed fire be used to maintain healthy forest conditions. Still others advocate a balance of land conservation strategies where some lands are protected from human management and other lands are managed to achieve desired environmental conditions and associated social benefits.

## Old Forest Ecosystems

A significant issue centers on the debate about the amount and distribution of old forest ecosystems needed to sustain viable populations of old forest associated species. In addition, both the public and scientific community have differing views about appropriate practices and methods for increasing and perpetuating old forests.

## Riparian and Aquatic Ecosystem Health

There is disagreement over the appropriate level of management activities and types of uses in aquatic and riparian areas. One view is that management actions have the potential to degrade aquatic and riparian ecosystems. Others believe that aquatic and riparian ecosystem health can best be maintained and enhanced through active management.

## Fire and Fuels

There are differing views regarding the type, rate, and intensity of actions that should be taken to reduce fuel hazards. Among those that believe management actions should be taken, there is disagreement over the method (for example, prescribed fire versus mechanical treatment) and strategy (for example, linear fuelbreaks versus strategic area treatments), treatment priorities, and where to emphasize treatments.

## Habitat for Threatened, Endangered, and Sensitive Species

There is disagreement over how to best protect and restore habitat for wildlife, particularly threatened, endangered, and Forest Service sensitive species (for example, California spotted owl, northern goshawk, Pacific fisher, American marten, and Sierra Nevada red fox). Some advocate protection from both human interventions and nature's catastrophic events, for example, wildfire, while others advocate judicious management to encourage desired habitat conditions and reduce the risk of losses to catastrophic events.

## Lower Westside Hardwoods

There is disagreement over how to best maintain and restore hardwood ecosystems. Some advocate active management to maintain and enhance hardwood forests through mechanical methods and prescribed fire. Others advocate a preservation approach with very little active management.

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The uncertainty associated with future fire trends has serious implications in modeling fire effects on vegetation. The variation in annual acres burned and the rate at which large fire years occur are difficult to capture using the historic mean. Using the mean from 1970 to 1996 provides the SPECTRUM model with a rate of 43,000 acres burned annually. At this rate, under all of the alternatives, critical habitat types grow rapidly enough to replace habitat that is lost to wildfire. If the years between 1986 and 1996 are used, the rate provided to the SPECTRUM model is 69,800 acres. Subsequent SPECTRUM model runs made for the FEIS on national forest at this higher rate. The higher rate indicated that at year 50, in all alternatives, the rate of habitat loss from wildfires exceeded the growth and yield for critical habitat types. The sensitivity modeling done in SPECTRUM to determine the threshold rate at which critical habitat is lost to fires and not replaced indicates that it is just slightly higher than the rate associated with between 1986 and 1996. (See the Landscape Patterns section 3.1 and Appendix B for more discussion on sensitivity testing) It is also uncertain whether fire suppression resources can maintain their current levels of efficiency, and alternatives that rely on this assumption could lose critical acres of habitat at an even higher rate than modeled.

In responding to public comment the rate for projecting wildland fire acres burned was refined, it is now based on the last 10 years of fire history. The wildland fire projections now start at 69,800 acres in the FEIS. This changes several key measures in the SPECTRUM outputs: 1. the number of acres burned, 2. the proportion of lethal, mixed-lethal, and non-lethal acres by vegetation, and 3. the relative effectiveness of the alternatives. Therefore, it is assumed that the alternatives that treat the most acres in a strategic manner can potentially reduce future wildland fires the greatest and maintain the greatest amount of habitat. This assumption can only be true if the treatments themselves do not compromise habitat. If the treatments themselves compromise habitat and the habitat is considered lost or temporarily unusable, then the effects of the treatments that were designed to protect habitat from loss are similar to the effects of losing habitat to wildland fire. This assumption led to the modification of Alternative 8's treatment prescriptions.

The correlation between drought, elevation, and lightning fire size indicates that future fire frequencies will be a function of: (1) the number of dry years in succession and (2) the occurrence of lightning during dry years. The greatest acreage is expected to burn where lightning strikes coincide with the highest fuel levels. Lightning patterns at low to mid-elevations, in areas of high fuel loading on both the east and west sides of the range, will direct the pattern of future wildland fires. Rates of change in future wildfire acreages burned from historical levels are unknown and were not included in the modeling.

