7) Cow Camp - SPI response

Sierra Pacific Industries

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August 11, 2008

Mr. Mike Bacca
CAL FIRE
1234 East Shaw Avenue
Fresno, CA 93710- 7899

Re: **THP# 4-07-037/TUO-6 (Cow Camp THP)**

Dear Mr. Mike Bacca

The following changes shall complete the final edits necessary to proceed with your final determination. Changes are listed by section and page number for your convenience.

1. **Section III**

   Pages 41 & 42, Change: New language regarding effects of "Visual Retention" on MSP.

   Pages 50 – 57, Change: New section "Consideration of Feasible Silviculture Alternatives"

2. **Section IV.**

   Page 60; Change: The year to 1996 in past projects paragraph.

   Page 62 – 72: Change: First three words in the second paragraph under planning watershed. Added past projects table to biological assessment area description, also changed the wording of the first two sentences of the biological assessment area description. A new assessment area size discussion is included as well as a new section titled "Federal and State Studies and Planning Documents". The literature cited has been updated and new wording for traffic impacts assessment area.

   Page 81 – 91: Change: Replaced CEQA Analysis of Herbicide use.

   Page 95: Change; First two sentences of the biological assessment area description to match the wording on page 62.

   Page 99 - 103: Change: New language for California Spotted Owl and the Pacific Fisher.

3. **Section V.**

   Page 129 – 136.1: New Biological Assessment area and past projects maps showing the "Biological Assessment Area "and new map showing visual assessment area.

All the changes above have been reviewed on the ground during the PHI and have been agreed to by SPI district manager Tim Tate and by myself. If you have any questions Please contact me at (209) 532-7141.

Sincerely

Michael T. Vroman,

RPF #2447

objectives.

953.6(b)(6) – The treatment of the stand to be used in harvesting:

(b)(6)(A) – Guidelines used in determining which trees are to be harvested or left:
The designation will be achieved according to the following guidelines:

A. All groups to be retained will be flagged around their boundaries.
B. Groups will be selected on the basis of their ability to mitigate the visual effects of the harvest from nearby roads, trails, or other common viewing sites. Additionally, groups will be chosen which focus retention on diverse attributes such as: pockets of younger stocking, existing snags, large down logs, multistoried vegetative structure, individual or groups of oaks, riparian areas, significant rock outcrops, at topographic confluences, or a combination of these characteristics.
C. Where possible, groups will be incorporated into other "buffer" areas, such as watercourse zones or "view strips" along public or other high use roadways.
D. Where feasible, edges of the units will be varied by "feathering" boundaries so that straight, harsh lines are not formed as unit boundaries.
E. Dispersed retained trees will be marked in paint, and the RPF will instruct the LTO(s) to protect these trees during operations.

(b)(6)(B) – Type of field designation for groups and dispersed trees:
Retained dispersed trees shall be marked at breast height with orange paint. Retained groups shall be flagged with blue and yellow flagging.

(b) (6)(C) – Site preparation and regeneration timetable:
Site preparation will be used as outlined in Section II, Site Preparation Addendum. The proposed stocking guideline is to meet the point count method described in 14 CCR 952.7(b)(1), which calls for 300 point count within five years after completion of timber operations. Site preparation (such as mechanical, chemical, or
intentional fire) will not be employed inside the retained groups, but may be utilized between dispersed individual trees.

953.6(c): Alternative prescription in comparison to the practical on-the-ground effects of a clearcut:
The Visual Retention AP will not have the practical on-the-ground effects of a traditional clearcut. The retention of the groups will provide partial shade, microclimate amelioration, shelter from wind, forest structure for wildlife habitat, and tree species diversity not offered with traditional clearcuts. In addition, retained dispersed trees between the groups in the units will greatly moderate the visual appearance that would occur with traditional clearcuts. Although the retained trees are intended for structure to moderate visual appearances, they will undoubtedly also provide natural seeding to augment planted trees.

The Visual Retention AP is an evenage regeneration harvest. As such, this AP will conform to all rules applying to evenage regeneration harvests [14 CCR 953.1(a)] including: age, acreage limitations, requirements for separation by logical logging units, and adjacency to previous evenage units.

Visual Retention

In 2000, Sierra Pacific Industries announced a change in policy that affects our land in the Sierra Nevada. This policy implements a type of silviculture called "Visual Retention" in order to mitigate potentially deleterious aesthetic effects that might occur with clearcuts. The primary concern we intend to address through this policy shift is the visual resources within our THPs. Under this type of silviculture, minimums of 4 to 8 merchantable trees per acre are retained (either in groups and/or dispersed throughout the timber stands) instead of the traditional clearcut method whereby all merchantable trees are removed in a single operation. Our goal is for "Visual Retention" silviculture to be applied to 70% of our potential future clearcuts in the Sierra Nevada.

Maximum Sustained Production is presently analyzed for our ownership through an approved Option A document on file with the Department of Forestry. Given the recent announcement of our change in policy to more reliance on Visual Retention, we believe that our long-term sustained yield (LTSY) may decline slightly. We are not certain that this decline will occur, nor do our preliminary analyses show that it will be significant. Our preliminary calculations indicate that any decline in LTSY will be less than 5% of projected harvest levels. The effect of minor reductions in growth caused by visual retention will be to future projected stand yields, and won't change near term harvest levels significantly. Since SPI's Option A shows increasing future harvest levels, the potential would be to minimally reduce a future projected higher level. The trend in harvest levels and LTSY would continue to be up significantly from current harvest levels.

953.6(d): Marking:

The groups of trees to be retained under this AP will be flagged by an RPF or his designee prior to harvest. The dispersed retention trees will be marked with paint by the RPF or his designee prior to harvest. At least 10% of the units, with a minimum of one unit, for each method (those closest to clearcut and those closest to seed tree seed step) will be marked prior to the PHI for evaluation.

953.6(e)(3):

Will this prescription reduce the after harvest stocking standards or evenage prescription limitation below the most closely associated standard? YES _ NO **X**

"Stocking standard" (ref. 895.1) means the standard established in 14 CCR 952.7. For evenage regeneration cutting as proposed here, the appropriate standard is 952.7(b)(1): an average point count of 300 per acre on Site I, II, and III lands. This is the standard proposed above and will be met within five years after completion of timber operations.

Evenage prescription limitations related to stand age, maximum unit size, and adjacency have and will be met.

Clear-cut 953.1(b):

The plan area has seven clearcut units. The clearcut units total 109 acres. All trees may be removed from the clearcut units. Some trees will be left on rocky areas not suitable for site preparation. Upon inspection of each unit the RPF may elect to retain some desirable regeneration and hardwoods. This will take place on a site-by-site basis. Site preparation and artificial regeneration will be used to achieve the required three hundred-point count stocking standards as specified in 952.7(b)(1). Clearcuts will be site prepared and planted. This area has been selected for clearcut to convert stands that are highly variable and in some cases poorly stocked to more productive plantations.

Wildlife Retention Areas (WRA):

It is the policy of SPI to establish WPA's within selected evenaged management units where site- specific wildlife habitat and vegetation diversity can be enhanced. WRA's will also enhance stand structure by creating variation in plantations earlier in the life of the stand than may otherwise occur. These small clumps of residual vegetation also enhance the post harvest aesthetics of units by breaking up the visual continuity. The purpose of the WRA's is to maintain SPI's statewide wildlife management objectives. "Wildlife Retention Areas" are defined as small-protected areas (approximately 1/10 acre in size) of diverse vegetation types (Oaks, Conifers, Snags, Brush, Large down woody debris, grassy meadows/springs, rock outcrops, etc.) that are well distributed throughout the THP harvest area. Wildlife retention areas shall be avoided during all site preparation operations. Wildlife Retention Areas may or may not occur in any given unit. Each unit will be reviewed during operations for a variety desirable features and potential locations for WRA's. The placement of WRA's will be well dispersed and WRA's shall remain intact throughout timber operations. Individual trees may be removed from within retention groups at the discretion of (and as designated by) the RPF, and equipment may cross perimeter boundaries as may be necessary to remove harvest trees where approved by RPF prior to use.

Alternatives 2,3,4,5 & 6 do not reflect the desires of the landowner and as a result of this analysis appear to have the potential to increase risk of and or directly increase potential adverse impacts. Therefore, these alternatives are rejected. For this reason, Alternative #1 is considered the preferred alternative.

Consideration of Feasible Silviculture Alternatives

The following analysis is an assessment of the early historical record depicting the pre-settlement condition of California forests, and the effects historical management practices, including fire management, have had on today's forest conditions. This assessment provides the background and reasoning leading to our choice of the mix of preferred silvicultural practices from the range of alternatives.

Factors Considered in Silvicultural Decision

Changes to Forest Conditions from Pre-Settlement to the Present

To better assess and understand SPI's silvicultural decisions, it is necessary to recognize some changes that have occurred to our interior forests in California. Itemized below are several general forest characteristics relating to structure, composition and habitat condition. A summary of the trends and changes that have occurred is presented for each. Following that summary are supporting statements and citations from the scientific literature reviewed and cited.

Forest Density

Forests in California have become denser over the last 100 years as a result mainly of fire suppression efforts; selective logging has increased this trend. This trend is likely to continue.

