## Responses to Comments

A preliminary Environmental Assessment (EA) and supporting environmental analyses (resource specialist reports) for the Last Chance Integrated Vegetative Management Project were provided to the public for comment during the 30-day comment period. The following individuals and organizations provided timely comments during the 30-day comment period:

- Chad Hanson, representing the John Muir Project (JMP)
- Ken Wilde, representing Sierra Pacific Industries (SPI)
- Sue Britting and Craig Thomas, representing Sierra Forest Legacy (SFL), with joint signature from Pat Gallagher of the Sierra Club (SC) (2 letters)
- Linda Blum, representing the Quincy Library Group
- George Terhune, interested member of the public

This appendix describes how comments have been considered in the environmental analysis for the Last Chance Project.

**1. Comment -** "We object to reducing basal area to such low levels for a number of reasons. First, desired conditions for old growth stands have much higher basal areas than found in the post-treatment condition. Stand density for unharvested stands has been estimated from VTM data collected prior to the 1935 (Bouldin 1999). Remote mixed conifer sites in this dataset *SFL and SC: Comments on Last Chance draft EA (5-8-08) 2* reflect stands that have not been harvested and have been characterized as old growth (Ibid., p. 111-1113). Stand basal areas from two remote stands area averaged 566 $ft^2$/ac and 344 ft2/ac, respectively, and 21% of the stands exceeded 1000 $ft^2$/ac (Ibid.). Stand density in these old growth forests is 3 to 10 times greater than the post-treatment densities proposed in the draft EA (SFL & SC 1 p. 1)"

**Response** - Most of the Last Chance Project stands proposed for treatment (approximately 2,350 acres out of a total of 2,383 acres) are located within the Old Forest Emphasis Area Land Allocation. The Old Forest Emphasis Area Land Allocation encompasses approximately 40% of the National Forest System lands in the Sierra Nevada National Forests and not all of the area in this land allocation is currently in an old forest condition.

As described in the *Sierra Nevada Forest Plan Amendment Record of Decision* (SNFPA ROD 2004, page 48), desired conditions for old forest emphasis areas include the following:

- Forest structure and function generally resemble pre-settlement conditions.
- High levels of horizontal and vertical diversity exist within 10,000 acre landscapes.
- Stands are comprised of roughly even-aged vegetation groups, varying in size, species composition, and structure. Individual vegetation groups range from 0.5 to more than 5 acres in size.
- Tree sizes range from seedlings to very large diameter trees.
- Species composition varies by elevation, site productivity, and related environmental factors.
- Multi-tiered canopies, particularly in older forests, provide vertical heterogeneity.
- Dead trees, both standing and fallen, meet habitat needs of old forest associated species.

- Where possible, areas treated for fuels also provide for the successful establishment of early seral stage vegetation.

As described in the EA, a total of approximately 254 acres is currently classified as “late seral, closed canopy coniferous forest” within the Last Chance Project Area. This acreage is comprised of either small inclusions (less than 5 acres) or stands encompassed within a number of the project’s treatment areas. Hence, late seral closed canopy forest inclusions or stands comprise anywhere from 1 to 34% of the acreage within the treatment areas in which they occur. The Silviculturist Report shows that for a given treatment area, basal areas can range from 90 to over 600 $ft^2$ per acre, highlighting the high degree of heterogeneity of the vegetation within any one treatment area. Also, the lower the basal area, the faster the individual trees would grow. Trees would have larger diameter and larger crowns indicating vigor compared to stands with high basal area and smaller weak trees. The comment refers to the average basal areas reported for the treatment areas; however, these values do not reflect the higher levels of basal area for the late seral, closed canopy inclusions and stands within the treatment units. To better clarify this, the EA and the Silviculturist Report describe a range of basal areas for each treatment unit. In addition, Table 2 in the MIS Report displays the acreages of the California Wildlife Habitat Relationship (CWHR) types that comprise each treatment method.

The treatments proposed for late seral, canopy habitat under either of the action alternatives (Alternatives 1 and 3) would retain late seral characteristics in terms of canopy cover and larger trees while enhancing the resiliency of these stands to the adverse effects of wildfire, drought, insects, and diseases. None of the proposed treatments under either action alternative would reduce canopy cover in the late seral inclusions or stands below 50 percent, and all treatments would retain the larger trees, thereby retaining the existing size class “5” (medium- to large-sized trees, with an average tree size of 24 inches dbh).

**2. Comment -** “Second, a review of habitat conditions for California spotted owl lead Verner et al. (1992, p. 96) to characterize suitable owl habitat. They recommend basal areas of 185-300 $ft^2$/ac for nesting/roosting habitat and 180-200 $ft^2$/ac for foraging habitat. The weighted average and individual post treatment basal areas fall far short of these recommendations. The treated area may well be critical to foraging and nesting for California spotted owl since the home range in this area contains only 656 acres of suitable habitat in the home range core area (HRCA) (Triggs 2008, p. 13) (SFL & SC 1 p .2).”

**Response -** In response to comments, a third alternative was developed in the EA (Alternative 3) that retains higher levels of basal area than the proposed action (Alternative 1). Alternative 3 is designed to respond to concerns regarding the potential impacts of removing trees up to 30 inches dbh and reducing canopy cover on habitat for the California spotted owl.

As described in the EA (p. 7), the structure of the stands proposed for treatment is highly variable. The stand examination data alone do not completely portray the heterogeneous conditions of the stands in the project area because they are based on data gathered at the treatment area scale: in some cases, the treatment areas are comprised of highly variable stands. For example, in a single stand, basal areas can range from 90 to 600 square feet per acre:

averaged post-treatment values for the treatment areas do not capture this variability. Finally, both action alternatives (Alternative 1 and 3) would meet the Sierra Nevada Forest Plan Amendment's standards and guidelines for retaining canopy cover, basal area, and large trees.

**3. Comment -** "Lastly, our review of stand yield tables indicates that fully stocked basal area of mixed conifer stands of 100 years old on Site 50-60 range from 280 to 300 ft2/ac (Dunning and Reineke 1933). The recommendation in the Pest Report for the Last Chance Project identified that: … thinning to a stand density that is 80% or less of "normal" basal area for the site would effectively reduce tree competition for limited water and nutrients and reduce the susceptibility to future bark beetle related mortality. Thinning to this level would also be consistent with recent direction from the Regional Forester that suggests designing thinnings to "ensure that density does not exceed an upper limit (for example: 90% of normal basal area, or 60% of maximum stand density index)" and to "design thinnings to ensure that this level will not be reached again for at least 20 years after thinning." (Regional Forester letter, "Conifer Forest Density Management for Multiple Objectives", July 14, 2004). (Cluck and Woodruff 2008, p. 13). Eighty percent of full stocking, where full stocking is 280 to 300 ft2/ac, ranges from 224 to 240 ft2/ac. The proposed post treatment basal areas by unit (and weighted average over all unit) appears to be far less than the 80% of full stocking recommended by Cluck and Woodruff to ensure healthy stand conditions. We understand from the draft EA that the area is heterogeneous, i.e., existing tree cover is highly variable. Trying to imagine the spatial distribution of the trees and habitat is very challenging. For instance, given the extremely low weighted mean basal area across the treatment units (i.e., 99 ft2/ac) more than half of the area would need to be devoid of basal area to even come close a mean basal area of 200 ft2/ac. If the heterogeneous environment explains the low mean post treatment basal areas, this circumstances need to be described more fully in the draft EA. As it stands, the post harvest treatment basal areas appear to be extremely low and may be below the treatment levels modeled in the Framework FEIS. As currently portrayed, the post-treatment unit basal areas appear to be lower than necessary to increase fire resiliency or reduce density induced mortality. The extreme reduction in basal area suggests that owl habitat is degraded to levels that are far below suitable, and that desired conditions for the development of old forests are not being met. The effects of such conditions have not been adequately addressed in the draft EA (SFL & SC 1 p. 2)."

**Response-** The July 14, 2004 Regional Forester's Letter states: "When designing thinnings, ensure that density does not exceed an upper limit (for example: 90% of normal basal area, or 60% of maximum stand density index); this is a prudent way to avoid the health risks associated with density. Design thinnings to ensure that this level will not be reached again for at least 20 years after thinning."

The goal is to retain pine on this site with the desired SDI of roughly 450 maximum. This relates to managing the stand SDI at 180 (40% of maximum and allow the stand to grow to maximum) which generally occurs within 20 years. James N. Long and John D. Shaw (2005) describe a density management regime for Ponderosa pine that suggests "450 to be a reasonable approximation of the maximum size density relation" for Ponderosa pine. Their paper concludes that an SDI of 150 "as a reasonable estimate of the lower limit of full site occupancy." Oliver (1995) suggests "that endemic populations of beetles start to thin stands when their SDI reaches

230."  The 180 described above is within this recommended range.  Further personal communication with James Long states, "pick the lowest max. SDI (among the max. SDIs for the species in your desired stand) and use that as the "stand" max. SDI.  This …strategy is my recommendation.  For example, in your mixed conifer stands, I would like to use 450 as the max SDI. (Ponderosa pine will (I assume) also be one of the featured species)."  Ponderosa pine is the "preferred" species on these sites as they are the most "fire tolerant" species in this area.

As SDI continues to rise over 230 in a mixed conifer stand, ponderosa pine and other shade intolerant conifer species will decline and be out-competed by species that are relatively shade tolerant. Shade tolerant trees, such as incense cedar and true firs, can persist at much higher densities causing a shift in species composition. The prescription as designed incorporates the density and management findings and recommendations of Oliver and Long in order to maintain a component of pines in the mixed conifer stands. This strategy fulfills a key component of the purpose and need for action.

**Table 1.** below identifies the range of current and Proposed Action SDI values for treatment areas by plots within 2 treatment areas.  Using FVS, the stand was then grown for 20 years and the 20 year post thin SDI value is identified below along with a calculation stating the percent of maximum SDI that will be reached in 20 years.

| Treatment Area # | Current SDI | Post Thin SDI | 20 Year Post Thin SDI | % of Max SDI 20 years |
|---|---|---|---|---|
| **69** | 419 | 305 | 383 | 85 |
| | 561 | 358 | 407 | 90 |
| | 350 | 270 | 375 | 83 |
| | 350 | 300 | 434 | 96 |
| | 291 | 161 | 459 | 102 |
| | 363 | 345 | 420 | 93 |
| | 328 | 301 | 377 | 84 |
| | 464 | 236 | 351 | 78 |
| | 434 | 250 | 334 | 74 |
| | 487 | 336 | 354 | 79 |
| | 389 | 270 | 364 | 80 |
| | 437 | 265 | 353 | 78 |
| | 363 | 338 | 409 | 91 |
| | 411 | 264 | 357 | 79 |
| | 317 | 291 | 397 | 88 |
| | 414 | 273 | 334 | 74 |
| **134** | 158 | 158 | 264 | 59 |
| | 419 | 305 | 383 | 85 |
| | 561 | 358 | 407 | 90 |
| | 350 | 270 | 375 | 83 |
| | 350 | 300 | 375 | 83 |
| | 291 | 291 | 459 | 102 |
| | 363 | 345 | 420 | 93 |
| | 328 | 301 | 377 | 84 |
| | 464 | 236 | 351 | 78 |
| | 434 | 250 | 334 | 74 |
| | 487 | 336 | 354 | 79 |
| | 389 | 270 | 364 | 81 |

Table 1 indicates that the SDI values in these two treatment areas exceed the Regional Forester's 60% of maximum stand density index direction indicating that we are not reducing the density enough to achieve full forest health protection benefits. Please be informed that the FVS modeling is only used to compare treatments, but in this case, it does adequately demonstrate that the prescription benefits the old forest characteristics of the vegetation rather than density management. The standards and guidelines for the old forest characteristics and the marking prescription would be applied.

The stand heterogeneity must also be reflected and the intent is not to mislead the reader with Table 1 above.

**Table 2.** below identifies treatment areas with different densities and different SDI values.

| **Treatment Area** | **Current SDI** | **Post Thin SDI** | **20 Year Post Thin SDI** | **% of Max SDI 20 years** |
|---|---|---|---|---|
| **76** | 158<br>419<br>350<br>350<br>291 | 158<br>408<br>350<br>350<br>291 | 264<br>479<br>476<br>492<br>482 | |

Note that many plots in Treatment Area #76 do not show a difference in post-thin SDI. Again, this model is used for comparison, and the standards and guidelines in the SNFPA ROD would be applied. The stand heterogeneity will allow thinning in dense pockets to achieve the goals and no thinning in other areas to retain the 50% canopy cover.

When managing for basal area, Dr. William Oliver (1997) recommends a basal area below 150 $ft^2$ per acre when managing ponderosa pine. As an example, current basal areas in the Last Chance Project Treatment Area #69 ranges from 13 to 338 $ft^2$ per acre, and the Tahoe National Forest desired ranges from 153 to 249 $ft^2$ per acre. The Tahoe National Forest desired is described in the R5 Forest Service Silvicultural Practices Handbook as "desired basal ranges from 71 to 80% of normal." There is an opportunity to thin in the dense areas, and retain the 50% canopy in the open areas.