#### Uncertainty in Modeling Landscape Vegetation Patterns

Understanding changes in vegetation structure is critical when discussing effects of management decisions or other landscape-disturbing events. Tree-dominated vegetation on the western slopes of the Sierra Nevada has changed dramatically over time, resulting in changes in fire regimes. Modeling the effects of this change as it relates to different landscape allocations, treatment prescriptions, and levels of natural disturbance is very difficult. Therefore, uncertainty about the spatial nature of these various disturbances and treatments on the landscape over time is great. Yet, the consequences of changing the pattern of smaller even-age patches that form a large mosaic landscape can be easily seen when studying the large fire history pattern for the last 20 years in the Sierra Nevada. Fire intensities have changed with changes in vegetation due to fire exclusion and management practices. Relying on suppression resources to minimize fire effects in critical wildlife habitat is risky and its continued effectiveness over time is uncertain.

**Fire Suppression Costs**

Figure 3.5s forecasts the average annual number of acres burned by wildfire for each alternative. The number of acres differs based on each alternative's effectiveness in using preventative measures to curb the spread and severity of wildfires.

The cost estimates for fire suppression are based on two extremes. The high cost estimate assumes that fire suppression costs will be high in the next 10 years as the result of a dry cycle in the Mediterranean climate of the Sierra Nevada. Costs in this instance reflect the average suppression costs incurred by Sierra Nevada national forests during the four driest years between 1986 and 1996. The low cost estimates for fire suppression assume that the fire suppression costs in the next 10 years will be low as the result of a wet climate cycle. Low cost estimates are based on the costs to suppress wildland fire in the three lowest fire years for the period 1986 to 1996. There is approximately a 15-fold increase in costs between the low and the high estimates.

**Table 3.5w.** Average annual costs to suppress wildland fires for high, low, Wildland Fire Use, and average fire frequency years in the Sierra Nevada (in 1995 dollars).

| | Alt 1 | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 | Alt 7 | Alt 8 | Mod. 8 |
|---|---|---|---|---|---|---|---|---|---|
| Low-Fire Activity | 5,213,730 | 5,246,931 | 5,035,048 | 4,870,532 | 5,290,972 | 5,015,042 | 4,990,806 | 5,115,535 | 5,042,266 |
| High-Fire Activity | 75,995,187 | 77,458,008 | 73,490,331 | 70,675,522 | 78,115,596 | 73,587,849 | 73,035,512 | 75,990,153 | 74,119,795 |
| Wildland Fire Use | 17,500 | 175,000 | 1,750,000 | 17,500 | 175,000 | 1,750,000 | 1,750,000 | 1,750,000 | 1,750,000 |
| Average Fire Year | 35,390,728 | 36,105,539 | 34,227,642 | 32,902,495 | 36,412,312 | 34,286,403 | 34,022,353 | 35,437,309 | 34,538,765 |

**Equipment, Infrastructure, and Labor Costs**

The current fire management workload for the Sierra Nevada national forests is divided into two primary tasks. The first is fire suppression, which includes prevention, detection, and suppression of wildland fires. The second is fuels management, which includes prescribed fire planning, project implementation, smoke management, fuels inventory, and timber management support.

Alternative 2 has the lowest degree of active management, with significant declines in both prescribed fire and mechanical treatments, resulting in the greatest change in labor force and infrastructure relative to current levels. Under Alternative 2, fire management workloads would shift toward protection as the potential for wildfires increased.

Alternatives 3, 5, 8, and Modified 8 would have sufficient increases in prescribed burning to require additional personnel. This additional support could be requested from adjacent units or cooperators, contracted or hired. Alternatives 4, 6, and 7 are the most aggressive in implementing the fire and fuels management strategies and, therefore, have the greatest increases in the amount of work required. Additional labor and equipment resources would be required to support planning, contract administration, and implementation of both mechanical and prescribed fire treatments.

### D. Risk and Uncertainty of Implementation

Each alternative has varying degrees of risk and uncertainty associated with it. The threat of loss from wildfires is the most important consideration, even though we cannot predict when and where wildfires occur. The risk associated with implementing a fuels management strategy is still lower, than the threat from wildland fire, even when one considers potential smoke emissions and escaped

prescribed fires. Most of the uncertainty in implementing a successful fire management strategy is associated with doing enough fuels treatments in enough places to influence wildland fire in the intended ways.