- In the Sierran mixed-conifer, pre-European forests probably consisted of a complex array of mostly small, even-aged aggregations and/or stands representing a wide range of age- and size-classes. Compared to today's forest conditions, stands would have been less dense and groups of different-sized trees would have been separated more horizontally into even-aged aggregations with less vertical diversity within groups (Weatherspoon et al 1992).
- To various degrees, the forest system has been changed from one dominated by large, old, widely spaced trees to one characterized by dense, fairly even-aged stands in which most of the larger trees are 80-100 years old. This forest appears to be unstable. Its trajectory into the future is largely unknown but stand structure can be expected to change markedly over the next 100 years (McKelvey and Johnston 1992).
- In particular, it is believed that fire suppression and past logging practices have resulted in overly dense under-stories of the more shade-tolerant conifers, such as incense cedar, and the drought-susceptible white fir (Ferrell 1996).
- These overly dense stands are subject to extensive mortality from drought and insects, including the loss of the most desirable large, old trees (Weatherspoon et al 1992, Ferrell 1996). Mortality has been greatest in overly dense stands, especially those where past logging and/or fires-exclusion practices have promoted stand conditions susceptible to insects, pathogens, fire, and drought (Ferrell 1996).
- Because tree removal historically has targeted larger stems, and because these large trees appear to have been unevenly distributed on the landscape, forming groves, it is likely that their removal caused a decrease rather than in increase in landscape-level forest heterogeneity (McKelvey and Johnston 1992).
- The patchwork of small, even-aged aggregations that characterized the mixed-conifer type before 1900 has become less distinct (Weatherspoon et al 1992).
- Changes at least partly attributable to fire suppression that are thought to have contributed to an increase in owl habitat include increased stand density, greater development of middle and lower canopy layers, more snags and more coarse woody debris (Weatherspoon et al, 1992).
- It is possible that these changes have led to a net improvement in spotted owl habitat (Weatherspoon et al 1992).

Species and Genetic Composition

Forests in California have become increasingly composed of white fir and incense-cedar while the ponderosa pine component has declined. Fire suppression and selective logging have contributed to this trend. Dysgenic effects from diameter cutting systems are likely. Selective logging is the primary cause of this trend, but fire suppression has also increased this effect. These trends are likely to continue.

- The structure and composition of Sierran mixed-conifer forests have been affected profoundly by fire suppression policies begun in the early 1900s (Weatherspoon et al 1992).
- Comparing the estimates of tree species composition in 1913 to current estimates suggests that true fir and incense cedar have increased and that pines have decreased (McKelvey and Johnston 1992).
- Historic and recent selective logging tends to favor shade-tolerant species such as firs and cedars at the expense of the more shade-intolerant and drought-resistant pines (Ferrell 1996).
- On high site forest land in the central Sierra Nevada, forest inventories since 1957 show that in selectively cut areas, pine seedlings and saplings are fewer in number compared to the more shade tolerant white fir and incense-cedar. Also, the pine does not seem to be surviving well into the sapling stage (Olson and Helms 1996).
- Only the center portion of openings of .5 to 1.5 acres are large enough to allow adequate growth of shade intolerant pines. Shade tolerant species overwhelm pine in other areas of these small openings (Olson and Helms 1996).
- It is reasonable to infer that the proportion of fir has increased by perhaps 10-20 percent while the proportion of yellow and sugar pines has decreased by a similar amount. The trend toward the more shade-tolerant fir will be enhanced by selective removal of trees, by fire suppression and by maintenance of the very dense stand conditions that exist in many areas of the Sierra Nevada today (McKelvey and Johnston 1992).
- The changes in forest conditions described for Ponderosa pine and mixed conifer forest types have occurred to a lesser degree in the true fir forest types (McKelvey and Johnston 1992).
- This complex fire regime, along with other agents of disturbance, produced a variable, irregular patchwork of even-aged groups, most from less than an acre to several acres in size. Openings created by fires and other disturbances provided conditions favorable for regeneration and growth of shade-intolerant trees and plants, including ponderosa pine, and California black oak (Weatherspoon et al 1992).
- Maynard, Overton, and Johnson (1987) characterize diameter-limit cutting as follows: "In terms of genetic consequences, diameter-limit cutting is like destroying the lst, 2nd, and 3rd place finishers in every horse race, and putting the last place finishers out to stud!" (Howe, 1989).
- If uneven-aged management were ever to successfully be practiced wholesale over large areas for long periods of time, it has the potential for quickly liquidating pioneer and early seral species (Zobel and Talbert, 1984). Uneven-aged management of this sort would be inconsistent with the ecology of virtually all temperate forests, which recycle periodically, primarily by fire (Howe, 1989).

Large Trees

The forests of California have had a decrease in the distribution of large trees across the landscape and this trend is likely to continue.

- The average yellow pine was reportedly 150 to 180 feet tall and 3 to 4 feet in diameter at breast height (McKelvey and Johnston 1992).
- Large, old trees appear to have been characteristic of many forested areas. However, this certainly does not imply that varying sized patches of shrubs or younger trees were not present in the landscape. Variation in tree size and species composition was likely to be greater horizontally (across the landscape) than vertically (within a single stand) (Skinner and Chang 1996).
- The western pine beetle kills mainly mature pines weakened by root disease, dwarf mistletoe, or

drought (Ferrell 1996).

Fire Intensity

Forests in California have become more susceptible to high intensity stand destroying catastrophic wildfire and this trend is likely to continue.

- Prior to European settlement in the mid-1800's, Sierran mixed-conifer forests were characterized by a short-interval, low- to moderate-severity fire regime. As a result of human activities since the mid-1800's, the fire regime has been changed to one of less frequent but substantially more severe fires (Weatherspoon et al 1992).
- Frequent fires in the mixed-conifer type maintained surface fuels at fairly low levels, and kept the under-story relatively free of trees and other vegetation that could form fuel ladders to carry surface fires in to main canopy (Weatherspoon et al 1992).
- Although high severity crown fires usually could not be sustained over large areas, they affected small areas (ranging in size from a single tree to at least several acres) and probably were relatively common and an important influence on stand structure (Weatherspoon et al 1992).
- Success in excluding fire from large areas that were once regulated by frequent low-to moderate-severity fires has simply shifted the fire regime to one of long-interval, high-severity, stand-replacing fires (Weatherspoon et al 1992).
- In recent years, large fires have become less controllable and more severe, evidently reflecting in part increased fuel loading (Weatherspoon and Skinner 1996).
- Fuel conditions in much of the Sierra Nevada support the potential for large fires exhibiting extreme fire behavior with likely undesirable effects (Sapsis et al 1996).

Early Seral

The forests of California have seen a decrease in early seral components. Except for areas burned in large catastrophic wildfire, this trend is likely to continue.

- Forest openings have disappeared or become smaller in a remote study area of the Klamath Mountains during the period of effective fire suppression (Skinner 1995).
- Stressed pines are usually killed singly or in small clumps during non-drought periods but during droughts both mature and pole-sized pines may be killed in large groups and the openings thus created support establishment and growth of shade-intolerant plants and trees (Ferrell 1996).

Open Forest

The extent of open, well-spaced forests in California has declined, and this trend is likely to continue.

- The earliest and best known descriptions of the mixed conifer forest were written by John Muir, who described the "inviting openness of the Sierra woods" and noted that their "park-like" condition enables one to have "little difficulty in riding on horseback through successive belts" to the peaks (Helms and Tappeiner 1996).
- It appears that many forested areas were generally more open than they are today, due mostly to the frequency of fires (Skinner and Chang 1996).

Small and Medium Sized Trees

Forests in California are now composed of smaller stems at greater density and this trend is likely to continue.

- Conifer stands have become denser, mainly in small and medium size classes of shade-tolerant tree species. Stands have become more complex when viewed vertically, but less complex and more homogeneous in terms of areas arrangement. "Selective" cutting of large over-story trees has probably reinforced these trends (Weatherspoon 1996).

- As frequent fires of low to moderate severity ceased to be a dominant ecological force, shade-tolerant and fire-sensitive tree species (especially white fir) increased dramatically in abundance, particularly in small to medium size classes. Multiple-canopied stands consisting largely of these shade-tolerant species are now common. Regeneration of pines, black oak and other shade-intolerant species has declined except in areas opened by wildfires or management activities (Weatherspoon et al 1992).
- The pine engraver beetle kills mainly pole-size pines in overly dense stands, especially during droughts (Ferrell 1996).
- Trees in smaller size classes were uncommon, though patches of very small regeneration were present (McKelvey and Johnston 1992).

Forest Stand Structural Elements

Snags of all sizes and large woody debris on forest floors have increased and, except for catastrophic wildfire, this trend is likely to continue. In the future, the increasingly dense forest will no longer grow large trees at a rate that ensures the potential supply of large snags and large woody debris. The regular disturbance caused by repeated unevenaged harvest entry can increase the small hardwood component of stands. Yet, like conifers, such harvest does not provide the growing environment suitable to produce large hardwood trees. These trends are the results of fire suppression and selective logging and are likely to continue.