Characterizing the vegetation with weighted mean basal area across the treatment areas does not accurately reflect conditions on the ground. Ranges more accurately reflect the vegetation. The treatment areas within the Last Chance Project area are composed of heterogeneous stands that are interspersed with a variety of heterogeneous plant aggregations. As stated above, the basal areas in Treatment Area #69 currently range from 13 to 338 $ft^2$ per acre. Treatment Area #70 ranges from 98 to 637 $ft^2$ per acre. Because the data were collected and compiled at the treatment area scale, averaging these values does not reflect the heterogeneity.

Furthermore, dense aggregations within Treatment Area #69 would be thinned from below to retain at least 40% of existing basal area, generally comprised of the largest trees and to retain all live trees greater than or equal to 30 inches dbh. Leave trees would be selected from dominant or co-dominant crown classes and would be the best-formed, disease, and damage-free trees available with full crowns. Intermediate crown classes would be retained where necessary to meet the required leave tree spacing. Overtopped and suppressed trees would not be retained. Sparse areas would have little to no basal area removed.

The standards and guidelines identified in the SNFPA ROD would be implemented to ensure retention of 40% of the existing basal area, and at least 50% canopy cover where it currently exists. The marking guidelines state, "These stands are very heterogeneous and the goal of this project is to thin out the dense trees. Some areas may have minimal trees removed and other areas will have a lot of trees removed. Plan for variability." The heterogeneity and variability of the vegetation has been considered in developing the marking guidelines for this project. The vegetation modeling like FVS (Forest Vegetation Simulator) is used to compare different treatment scenarios and it is important to remember that models only give an approximation of stand conditions over time. The standards and guidelines in the ROD are the prescription that is being implemented.

Alternative 3 was developed in response to comments relating to basal area retention. This alternative would retain all trees greater than 20 inches in diameter. It would focus on thinning the 8- to 19-inch trees while retaining the 20 inch and greater. This alternative would result in higher residual basal areas and less thinning. The final EA not only fully analyzes Alternative 3 but also explains the current stand heterogeneity in more depth. Refer to the effects analysis on pages 32 through 62 of the EA.

**4. Comment- "Irregularities in Stand Data-** In addition to the issues we raise above regarding stand basal area, we also find results that appear inconsistent with the narrative of the draft EA. We ask that the apparent inconsistencies be corrected or that detailed narrative is included in the draft EA or specialist reports to explain the concerns raised below (SFL & SC p. 3)."

**Response-** Please refer to the responses below.

**5. Comment- "Abundance of trees greater than 20 inches dbh-** The draft EA (p. 33) indicates that "the majority of the trees in most of the stands proposed for treatment are greater than 20 inches in diameter." Accepting that this statement does not apply to the plantation units, we reviewed the estimated quadratic mean diameter of the post treatment stands. The QMD for the units ranged from 8.6 to 20.6 inches and about 990 acres had QMD below 14 inches. This data appears contrary to the claims that there are few trees less than 20 inches dbh available for harvest. Unit 69 provides a specific example. The existing QMD for this unit is reported as 9.8 inches. A footnote in the draft BE (p. 32), however, indicates that "the majority of the trees in Stand 69 are greater than 24 inches in diameter." If this were the case, it seems that the QMD should be higher than 9.8 inches. The basal area and trees per acre estimates also do not support the notion that the majority of the trees in this unit are greater than 24 inches dbh. The basal area reported for this unit is 119 $ft^2$/ac and the trees per acre is 243. If, for illustration purposes, we assume that 80% of the trees are 24 inches dbh, then the stand would have about 600 $ft^2$/ac of basal area (i.e., 194 TPA * 3.1 $ft^2$/ac for each 24-inch dbh tree). This rough estimate far exceeds the reported basal area of 119 $ft^2$/ac (SFL & SC p. 3)."

**Response-** As described in the responses above and shown in Table 10 of the EA (p. 35), the treatment areas are typically comprised of several stands; hence, treatment area averages do not describe the heterogeneous condition of the vegetation. Ranges provide a more complete picture of actual conditions on the ground. For example, the QMD measured in individual plots in Treatment Area #65 ranges from 6.6 to 11.4 inches; Treatment Area #66 ranges from 5.7 to 21.6 inches; and the QMD for Treatment Area #69 ranges from 5.6 to 10.8 inches. The Pacific Southwest Region Silvicultural Handbook describes QMD as "the diameter of the tree of average basal area." The QMD has a stronger correlation to stand volume than the arithmetic mean of stand diameter. Therefore, QMD is the quadratic mean diameter of a tree equal to the mean basal area of the stand.

The diameter distribution from a plot in Treatment Area #69 (where the QMD is 10.8 inches) is as follows:

| **Diameter Class (inches)** | **Number of Trees per Acre** |
|---|---|
| 2 | 72 |
| 4 | 168 |
| 6 | 144 |
| 8 | 96 |
| 10 | 0 |
| 12 | 0 |
| 14 | 8 |
| 16 | 8 |
| 18 | 0 |
| 20 | 0 |
| 22 | 0 |
| 24 | 8 |
| 26 | 0 |
| 28 | 0 |
| 30 | 16 |
| 32 | 0 |
| 34 | 0 |
| 36 | 0 |
| 38 | 8 |
| 40 | 0 |
| 42 | 8 |

Another plot in Treatment Area # 69 (where the QMD is 5.6 inches) is as follows:

| **Diameter Class (inches)** | **Number of Trees per Acre** |
|---|---|
| 2 | 192 |
| 4 | 144 |
| 6 | 24 |
| 8 | 80 |
| 10 | 8 |
| 12 | 24 |
| 14 | 8 |

The above diameter class distributions reflect the heterogeneity within the treatment areas. The statement noted in this comment appeared on page 33 of the EA under development during the

30-day comment period.  The specific statement was: “the majority of the trees in most of the stands proposed for treatment are greater than 20 inches in diameter.”  This statement was intended to imply that the diameter classes that are contributing to the potential volume removal are greater than 20 inches.  For example, the volume of a 4-inch diameter tree is 0.726 cubic feet; a 24-inch diameter tree has a volume of 88 cubic feet; and a 42-inch tree has 469 cubic feet.  The trees available to be managed with a commercial timber sale are greater than or equal to 10 inches dbh under a standard timber sale contract and 4 inches dbh under a stewardship contract.

The FVS was used in this analysis to compare effects between treatment areas and between alternatives.  Treatment area averages can be misleading in the stand density discussion due to the vegetation heterogeneity within the treatment areas.  The SNFPA ROD standards and guidelines, including retention of 50% canopy cover and retention of 40% of the existing basal area, would be followed in carrying out the treatment prescriptions.  The FVS modeling is used for making relative comparisons between treatment areas and between alternatives only.

**6. Comment- “Reduction in QMD with Harvest -** The draft EA (p. 33) states “The prescription is to always thin from below starting with 4 inch in diameter trees and working up.” We interpret this to mean that the trees will be thinned starting with the smallest diameter and increasing diameter until the objectives are met.  One characteristic of a thin from below is to increase the post-treatment QMD.  We note that for several of the harvest unit (Units 67, 68, 76, 77, 78, 135, and 136; totaling 625 acres), the post harvest QMD is actually less than the pretreatment QMD.  For several other units (Units 65, 73, and 133; totaling 188 acres) have no or a very minor (< 0.2inches) reductions in QMD.  These reductions in QMD and lack of increase in QMD suggest that practices other than thin from below (e.g., thin from the middle or across all diameter classes) are being proposed (SFL & SC p. 3).”

**Response-** Thank you for pointing out the discrepancies in the table.  The information has been corrected in the EA. The commenter is correct, in that a thin from below will increase the post-harvest QMD as smaller trees are removed.  While modeling provides an indication of the effects of the treatments on vegetation structure, the forest plan standards and guidelines (which are embodied in the marking guidelines) would ultimately determine which trees would actually be retained on the ground when the project was implemented.

**7. Comment- “Economic Analysis-** The limited economic analysis provided in the draft EA (p. 48) indicates that there will be a net value of $248,380.  We ask that you provide a more detailed analysis that covers all the activities proposed in the project including prescribed burning, road repairs, and treatment of small diameter material.  This information is needed to evaluate the cost effectiveness of the project and the claims made in the draft EA (p. 32) that thinning to lower diameter limits would be uneconomic.  We note that according to the existing volume estimates about 6 mbf/acre will be harvested from the tractor units.  This is twice the volume that was used to judge the economic feasibility of proposals to harvest at lower diameter limits and suggests to us that there is additional volume that can be retained while still meeting the stated criteria (3 mbf/acre) for economic feasibility (SFL & SC p. 3).”

**Response-** The most current economic analysis for the proposed action shows a reduction in overall net value from that previously reported. The reduction in value is related to higher logging costs, higher fuel costs, and reduction in the delivered log prices as of May 19, 2008. Draft project documents initially reported a net value of $248,380.00; however, the current estimated net value is $215,828.00. The estimated base rate value is $110,644.00. Approximately $105,184.00 potentially above base rate value would be available for proposed treatments: $10,000.00 for road reconstruction; $35,000.00 for small stem removal (only on tractor ground units); and $60,184.00 for tractor piling (approximately 300 acres).

The economic analysis for Alternative 3 takes into account two treatment areas: #67 and #133 for approximately 198 acres. This alternative would not cut trees larger than 20 inches dbh using a thinning from below, favoring retention of dominant, co-dominant, and some intermediate trees. The average cut diameter under Alternative 3 is estimated to be 13 inches dbh. A total of approximately 330 mbf would be harvested under this alternative.

The economic analysis based on an average cut tree diameter of 13 inches dbh resulted in an estimated net value to be $90,000.00. The estimated base rate value is $60,000.00. Approximately $29,440.00 potential above base value is available for proposed treatments: Thinning at a small average diameter could potentially allow needed road reconstruction ($10,000.00) and allow removal of hazardous small stem material ($2,250.00). There could be insufficient funds for tractor piling hazardous fuels ($19,800.00).

The proposed action is designed to retain all live trees equal to or greater than 30 inches dbh. The estimated administrative costs pertaining to analysis is $26.35 per mbf and appeals is $13.18 per mbf based on the Tahoe NF program costs, August 2007.

Costs for timber sale preparation are approximately $20.14 per mbf. Timber Sale Administration average costs are approximately $20.14 per mbf based on Tahoe NF program costs, August 2007.

Hazardous fuels treatment related costs vary by treatment. Average tractor piling and burning costs are approximately $500.00 per acre based on historic actual costs of similar projects, adjusted for inflation.

Post mechanical thinning treatments that require brush maintenance: general costs estimates range between $100.00 per acre to $300.00 per acre based on local American River RD experience. Several variables influence effectiveness and efficiency of post mechanical thinning treatments such as slopes, weather, staffing fuel type, and fuel conditions.

The Last Chance action alternatives include follow-up fuels treatments. Hence, there would be no additional costs for these related treatments once the initial project proposal was carried through the environmental analysis process.

The estimated timber sale receipts generated for the Last Chance project could be $110,644.00. The estimated volume to be removed is 10 mmbf based on general sale and data input for timber sale economic evaluation, USFS-R-5 Sale Evaluation.

Alternative 3 would treat approximately 198 acres using mechanical harvesting method. The average size material cut and removed would be 13 inch dbh, predominately sugar pine, Douglas-fir and white fir. Approximately 330 mbf of merchantable sawtimber would be cut and removed.

The estimated timber sale receipts generated under Alternative 3 would be $6,510.00 based on data input for timber sale economic evaluation, USFS-R-5 Sale Evaluation.

**8. Comment- "Marking Guidelines-** We appreciate your inclusion of the marking guidelines in the package circulated for review. Review of this document helps us to understand some of your thinking about how you plan to implement the harvest prescriptions. To further our understanding of project implementation, we are interested in reviewing marked units prior to timber harvest to evaluate how the marking crew interpreted the directions (SFL & SC p. 4)."

**Response–** Tree marking is completed. We have hosted several field visits to the project area. One field trip included review and discussion of tree marking designation. This was held Summer, 2008.

**9. Comment- "Management of Plantations-** We continue to be very supportive of the efforts proposed in the draft EA to masticate and otherwise increase the fire resiliency of the plantations located within the project area (SFL & SC p. 4)."

**Response**– Please note that the plantation mastication treatments were proposed as a categorically excluded action (Forest Service Handbook 1909.15 Chapter 31. 2, Category 6. Timber stand and/or wildlife habitat improvement activities which do not include the use of herbicides or do not require more than one mile of low standard road construction). These treatments have been separated out from the Last Chance Project environmental analysis to provide a higher likelihood that the Pest Management (Western Pine Beetle Initiative) funding, which expires at the end of the fiscal year (September 30, 2008), can be committed for this work.