Alternatives 3, 4, 5, 6, 7, 8, and Modified 8 all propose landscape strategies to reduce hazardous fuel conditions in the Sierra Nevada. Alternatives 3, 4, 6, and 7 have permitted flexibility in the standard and guidelines to allow for full implementation of the fire and fuels strategy. Alternative 5, 8, and Modified 8, permit full implementation treatments to occur in the defense buffer (276,185 acres) of the Urban Wildland Intermix Zone. The threat buffer (1,774,912 acres) has limits are applied to "sensitve habitats". "Sensitive habitat" comprise nearly 5 million acres of the Sierra Nevada, they include, Old Forest Emphasis areas, Spotted Owl Protected Activity Centers and Cores, and Critical Aquatic Refuges.

**Threat and Uncertainty of Loss to "Sensitive Habitats" from Wildland Fire**

The uncertainty surrounding the effects of fuel treatments on sensitive habitat is assumed greater than the risk of a wildfire may or may not happen under Alternatives 5, 8 and Modified 8. However, the ability of fire management to provide adequate fire protection so these habitats can be maintained is equally uncertain. Many if not all of the key habitat features such as large old trees, multi-layered forests, dense canopy cover, species diversity, dead and down material, and snags are based on current and existing conditions. The current habitat condition in many places is generally a result of a fire exclusion policy in the Sierra Nevada. Fire exclusion is a "management decision" and cannot be expected to maintain habitat over-time.

Most wildland fire risk assessments are based the number of ignitions that have occurred on a given landscape over a period of time. With 3 inputs, one can determine the probability of a fire on the landscape over some time period, for example; Watershed A, has a 5% chance of having a 500-acre fire or larger in the 10 years. This type of assessment is based on the Poisson Probability Law and Fire Occurrence (Wiitala 1999), interestingly in the Sierra Nevada where there is a rich fire history and lengthy fire database, the probability of large fire in the next 10 years is almost certain. Given the amount of and juxtaposition of these sensitive habitats it certain that some will be lost. The Plumas National Forest has lost 5% a year of Spotted Owl Protected Activity Centers over the last two years from wildland fires. Treatment projections for Modified 8 are estimated to be near 100,000 acres annually, with little outside of the Urban Wildland Intermix zone occurring in sensitve habitats during the first decade. The Sierra Nevada will to continue to have large fires during the implementation of any of these strategies, but as priorities focus treatments in the Urban Wildland Intermix zone, sensitve habitats including Old Forest Emphasis Areas will likely see little activity outside prescribed fire. Generally, most of the acres treated outside the Urban Wildland Intermix will be plantations or in vegetation types that are not considered sensitive habitat.

Sensitive habitats can be treated with prescribed fire, but the rate at which this will occur is also uncertain do to the limitations on burning. When treatment prescriptions in these critical habitats call for the return of fire into the ecosystem it becomes difficult, if not impossible, to maintain all the key habitat elements, such as multi-layered canopies, dead and down logs, dense overstory cover (greater than 60 percent) with each entry if limited to in-season and late-season burns. The standards and guidelines for Modified 8 do allow some flexibility in prescribed fire outcomes, but limits activity by capping the annual number of acres that can be treated.

The ability of the individual national forests or local units to implement the fire and fuels strategy will be influenced by limited operating periods, standards and guidelines. Limited operating periods vary by species, but often affect all alternatives similarly (Table 3.5x). Hence, this key factor, which influences the Forest Service's ability to implement fire and fuels management strategies, is nearly the same for all of the alternatives. Certain standards and guidelines limit the acreages in specific land allocations or areas that could be treat annually (Table 3.5x); some of the standards and guidelines apply to all of the alternatives, making it difficult to determine if one alternative would be more successful than another in implementing treatments.

Five of the seven action alternatives (Alternatives 3, 4, 6, 7, 8, and Modified 8) apply strategically placed area treatments (SPLATs) as part of their fire and fuels management strategy. However, the certainty of being able to implement the SPLAT approach differs by alternative.