- Continual suppression of the fires in many of these forests has probably increased coarse woody debris accumulations above that in pre-suppression-era forests (Skinner and Chang 1996).
- There has also been an increase in the accumulation of downed logs and snags in these forests as a result of the increased mortality from recent, severe fires, from insects and from stressed overcrowded pine stands. As a consequence, large high-severity fires, once rare, have become commonplace in recent years, as have many small, high intensity fires (Chang 1996).
- With fire suppression, fuels on the forest floor (including coarse woody debris) have accumulated far beyond their normal levels (Weatherspoon et al 1992).
- More snags and large woody fuels are likely to increase fire spotting and suppression difficulty (Weatherspoon et al 1992).
- The increased mortality due to stress has also added greatly to fuel loads. The increase in snags and large woody fuels is likely to increase fire spotting and make fires harder to suppress (Chang 1996).
- It seems likely that on xeric sites relatively few downed logs reached advanced stages of decay before being consumed by fire (Weatherspoon and Skinner 1996).
- Many high quality mature forest stands in the Sierra Nevada have low to moderate over-story tree densities, moderate canopy cover, and openings of sufficient size for successful reproduction of the relatively shade-intolerant pioneers, such as pines and a variety of brush species (Franklin and Fites-Kaufmann, 1996). Wildfires of light to moderate intensity and moderate to high frequency have been important in creating and maintaining this structure.
- In mature forest stands, the hardwoods are decadent and dying, with little regeneration to provide replacement trees (McDonald and Tappeiner 1996).
- The four major hardwood species in the Sierra Nevada are well adapted to take advantage to changes in the environment. These species are able to respond more quickly and effectively to disturbances than their conifer associates (McDonald and Tappeiner 1996).
- Sierra Nevada hardwoods do not grow as tall as their conifer associates causing the hardwoods to be shaded out and eliminated over time without additional disturbance (McDonald and Tappeiner 1996).

Wildlife Species Response to Habitat Changes Over Time

Despite the past 200 years of human manipulation of California's forests, most wildlife species seem to have adapted to these changing conditions. Given the reduction of early seral and open forest conditions, wildlife associated with these habitats may not be able to continue to adapt in the future.

- Compared to the more intensively developed regions of California, the terrestrial vertebrate fauna of the Sierra Nevada is relatively intact (Graber 1996).
- Only three vertebrate species are known to have been lost from the Sierran fauna in historic times, the California grizzly bear, the Bell's vireo and the California condor (Graber 1996). All of these species require forest openings for all or part of their habitat needs
- Biological communities and structural elements that were present in aboriginal times have persisted, although some floristic components, size and spatial distribution of each habitat component may be different to varying degrees (Graber 1996).
- The most important factor in population viability for nearly all species has been and continues to be habitat quantity and quality (Graber 1996).
- The North American Breeding Bird Survey provides the most useful data regarding Sierran vertebrate species status and trend (Graber 1996). Twenty-six years of data from the Breeding Bird Survey suggest that 29 land-bird species may be declining in population. Sixty five percent of these species are associated with early seral or open forest habitats, while twenty seven percent are associated with dense forest habitats. (SPI - CWHR 1999).
- The principal predictor of the presence of a particular vertebrate is appropriate habitat. Wildlife habitats are largely equivalent to vegetation types or biological communities but may also require the presence of abiotic elements such as cliffs, caves, lakes and streams or sandy soils (Graber 1996). Most wildlife species also make significant use of biotic structural elements for important life functions: shrubs or trees at a particular seral state, size or density; snags; logs; and hardwoods (Graber 1996). The amount and distribution of these abiotic and biotic structural elements often control population levels of wildlife species (SPI – CWHR 1999).
- Fire suppression in the Sierra Nevada has led to forest and chaparral stand conditions inimical to many Sierra land-birds because of loss of habitat elements, including forest openings with herbs and shrubs (Graber 1996).
- The high fuel loading resulting from fire suppression can lead to large, stand-destroying fires that eliminate large, old trees, snags and logs (Graber 1996).
- Of 246 wildlife and fish species that commonly utilize forested habitats in California, 29% are associated with early seral habitats, 14% are associated with dense, small tree forests, 22% are associated with open forests, 14% are associated with dense, large tree forests, 6% are associated with abiotic elements such a cliffs and caves, and 14% are associated with water and riparian habitats (SPI - CWHR 1999).
- Of 246 wildlife and fish species that commonly utilize forested habitats in California, 80 are associated with snags, 78 are associated with logs, 158 are associated with grass and/or shrub edges and/or layers, and 75 are associated with mast producing hardwoods (SPI - CWHR 1999).
- Absent non-habitat factors (trapping, poisoning, competition or predation from introduced species, etc.), the changes in habitat caused by fire suppression and forest management activities are likely to have caused the following trends in populations of wildlife species:
  - cold water associates – stable trend
  - early seral associates – stable to declining trend
  - open forest associates – stable to declining trend
  - dense small tree associates – stable to increasing trend
  - dense large tree associates – stable to declining trend
  - snag associates – stable to increasing trend
  - log associates – stable to increasing trend
  - edge and layer associates – stable to declining trend
  - hardwood associates – stable to declining trend

While some of these trends could lead to significant adverse effects if allowed to continue for a long period of time, SPI intends to arrest the progression to the extent it is feasible of those we consider could lead to significant adverse effects. This will be accomplished on SPI land through implementation of forest management prescriptions and regimes that consider and incorporate the factors described below.

Management Considerations

These considerations are part of the overall decision process that leads to our discussion and conclusions presented below.

- Providing a sufficient amount and distribution of mature forests and providing a sufficient quantity and distribution of snags and other dead wood in forests of all ages with all degrees of canopy cover and tree densities, appear to be crucial for the continued existence of an intact and healthy Sierran forest avifauna (Graber 1996).
- There are also species that prefer open stands or forest openings. These open stands and openings would have occurred in many places due to past fire regimes and could be created with appropriate forestry practices today (Graber 1996).
- In general, conditions need to be moved away from dense, small-tree-dominated forests toward more open, large-tree-dominated forests (Weatherspoon and Skinner 1996).
- Any landscape-level needs for large, even-aged stands are likely to be met by severe wildfires and subsequent plantation establishment for the foreseeable future (Weatherspoon 1996).
- Natural even-aged stands originate mostly from high-severity fires that kill the great majority of trees in the stand. In pre-European fire regimes, high-severity fires occurred most often in moist sites or sites dominated by white fir. Even-aged stands resulting from even-aged silvicultural systems and from infrequent severe fires may be similar in terms of the general structure and arrangement of live trees (Weatherspoon 1996).
- Maintaining open forest conditions provides for reduced fuels and damage from fire, increased tree size, and opportunities for under-story vegetation layers (Oliver et al 1996).
- Repeated logging of stands by selective methods can lead to increased levels of root disease by repeatedly providing trunk or root wounds which are infection sites for root pathogens. Done properly, intensive even-aged management should mitigate most of these problems (Ferrell 1996).
- If present trends and management practices continue, Sierra Nevada forests will experience outbreaks of bark beetles and wildfires in response to the recurrent droughts characteristic of the California climate. It is likely that the high levels of forest damage caused by these agents will increase in the future over much of the Sierra Nevada (Ferrell 1996).
- Mortality of remnant old-growth trees will increase due to their age-related higher susceptibility to insects and pathogens (Ferrell 1996).
- If management strategies are altered in the direction of restoring pre-settlement forest composition and structure, current forest conditions, including damage from insects and pathogens, would probably be mitigated (Ferrell 1996).
- Silvicultural techniques are needed in addition to or in lieu of fire in many areas to move conditions away from dense forests dominated by small trees and containing excessive fuels toward more open forests dominated by large trees (Weatherspoon 1996).
- All forest management activities must be done carefully as with every entry into a stand there is a risk of injuring the residual trees. In particular, scorching and mechanical injury to remaining trees should be minimized. Appropriate equipment and methods should be used to minimize soil compaction and root damage (Ferrell 1996).
- After 40 years of plantation growth, tree size was dramatically affected by stand density. In low-density stands, tree diameters averaged 21.2 inches in dbh and live crown ratios average 70%. Values were 13.5 inches and 54%, respectively, in the high-density stands (Oliver et al 1996).
- Tree size and vigor increase as stand density decreases (Oliver et al 1996).
- Sierra Nevada hardwood species grow best in stands with total crown densities of 40-60 percent and total basal areas between 100-125 square feet (McDonald and Tappeiner 1996).
- In general, computer simulations indicate that average volume increment from properly implemented even-age management techniques will equal or exceed other management styles. Growth in diameter and height of trees planted in Blodgett Forest outperform expected growth rates for unmanaged ponderosa pine plantations (Olson and Helms 1996).

Discussion and Conclusions

The trends in habitats or structural components (habitat elements) presented should not be considered as long-term significant adverse effects on species or forests, but should be viewed as potentially significant if negative trends are not arrested or reversed.

In light of these trends (in habitats and structural components) from past logging and fire suppression, the following discussion will provide the general background information that guides the primary choice of landowners; to use either evenaged or unevenaged regeneration systems.

Results from Past Harvesting and Fire Suppression

Earlier foresters did not have the benefit of data sets and fire suppression effects research to guide their decisions. They found a mostly open pine forest and harvested it. They protected it from wildfire and the typical result was a well-stocked forest, dominated by pine with high growth rates. In many instances they employed so-called "selective harvest" methods, taking only the largest dominant trees. As new generations of foresters were hired and trained in these selective harvest methods, what they did not realize was that, as this effort continued, they were no longer starting with the same forest dominated by large-tree and open spacing.

Taking into consideration forest practice stocking rules, tree species composition, higher canopy closures and stem density, they could no longer expect successful regeneration of shade intolerant species nor achieve growth rates that would allow continued harvesting at sustainable levels. Tree growth in these more shady conditions was no longer keeping up with planned harvest rates, as they had in the past.

Earlier foresters and landowners also were encouraged by both State tax laws and the Forest Practice Act to continue individual tree selection harvesting. Under California tax code ad valorem taxes (annual full value land taxes) – pre 1976, Section 12¾ of Article XIII of the California Constitution encouraged 70% removal of the volume and retention of trees less than 18" in diameter. The incentive provided was that the remaining timber value was removed from the tax rolls for 40 years after such a harvest.