**10. Comment- "Alternatives-** Based on our review of the data in the draft EA, we have serious concerns that tree density is being reduced to levels that are far below those needed to increase fire resiliency and to reduce the potential for density induced mortality. We ask that you develop an alternative that retains greater basal area while still increasing fire resiliency of the stands. We also ask that you develop an alternative that favors the retention of medium sized (larger than 16inches to 20inches dbh, depending on the stand) ponderosa pine (SFL & SC p. 4)."

**Response-** To respond to this comment, the EA includes a third alternative (Alternative 3) that retains higher levels of basal area in the larger trees than the proposed action (Alternative 1). Alternative 3 would remove no trees greater than or equal to 20 inches dbh. Alternative 3 is designed to respond to concerns regarding the potential impacts of removing trees up to 30 inches dbh and reducing canopy cover on habitat for the California spotted owl.

**11. Comment- "Post Treatment Basal Areas for the Last Chance Project Are Far Lower than Those Suggested in Direction from the Regional Forester.**

The Regional Forester issued clarification and guidance on the design of treatments to address forest health and stand density on July 14, 2004. (Attachment 1). The direction indicates:

> ...when designing thinnings ensure that density does not exceed an upper limit (for example: 90% of normal basal area, or 60% of maximum stand density index); this is a prudent way to avoid the health risks associated with density.

The post thinning basal areas proposed in the Last Chance draft EA appear to be substantially below 90% of normal basal area and well outside the direction from the Region (SFL & SC 2 p. 1)."

**Response-** The direction cited in this comment is incomplete. The following sentence in the guidance letter from the Regional Forester states, "Design thinnings to ensure that this level will not be reached again for at least 20 years after thinning." Tree growth will cause an increase in basal area over the next 20 years. Post-thinning basal areas are lower than the recommended upper limits of density to allow for this growth. The treatments proposed in this project meet direction from the Region. See also the response to Comment 3.

**12. Comment- "Projects Elsewhere in Old Forest Emphasis Areas on the Tahoe National Forest Retain Higher Basal Area and Still Meet Forest Health Objectives.**

We have been reviewing the Canyon Project on the Yuba River Ranger District of the Tahoe National Forest. (Attachments 2 and 3). The Canyon Project is located at about the same elevation as the Last Chance Project and the "objectives for the project are to increase structural and spatial diversity, enhance black oak (Quercus kellogii) reduce stand density to improve tree health, release large diameter conifers, and reduce fuels." (Attachment 2, p. 1). A significant portion of the project is in Old Forest Emphasis Area (OFEA). Desired post treatment basal area for all units in this project was above 170 ft2/ac with a significant number of units above 200 ft2/ac. Further, desired basal area for many units exceeded 240 ft2/ac. These treatments were designed to meet forest health objectives to reduce stand density and increase heterogeneity – the same objectives proposed for the Last Chance Project.

This information further supports our previous comments that the harvest proposed for the Last Chance Project is more aggressive than needed to meet the purpose and need (SFL & SC 2 p. 2).

**Response-** Treatment design is site specific. Many variables influence the determination of residual density. Tree species composition, diameter distribution, seral stage, presence or absence of forest pathogens and/or wildlife species, and location on the landscape will all factor into treatment design. Additionally, implementation of SNFPA standards and guides will influence each stand differently such as the canopy closure retention and basal area retention guidelines. Due to the variability in forest conditions, removed from the proper context such comparisons have little value. Having the similar objectives for a project does not indicate the treatment will be the same. The treatments proposed in the Last Chance project were individually designed at the stand level by a certified silviculturist to meet the purpose and need and comply with all applicable standards and guidelines.

**13. Comment-** "We do have a few concerns related to the Fuels treatment section (pg 23): If tractor piles need to be placed 10 feet away the boles of retention trees, then some forethought needs to occur during the tree-marking phase to allow for some openings for the piles (SPI p. 1)."

**Response-** The intent of this requirement is to protect the residual trees during the tractor piling and burning activities that would be conducted after the harvest operation. Openings created through the harvest operations, along with naturally open areas, would be utilized during the piling activity. Additional pile locations and removal of sub-merchantable trees would be identified during the piling operation. Creating openings for tractor/grapple pile locations during the tree-marking phase would not be an efficient use of the marking crew.

**14. Comment-** "It is often logistically difficult with a mechanical whole tree operation to place the landing pile in the center of the landing (SPI p. 1)."

**Response**- The intent of centering the landing pile on the landing is to protect the residual trees during piling and especially the burning of the piles. Constructing the landing piles as close to the center of the landing as possible will help meet this intent. The contractual requirement is generally a 10-foot fireline to mineral soil around the landing pile. The Timber Sale Administration Handbook recommends "the machine piles should be at least 25 feet from the residual stand to prevent damage from burning piles."

**15. Comment-** "Requiring Fell and 150' roadside pile with whole tree removal adds to the cost of the operation with minimal gain, especially if the area is going to be tractor piled afterwards (SPI p. 1)."

**Response-** Including "Fell" small damaged trees on tractor ground is a typical contract requirement for this type of harvest activity. The 150' handpile requirement is only along Road 43-2 (Western States Trail) for scenic/visual value. This visually sensitive zone (150' each side of the Western States Trail) would require handpiling only, tractor piling would not occur within this zone.

**16. Comment-** "Recent research provides evidence that seriously questions the very basis for thinning and its assumed effectiveness. Rhodes and Baker (2008) found that, based upon the fire rotation interval for high severity fire, and assuming an effectiveness period of 20 years for a mechanically-thinned area (i.e., before it would need to be treated again to maintain effectiveness from a fire/fuels perspective), the probability of a thinned area encountering a high severity fire patch during the 20-year effectiveness period (assuming for the sake of argument that the thinning actually does reduce fire severity during this period) is only about 3.3% in California's forests. It would be less than 2% if an 11-year thinning effectiveness period is assumed (Rhodes and Baker 2008). This means that, in order to have a 50% chance of having the thinned area reduce the severity of a fire patch that would have otherwise been high severity, the thinned area would have to be re-thinned every 20 years for about 300 years (see Rhodes and Baker 2008). Please fully analyze the implications of this new data, and please also fully divulge whether you intend to re-thin this area over and over again every couple of decades or so for the next three centuries or so in order to have a reasonable probability of having the thinning area ACTUALLY prevent high severity fire from occurring in the thinned area. If so, please fully analyze the cumulative environmental impacts on wildlife, soils, and watersheds from such repeated mechanical activities on this site. If not, please divulge the fact that the probability that the thinned area will NOT encounter a high severity fire area is about 97% or greater, and that your thinning activities are extremely unlikely to be effective in any tangible or meaningful way for fuels/fire management (JMP p. 1)."

**Response-** There are several recent peer-reviewed published scientific papers (Omi et al. 2007, Raymond and Peterson 2005, Skinner et al. 2004, Omi and Martinson 2002) that state that forest stands thinned without a follow-up fuels treatments are ineffective or have significantly higher damage to the overstory. However, the Last Chance Integrated Vegetation Management Project is proposing thinning with follow-up fuels treatments. The Last Chance Integrated Vegetation Management Project will remove a vast majority of the thinned material on the tractor harvest ground through whole-tree yarding. The cable-thinned areas will be followed by an underburn. Fuels data plots within the project area indicate that one of the treatment areas (#66) has more than 20-25 tons/acre of existing fuel loadings. The preexisting somewhat high fuel loadings in this treatment area would be mechanically piled and burned. Numerous recent research papers and studies show that a mechanical thinning followed by a fuels treatment significantly reduces the severity of any wildfire that moves into them (Stephens 2008 Fire Science Brief, Issue #6, March 2008), Omi et al. 2007, Skinner et al. 2004, Omi and Martinson 2002, Graham et al. 2004, Moghaddas and Craggs 2007, Murphy et al. 2007 (USDA, R5-TP-025), Fites et al. 2007, Ritchie et al. 2007)

Rhodes and Baker carried out a simplistic analysis of the probability that escaped wildfires will encounter randomly located fuels treatments within 20 years of original treatment, at the scale of the western United States (1,197,000 square miles), and also for 6 other very large analysis areas nested within the western United States, one of these being the entire State of California (164,000 square miles, of which about 31,000 square miles are Forest Service managed). The Last Chance Project area is 4.1 square miles. The huge scale of Rhodes and Baker analysis (and their many limiting assumptions; see below) makes any local application of their results impossible and statistically and scientifically unsupportable. Indeed, on page 6, Conclusion, paragraph 1, Rhodes and Baker specifically state that:

> "Our analysis area provides West-wide and regional first approximation of the likely upper bound of fuel treatment effectiveness. While valid at these two scales [sic], they are not applicable to all smaller analysis areas, due to spatial variation in annual fire probability."

In their analysis, Rhodes and Baker assume, among other things, that fires and fuel treatments occur at random across their study region (i.e. that fires and fuels treatments are not more probable in some locations than in others), that there is no geographic variability in fire severity, that climate and its effects on fire occurrence and behavior are static, and that there is no spatial variability in the "value" of landscapes, i.e. that there are no geographic, fire-related, social, or cultural factors which might influence the placement of fuels treatments or the relative value of those treatments in meeting human needs or desires. All of these fundamental assumptions in the analysis are demonstrably false and seriously undermine their conclusions even at the huge geographic scales at which they make them. Rhodes and Baker's analysis is essentially analogous to generating a 100-year flood probability map for the entire State of California, including the desert, mountaintops, and all other areas far from streams, and including no information on population density or urban boundaries; the results may be theoretically interesting, but they have little or no practical use.

It is worth focusing on two of Rhode and Baker's most fundamental assumptions: (1) random treatment placement, and (2) random fire occurrence. As noted above, both of these assumptions are false. Forest Service fuels treatments in the Sierra Nevada are strategically located so as to maximize effectiveness and long-term benefit, and indeed, strategic location of fuels treatments is a major time, money, and energy sink for Forest Service units statewide (Bahro et al. 2007). Fuels treatments located in a strategic manner on as little as 20-30% of a landscape can lead to strong amelioration of fire severity across the landscape as a whole (Finney 2001, Agee and Skinner 2005). It is also well-known that forest fires do not occur randomly on landscapes, but rather preferentially occur in locations with high ignition probabilities, topographically complex terrain, and propensity to warm, dry, and windy conditions (Graham et al. 2004, Sugihara et al. 2006, Bahro et al. 2007). Figure 1 shows the Last Chance Project area location, with fire perimeters obtained from the State fire history database http://www.frap.cdf.ca.gov/data/) The Canyon of the North Fork Middle Fork of the American River is well known as a "problem-fire" area.

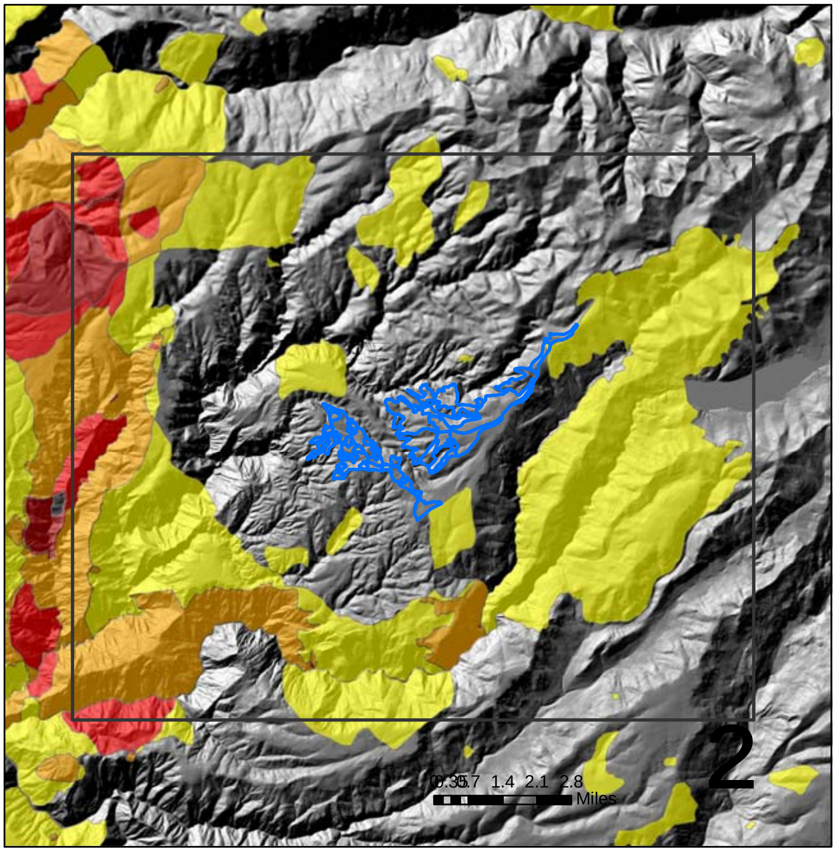


**Figure 1.** *Last Chance Project location, with fire perimeters obtained from the State fire history database. Yellow = burned one time during the period of record (1910-2005); Orange = burned twice; Red = burned three times; Dark Red = burned four times; Black = burned five times.*

The towns of Foresthill, Michigan Bluff, and other small communities, as well as numerous rural residences, roads, and mining claims are found along the canyon rim and in some cases in the canyon bottom. There is also much recreation use in the area. These factors lead to many ignitions every fire season. Although most ignitions are successfully put out before they become big enough to be represented in the fire history database, the Canyon is aligned with the prevailing direction of wind during the summer, slopes are steep and the topography complex, and a relatively high number of fires escape control. The Last Chance Project, far from being randomly located, is situated specifically to slow fire spread and lower fire severity in a "salient" of unburned forest that has been accumulating fuel for many decades.