**Table 3.5x.** Limiting operating periods and acres available for treatments affecting implementation of fuels and fire management strategies

| Area of Concern | Limiting Operating Period | Acres available for treatment | Alternative |
|---|---|---|---|
| **Forest Wide** | Limit to lands outside Urban "Defense" Buffer | 35% mechanical treatments | Mod 8 |
| **Critical Aquatic Refuges*** | | 15% | Mod 8 |
| **Riparian Areas*** | Limits on mechanical treatments | Vary by site Emphasis Areas | Mod 8 |
| **Meadows*** | | | |
| **Spotted Owl PAC's** | 3/1-8/31 (survey required) | 1% year per forest | 8 |
| **Spotted Owl PAC's** | 3/1-8/31 (survey required) | 10% year per forest | 6, 7, Mod 8 |
| **Goshawk PAC's** | 2/15-9/15 (survey required) | 1% year per forest | 6,7,8 |
| **Great Gray Owl** | 3/1-8/31 (survey required) | 1% year per forest | 6,7,8 |
| **Old Forests Emphasis Areas** | None for prescribed fire | | |
| **Old Forests LSOG 4 &5** | Mechanical Treatments | 15% of the area | Mod 8 |
| **Fisher Den Sites** | 3/1-6/30 (survey required) | | Mod 8 |
| **Fisher Detection Buffers** | | | 8 |
| **Martin Den Sites** | 5/15-7/31 (survey required) | | Mod 8 |
| **Martin Detection Buffers** | | | 8 |
| **Red Fox Den Sites** | 1/15-6/30 (survey required) | | Mod 8 |
| **Foothill Yellow Legged Frog**** | | 15% year per forest | 6 |
| **Foothill Yellow Legged Frog**** | | 5% year per forest | 7 |
| **Foothill Yellow Legged Frog**** | | 25% year per forest | 3,4 |
| **CA Red Legged Frog** | 10/31- 4/30 (survey required) | | All |
| **Smoke Management** | None | Locally determined | All |

**These areas are not specifically targeted for treatment by the fire and fuels management strategy.*
***This includes northern leopard frog and mountain yellow legged frog, and other riparian dependent species.*

Alternative 5, 8 and Modified 8 has the highest degree of uncertainty when it comes to implementing the SPLATs across broad landscapes. This is not a problem in the short term (first decade) given the number of acres needing treatment. The concern is due to the specific stand-level structural retention standards in suitable California spotted owl nesting and foraging habitat that could limit opportunities for establishing the SPLATs around PAC's and Core areas. For example, treatments in suitable foraging habitat must retain at least 50 percent total crown cover and treatments in suitable nesting habitat must retain at least 70 percent total crown cover. In addition, at least two distinct canopy layers must be retained in suitable nesting and foraging habitat. In landscapes with high proportions of suitable California spotted owl habitat, meeting the fuel treatment objectives for the SPLATs (such as creating a sufficient fuels mosaic so that a surface fire would only occasionally reach into the base of the secondary crowns in the stand, causing only torching of a single tree or small group trees, and maintaining a sufficient distance between crowns of adjacent trees where there is potential for active crowning on the landscape) could be difficult because of the need to maintain these key habitat

elements. Alternative 3, 6 allows managers more options for placing the SPLATs across landscapes because it establishes landscape-level desired conditions for key habitat elements, such as canopy cover and canopy layering, while allowing greater variation in individual patches or stands to provide for placement of the SPLATs as needed. Alternative 7 provides additional options for establishing the SPLATs. Alternative 4's desired conditions and standards and guidelines provide managers with the greatest degree of flexibility to establish and maintain the SPLATs; hence, this alternative has the lowest degree of uncertainty associated with implementing the SPLAT approach.

All the alternatives allow local discretion on the most effective method, location, and prescriptions for hazard fuel reduction. It is implied and understood, that the discussion and analysis in this FEIS cannot identify individual units, methods, and prescriptions for each stand encountered by the field. It can and does provide the rational for the methods, location of treatments, and prescriptions one would need to accomplish the fire and fuels strategies in the FEIS.

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range, but there are gaps where populations are potentially absent or only present in low density as a result of environmental or population conditions. However, the disjunct areas of higher potential population density are typically large enough and close enough to other subpopulations to permit dispersal among subpopulations and potentially to allow the species to interact as a metapopulation across its historical range.

**Outcome C**. The combination of environmental and population conditions restrict the potential distribution of the species, which is characterized by patchiness and/or areas of low abundance. Gaps where the likelihood of population occurrence is low or zero, are large enough that some subpopulations are isolated, limiting opportunity for species interactions. There is opportunity for subpopulations in most of the species range to interact as a metapopulation, but some subpopulations are so disjunct or of such low density that they are essentially isolated from other populations. For species for which this is not the historical condition, reduction in overall species range from historical may have resulted from this isolation.