Information Based Decisions

SPI has collected data across our property using a systematic grid of plots. This data provides some of the basis for SPI's demonstration of achievement of maximum sustained production filed pursuant to 14 CCR 913.11(a), [933.11(a), 953.11(a)]. Included in this data set is a comprehensive set of radial core measurements. Conifers grow radially and each summer produce denser and darker cells which appears in cross section as a ring. This radial core measurement allows us to assess individual tree growth rates. We now have over 346,000 individual trees from throughout our land that have been measured this way. This investment in data collection has allowed SPI to assess the effects of past silviculture in ways that were not available to previous landowners nor the foresters who prescribed past management decisions.

The company-wide average radial core data for the 8-inch diameter breast height (dbh) tree and the same data for the average harvested tree (approximately 22 inches (dbh)) are based upon over 13,000 random samples in each diameter class. The average 8-inch tree is growing 17.7 rings per radial inch while the average 22-inch tree is growing 11.7 rings per inch. Such trees growing at the combined average of 14.7 rings (or years) per radial inch under current selective management, will take 103 years to grow from 8" to 22" (current average crop tree size). At the same time, if removed and regenerated under an evenaged regeneration system, a seedling can easily grow to 22 inches in 55 years and to 32 inches dbh under SPI's estimated 80-year average rotation. Thus, we could not only grow a 22" tree in far less time, we can grow an even larger diameter tree decades before the existing 8" tree reaches 22". It is clear that we could grow a forest stand of larger trees, faster, by clearing and planting. This would allow us to reverse trends in early seral composition and extend early seral characteristics further into the life of a stand. This would also produce a larger average tree and more open habitat for wildlife in much less time. Clearing and planting also provides us an opportunity to treat surface fuels and reduce fire risk. Stocking control and pruning further reduces fuel buildup and distribution.

Our system of even aged management does not ignore many other special element needs in our forest. Snags for example, are provided for specifically in SPI's "Habitat Management Guidelines for Cavity-Using Species on Sierra Pacific Industries Land". These special elements are discussed in other sections of this THP.

This information helps guide the primary choice of silvicultural regeneration method across the ownership, but as is always the case, site-specific conditions must be analyzed in relation to other forest values. The specific mix of evenaged and unevenaged silviculture presented in this THP is consistent with the estimates of silvicultural systems presented in SPI's Option A for this forest district. Company-wide, this THP combines with others to produce a change over time from a current per acre average growth rate of 379 bdft to an estimated average growth rate of 980 bdft/ac.

The most profound effect of our management is an increase in the average tree diameter over time. Today, for example, the average diameter of a harvested tree on SPI lands in the Sierra Nevada is 22" at breast height. In 100 years, using our planned silviculture, the average tree at harvest will be 32" to 34" dbh. This also means that we will have much more land with 22 to 34 inch size class trees. In the future, the 22" diameter trees will be left – not harvested until they reach 32-34 inches. Data contained in SPI's Option A for each Forest District demonstrate that volume for all diameter classes greater than 18" dbh increases each decade for the projected next 100 years.

Our goal to increase tree size and timber volume per acre over time will also enhance some other forest values. For example, our management will provide opportunities for natural processes to produce large snags and better wildlife conditions over time. In addition, other forest values to benefit include, but are not limited to; recreation, watershed, wildlife, range and forage, fisheries, regional economic vitality, employment, and aesthetic enjoyment. SPI estimates in our Option A document that 32% of our overall productivity is foregone to provide those other forest values.

Evenaged regeneration systems reduce the number of times heavy equipment is utilized on any site; -- this lowers the potential for soil compaction, and residual stand damage, thus reducing the risks of introduced disease and growth-reducing disturbances.

In conclusion, SPI's responsibility to meet the laws of California, combined with our goals as a primary wood products producer, leads us to choose evenaged regeneration systems wherever possible. This is achieved while providing consideration for other forest values. This decision comes with our understanding that it requires a significant re-investment in planting and future stand cultural treatments. At current costs ("2000" dollars), these investments are estimated to be in excess of over $600 per acre. The alternative choice of unevenaged regeneration comes with no reinvestment requirement, but continues the potentially negative trends discussed above. The silviculture presented in this THP, while still a mix of both regeneration systems, is our best effort to begin to reverse these negative trends. In doing so, our current practices if projected over the long term will convert inferior forests characterized by small trees and slow growth into forests characterized by significantly larger trees and much more vigorous growth. We can recreate forests populated by large, healthy trees.

By using primarily evenaged silvicultural systems, and allowing trees to become larger across our ownership, we can effectively change the projection in habitat trends noted earlier. Given that the negative aspects of these trends were driven primarily from selection harvest systems and loss of openings caused by wildfires, moving toward evenaged regeneration harvest regimes will create openings in the forest and allow retention of selected habitat elements, such as cull trees, hardwoods, and islands of non-regenerated stands, to reverse some of the negative trends previously noted. We believe the outcome of our selected management regime will produce the following habitat trends over time.

- cold water associates – stable trend
- early seral associates – stable to increasing trend
- open forest associates – stable trend
- dense small tree associates – stable to declining trend
- dense large tree associates – stable to increasing trend
- snag associates – stable to increasing trend
- log associates – stable to increasing trend
- edge and layer associates – stable to increasing trend
- hardwood associates – stable to increasing trend

While the discussion of potential effects of many decades in the future show positive trends it is important to note that these trends and changes in the forest structure depend upon the continued implementation of a series of potential and speculative future projects, which are clearly not proposed by this plan. SPI forest management produces habitat conditions that will continue to provide for the needs of the Pacific fisher and California Spotted Owl. At such time as these potential future projects are proposed SPI will and must per the Forest Practices Act and Rules once again conduct a cumulative impact analysis and modify and change those projects to respond to conditions at that time.

Feasible Alternatives Summary- Cow Camp THP Considerations:

As stated in the previous paragraphs, this information helps guide the primary choice of silvicultural regeneration method across the ownership. However, the site-specific conditions of each THP must be accessed in relation to long term objectives in order to make the timeliest decision in how to prepare timber stands for future harvests. The overriding consideration for the proposed silviculture on this plan is to achieve desired stand conditions in preparation for the final harvest at some time in the future.

Item 31: Justification for treatment of landing slash for hazard reduction as per CCR 957.2(a):

A little less than two thirds of the subject harvest area is scheduled for an evenaged silvicultural prescription where whole-tree skidding (mechanical logging) is the preferred logging method. This will provide the removal

SECTION IV

CUMULATIVE IMPACTS ASSESSMENT

(1) *Do the assessment area(s) of resources that may be affected by the proposed project contain any past, present, or reasonably foreseeable probable future projects?*

Yes **X** *No* ____

The assessment area under consideration is the Cumulative Impacts Assessment Area (CIAA), which is defined by the Middle Beaver state-planning watersheds (see **Cumulative Impacts Assessment Area** maps following item #5, and see **item #5** for assessment area descriptions). The CIAA ownership is comprised of Sierra Pacific Industries (SPI) and USDA, Forest Service (USFS). The past, present, and future projects originating from these ownerships are discussed below.

Past Projects

Past project records (timber harvest plans) at the SPI and CDF Fresno offices were queried based on the CIAA legal descriptions. Numerous timber harvest plans (THPs) approved since 1996 were identified within the CIAA and are summarized in Table 1. Past timber sales undertaken by the USFS are discussed below table 1.

Table 1:

THP#/Year	THP Name	Landowner	Silviculture	Acres
4-96-94-TUO	Sweet Corral	SPI	SELE	15
4-96-180-TUO	Whittles Upper Camp	SPI	SELE, CCUT	9
4-96-186-TUO	Cow Camp	SPI	CCUT, SELE, SHRS	637
4-97-111-TUO	Burnt Corral	SPI	ALT, SELE	682
4-98-115-TUO	Beaver Creek	SPI	CTHL, SELE	57
4-01-64-TUO	Curry	SPI	ALT	4
4-02-059-TUO	Little Beaver	SPI	ALT, SANI, SELE	395
4-02-080-TUO	Crane THP	SPI	ALT,CCUT, SANI, SELE, FUEL	533
4-02-87-TUO	Foggie THP	SPI	Fuel	10
4-04-52-TUO	N. Staislaus	SPI	ALT	2
1999	Interface	USFS	SELE	300
Total Acres				**2,644**

Based on information given by Sid Beckman, Karl Graves and Greg Casselberry, USFS Calaveras Ranger District, and Ted Franks, USFS Forest Supervisors Office Stanislaus National Forest. It was concluded that there have been one known past project that has occurred within CIAA on USFS managed land with in the Middle Beaver watershed. The "Interface" timber sale consisted of 300 acres of selection and was T06N R17E sections 31 and 32. The acres were calculated using GIS analysis based on maps given by the USFS.

Present Activities

There are no on-going THPs on SPI Lands, and no current projects or timber sales known on USFS managed lands.

Note: The RPF preparing the plan visited the Calaveras Ranger District on Dec 5th 2005. On that day the RPF reviewed wildlife records, past projects and archaeological records with Forest Service employees Mr. Karl Graves and Ms. Ailene Palmer. Prior to the meeting a letter requesting information regarding the above mentioned topics on November 30th, 2005. Personal reconnaissance by the RPF on USFS revealed no current

The CIAA includes the following assessment areas:

Cumulative impacts shall be assessed based upon the methodology suggested in Board Technical Rule Addendum Number 2 (Forest Practice Cumulative Impacts Assessment Process), and shall be guided by standards of practicality and reasonableness.

A description of the geographical area of each resource subject and a rationale for establishing the selected boundaries is given below.