Rhodes and Baker focus on the probability of a treatment experiencing a fire. Given the strategic placement of fuels treatments, the Forest Service operates from the standpoint that it is more important to focus on the probability that a fire is affected by a treatment. The treatments are not proposed for the sake of having them burned by fire, rather they are proposed for the purpose of changing the behavior of a wildfire, when and if one occurs. Success is not measured by the amount of treated acres that burned, but in how wildfires and their impacts are changed by treatment. Thus, a fuels reduction treatment, such as proposed on the Last Chance Project that does not get burned by a wildfire is not a “failure” of the treatment as implied by Rhodes and Baker.

The Last Chance Project was designed in the anticipation that the planned fuels reduction treatments would be tested by fire. In the vicinity of the Project, the Middle Fork American River drainage has supported a large wildland fire about every 7 years on average (median = 3 years). Access for suppression is difficult and fires often escape initial attack. Watershed and wildlife habitat values remain high in the unburned areas and these values are typically severely affected by wildfire. The Last Chance project was designed to change the outcome of this type of "problem fire" to these and other resources. If and when the Project area burns, the intent is that fire behavior will be moderate, and fire effects will be largely beneficial rather than destructive.

Fuels reduction is only part of the reason for thinning stands. “Forest health” issues are also part of the reasoning behind the proposed treatment plan. When properly accomplished, stand thinning has long-term effects on stand sustainability, not only with respect to fire, but with respect to insects and drought as well (Spurr and Barnes 1992, Graham et al. 2004). The fact that there is some probability that these areas may not be impacted by a high severity fire does not negate the fact that stand densities would be reduced to levels more characteristic of fire-adapted and fire-resilient forests. It also does not negate the fact that stand density reductions will increase the resilience of the treated stands to water stress (and myriad secondary stressors), which takes on progressively greater importance as California climates continue to warm.

The request to fully analyze the cumulative environmental impacts on wildlife, soils, and watersheds from repeated mechanical activities for the next 300 years on this site is outside the scope of this analysis. It is not possible to foresee what kind, the extent, or when future mechanical thinning treatments would be required on this site to meet forest health objectives. It is expected that some follow-up mastication and underburning projects on portions of the Last Chance Project Area would be needed within 15 to 20 years of the proposed treatments in order to maintain minimal ladder fuel densities and low surface fuel loadings as part of a District wide SPLAT (strategically placed land area treatment) system. Again, since the size, location, and type of treatments that may be required to maintain the low surface fuel loadings and ladder fuel densities within the Last Chance Project are unknown at this time, the potential effects of this unknown work cannot be determined. The potential impacts of future mechanical thinning and fuels maintenance projects on the environment would be analyzed at the time they are proposed.

**17. Comment-** “Please prepare a DEIS for this project. In the DEIS, please describe in detail each of the following for all of the final alternatives (including figures) IN EACH PROPOSED TIMBER SALE UNIT (some of this data is in the current Silvicultural Report, but some is not): a) the existing density of trees, both live and dead, in each size class (in two-inch dbh increments); b) the existing species composition of trees in each size class; c) the existing range of variability in density and species composition across the project area; d) your expected post-logging density of trees (trees per acre and basal area) in each size class; e) your expected post-logging composition of trees in each size class; your post-logging expected range of variability in density and composition; f) the historic data that you rely upon for your assertion that you are restoring historic conditions; and g) the current and expected post-logging canopy cover in each unit. Without this information, it is impossible to evaluate the scientific accuracy and integrity of the analysis, or to understand the extent and intensity of canopy reduction and the resulting impacts to the habitat of spotted owls and MIS and SAR species (JMP p. 1).”

**Response-** As disclosed in detail in Chapter 3 of the Last Chance EA, analysis of environmental impacts associated with the proposed Last Chance Project has not found any significant impacts as defined at 40 CFR 1508.27. Therefore, preparation of an environmental impact statement for the Last Chance proposal is not necessary.

Stand structure information, both before and after treatment, is provided in the EA and the Silviculturist Report (which is incorporated by reference) to disclose the effects of the proposed alternatives on the vegetation in the project area. Pre- and post-treatment basal area, trees per acre, and tree canopy cover by treatment unit is displayed in Table 10 in the EA (p. 35). A detailed discussion of stand conditions before and after treatments is provided in the Silviculturist Report. This information is used in the BE/BA and the MIS Report to assess the effects of changes in stand structure on habitat for the California spotted owl as well as other Management Indicator Species (MIS).

Snag densities: Snag information is summarized from FVS modeling efforts and located in the project file. Snags are noted by size class >0 to 12 inches (<12 inches), >12” (12” to 18”), >18” (18” to 24”), >24” (24” to 30”), >30” (30” to 36”) and >36” and by hard or soft snag criteria.

| Stand # | Snags per Acre by Dia. |
|---|---|
| 69 | 48/ac <12” to 8/ac >18” |
| 70 | 69/ac <12” to 16/ac >18” |
| 76 | 144 <12” to 64 >12” |
| 65 | 218/ac<12” to 16/ac >18” |
| 66 | 201 <12” to 18 >24” |
| 67 | 54/ac<12” to 16/ac>24” |
| 68 | 32/ac <12” to 12/ac >12” |
| 71 | 113/ac <12” to 17/ac >12” |
| 72 | 39/ac<12” |
| 73 | 40/ac <12” |
| 74 | 40/ac <12” |
| 75 | 16/ac <12” to 8/ac >18” |
| 77 | 139/ac <12” to 62/ac >12” |
| 78 | 8/ac <12” to 8/ac >18” |
| 79 | 53/ac <12” to 8/ac >30” |
| 133 | 8/AC <12” to 8/ac >12” |
| 134 | 8/AC <12” to 8/ac >12” |
| 135 | 29/ac <12” to 16/ac >12” |
| 136 | 8/AC <12” to 8/ac >12” |
| 1000 | 8/ac <12” to 8/ac >12” |
| 1001 | <1/ac <12” to <1/ac >12” |
| 1002 | 23/ac <12” to <1/ac >12” |
| 1003 | 107/ac <12” to <1/ac <30” |
| 1004 | 8/ac <12” to <1/ac > 30” |
| 1005 | 53/ac <12” to <1/ac >24” |

The goal is to retain 4 to 6 snags per acre. The inventory information above identifies an adequate range of existing snags to meet the standards and guidelines. Refer to the marking guidelines which do not designate snags for removal. Incidental snags may be removed to meet safety standards near roads and areas of operation.

**18. Comment-** "In the DEIS, please fully analyze the cumulative effects of past mechanical thinning projects on the Ranger District on California Spotted Owls (CSOs) and their occupancy. Please provide specific data on pre-thinning and post-thinning CSO occupancy for all CSO territories in which thinning has occurred (i.e., within the biological home ranges, not just PACs and HRCAs) from the 1993 CASPO Interim Guidelines to present. Please also present occupancy data for CSO territories on the District in which no thinning has occurred within the greater biological home ranges during this time period (JMP p. 2)."

**Response-** There is only one spotted owl PAC and associated HRCA within the Last Chance Project Area. This PAC and HRCA are identified as PC 001. Cumulative effects for the spotted owl are discussed on pages 35 through 39 in the Last Chance Biological Evaluation and pages 27 through 31 in the Last Chance Management Indicator Species analysis.

For occupancy data in CSO territories thinned and those that have not been thinned since 1993, please refer to The Population Ecology of the California Spotted Owl in the Central Sierra Nevada (Guterrez et al. 2006).

**19. Comment-** "The 2001 Framework FEIS (Vol. 3, ch. 3, part 4.4, pp. 72-77) states that, within a 1,062-acre area around a spotted owl nest site, maintaining at least 60% of the area in at least 50% canopy cover is crucial to spotted owl survival and reproduction. This is a critical threshold. The DEIS must discuss and analyze: a) the current proportion of mature forest (CWHR 4, 5, and 6) with greater than 50% canopy cover in a 1,062-acre circle around each spotted owl site in the project area; and b) the post-project proportion of mature forest (CWHR 4, 5, and 6) with greater than 50% canopy cover in a 1,062-acre circle around each spotted owl site in the project area (JMP p. 2)."

**Response-** The 2001 SNFPA FEIS (Volume 3, Chapter 3, Part 4.4, page 76) describes a study conducted by Hunsaker et al. that found owl productivity positively correlated with the proportion of a specified analysis area having greater than 50% canopy cover. For a 1,062-acre circular analysis area surrounding an owl activity center, productivity was positively correlated where 60% of the area had greater than 50% canopy cover.

As described in the BE/BA, a total of 55 acres of HCRA associated with the project area's single PAC 001 is proposed for treatment under the action alternatives. This habitat is currently low quality foraging habitat (CWHR SMC4P). Following treatment, this habitat would remain as low quality foraging habitat (CWHR SMC4P).

The BE/BA includes an analysis of a 1,062-acre circular area surrounding the one activity center in the project area. The analysis finds that 47% of this area currently has 50% or greater canopy cover. Following treatments under either of the action alternatives, 47% of the area would have 50% canopy cover. Currently the 1062-acre circular analysis area is 13% below the critical threshold of maintaining at least 60% of the area in at least 50% canopy cover. The silvicultural prescription would promote tree growth and canopy development. The Forest Growth Simulation Model estimates that 20% or 212 acres would produce 50% canopy cover in 10 years following treatments. That means 67% or 712 acres would exceed the critical threshold of maintaining at least 60% of the area in at least 50% canopy cover.

SPLATs may directly affect some important structural elements that owls depend on by reducing canopy closure, vertical structure, and patch size. There is substantial uncertainty about the way in which SPLATs will affect California spotted owls in the Sierra Nevada. Thus, there is a need to estimate the effects of SPLATs on owls in a formal, experimental manner under an adaptive framework.

This study is an adaptive management experiment because of its design within the context of Forest Service projects and management direction such that results can be applied to future management decisions.

**20. Comment-** "The PEA states that a key objective of the project is ostensibly to protect suitable spotted owl habitat. Yet the documents do not state what the current density of snags, particularly large snags, is within the project area pre- and post-thinning. This data must be included for each timber sale unit in the project area. Verner et al. (1992) recommended at least 20 square feet per acre of basal area of large snags (over 15 inches dbh), or about 8 large snags per acre on average, for suitable spotted owl habitat. Abundant large snags are essential for spotted owls because owl prey species depend upon them (Verner et al. 1992). The documents do not state which proposed timber sale units have large snag densities far in excess of 20 square feet of basal area per acre. The DEIS must contain this information (JMP p. 2)."

**Response-** The analysis of pre and post-harvest down logs and snags can be found on pages 28 and 29 (Tables 13 and 14) in the Last Chance Biological Evaluation and pages 26, 33 and 34, (Tables 8, 9, 12, and 13) in the Last Chance Management Indicator Species analysis. Below is a summary of this analysis.

Current large down logs and large snags:

**Table 1.** Number of Large down logs Pre-treatment

| **Decay Class** | **1** | **2** | **3** | **Total** |
|---|---|---|---|---|
| # of logs > 20" inches @ mid point | 3 | 2 | 2 | 7 |

**Table 2.** Number of Snags Pre-treatment

| **Decay Class** | **3** | **4** | **5** | **Total** |
|---|---|---|---|---|
| Medium snags 15" to 24" | 2 | 2 | 3 | 7 |
| Large snags > 30" | 2 | 2 | 1 | 5 |

All existing snags and large down logs shown in the above tables will be protected during the 4 different treatment methods except those snags that pose a hazard to the treatment activities. It is expected that there will be no measurable difference in the number of snags and large down logs from the existing condition and the post treatment condition and it is expected that there will be no measurable difference in the number of snags and large down logs from the existing condition.