**Outcome D**. The combination of environmental and population conditions restrict the potential distribution of the species, which is characterized by areas with high potential for population isolation and/or very low potential abundance. While some of these subpopulations may be self-sustaining, gaps where the likelihood of population occurrence is low or zero are large enough that there is limited opportunity for interactions among them. For species for which this is not the historical condition, reduction in overall species range from historical has likely resulted from this isolation.

**Outcome E**. The combination of environmental and population conditions restricts the potential distribution of the species, which is characterized by high levels of isolation and very low potential abundance. Gaps where the likelihood of population occurrence is low or zero are large enough there is little or no possibility of interactions, strong potential for extirpations, and little likelihood of recolonization. There has likely been a reduction in overall species range from historical, except for some rare, local endemics that may have persisted in this condition since the historical period.

## 4.1.4. Dealing with Uncertainty

To assess likely consequences of the FEIS alternatives, statements made regarding the future distribution of environmental conditions judged important to sustaining species must be considered with the following caveats. First, there is uncertainty regarding the effects of factors beyond Forest Service management authority will affect habitat conditions on national forest lands. Much of this uncertainty arises from random fluctuations in the environment. This so-called environmental stochasticity includes such things as late-winter storms, droughts, insect outbreaks, catastrophic fires, and so forth. Such disturbances vary in intensity and spatial distribution from year-to-year in unpredictable fashion. In addition, broad-scale, directional environmental changes induced by processes such as global warming and human development in and adjacent to the planning area can affect the overall trajectory of conditions through time. However, these factors will presumably be common among all alternatives and are considered within the realm of cumulative effects. The unpredictable nature of these processes limits the confidence in predictions of vegetative conditions (and subsequent effects on other species), particularly at smaller scales where local disturbance can have the most dramatic effect.

Other important sources of uncertainty stem from incomplete knowledge of species' population status and habitat relations, unforeseen changes that will occur on private lands, and many factors not directly related to habitat that affect various species or populations.

The sum product of the uncertainty described above and throughout this document is that any projection of future conditions is but one of many projections that could be made under different sets of assumptions. For example, future weather patterns, wildland fires, and congressional appropriations will affect implementation, but are not knowable today. For planning purposes, however, it is more important to know how alternatives compare under commonly shared assumptions. The approach taken in this assessment of consequences is to establish a single set of assumptions that apply equally across all alternatives. These assumptions limit much of the uncertainty inherent in the real world, and allow us to focus on the causal factors most likely to be influenced by management of the national forests. The primary objective of this analysis is to increase understanding of how the alternatives might affect future amount, quality, and distribution of habitats and associated effects on species persistence and distribution.

The fact that the alternatives are analyzed with uncertainty and limited information has three major implications. First, the likely outcomes reported as consequences must be viewed as products of professional judgement made using the best available scientific information. Second, all projections of consequences must be viewed as working hypotheses. While they are based on a combination of professional judgment and empirical data analysis, these hypotheses must ultimately be verified in real world experiences - reinforcing the need for adaptive management and conservation based on continued monitoring and research. Third, there is an expectation that the estimated outcomes are robust to the assumptions under which they are analyzed. That is, the utility of the analysis is strengthened if the outcomes of the alternatives remain unchanged under any reasonable set of assumptions.

In summary, there is considerable uncertainty concerning viability. This uncertainty arises as a consequence of both unknowable future events and a lack of information and understanding of ecological relationships affecting species. To analyze the consequences of the alternatives we have made reasonable assumptions about both unknowable future events and underlying ecological relationships. Further research, such as species response to habitat change, can improve our understanding of underlying relationships and, therefore, replace our assumptions about those relationships. Definitive cause and effect research on wildlife is hampered because many species of interest are long-lived. Long-lived species require longer-term research to derive definitive conclusions about underlying cause and effect relationships. The complexities of fragmented ecosystems that provide habitat also hamper the development of research results. For these reasons, many decades of research will be required to increase our knowledge of these ecosystems and the species associated with them. Unknowable future events and trends can never be discerned with future research, analysis, or information, and we must continue to rely on assumptions that portray reasonable scenarios about our future. This FEIS makes statements about incomplete information and the uncertainties associated with estimates of effects. Summaries of credible scientific evidence relevant to the effects are disclosed, and this FEIS presents impacts based on theoretical approaches or research methods generally accepted in the scientific community.