IDENTIFICATION OF RESOURCE AREAS

Cumulative impacts shall be assessed based upon the methodology suggested in Board Technical Rule Addendum Number 2 (Forest Practice Cumulative Impacts Assessment Process), and shall be guided by standards of practicality and reasonableness.

A description of the geographical area of each resource subject and a rationale for establishing the selected boundaries is given below.

Watershed Assessment Area

The watershed assessment area (WAA) for this plan consists of the Middle Beaver CALWATER version 2.2 planning watershed 6534.500402. FPR 895.1 defines planning watershed as follows:

Planning Watershed means the contiguous land base and associated watershed system that forms a fourth order or other watershed typically 10,000 acres or less in size. Planning watersheds are used in planning forest management and assessing impacts. The Director has prepared and distributed maps identifying planning watersheds plan submitters must use. Where a watershed exceeds 10,000 acres, the Director may approve subdividing it. Plan submitters may propose and use different planning watersheds, with the Director's approval. Examples include but are not limited to the following: when 10,000 acres or less is not a logical planning unit, such as on the Eastside Sierra Pine type, as long as the size in excess of 10,000 acres is the smallest that is practical. Third order basins flowing directly into the ocean shall also be considered an appropriate planning watershed.

The watershed was chosen as the assessment area because they represent a distinct hydrological unit and suit the scale of the proposed timber operations. The watershed assessment area includes approximately 6,240 acres. The watershed assessment area boundary is shown on the Watershed Assessment Area Map found at the end of Section IV. The watershed assessment area boundaries were selected in order to evaluate the potential cumulative impacts of other projects occurring in the drainage in combination with the proposed THP. The rationale for using the planning watershed is that it represents the natural collector of potential water quality impacts, since if they exist they will accumulate in the watercourses that define the planning watershed.

Soil Productivity Assessment Areas

The soil productivity assessment area boundaries are the same as the THP harvest unit boundaries. Projects located at other locations will not affect soil productivity within the proposed THP.

Biological Assessment Area

The biological assessment area (BAA) boundaries encompass the WAA and a 1-mile radius from the THP boundaries. The BAA includes portions of the Mill Creek, Little Rattlesnake, Upper beaver, Middle Beaver, Lower Beaver and Upper Griswold Creek state-planning watersheds. The area has been selected in order to determine potential adverse cumulative impacts on a variety of habitat types and seral stages within a logical area of influence. The area has been selected in order to determine potential adverse cumulative impacts on a variety of habitat types and seral stages within a logical area of influence.

This area is large enough to capture potential cumulative effects, yet not so large as to dilute or render potential effects of the project undetectable. Clearly within this area, there are subunits which would include only those watershed areas frequented by a particular species or that might affect a particular species. Since some plants and animals are limited to specific habitats or physiographic locations, the biological assessment area includes all such smaller species-specific assessment areas that are subunits of the larger base area. SPI provides mitigation to protect such limited area species. Conversely a very few species may have home ranges greater than the biological assessment area. Such species either fly or range over large areas searching for food and do not have restricted or very specific habitat needs at this scale. These species such as goshawks or Pacific fisher usually have more restricted ranges when nesting or denning. They also have much more restricted habitat needs or uses at this time. SPI considers nesting/denning needs at the biological assessment scale, and therefore if we meet theses species needs at the BAA level, and have knowledge of the larger area, we can assess their potential impacts from this THP.

Table 2:

THP#/Year	THP Name	Landowner	Silviculture	Acres
4-96-94-TUO	Sweet Corral	SPI	SELE	15
4-96-180-TUO	Whittles Upper Camp	SPI	SELE, CCUT	9
4-96-186-TUO	Cow Camp	SPI	CCUT, SELE, SHRS	637
4-97-111-TUO	Burnt Corral	SPI	ALT, SELE	682
4-97-106/TUO	Grizzly	SPI		794
4-98-115-TUO	Beaver Creek	SPI	CTHL, SELE	57
4-98-117-CAL	North Fork	SPI		122
4-01-037-TUO	Cedar Flat	SPI		203
4-01-64-TUO	Curry	SPI	ALT	4
4-02-059-TUO	Little Beaver	SPI	ALT, SANI, SELE	395
4-02-080-TUO	Crane THP	SPI	ALT,CCUT,SANI,SELE,FUEL	533
4-02-87-TUO	Foggie THP	SPI	Fuel	10
4-03-057-TUO	Rattlesnake	SPI		322
4-04-047-TUO	Cowboy Springs	SPI		638
4-04-52-TUO	N. Stanislaus	SPI	ALT	2
1999	Interface	USFS	SELE	300
Total Acres				**4,723**

Some forest dwelling species may migrate or disperse over great distances. The RPF, the reviewing agencies and the public are aware that this BAA does not exist in isolation and that there is air and forest cover outside of this area. The RPF is unaware of, and the reviewing agencies did not raise, biological concerns regarding any species that might migrate from or disperse through this area. Species that might utilize all or a portion of this area would include goshawks, spotted owls, fishers, and eagles. There is no substantial evidence known to SPI that the life cycle of these or other species will be impacted by this THP and or any other project identified in or outside the biological assessment area. Adequate reproductive, resting and foraging habitat is required for each species. A brief review of surrounding watersheds indicates that this project will not impact available habitat in the region and will not cumulate with other activities to affect the species. On SPI lands the amount of available reproductive and resting habitat will increase substantially over time, and this would be true in all watersheds where SPI owns timberland. Sustained yield requirements across the state constrain creation of contiguous forests comprised of small diameter trees, which condition would be adverse for fishers and spotted owls. In determining that the basic BAA is adequate we have looked at larger areas for species such as owls and fishers to determine that the choice of this BAA is not adverse to species with larger home ranges.

Additional support for the rationale to choose this BAA is that most similar projects on federal lands are recommended for project implementation analysis to use a planning watershed scale area for impact analysis (See SNEP Vol. I Chapter 6 pg. 106-107). Finally, this scale of assessment area is recommended by the Board of Forestry in the definition of planning watershed (14 CCR 895.1) and to facilitate the required determination by CDF under 14 CCR 897(b)(1)(B) that functional wildlife habitat for all existing wildlife be maintained at the planning watershed scale.

Recreational Assessment Area

The recreational assessment area (RAA) includes the THP area plus 300 feet around it, as recommended in the cumulative impacts guidelines dated 13 August 1991. This distance was chosen because it is the distance within which the sights and sounds of the actual timber harvest might be most intrusive. Listeners or viewers more than 300 feet from operations are not expected to be significantly impacted.

Visual Assessment Area

Defined as the project area that is readily visible to a significant number of people who are no further than three (3) air miles from the forest operation. This distance is chosen because it represents the thresh-hold of significant visual impact in the opinion of the plan submitter. Viewers using the naked eye are not likely to be significantly impacted if observing from a distance of more than three miles.

Vehicular Traffic Impacts Assessment Area

The traffic CIAA consists of those portions of the haul route from the THP area, including all SPI private and public roads that ultimately terminate at State Highway 4. The existing private and public roads have a history of log truck traffic. The assessment area was chosen in order to evaluate the potential for cumulative impacts upon the existing transportation network.

Assessment Area Size Discussion

The following information is provided to clarify the choice of assessment area. SPI owns or has management responsibility on approximately 1.65 million acres within California. These lands should be viewed in context and represent 4.1% of California's 40 million acre forested landscape.

SPIs' land lies in many planning watersheds within portions of hydrologic units defined by the state of California. The total area of the hydrologic basins containing our lands is approximately 26.7 million acres. SPIs' total acreage represents 6.1% of the whole of these planning watersheds. SPIs' ownership can be further localized, since over 1.2 million acres is primarily in the Sierra Nevada and Modoc Plateau region of California. There are over 15.4 million acres in hydrologic basins within the Sierra Nevada Modoc Plateau region. SPIs' acreage within that region represents 7.8% of the whole. The remaining 400,000 acres of SPIs' ownership lies in the region described as the Coast-Klamath-Cascade. There are over 11.3 million acres in total hydrologic basins within the Coast-Klamath-Cascade region. SPIs' acreage within that region represents 3.5%.

Since SPI primarily manages commercial forestlands, our ownership must also be put into perspective relative to the area of total forestland and commercial forestlands in California. There are approximately 19 million acres of commercial forestland in California; SPIs' total acreage represents 8.4%. Focusing on all counties in which SPI manages forestland (within California), there are 20.1 million acres of forestland, SPIs' acreage represents 8.0%. Focusing only on commercial forestlands within these same counties there are approximately 12.2 million acres, SPIs' total acreage represents 13%.

These percentages represent SPIs' total current land base. The annual acreage of projects (THPs) proposed to be harvested is a small fraction of SPI's land. Use of a large assessment area, like the Sierra Nevada Modoc Plateau region could serve to dilute any impacts estimated to insignificance.

On the other hand, if the assessment area were too small, (say one acre), minor impacts could be viewed as long-term, significant adverse impacts; until they are viewed in a proper scale one cannot tell if they are truly significant. It is in this context that we continue to carefully choose the assessment areas for each THP.

SPI's harvest planning mitigates potential long-term significant adverse effects to wildlife habitats at the scale of each watershed. Therefore, larger assessment areas containing SPI land would also meet our wildlife habitat goals, since we meet these goals at each of the subparts, the planning watersheds.

To assess the potential cumulative effects on wildlife that may have a current range large enough to extend beyond the Cal Planning Watershed, SPI offers the following discussion and analysis.