**21. Comment-** "The PEA states that a key objective of the project is ostensibly to protect spotted owls from wildland fire in their territories. However, recent scientific evidence regarding spotted owls in northwestern California and in Oregon found that positive trends in survival and reproduction depended upon significant patches of habitat consistent with post-fire effects (e.g., montane chaparral patches, snags, and large downed logs) in their territories because this habitat is suitable for a key owl prey species, the Dusky-footed Woodrat (Franklin et al. 2000, Olson et al. 2004). This habitat is not mimicked by logging as proposed by this project, which does not create an abundance of snags and large downed logs, and which seeks to reduce shrub cover. If your stated project objectives are achieved, you could not only render thousands of acres of spotted owl habitat unsuitable or marginally suitable in the present and near-term, but could also reduce survival and reproduction by preventing occurrence of natural post-fire habitat heterogeneity in the spotted owl territories (JMP p. 2)."

**Response-** The studies referred to in this comment regarding post fire effects and owl prey species were conducted in northwestern California and Oregon. This is the historic range of the northern spotted owl, which is a different sub-species than the California spotted owl. Research findings regarding California spotted owl used in the Last Chance analysis are those that have been conducted in the Sierra Nevada.

The Last Chance Project proposes to treat a total of 2,383 acres, of which 629 acres (or approximately 26%) are currently suitable California spotted owl habitat. As described in the BE/BA, all of the treatments would retain canopy closure at 50% or greater where it currently exists and would not reduce the existing tree size class. Hence, the proposed treatments would not reduce the *amount* of suitable California spotted owl habitat. Currently, the habitat suitability has a moderate value that was determined from the CWHR model. The BE on pages 33 and 34 conclude that after treatments the habitat suitability maintains a moderate value based on CWHR modeling. There are a total of 73 acres classified as montane chaparral which is only 3% of the project area and would not render thousands of acres of spotted owl habitat unsuitable as you suggest. Regarding snags and down logs, refer to response # 18.

**22. Comment-** "The PEA suggests that wildland fire is a threat to CSOs, but does not cite to any published and peer-reviewed scientific literature that concludes this. Please provide citations to primary scientific data from peer-reviewed publications to support your claim that wildland fire is a threat to spotted owls, or retract this statement (JMP p. 3)."

**Response-** The Last Chance Project EA specifically states large scale catastrophic wildfire presents one of the greatest threats to the spotted owl in the Sierra Nevada. The key here is large scale catastrophic wildfire or large stand replacing wildfires. The following are several references that support this fact: Verner et al. 1992, and Davis: University of California, Centers for Water and Wildland Resources 1996. These were cited in the BE. Other citations that support that large scale catastrophic fires that pose the greatest natural risk to spotted owl habitat are: Weaterspoon et al. 1992, MacCracken et al. 1996, Verner et al. 1992, U.S. Fish and Wildlife Service 1992, 1995.

**23. Comment-** "Wildland fire remains heavily suppressed currently relative to pre-suppression annual extent (area) of burning in forests of California and the western U.S. in general, with current levels being about one-tenth of pre-suppression levels of annual burning (Medler 2006, Stephens et al. 2008 (in press in Forest Ecology and Management). Fire at ALL levels of severity, including high severity fire, are in deficit currently relative to pre-suppression times (Hanson 2007). In the Lake Tahoe Basin, for example, montane chaparral has declined by 62% since the 19$^{th}$ century due to the reduction in high severity fire occurrence, creating a significant concern about the plant and animal communities that depend upon post-fire montane chaparral (Nagel and Taylor 2005). The project documents fail to acknowledge that patches of high severity fire are natural in these ecosystems, and that many plant and animal species depend upon such habitat (Hanson 2007, Hutto 1995, Hutto 2006, Noss et al. 2006). In fact, peak levels of native diversity in higher plants and wildlife species is found in patches of conifer forest burned at high severity which have not been managed (logged) (Noss et al. 2006). Please explain your suggestion that wildland fire is an ecological threat in light of this information (JMP p. 3)."

**Response-** Wildland fires burning with mostly moderate to high severity are considered a threat to the dry forest ecosystems of the western United States that developed under a fire regime of frequent fire with mostly low-severity (Graham et al. 2004). The North Fork of the Middle Fork American River watershed is within the Sierra Nevada mixed-conifer dry forest ecosystem. This ecosystem developed under a fire regime of frequent mostly low- to moderate-severity fires (Beaty and Taylor 2007). According to many peer-reviewed scientific papers, prior to the 20th century, low severity fires burned regularly in most dry forest ecosystems (Everett et. al. 2000, Covington and Moore 1994, Hessl et. al. 2003), with ignitions caused by both lightning and humans (Graham et al. 2004). According to Sugihara et al. (2006), few California ecosystems (pre-historically) had a fire regime that was dominated by high severity fires.

Fire dendrochronology information (Skinner personal communication, 2006) gathered within the borders of the adjacent 2001 Star Fire found a mean fire interval of 15 years and a median of 8 years. These intervals are very similar to the ones that Beaty and Taylor (2007) found in a Sierra mixed conifer forest on the west shore of Lake Tahoe (approximately 15 miles east of the Project Area). Based on Beaty and Taylor (2007), Sugihara et al. (2006), and many others, the fire return intervals found within the adjacent Star Fire are very indicative of an ecosystem that developed with frequent fires of mostly low- to moderate-severity.

The percentage of high severity burn acreage within this type of fire regime is thought to be rare and the patches of high severity also being mostly small (Bonnicksen and Stone, 1982; Kilgore, 1973). Weaver (1943) noted that historically, dry forests contained diverse understories most often of grasses, forbs, and low shrubs: a condition maintained by frequent, low-intensity surface fires (Graham et al. 2004). However, some recent studies indicate a more complex mixture of severity patches that is controlled by topography: mostly slope position and aspect. Mesic areas: e.g., north aspects, lower portions of canyons, lower third of slopes appear to have had a fine-grained heterogeneity of mostly low-severity with some moderate- to high-severity. The more xeric locations: for example, upper south aspects, had a more coarse-grained network with a higher percentage and larger patches with moderate- to high-severity (Beaty and Taylor 2007, Taylor and Skinner, 1998; Beaty and Taylor, 2001). A majority of the Last Chance Project is located on a generally flat ridgetop with a general slope inclination of northwest. This area would be expected to have more of a fine-grained heterogeneity of severity patches found in the more mesic locations. Most of the project area would be expected to have developed under a pre-suppression fire regime of mostly low- to moderate-severity.

Due to active fire suppression starting in the early 20th century and other forest management activities, there have been major changes in forest structure and fuel loadings within most of the dry forest ecosystems within the western United States. Now dense stand and forest structures are now common on sites historically burned by frequent, low to moderately severe fires (Arno 1980, Agee 1991, Taylor and Skinner 1998, Brose and Wade 2002). These conditions— with their abundant surface and ladder fuels, and low canopy base heights—readily facilitate the development of crown fires (Weaver 1943, Laudenslayer et. al. 1990, Scott and Reinhardt 2001) (Graham et al. 2004). Miller et al. (2008) have found a significant increase in the percentage of high severity fire along with a resultant increase in the size of high severity patches occurring within California's dry forest ecosystems during the last decade compared to previous decades.

One of the fires within this study is adjacent to the Project Area. The 2001 Star Fire burned approximately 16,800 acres just south and southeast of the Project Area (see map within Response to Comment #1). One patch of approximately 5,891 acres (34%) of the Star Fire was classified as burning with a high severity (BAER mapping). Miller et al. (2007) state that BAER (Burned Area Emergency Response) soil burn severity maps substantially underestimate the area of stand-replacing fire and greatly underestimate the heterogeneity in vegetation burn severity on burned landscapes. The BAER estimation (a likely underestimation) of the Star Fire's high-severity percentage and the 5,900-acre patch of high severity, based on the numerous papers cited above, are significantly outside that normally found in an area with frequent fires of low- to moderate-severity.

Approximately 7% of the Project Area watershed is under consideration for treatment, leaving the remainder susceptible to varying degrees of wildfire severity based on vegetation type, aspect, slope location, and the time of day and weather and fuel conditions at the time a fire burns through the area. If a wildland fire were to occur in the untreated portions of the North Fork of the Middle Fork of the American River, the District estimates that the percentage of area burned by a high severity fire would be very similar to the Star Fire. Based on the information presented by Graham et al. (2004), Miller et al. (2008), and Sugihara et al. (2006), there is not a deficit of high severity burned acreage within California's dry forest ecosystems. Based on the numerous studies cited above, a fire within the North Fork of the Middle Fork of the American

River would be expected to have a lower percentage of low severity and a significantly higher percentage of high-severity than would have been found within a pre-suppression fire.

The EA does not identify wildfire as an "ecological threat." It does suggest that the proposed treatments would help reduce the size of any fire that may occur within the North Fork of the Middle Fork of the American River and initiate the restoration of a more fire resilient Sierra mixed-conifer forest within the watershed.

**24. Comment-** "Please include a cost estimate for a 30"-limit mechanical thin, including, at a minimum, the following: a) administrative costs to the USFS pertaining to analysis and appeals; b) costs to the USFS of sale preparation and administration; c) PER ACRE costs to the USFS of slash piling and burning; d) PER ACRE costs to the USFS of brush maintenance following the mechanical thinning as a result of canopy reduction (this cost must be included, regardless of whether brush maintenance is required only 3-5 years after mechanical thinning or 10-15 years after mechanical thinning; and no similar cost would be applied to non-commercial thinning since essentially no measurable canopy reduction would occur); e) the administrative costs to the USFS pertaining to analysis and planning for the slash clean-up and brush maintenance projects following the mechanical thinning; f) the projected timber sales receipts to the USFS from the timber sale; and g) the total timber volume of the timber sale (in board feet of sawtimber, as well as tons of biomass). Please include citations to actual projects for all estimates (JMP p. 3)."

**Response-** The proposed action is designed to retain all live trees equal to or greater than 30 inches dbh. The estimated administrative costs pertaining to analysis is $26.35 per mbf and appeals is $13.18 per mbf based on the Tahoe NF program costs, August 2007.

Costs for timber sale preparation are approximately $20.14 per mbf. Timber Sale Administration average costs are approximately $20.14 per mbf based on Tahoe NF program costs, August 2007.

Hazardous fuels treatment related costs vary by treatment. Average tractor piling and burning costs are approximately $500.00 per acre based on historic actual costs of similar projects, adjusted for inflation.

Post mechanical thinning treatments that require brush maintenance: general costs estimates range between $100.00 per acre to $300.00 per acre based on local American River RD experience. Several variables influence effectiveness and efficiency of post mechanical thinning treatments such as slopes, weather, and staffing fuel type and fuel conditions.

The Last Chance action alternatives include follow-up fuels treatments. Hence, there would be no additional costs for these related treatments once the initial project proposal was carried through the environmental analysis process.

The estimated timber sale receipts generated for the Last Chance project could be $110,644.00. The estimated volume to be removed is 10 mmbf based on general sale and data input for timber sale economic evaluation, USFS-R-5 Sale Evaluation.

**25. Comment-** "The PEA asserts that intensive mechanical thinning up to 30 inches dbh is necessary to reduce potential for severe fire. However, recent scientific studies have found that precommercial thinning of sapling and pole-sized trees only (up to 8-10 inches in diameter) effectively reduces fire severity. See, for example:

a. Omi, P.N., and E.J. Martinson. 2002. Effects of fuels treatment on wildfire severity. Final report. Joint Fire Science Program Governing Board, Western Forest Fire Research Center, Colorado State University, Fort Collins, CO. Available from http://www.cnr.colostate.edu/frws/research/westfire/finalreport.pdf (found that precommercial thinning of trees under 8 to 10 inches in diameter reduced potential for severe fire (email communication with the authors confirmed that trees removed were of this small size class). More specifically, the Omi and Martinson (2002) study, found that precommercial thinning reduced stand damage (a measure of fire severity generally related to stand mortality) in both of the two thinned study sites, Cerro Grande and Hi Meadow (the authors reported that the Hi Meadow site was marginally significant, $p<.1$, perhaps due to small sample size), each with several plots.

b. Martinson, E.J., and P.N. Omi. 2003. Performance of fuel treatments subjected to wildfires. USDA Forest Service Proceedings RMRS-P-29 (found that non-commercial thinning of submerchantable-sized trees, generally followed by slash burning or removal, in several areas across the western U.S. greatly reduced fire severity, and that this result held true regardless of post-thinning basal area density).

c. Strom, B.A., and P.Z. Fule. 2007. Pre-wildfire fuel treatments affect long-term ponderosa pine forest dynamics. International Journal of Wildland Fire 16: 128-138 (non-commercial thinning of very small trees under 20 cm dbh (8 inches dbh) in seven different sites dramatically reduced fire severity, resulting in post-fire basal area mortality of only about 28% (low severity) in non-commercially thinned areas versus post-fire basal area mortality of about 86% in untreated areas) (JMP p. 3)."