To place this plan and future harvesting in perspective we describe the environmental setting and place our ownership and our average annual harvesting with reference to the size of the Sierra Nevada Region. (South of the Pit River) (See Figure 1 on next page for a graphic depiction).

By far the largest landowner in the Sierra Nevada region is the federal government, controlling the overwhelming preponderance of the land area. In keeping with its legal mandate, the federal government has undertaken large scale planning efforts designed to maintain viable populations of all of the various species including those which are thought to be dependant upon certain forest elements usually associated with more mature forest types. These Sierra wide plans offer a frame of reference for considering Sierra wide impacts of SPI's present and reasonably foreseeable future harvesting.

The USFS manages the federal land under a variety of different federal laws, including the Organic Act, the Multiple Use Sustained Yield Act, the National Forest Management Act and their adopted implementing regulations. As it relates to those species that are not listed under the Endangered Species Act (which includes the California spotted owl and Pacific fisher) the USFS currently manages these other species under implementing regulations that set the goals of maintaining the viability of each species over each species historic range.

The Federal government has interpreted these viability goals as controlling and has overridden most of the other forest management goals, including meeting sustainable non-declining flows of timber to meet the nation's needs for wood products. In this context the USFS planning documents are reviewed by other federal jurisdictional agencies including the US Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service. The USFWS provides its oversight with respect to maintaining viable wildlife populations in the form of various consultation and biological opinion documents.

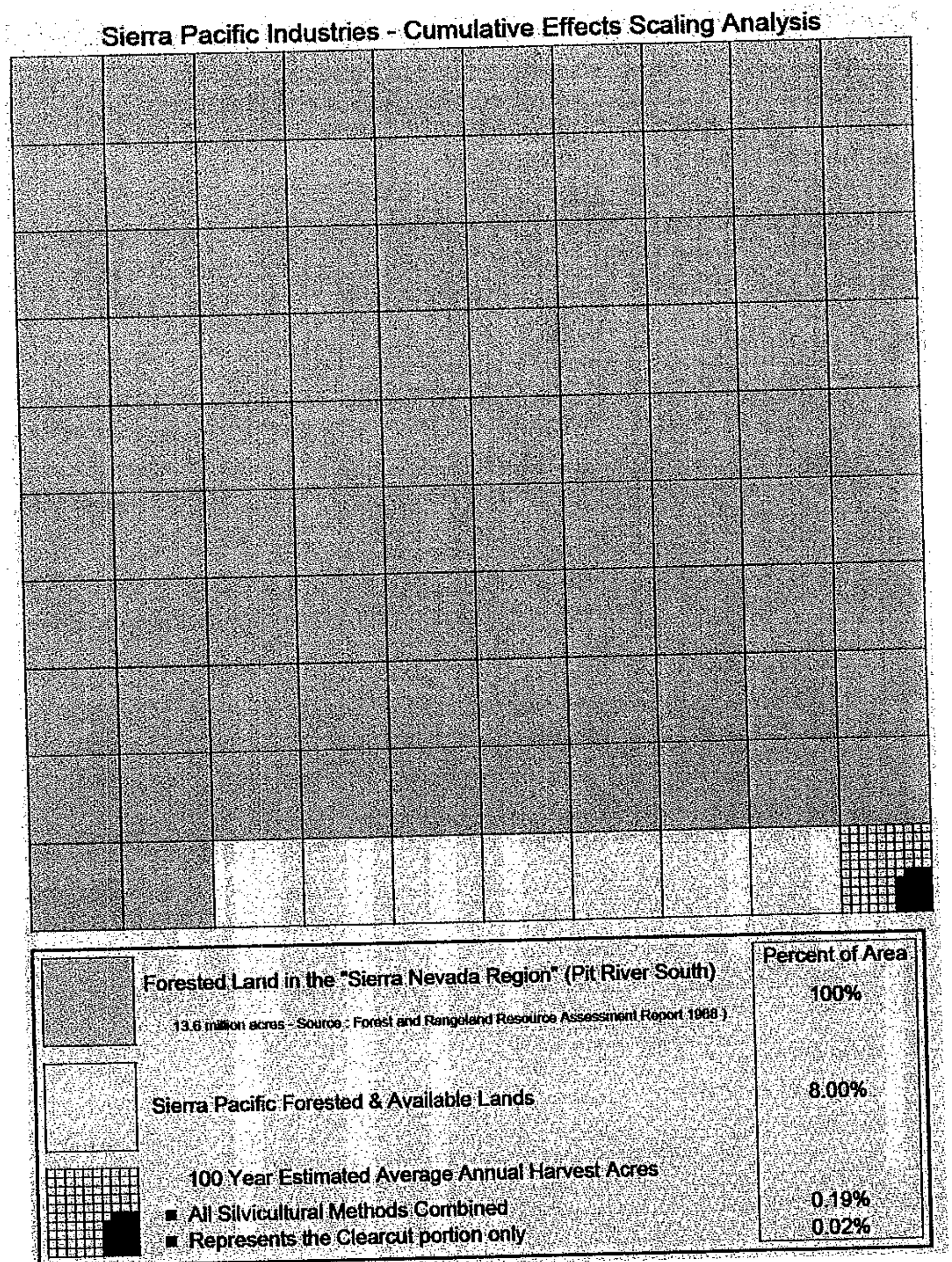


FIGURE 1

A note about the diagram, each large square represents 1% of the "Sierra Nevada Region", greater detail in the corner allows each smaller division to represent 1/100th of 1%. All harvesting was shown as occurring in one small location for ease of viewing, actual SPI annual harvest depicted would be spread throughout the entire SPI land base. That SPI land base is also distributed through out the northern 2/3 of the analysis area. The total silviculture of SPI as a percentage of the Sierra Nevada forestlands reads as approximately 19 hundredths of one percent annually. The total clearcut silviculture of SPI as a percentage of the Sierra Nevada forestlands reads as 2 hundredths of one percent annually. (The black grid cell lines used to help identify the 1/100ths of one percent actually cover as much of the representative area as the SPI annual clearcut silviculture acreage.)

SPI as a private land owner in California manages its land for goals and objectives different than those of federal land managers. While SPI operates under the statutory requirements of the ESA, its projects must be implemented under the California Environmental Quality Act (CEQA), the California Endangered Species Act and the state Forest Practices Act. In this respect, SPI does not take species listed under Federal and State endangered species act and mitigates environmental impacts as required by CEQA, and the rules of the Board of Forestry. Pursuant to these statutory mandates care is taken to prevent significant long-term adverse effects to the environment, including significant effects to non-listed species. SPI must also demonstrate achievement of maximum sustained production of timber products as defined in the state Forest Practice Act.

For many of the same reasons that private landowners could not produce detailed project level assessments at the scale of the Sierra Nevada, the USFS analysis simply assumes that private lands will make little or no contribution to their landscape habitat goals. In essence, the Federal Government assumes that sufficient habitat to provide for all wildlife species must be adequately maintained on federal lands without resort to private lands, and formulates its plans accordingly. For that reason, the USFS usually takes very conservative approaches to management decisions or planning constraints that it proposes and applies when implementing a project. The current guiding document for their lands in the Sierra Nevada is called the Sierra Nevada Framework (USDA 2001, USDA 2004). The document reviews the status of the California Spotted Owl and proposes safeguards for maintaining a viable population of this species. This document was reviewed by the USFWS in its biological opinion and was determined to be in compliance with the ESA (USDI 2001, USDI 2003, USDI 2006).

The government studies cited in the USFS Framework and USFWS opinion tend to focus on the presence of mature forest habitat or characteristics normally associated with that habitat, chief among them being the presence of large trees in a stand conducive to spotted owl nesting and roosting. Implicit in the government's analysis is the apparent presumption that the constraining factor on owl populations is the presence of appropriate large tree nesting habitat. We have set forth the data in our discussion (infra) that owl nests are in fact found on private lands with 2/3 of known nest trees on SPI's land having the diameter range from 20" to 48", with average diameters of 34 inches. Additionally we have demonstrated that there are large snags and larger trees spread across the landscape preserved in streamside protection zones that will not be harvested. The most recent studies of Northern Spotted Owls (genetically very similar to California Spotted Owls, and whose prey and habitat uses are also very similar) demonstrate that forest edge habitat for the prey base is an integral component in spotted owl habitat (Meyer et al. 1998, Franklin et al. 2000, Zabel et al. 2003, Olsen et al. 2004). This is especially relevant in low to mid elevation, hardwood, hardwood conifer mixed, and pine / mixed conifer forest types. If there is adequate nesting habitat then food becomes the constraining influence on owl success. Harvesting creates edge that in turn causes the development of habitat types known to produce prey.

Because SPI's land contains adequate nesting and roosting habitat, and through management necessary prey producing "edge" habitat, SPI provides habitat for owls. Additionally, good silviculture practiced over time will increase the average tree diameter on SPI land from 17 inches to 32 inches. So that if we assume that more stands with large trees are better for owls, forest management on private timber lands will improve owl habitat. As explained in the alternative silviculture section of this THP (given the current condition of SPI forests after years of selective logging) cutting and re-growing trees will have the end effect of increasing average tree diameter. But the more important consideration is that enough nest sites already exist and will continue to exist so that increased edge will increase prey, which is expected to improve or maintain owl density. In addition, given that spotted owls can disperse through a wide range of forested landscapes, including highly fragmented landscapes, continued management in this manner will insure that diverse forest landscapes continue to exist on SPI land, allowing dispersal by juvenile and adult spotted owls to successfully occur (Forsman et al. 2002). Therefore, active silviculture is expected to enhance owl habitat across the Sierras. According to government projections viable populations will persist without benefit from private lands and hence we anticipate only a potential positive effect from SPI's activities when analyzed on landscape or a Sierra wide basis.