**Response-** The Last Chance Project treatment prescriptions are designed to meet a variety of resource objectives, including reducing the adverse effects of uncharacteristically severe wildfires and enhancing the resiliency of forest stands to fire, drought, insects, and diseases. Mechanical thinning up to a 30-inch dbh is not required to reduce the potential for severe wildfire effects. Text is included in the EA to make it clear that the removal of trees greater than 10 to 16 inches dbh (the size varies depending on the treatment area) is aimed at meeting other project objectives, rather than to reduce the potential for severe fire.

There are several recent case studies and peer-reviewed papers, including the ones cited, that conclude that mechanical thinning of smaller sized trees along with a follow-up surface fuels treatment greatly reduces fire behavior indices and severity. An FVS run of the plot data taken inside Treatment Area # 74 indicates that removing trees less than 16 inches dbh is the level that starts to moderate fire behavior. Some FCCS (Fuel Characteristic Classification System) modeling, using plot data from the Last Chance Project area, indicates that removing conifers less than 10 to 12 inches dbh, depending on plot conditions, along with surface fuel treatment, ameliorates fire behavior indices to levels that should produce a surface fire with low to moderate severity.

**26. Comment-** "The PEA assumes that mechanical thinning, as you propose, will reduce, rather than increase, potential for severe fire. There is ample evidence to contradict this. Research that I recently conducted in the Sierra Nevada found the same thing. See Hanson and Odion 2006 (attached). Even in an area (Eldorado National Forest) that was mechanically thinned very shortly before the fire, and was masticated (material <10inches diameter) mere months before the fire, had higher combined mortality from thinning and fire than the adjacent unthinned area (Hanson and Odion 2006). Another recent study found the following: "Compared with the original conditions, a closed canopy would result in a 10% reduction in the area of high or extreme fireline intensity. In contrast, an open canopy [from fuel treatments] has the opposite effect, increasing the area exposed to high or extreme fireline intensity by 36%. Though it may appear counterintuitive, when all else is equal open canopies lead to reduced fuel moisture and increased midflame windspeed, which increase potential fireline intensity" (Platt et al. 2006. Annals of the Assoc. Amer. Geographers 96: 455-470). You have not analyzed, or adequately analyzed, this type of evidence from actual wildland fires burning through areas mechanically thinned. Instead, your documents make assumptions or rely upon modeling results, which are based upon assumptions that may not reflect actual real-world fire behavior. Increased fire severity could result from: a) increased mid-flame windspeeds due to a reduction in the buffering effect of mature tree boles; b) slash debris (even if you make efforts to reduce slash, this is never totally effective, and much slash remains—enough to perhaps increase overall surface fuels relative to current levels, which the current analysis does not adequately discuss); c) accelerated brush growth due to increased sun exposure; and d) desiccation of surface fuels due to increased sun and wind exposure (JMP p. 4)."

**Response-** There are several peer-reviewed papers and case studies showing that thinning dry conifer forest ecosystems without follow-up fuels treatments that reduce surface fuel loadings can increase fire severity. Omi et al. 2007, Raymond and Peterson 2005, Skinner et al. 2004, and Omi and Martinson 2002, are just some of the papers that find that forest stands that are thinned without a follow-up fuels treatments are ineffective in modifying fire behavior or have significantly higher fire damage to the overstory.

The Last Chance Project EA's description of the action alternatives makes it clear that all thinning activities would be followed by some form of surface fuel reduction. The thinned material in the tractor harvest treatment areas would be removed through whole-tree yarding to minimize activity-generated surface fuels. Treatment Area #66 has a measured average of 17.7 tons per acre of existing surface fuels. To address this problem, surface fuels throughout this entire 311-acre treatment area would be mechanically piled and burned. The cable-thinned areas would receive follow-up underburning.

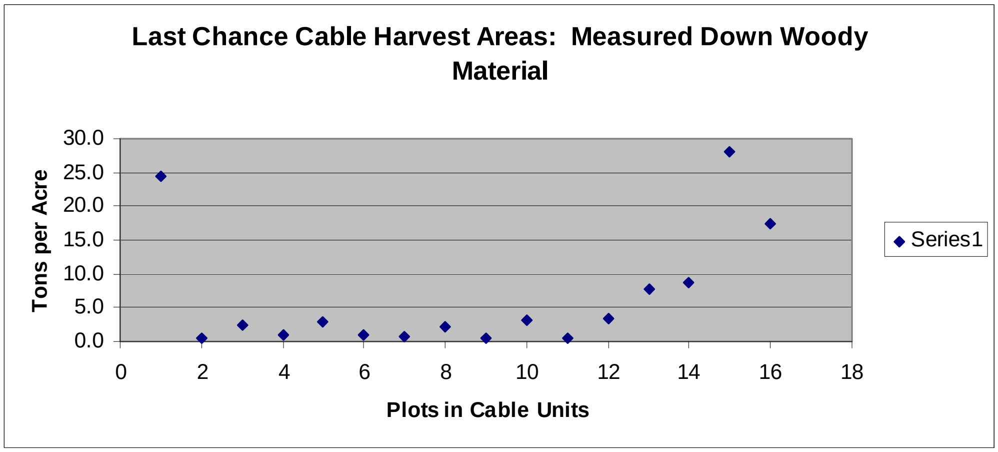


**Figure 1.** Average measured down woody material in cable harvest areas: 6.5 tons per acre.

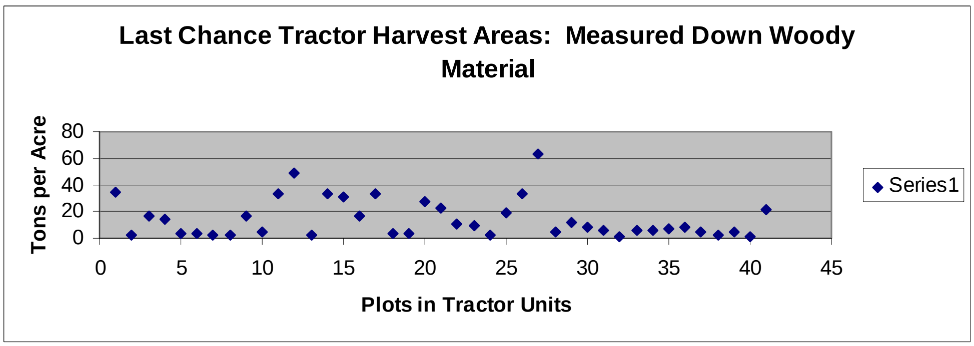


**Figure 2.** Average measured down woody material in tractor harvest areas: 14 tons per acre.

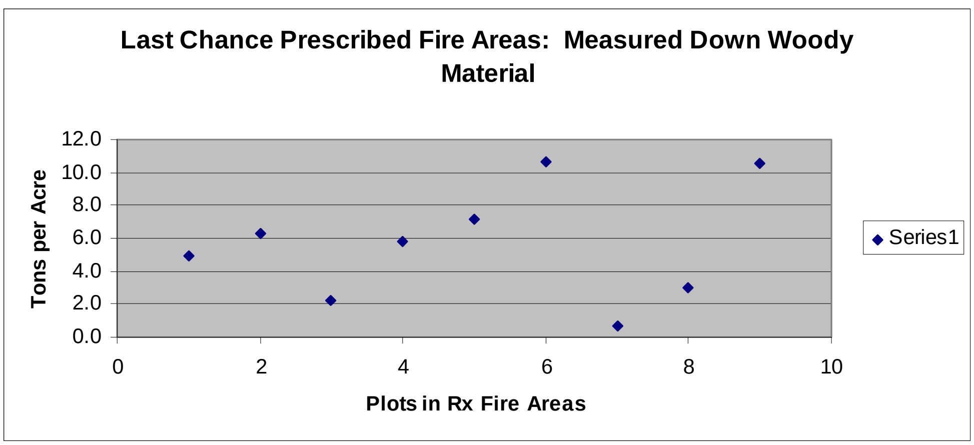


**Figure 3.** Average measured down woody material in prescribed fire areas: 5.7 tons per acre.

Numerous recent peer-reviewed research papers and studies show that mechanical thinning followed by a fuels treatment that reduces surface and ladder fuels significantly reduces the severity of any wildfire that burns into them (Stephens 2008 Fire Science Brief, Issue #6, March 2008, Omi et al. 2007, Skinner et al. 2004, Omi and Martinson 2002, Graham et al. 2004, Moghaddas and Craggs 2007, Murphy et al. 2007, Fites et al. 2007, Ritchie et al. 2007).

The Hanson and Odion (2006) abstract concluded that mechanical thinning increases wildfire severity (defined as fire induced mortality) in comparison to untreated areas.

The abstract gives no indication when the thinning took place in most of the plots, no indication if the stands had follow-up fuels treatments, and no information on the type of yarding used. Tahoe National Forest records indicate the thinning conducted within the Gap Fire area was conducted several years prior to the Gap Fire (2001); the thinned stands were not whole-tree yarded (it was not a practice conducted on the Forest at that time); there was no follow-up surface fuels removal treatment; and the treatment prescription was an overstory thinning rather than a thinning from below. Under such circumstances, it is not surprising that the mortality rates were similar or greater in the "thinned" areas compared to the control areas. The conclusion that heavy surface fuel loadings, if left after thinning, contribute to increased tree mortality and fire severity is not in dispute. The studies cited in the first paragraph above all agree with that premise. All of the mechanically thinned units within the Last Chance Integrated Vegetation Management Project follow the guidance of the numerous papers cited above.

The FVS modeling conducted for the Last Chance Project shows an overall increase in fire behavior indices if the surface fuels are not treated after thinning. The FVS fire behavior runs discussed in the Fire and Fuels Specialist Report show very small to significant increases in flame lengths and minimum wind speed needed to initiate tree torching if the thinning is conducted without a follow-up surface fuels treatment within most of the mechanically thinned units. To manage this concern, all mechanically thinned areas have planned fuels treatments that would maintain or decrease existing surface fuel loadings. The FVS modeling suggests that the planned vegetation and fuels treatments would significantly reduce overall fire behavior indices within the treatment areas. This would provide for greater safety and an anchor point for any fire suppression actions that may occur within this portion of the North Fork of the Middle Fork of the American River watershed, fire severities that should mimic pre-suppression severities, improved forest health, and greater protection for the natural and cultural resources that occur in the area.

The opening of the crowns may accelerate shrub growth within the thinned units. Future surface fuels treatment would deal with this problem should it occur.

**27. Comment-** "Any increase in fire severity resulting from mechanical thinning will be particularly problematic near human communities or structures—a potential outcome which the current analysis does not adequately discuss or analyze. Such an increase in fire hazard post-thinning could come immediately, due to slash debris and increased mid-flame windspeeds, or it could come shortly after slash removal, due to accelerated brush regrowth. Please describe in detail in the final document when exactly slash debris would be piled and burned following thinning, whether slash piling and burning will be a formal requirement, and what will be the potential adverse impacts on human health and safety if a fire occurs after thinning but prior to piling/burning or broadcast burning? Please also fully analyze the potential increased danger to public safety even after slash treatment due to the other effects discussed above which can result in increased fire severity from mechanical thinning (e.g., accelerated brush growth after slash treatment due to canopy reduction, increased midflame windspeeds, and desiccation of surface fuels). The analysis must divulge in detail precisely when or if burning of the slash piles would occur, how it would be funded, whether it would be required of the timber contractor as part of the timber sale contract, or whether funding and completion is questionable. We are very aware of the recent tragic situation in the Angora Fire in South Lake Tahoe in which slash piles from Forest Service mechanical thinning operations were allowed to sit untreated for several years. The Angora Fire burned extremely fast and intensely through this area, contributing to the destruction of nearby homes. The thinning made matters worse in this circumstance. In the case of your current proposed project, there would be even more slash debris since it is a much more intensive thin, and far more trees, and larger trees, would be cut (JMP p. 5)."

**Response-** The Last Chance Integrated Vegetation Management Project is not located near any communities or structures. The planned vegetation and surface fuels treatments within the Last Chance Project are aligned with the latest scientific information. Stephens 2008 (Fire Science Brief, Issue #6, March 2008), Omi et al. 2007, Skinner et al. 2004, Omi and Martinson 2002, Graham et al. 2004, Moghaddas and Craggs 2007, Sexton et al. 2007 (USDA, R5-TP-025), Fites et al. 2007, and Ritchie et al. 2007, show mechanical thinning followed by a fuels treatment that reduces surface and ladder fuels significantly reduces the severity of any wildfire.

All mechanically thinned tractor harvest units would be whole-tree yarded. The bulk of the slash generated from the tractor thinning operations would be piled in the landings concurrently with thinning activities. Treatment Area #66 has a measured average of 17.7 tons per acre of existing surface fuels. To address this problem, surface fuels throughout this entire 311-acre treatment area would be mechanically piled and burned. The slash generated from the cable-thinned units would be lopped and scattered to within 30 inches of the ground within a few months of completion of the thinning operations and then removed through underburning within a few years of the completion of the the thinning operation. There is a recognized elevated fire severity risk in these areas from the activity fuels generated until they are removed through prescribed fire or they decay naturally.

There should be little or no impact on human health and safety if the follow-up surface fuels treatments have not been conducted prior to a fire burning into the Last Chance Integrated Vegetation Management Project units compared to no management activities being conducted. The FVS fire behavior runs show there may be slight increase in overall fire behavior indices and tree mortality if the stands are thinned without the follow-up surface fuels treatment compared to no thinning.

**28. Comment-** "Please explain your proposal of a 30 inches dbh limit for mechanical thinning, in the context of a fire/fuels management proposal, when no peer-reviewed, published scientific literature recommends such a prescription as being necessary or effective in the context of fire/fuels management (JMP p. 5)?"

**Response-** Removal of trees greater than 10-16" DBH is to meet other stated Last Chance Integrated Vegetation Management Project objectives: not to reduce the potential for severe fire.

There are several recent case studies and papers including the ones cited state that mechanical thinning of smaller sized trees along with a follow-up fuels treatment greatly reduces fire behavior indices and severity. A Forest Vegetation Simulator (FVS) run of the plot data taken inside unit 74T indicates that the removal of trees greater than 16 inches dbh effectively moderates fire behavior. Some Fuels Characteristics Classification System (FCCS) modeling, using plot data from the Last Chance Integrated Vegetation Management Project Area, indicates that removal of conifers less than 10-16 inches dbh, depending on plot conditions, ameliorate fire behavior indices to levels that should produce a surface fire with very little or no torching of the forest canopy.

**29. Comment-** "You must fully consider a reasonable range of alternatives, including an alternative with a 16 inches dbh limit in mechanical thinning units (retaining at least 60% canopy cover in dominant and codominant trees to protect spotted owl populations and other wildlife, and at least 50% canopy cover where existing canopy is between 50% and 60%, and at least 40% where canopy cover is 40-49%). The final analysis and decision documents must include a full comparison of all fire/fuel modeling output results for all of the final alternatives that are fully considered (including the 16inches limit alternative described above) (JMP p. 5)."

**Response-** In response to this and other comments, the EA includes a third alternative (Alternative 3) that retains higher levels of basal area in the larger trees than the proposed action (Alternative 1). Alternative 3 would remove no trees greater than or equal to 20 inches dbh. Alternative 3 is designed to respond to concerns regarding the potential impacts of removing trees up to 30 inches dbh and reducing canopy cover on habitat for the California spotted owl. The EA and supporting reports, including the fire and fuels report, fully analyze and disclose the environmental effects of Alternative 3.

**30. Comment-** "We believe this project would harm some MIS and SAR species for which annual population monitoring is required by App. E of the 2001 Framework, but for which no such monitoring has been conducted. As such, the project cannot proceed unless either the required monitoring is conducted, or it is substantially redesigned such that it will not harm habitat for these MIS and SAR species. The 2004 Framework ROD specifically incorporated the population monitoring requirements of Appendix E of the 2001 Framework FEIS. The MIS and SAR species which have a check mark under the column heading "Population Monitoring" are required to have their populations monitored. *Earth Island Institute v. U.S. Forest Service*, 442 F.3d 1147, 1173-1176 (9$^{th}$ Cir. 2006). These include numerous species dependent upon dense, mature forest—species that would or could be harmed by the proposed project. The Forest Service has failed to conduct this monitoring, and thus cannot continue to log the habitat of these species without risking a threat to their viability. *Earth Island Institute v. U.S. Forest Service*, 442 F.3d 1147, 1173-1176 (9$^{th}$ Cir. 2006). Moreover, the recent MIS amendment of the 2004 Framework forest plan is illegal under NEPA and NFMA, and does not relieve the USFS of the requirement to conduct annual population monitoring of specified MIS and SAR under App. E. Such species include, but are not limited to, the following:

a) Olive-sided Flycatcher. This species is highly vulnerable to the "ecological trap" created by logging, which results in open habitat that can superficially appear to be suitable, but which does not sustain populations. See Altman and Sallabanks (2000); Robertson and Hutto

(2007); Hutto (1995). The Sierra Nevada is the core and heart of this species' North American range (Altman and Sallabanks 2000, Hutto 1995). The 2001 Framework FEIS, App. E, lists this species as having moderate vulnerability in terms of viability, but most of the scientific literature places the vulnerability at high currently.

b) Swainson's Thrush. This species depends, for nesting and foraging, on dense mature forest with dense understories. See 2001 Framework FEIS, Vol. 3, Chpt. 3, part 4.5, pp. 65-68. The 2001 Framework, App. E, lists this species as having high vulnerability in terms of viability.

c) Black Bear.

d) Pileated Woodpecker (relies upon closed-canopy forest with abundant snags).

e) Red-breasted Sapsucker (relies upon dense forests, often in or near riparian zones, and is threatened by logging). See, e.g., Fix and Bezener 2000, Kaufman 1996. The 2001 Framework, App. E, lists this species as having moderate vulnerability in terms of viability.

f) Williamson's Sapsucker (is associated with mature closed-canopy forest with abundant snags, and now appears to be very rare in Sierra Nevada forests) (JMP p. 6)."

**Response-** MIS are animal species identified in the SNF MIS Amendment Record of Decision (ROD) signed December 14, 2007, which was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule) (36 CFR 219). The SNF MIS ROD states, "This decision modifies Appendix E of the 2001 SNFPA FEIS, as adopted by the 2004 SNFPA ROD in the following manner: this decision removes the "X" in the MIS column in Tables E-9, E-10, and E-11 of Appendix E. This decision drops these species as MIS" (SNF MIS ROD, page 5). The Amendment replaces the Tahoe National Forest's former MIS list with a list of 13 MIS, which do not include the olive-sided flycatcher, Swainson's thrush, black bear, pileated woodpecker, red-breasted sapsucker, or Williamson's sapsucker. Guidance regarding MIS set forth in the Tahoe LRMP as amended by the 2007 SNF MIS Amendment ROD directs Forest Service resource managers to (1) at project scale, analyze the effects of proposed projects on the habitat of each MIS affected by such projects, and (2) at the bioregional scale, monitor populations and/or habitat trends of MIS, as identified in the Tahoe LRMP as amended.

The bioregional scale monitoring strategy for the Tahoe NF's MIS is found in the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (ROD) of 2007. Bioregional scale habitat monitoring is identified for all twelve of the terrestrial MIS. In addition, bioregional scale population monitoring, in the form of distribution population monitoring, is identified for all of the terrestrial MIS except for the greater sage-grouse. For aquatic macroinvertebrates, the bioregional scale monitoring identified is Index of Biological Integrity and Habitat. The current bioregional status and trend of populations and/or habitat for each of the MIS is discussed in the Sierra Nevada Forests Bioregional Management Indicator Species (SNF Bioregional MIS) Report (USDA Forest Service 2008).

All habitat monitoring data are collected and/or compiled at the bioregional scale, consistent with the LRMP as amended by the 2007 SNF MIS Amendment ROD (USDA Forest Service 2007).

Habitats are the vegetation types (for example, early seral coniferous forest) or ecosystem components (for example, snags in green forest) required by an MIS for breeding, cover, and/or feeding. MIS for the Sierra Nevada National Forests represent 10 major habitats and 2 ecosystem components (USDA Forest Service 2007), as listed in Table 1. These habitats are defined using the California Wildlife Habitat Relationship (CWHR) System (CDFG 2005). The CWHR System provides the most widely used habitat relationship models for California's terrestrial vertebrate species (ibid). It is described in detail in the SNF Bioregional MIS Report (USDA Forest Service 2008).

Habitat status is the current amount of habitat on the Sierra Nevada Forests. Habitat trend is the direction of change in the amount or quality of habitat over time. The methodology for assessing habitat status and trend is described in detail in the SNF Bioregional MIS Report (USDA Forest Service 2008).

Species-at-Risk (SAR) were assessed in Appendix R and listed in Appendix E of the 2001 SNFPA FEIS. The SNF MIS ROD states, "The 'species-at-risk' identified in Tables E-9, E-10, and E-11 [of Appendix E of the 2001 SNFPA FEIS] are not part of the current monitoring program and this decision does not change that status" (SNF MIS ROD, page 5). The use of the concept of SAR was a forward-looking attempt to implement the 2000 planning rule. The 2000 planning rule was never implemented. There are no legal requirements for monitoring SAR. The specific species are identified as an issue for that project.

**30a).** The olive-sided flycatcher is not listed as a MIS for the Tahoe National Forest. In the Sierra Nevada, olive-sided flycatchers are more abundant in open mixed conifer and open red fir forests than in closed canopy forest (Breedy 1981). Optimum habitat is considered to be late successional forests with 0-39% canopy cover (Verner 1980). This habitat type was addressed as late seral open canopy coniferous forest ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine habitat [CWHR ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 5, canopy closures S and P]. Refer to the Last Chance MIS report pages 13, 14, and 15.

**30b).** The Swainson's thrush is not listed as a MIS for the Tahoe National Forest. In California, Swainson's thrush is primarily associated with riparian habitat (Garrett and Dunn 1981) (Unitt 1984). This habitat type is protected by RCAs and BMPs.

**30c)**. The black bear is not listed as a MIS for the Tahoe National Forest and other Sierra Nevada Forests. This species is a habitat generalist and the Last Chance MIS Report concluded that the 8 habitat types analyzed determined that the Last Chance Integrated Vegetation Management Project will not alter the existing trend in the habitat types, nor will it lead to a change in the distribution of these habitat types across the Sierra Nevada bioregion.

**30d)**. The pileated woodpecker is not listed as a MIS for the Tahoe National Forest.

**30e).** The red-breasted sapsucker is not listed as a MIS for the Tahoe National Forest.

**30f).** The Williamson's sapsucker is not listed as a MIS for the Tahoe National Forest.

**31. The Location and Size of SPLATs.** (Blum; Terhune)

**Response-** In order to meet the management direction, strategically placed land area treatments (SPLATs) are proposed over the landscape. The Tahoe National Forest's SPLAT strategy follows the direction in the 2004 Sierra Nevada Forest Plan Amendment (SNFPA). The fire and fuels management strategy within this decision is based on the premise that disconnected fuel treatment areas overlapping across the general direction of fire spread are theoretically effective in changing fire spread (Finney 1999). These disconnected fuel treatments, generally termed SPLATs act to slow the spread and reduce the intensity of oncoming fires. The locations of SPLATs also act to reduce damage to treated and untreated areas and the impact of large, uncharacteristically severe wildfires. The SNFPA decision further recognizes two criteria that must be met for the strategy to be effective: the pattern of area treatments across the landscape must interrupt fire spread and the treatment prescriptions must be designed to significantly modify fire behavior within the treated area.

SPLATs are primarily located to function as "speed bumps," slowing the spread and reducing the intensity of oncoming fires, thereby reducing damage to both treated and untreated areas and reducing the impacts of large, uncharacteristically severe wildfires. SPLATs may be natural, constructed, or the result of unplanned disturbances, and it is important to note that SPLATs are not a fixture on the landscape. Effective SPLATs are characterized by more open stands of larger fire-resistant trees with reduced ladder and surface fuels. Such conditions would reduce the extent and severity of wildfires in the area, allowing for a reduced risk of damage to forest resources, including wildlife habitat and water quality.

The American River Ranger District created a preliminary baseline SPLAT map to assist the district staff when developing the district landscape level integrated vegetation and fuels plan. This initial layer relied on fire behavior, fire history, fuels characteristics, topography and existing barriers (road, streams) inputs. Resource constraints (protected activity centers, cultural resources) were not evaluated during the baseline SPLAT map development. During project initiation, the district interdisciplinary team reviews the baseline SPLAT pattern and makes any modifications needed to ensure resource constraints are evaluated and management direction and objectives are met during site specific project proposals.

The Last Chance SPLAT treatment areas were developed by a district interdisciplinary team (IDT) composed of specialists from fire, wildlife, soils, hydrology, heritage resources and vegetation management. The IDT modified the baseline SPLAT layer's size, shape, and location based on, among others, site specific information on topography, fuel characteristics, sensitive species habitat, roads and conditions favorable for fire suppression activities (flat ridge, anchor points), vegetative and fuels conditions that would produce low fire intensities and severities.

The SPLATS being proposed by the Last Chance Project Area may be maintained, modified, or replaced by "new" SPLATs during the development of future vegetation and fuels projects within the North Fork of the Middle Fork of the American River Watershed.

Each Ranger District developed their SPLAT layer independently using a collaborative approach among District and Forest staff and the Regional Stewardship and Fireshed Assessment Cadre.