In the biological opinion from the USFWS and in the Framework decision it is assumed that private land will not contribute to long term habitat for the California spotted owl. (USDI, 2001, USDI(A) 2003, USDA 2001, USDA 2004, USDI 2003) As can be clearly seen in the California spotted owl discussion in this THP, SPI not only contributes to the habitat, but improves the habitat through its management practices. This is acknowledged in the USFWS decisions not list the California spotted owl (USDI 2003, USDI 2006). We believe the current research supports our conclusion that we will improve habitats for the California spotted owl. This is presented in this THP under the California spotted owl and our consideration of feasible silviculture alternatives discussion. Because we are doing significantly more to create and preserve habitat than is contemplated in the Federal Documents we conclude that at the scale of the Sierra Nevada and in context with all available federal plans, that our THP, taken together with all of our reasonably foreseeable future THPs, is not likely to have a long term significant adverse effect on the California spotted owl.

While at this large scale, we are persuaded that there are no adverse impacts, we will continue our analysis at the local THP planning watershed scale. Below we begin this analysis by describing the large tree dense forest habitats found on SPI lands and how we used data from a number of species to describe and define such habitats.

Wildlife Species Associated with Large Tree Dense Forest Habitats Found on SPI land in California (Life Form 4)

The Large Tree Dense Forest stand condition (Life form 4) is used by a number of wildlife species, such as the politically controversial northern spotted owl and Pacific fisher, which desire relatively dense forests with a significant number of large trees for reproductive and/or feeding activities. In defining this Life form, the question arises as to how to define "large tree." This was best answered by observing the habitat use of these species to ascertain their tree-size preferences and then labeling tree sizes accordingly—an approach that allows the species to determine biologically significant tree sizes, which can then be use to define the Large Tree Dense Forest Life Form.

Determining Tree-Size Preferences of Wildlife Species in Life form 4

From 1990 to 2007, plots were read at sites frequented by wildlife species typically associated with Life form 4 stands, and data were collected within 115 ft. of the nest, den, maternity, or rest structures (trees, snags) used by individual animals. All sites occurred in managed forest habitats, and all sites occurred on or immediately adjacent to SPI land (Table 1).

Table 1 Number of Nest and Rest Sites Used by Species of Interest in Life Form 4 Analysis

Species	Type of Site	No. of Sites
Northern spotted owl	Nest Sites	19
California spotted owl	Nest sites	30
American Marten	Male and Female Rest and Den Sites	165
Pacific Fisher	Female Den and Rest Sites	87
Pacific Fisher	Male Rest Sites	34
Northern Goshawk	Nest Sites	26
Silver-Haired Bat	Colonial Maternity Roosts	8
Total Number of Sites		**369**

Data regarding the size of trees at each site were evaluated for each species listed in Table 1. The parameters used to characterize each site and the results from the plot data are listed in Table 2 and include:

- dbh of the rest/nest/den structure
- quadratic mean diameter of the trees (except the structure itself) within 115 ft. of the rest/nest/den structure
- percent of sites that did not have any trees greater than or equal to various size trees, as measured by dbh.

Table 2. Selected Habitat Parameters Associated with Nest, Den, Maternity, and Rest Sites of Species Associated with the Large Tree Dense Forest Life Form

	Pine marten (n=165)	Pacific fisher males (n=34)	Pacific fisher females (n=87)	Northern spotted owl (n=19)	Northern goshawk (n=26)	Silver-haired bat (n-8)	California spotted owl (n=30)
Rest/Nest Structure (inches)							
Mean dbh	32.9	30.0	30.1	33.7	29.0	29.5	33.9
SD*	13.0	12.0	14.0	16.5	15.0	12.4	13.9
Range	8-79	10-58	8-75	12-66	13-79	12-47	15-76
Median	32.8	28.0	28	29.5	24.2	28.0	31.7
Mean±1SD	20-46	18-42	16-44	17-50	14-44	17-41	20-48
Rest/Nest Site Data (inches)**							
WHR QMD Mean***	15.3	13.3	10.8	13.8	17.9	13.5	15.6
SD	3.1	3.0	1.5	2.5	5.8	3.2	2.4
Range	9-28	9-19	8-15	10-19	11-40	10-19	10-22
Median	15.0	12.0	10.3	14.4	15.0	14.0	15.6
Mean±1SD	12-18	10-16	9-12	11-16	12-23	10-17	13-18
Percentage of Rest/Nest Sites with No Trees ≥ __ dbh							
≥ 14″ dbh	0.0	2.9	1.2	0.0	0.0	0.0	0.0
≥ 18″ dbh	1.9	2.9	4.6	0.0	0.0	0.0	3.3
≥ 22″ dbh	7.6	5.9	15.0	0.0	3.8	12.5	3.3
≥ 26″ dbh	27.6	23.5	27.6	22.2	15.4	12.5	6.7
≥ 30″ dbh	50.5	38.2	47.1	22.2	19.2	37.5	23.3

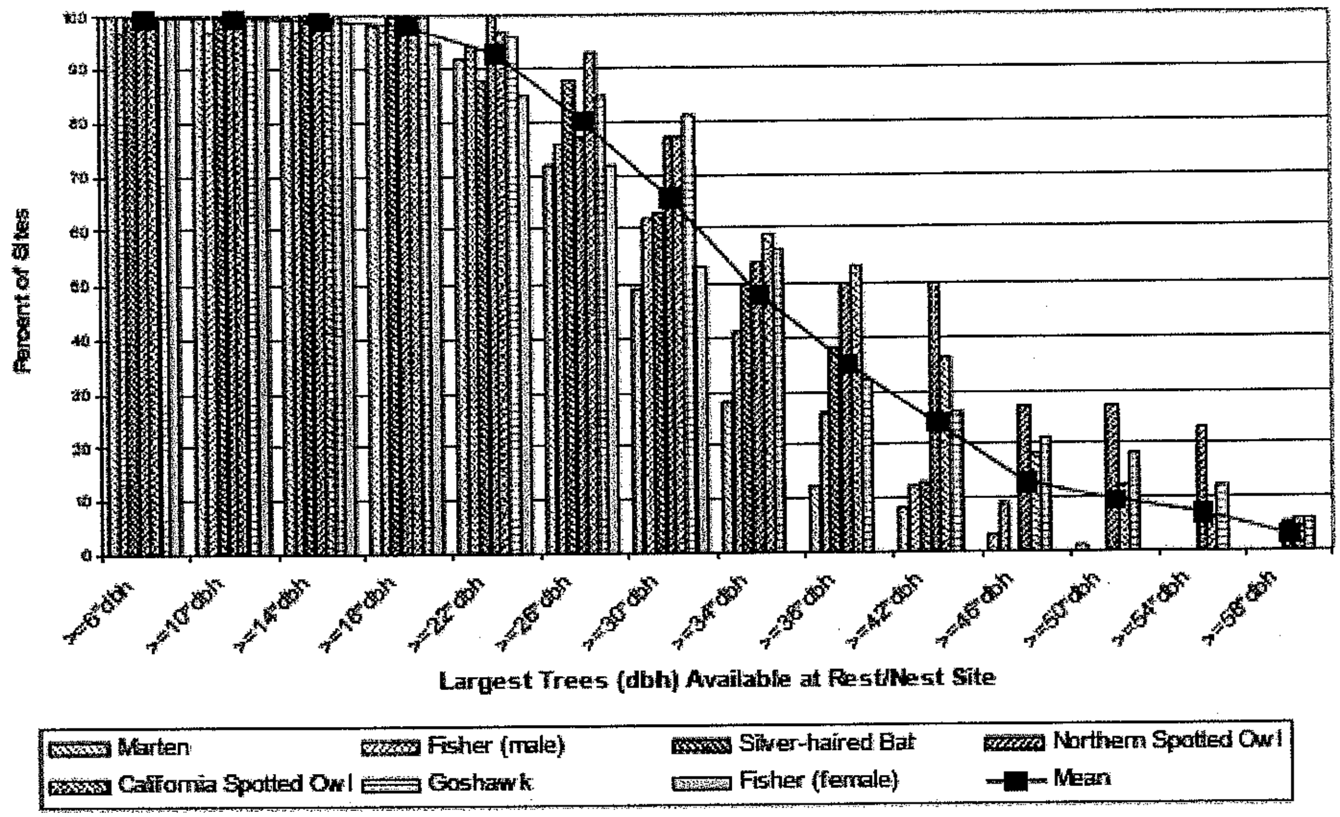
*** SD = 1 Standard Deviation from the mean**
**** Collected within 115 ft. of rest/nest structure**
***** Quadratic mean diameter at breast height of all trees ≥ 5″ dbh.**

The average diameter of the used tree/snag in these data was highly variable, with a minimum size used by any species being 15 in. dbh. The mean ±1 standard deviation for all species included use of trees as small as 20 in. dbh. This indicates that trees and snags in stands containing 22-in. dbh trees and larger are most likely of adequate size to meet the needs of these wildlife species for nest/rest site use.

The quadratic mean diameter (QMD) of trees within 115 ft. of the nest/rest structure was also variable, with a minimum size used by all species being 11 in. dbh. The mean ±1 standard deviation for all species included QMDs as small as 13 in. dbh. These data, combined with those described in the paragraph above, indicate that stands with a QMD of at least 13 in. dbh and including some trees at least 22 in. dbh or larger, are capable of supporting nest/rest site use by these species.