**32. Define catastrophic wildfire.** (Blum)

**Response -** All wildland fires vary in intensity in response to fuel, weather, topographical, and suppression/management factors. Large wildfires typically occur in locations with high ignition probabilities, topographically complex terrain, and propensity to warm, dry, and windy conditions (Graham et al. 2004, Sugihara et al. 2006, Bahro et al. 2007). Within any fire perimeter, effects may range from completely unburned areas to near total mortality of surface organisms, soil sterilization, and soil structure decomposition. Safford & Schmidt (TNF Historic Reference Condition Summary 5-2007) found the Last Chance Project Area in a moderately to severely departed state with respect to pre-settlement fire frequencies, even using "maximum" fire return intervals. This implies an unnatural accumulation of fuels and the potential for a wildfire to exceed historic levels of moderate to high severity, even under moderate burning conditions.

The District defines "catastrophic wildfire" as being any wildland fire with high severity percentages and areas that exceed the probable historic range of variability for the pre-European forests considered to support a fire regime of frequent low to moderate severity fires. This accepted fire regime is documented in the papers written for the Sierra Nevada Ecosystem Project (1996, Vol. II, Chapters 37,38, and 39) and numerous other scientific papers (Skinner et al 2005, Skinner 2006, Beaty & Taylor 2007, Skinner & Stephens 2004, Stephens & Collins 2004, Stephens et al. 2007, Miller et al. 2007). An example of what the District considers a catastrophic wildland fire is the Star Fire (2001). This fire had overall percentages of moderate to high severity fire significantly outside the historic range of variability.

**Literature Cited:**

Agee, J.K. 1991. Fire history of Douglas-fir forests in the Pacific Northwest USDA Forest Service general technical report PNW-GTR - Pacific Northwest Research Station (USA).

Agee J. K. and C. K. Skinner. 2005. Basic principles of forest fuel reduction treatments. *Forest Ecology and Management* 211:83-96.

Arno, Stephen F., 1980. Forest Fire History in the Northern Rockies. Society of American Foresters Journal of Forestry, Volume 78, Number 8, 1 August 1980 , pp. 460-465(6).

Bahro, B., K. H. Barber, J. W. Sherlock, and D. Yasuda. 2007. Stewardship and fireshed assessment: a process for designing a landscape fuel treatment strategy. USDA Forest Service General Technical Report PSW-GTR-203: 41-54.

Beaty, M.R. and Alan H. Taylor. 2001. Spatial and temporal variation of regimes in a mixed conifer forest landscape, Southern Cascades, California, USA. Journal of Biogeography, 28, 955-966.

Beaty, M. R., and A.H. Taylor. 2007. Fire history and the structure and dynamics of a mixed conifer forest landscape in the northern Sierra Nevada, Lake Tahoe Basin, California, USA. *Forest Ecology and Management* 255: 707–719.

Beaty, M. R., and T. H. Alan. 2008. Fire history and the structure and dynamics of a mixed conifer forest landscape in the northern Sierra Nevada, Lake Tahoe Basin, California, USA. *Forest Ecology and Management* 255: 707–719.

Brose, Patrick and Dale Wade. 2002. Potential fire behavior in pine flatwood forests following three different fuel reduction techniques. Forest Ecology and Management 163 (2002) 71-84.

Covington, W.W., and Moore, M.M. 1994. Southwestern Ponderosa Forest Structure: Changes since Euro-American settlement. Society of American Foresters, Journal of Forestry (1994), Volume 92, Number 1, pp. 39-47.

Everett, Richard L.; Schellhaas, Richard; Keenum, Dave, et al. 2000. Fire history in the ponderosa pine/Douglas-fir forests on the east slope of the Washington Cascades.. Forest Ecology and Management. 129: 207-225.

Finney, M. 2001. Design of regular landscape fuel treatment patterns for modifying fire growth and behavior. *Forest Science* 47: 219-228.

Fites, Jo Ann, Mike Campbell, Alicia Reiner, and Todd Decker. 2007. Fire Behavior and Effects Relating to Suppression, Fuel Treatments, and Protected Areas on the Antelope Complex – Wheeler Fire. The Fire Behavior Assessment Team.

Graham, R. T., S. McCaffrey, and T. B. Jain, (eds.). 2004. Science basis for changing forest structure to modify wildfire behavior and severity. Gen. Tech. Rep. RMRS-GTR-120. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, CO.

Gutierrez, R.J. and M.E. Seamans. 2006. Population ecology of the California spotted owl in the central Sierra Nevada: annual results 2006. Unpublished project report, U.S.F.S. R5, Vallejo, CA.

Hanson, C.T., Odion, D.C. 2006. Fire Severity in mechanically thinned versus unthinned forests of the Sierra Nevada, California. In: Proceedings of the 3rd International Fire Ecology and Management Congress, November 13-17, 2006, San Diego, CA.

Hessl, A.E., D. McKenzie and R. Schellhaas. 2003. Drought and Pacific Decadal Oscillation Linked to Fire Occurrence in the Inland Pacific Northwest. Ecological Applications: Vol. 14, No. 2, pp. 425-442. doi: 10.1890/03-5019

Kilgore, B.M. 1973. The ecological role of fire in Sierran conifer forests: its application to national park management. Quaternary Research 3: 496-513.

Laudenslayer, William F.; Darr, Herman H, 1990. Historical effects of logging on forests of the Cascade and Sierra Nevada ranges of California. 1990 Transactions of the Western Section of the Wildlife Society. pp 12-23

Long, J.N. and J.D Shaw. 2005. A Density Management Diagram for Even-aged Ponderosa Pine Stands. *Western Journal of Applied Forestry* 20(4) 2005.

MacCraken, J.G., W.C. Boyd, and B.S. Rowe. 1996. Forest Health and spotted owls in the eastern Cascades of Washington. Transactions of the North American Wildlife and Natural Resources Conference, Special Session7, Number 61.

Miller, J.D., H.D. Safford, M.Crimmins, and A.E. Thode; Quantitative Evidence for Increasing Forest Fire Severity in the Sierra Nevada and Southern Cascade Mountains, California and Nevada, USA, Ecosystems DOI: 10.1007/s10021-008-9201-9, 2008.

Moghaddas, Jason and J. Craggs. 2007. A fuel treatment reduces fire severity and increases suppression efficiency in a mixed conifer forest. *International Journal of Wildland Fire* 16: 673–678.

Murphy, K., T. Rich and T. Sexton. 2007. An Assessment of Fuel Treatment Effects on Fire Behavior, Suppression Effectiveness, and Structure Ignition on the Angora Fire, United States Department of Agriculture R5-TP-025 August 2007.

Oliver, W.W. 1995. Is Self-Thinning In Ponderosa Pine Ruled By *Dendroctonus* Bark Beetles? *In* Gen. Tech. Rep. RM-GTR-267.

Oliver, William W. 1997. Maximum Stand Densities for Ponderosa Pine and Red and White Fir in Northern California. 18th Forest Vegetation Management Conference.

Omi, Philip N., Erik J. Martinson, and Geneva W. Chong. 2007. Effectiveness of Pre-Fire Fuel Treatments, Submitted to the Joint Fire Science Program Governing Board December 31, 2006.

Omi, P.N. and E.J. Martinson. 2002. Effect of fuels treatment on wildfire severity. Final report submitted to the Joint Fire Science Program Governing Board. Colorado State University, Fort Collins.

Raymond, C.L. and D.L. Peterson. 2005. Fuel treatments alter the effects of wildfire in a mixed-evergreen forest, Oregon, USA. *Canadian Journal of Forest Research* 35: 2981-2995.

Rhodes, J. J. and W. L. Baker. 2008. Fire probability, fuel treatment effectiveness and ecological tradeoffs in western US public forests. *The Open Forest Science Journal* 1: 1-7.

Ritchie, M.W., C.N. Skinner, and T.A. Hamilton. 2007. Probability of wildfire-induced tree mortality in an interior pine forest: effects of thinning and prescribed fire. *Forest Ecology and Management*. Fire Science Brief Issue 4 January 2008 207: 200-108.

Safford, Hugh and Dave Schmidt. 2007. Historic Reference Condition Mapping, Version 3. Tahoe National Forest Regional Ecology Program, USDA-Forest Service Pacific Southwest Region & The Nature Conservancy, California Chapter, 19 May 2007.

Scott, Joe H.; Reinhardt, Elizabeth D. 2001. Assessing crown fire potential by linking models of surface and crown fire behavior. Res. Pap. RMRS-RP-29. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 59 p.

Sierra Nevada Ecosystem Project (1996, Vol. II, Chapters 37, 38, and 39).

Skinner, Carl N., personal communications 2006.

Skinner, Carl N., Ritchie W. Martin, Todd Hamilton, and Julie Symons. 2004. Effects of Thinning and Prescribed Fire on Wildfire Severity. 25th Forest Vegetation Conference, January 22-24, 2004, Redding, CA.

Skinner, Carl N., Stephens, Scott L. 2004. Fire in the Sierra Nevada. In: Murphy, Dennis D. and Stine, Peter A., editors. Proceedings of the Sierra Nevada Science Symposium. Gen. Tech. Rep. PSW-GTR-193. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture: 65-68.

Skinner, Carl N., Scott L. Stephens, and Sam Wilbanks. 2005. Jeffrey Pine-Mixed Conifer Fire History and Forest Structure With and Without Fire Suppression and Harvesting; Final Report Joint Fire Science Program Project 01-3-3-27.

Spurr, S. H. and B. V. Barnes. 1992. *Forest Ecology*. 3rd edition. Krieger Publishing Company, Malabar, FL.

Stephens, Scott L., 2008. Chainsaws or Driptorches: How Should Fire Risk Be Reduced? Fire Science Brief, Issue #6, March 2008.

Stephens, S.L., Collins, B.M., 2004. Fire regimes of mixed conifer forests in the north-central Sierra Nevada at multiple spatial scales. Northwest Sci. 78, 12–23.

Stephens, Scott L., Robert E Martin, Nicholas E. Clinton, 2007. Prehistoric fire area and emissions from California's forests, woodlands, shrublands, and grasslands. Forest Ecology and Management 251 (2007) 205–216.

Sugihara, N. G., J. van Wagtendonk, K. E. Shaffer, J.Fites-Kaufman, and A. E.Thode (Eds.). 2006. *Fire in California's Ecosystems*. University of California Press, Berkeley, California, p. 596.

Taylor, A.H. and Carl N. Skinner. 1998. Fire history and landscape dynamics in a late-successional reserve, Klamath Mountains, California, USA. Forest Ecology and Management 111 (1998) 285-301.

Thomas M. Bonnicksen, Edward C. Stone, 1982. Reconstrution of a Presettlement Giant Sequoia-Mixed

Conifer Forest Community Using the Aggregation Approach Ecology, Vol. 63, No. 4 (Aug., 1982), pp. 1134-1148. Published by: Ecological Society of America Stable URL: http://www.jstor.org/stable/1937250

USDA Forest Service. 2009. Last Chance Integrated Vegetation Management Project Environmental Assessment. Tahoe National Forest.

USDA Forest Service. 2000. USDA Best Management Practices.

USDA Forest Service Pacific Southwest Region. 2004. Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement Record of Decision. Vallejo, CA.

USDA Forest Service. Pacific Southwest Region. 2007. Sierra Nevada National Forests Management Indicator Species Amendment Record of Decision. Vallejo, CA.

USDA Forest Service. 2008. Sierra Nevada Forests Bioregional Management Indicator Species (MIS) Report: Life history and analysis of Management Indicator Species of the 10 Sierra Nevada National Forests: Eldorado, Inyo, Lassen, Modoc, Plumas, Sequoia, Sierra, Stanislaus, and Tahoe National Forests and the Lake Tahoe Basin Management Unit. Pacific Southwest Region, Vallejo, CA. January 2008.

Verner, J., K.S. McKelvey, B.R. Noon, R.J. Gutierrez, G.I. Gould, Jr. and T.W. Beck, Technical Coordinators. 1992. The California spotted owl: a technical assessment of its current status. Gen. Tech. Rep. PSW-GTR-133. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 285pp.

U.S. Fishand Wildlife Service. 1992. Recovery plan for the northern spotted owl-draft. U.S. Department of the Interior, Portland, Oregon, USA.

U.S. Fishand Wildlife Service. 1995. Recovery plan for the Mexican spotted owl: Vol.1. U.S. Department of the Interior, Albuquerque, NM, USA.

Verner, J.K., S. McKelvey, B.R. Noon, and R. J. Gutierrez. 1992. The California spotted owl: a technical assessment of its current status. U. S. Forest Service, Pacific Southwest Research Station, GTR-PSW-133, Albany, CA. USA.

Weatherspoon, C.P., S.J. Husari, J.W. van Wagtendonk. 1992. Fire and fuels management in relation to owl habitat in forests of the Sierra Nevada and Southern California. in J.K. Pages 247-260.

Weaver, H, 1943. Fire as an Ecological and Silvicultural Factor in the Ponderosa-pine Region of the Pacific Slope. Society of American Foresters Journal of Forestry (1943), Volume 41, Number 1, pp. 7-15.