Starting at 14 in. dbh and using 4-in. increments, the percentage of sites without any trees greater than or equal to the test size dbh class are displayed in Figure 2, which contains extensions of data beyond Table 2. The curve of the means associated with the 7 species indicates that there is a clear change in the number of sites that have trees between 18 and 26" dbh. Specifically, all six species chose sites that included at least one tree at least 18 in. dbh in almost all cases, whereas there is a clear change in the chart, resembling a threshold, in terms of requirements for trees larger than 22" DBH. This "threshold" indicates that these species needs regarding the presence of large trees are met by 22" dbh or larger.

Figure 2. Percent of Individual Species Rest/Nest Sites With at Least 1 Tree >=__" dbh



Thus, the Life form 4 stand condition (large tree dense forest) provides quality nesting/resting and denning habitat for wildlife species that breed and/or feed in large-tree stands, such as WHR structural classes 4D, 5D, and 6D. Wildlife species make significant use of the large-tree component of these stands. Quadratic mean diameters of trees in these stands are generally greater that 13 inches and there are significant numbers of trees greater that 22 inches in diameter. Thirty-five species of wildlife are assigned to this habitat form. Representative species include clouded salamander, northern goshawk, wood duck, northern and California spotted owl, American marten, pileated woodpecker, Vaux's swift, silver-haired bat, northern flying squirrel, and Pacific fisher. Management activities that maintain a variety of snag and log sizes and inclusions of hardwoods (mainly oaks) generally enhance this habitat form for use by wildlife.

Below, we include a more specific, detailed discussion regarding the California spotted owl and the Pacific fisher as examples of how the Life form 4 habitats provide for their maintenance and continued use of SPI lands. In this case, these two species are used as "indicators" of the likely outcome of SPIs' long-term management planning and implementation for all species associated with Life form 4 habitats.

(6) ***List and briefly describe the individuals, organizations, and records consulted in the assessment of cumulative impacts for each resource subject.***

Federal and State Studies and Planning Documents

In order to analyze the effects of our proposed timber harvest activities on forest-dwelling species and their habitat we have considered various Federal studies and planning documents. Sierra Pacific Industries has been an active participant in all of the following US Forest Service and BLM planning efforts:

- Region Five Land Management Plan Final EIS/Regional Guide
- California Spotted Owl EIS (CASPO)
- Revised Draft EIS for Managing California Spotted Owl Habitat

- Sierra Nevada Ecosystem Project (SNEP)
- Quincy Library Group EIS (QLG)
- Sierra Nevada Forest Plan Amendment Draft EIS (Framework)
- Sierra Nevada Forest Plan Amendment EIS (Final - Framework)
- Various Forest Plan EIS's for the National Forests in the Sierra, including the: Lassen, Plumas, Tahoe, Tahoe Basin, Eldorado, Stanislaus, Sierra, and Sequoia National Forests.
- BLM California Regional Land Management Plans
- Sierra Nevada Forest Plan 2001 Amendment EIS (Revised Final – Framework 1)
- Sierra Nevada Forest Plan 2004 Amendment SEIS (Revised Final – Framework 2)
  - Fish and Wildlife Service (USFWS) 2006 12 Month Finding regarding Federal California Spotted Owl Listing Petition
- USFWS 2006 Finding regarding Federal Fisher Listing Petition
- Department of Fish and Game 2008 Recommendation regarding State Listing Petition
  - Sierra Pacific Industries (SPI) 2008 Federal Fisher Candidate Conservation Agreement with Assurances (CCAA)
  - USFWS 2008 Environmental Assessment Summary regarding SPI's Fisher CCAA
- USFWS 2008 Conference Opinion and Finding regarding SPIs' Fisher CCAA
  - Conservation Biology Institute's 2008 Final Report to the Forest Service regarding short and long-term effects of fuels management on fisher and their habitat in the southern Sierra Nevada.

Sierra Pacific Industries involvement in the development of these documents and the documents themselves were considered for their information, background, and the context that they bring to the description of the environmental setting. However, it should be noted that all the federal efforts were designed to produce large scale Planning and Assessment Documents, not to assess the site-specific effects of individual projects. According to the SNEP analysis, for project planning and management decisions, the scale should be the CALWATER planning watershed units (a subdivision of the major river basins, used by SNEP and delineated by the California Department of Water Resources) (SNEP 1996). This is the primary project scale assessment area we have chosen for the local area THP cumulative effects assessment. Proposed activities for individual projects on federal lands are analyzed in a subsequent Environmental Assessment or EIS that is tiered to one of these planning documents. Four other points should also be noted concerning these Federal Planning Documents:

1. Public policy recommended by these documents (and, in some cases the scientific underpinning for that policy) was superceded by the subsequent approval of the next federal planning document to be released. For example, the CASPO Report was supplemented by the SNEP Report and the Frameworks, both 1 and 2, were designed to supercede all the listed planning documents above.
2. Implementation of the most recent federal planning document to govern management of federal forests in the Sierra Nevada (the revised Framework) is undergoing further review and is under legal challenge by several different interest groups.
3. Sierra Pacific Industries has site-specific data and scientific studies on a number of terrestrial and aquatic wildlife species that are incorporated into our individual THPs. We believe that this information is generally more probative when analyzing effects of our activities than federal studies that are largely literature reviews of studies from areas not in close proximity to Sierra Pacific lands or are very general remote sensing based, map or photo reviews, which rely heavily on assumptions and subjective decisions about site specific conditions.
4. Implementation of the latest federal plan (Framework) has been found by the Forest Service and the USDI Fish and Wildlife Service to have a high likelihood of adequately protecting habitat for the California spotted owl, regardless of what occurs on private land. (USDA 2001, USDI 2001, USDA 2004, USDI 2003).
5. Continued implementation of current management plans for the Forest Service and private forest lands were not likely to adversely affect the Pacific fisher in California and would most likely be beneficial to the fisher (CDFG 2008).

The bulk of federal planning documents concern planning, as opposed to biological information, and this process is driven by public policy and political considerations at a national level—not just biological data. As such, much of the planning portion of these federal documents is predicated upon goals and priorities not applicable to private lands. In addition, data and habitat conditions from private land are inadequately considered in these federal studies. The federal opinion from the US Fish and Wildlife Service on the USFS Sierra Nevada Framework 1 states:

> "This analysis *assumes* private lands do not contribute to the proportion of moderate and dense canopied habitat within home ranges, because the future status of that habitat remains uncertain."
> (pg. 75- 76 USDI 2001, US Fish and Wildlife Service's Biological Opinion on the Framework,) *(Emphasis added)*

> "Management of industrial forests is governed by the forest practice rules of the Z'berg-Nejedly Forest Practices Act, which provide *no specific* measures to protect or maintain habitat for California spotted owls and *therefore* do not provide assurance that activities will retain the amount and quality of habitat expected to maintain spotted owl occupancy or productivity (Bart1995, Hunsaker et al. *in press*, Verner et al. 1992)."
> (Pg. 138 USDI, 2001.) *(Emphasis added)*

> "The FEIS reported that timber harvest on private lands has been and will continue to be a major source of cumulative impact upon spotted owl habitat in the Sierra Nevada. According to the FEIS, it is *assumed* that spotted owl habitat on private lands will continue to decline under current Forest Practices rules."
> **(Pg. 138 USDI, 2001.) *(Emphasis added)***

For these reasons, the federal planning documents listed above are of limited value in drawing conclusions about appropriate management prescriptions on private lands. To the extent the biological information (as opposed to the "assumptions", "planning" and "federal public policy" information) in these documents was deemed relevant, we considered it in the process of analyzing potential impacts of timber harvest activities on various wildlife species and their habitat.

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General Description

The *watershed assessment area* is comprised of Middle Beaver Creek state-planning watershed. According to the *Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board (RWQCB) Central Valley Region, 4th Ed.*, the assessment area lies within the North Fork Stanislaus Hydrologic Area of the Stanislaus River Hydrologic Unit within the San Joaquin Hydrologic Basin. Ownership in the CIAA consists of 85% Sierra Pacific Industries and 15% U.S. Forest Service.

CEQA Analysis of the Potential Use of Herbicides Associated With This THP

Overview

While the actual use of a particular herbicide is not certain, some herbicide use is a reasonably foreseeable outcome of evenage timber harvesting. Sierra Pacific Industries may at most, apply herbicides on average once or twice per stand during the 80 year life of a timber stand. In our reforestation efforts, Sierra Pacific Industries does not use insecticides. Mainly, herbicides are used to temporarily retard the growth of brush and weeds that compete with conifers for nutrients and sunlight while the conifers are young. This use mimics and accelerates the natural progression of growth in a timber stand, which will at some point experience a conifer breakthrough and development of a conifer overstory.

At the present time, it is not possible to predict (without speculation) which herbicide, in which area, in which concentration, at which time will be used, if at all. Once trees are removed from a given area, it is impossible and or infeasible, given current technology, to know which brush or weed seeds are lying dormant in the soil, and it is impossible to predict which and when any particular combination of future environmental conditions will cause various brush and weed species to sprout. In any given area of harvest, dramatic differences in weeds and brush may be exhibited from year to year. For example, at a particular time post-harvest there may be a heavy appearance of thistle, followed the next year by thistle then Manzanita or Ceanothus. 54Different herbicides have different effects on different species and until we see what happens and make a determination about whether herbicides will be needed, we can only speculate. We simply do not know enough about these factors to be able to predict what will occur. In past reforestation efforts, depending on many factors, we have used imazapyr, triclopyr, hexazinone, glyphosate, and atrazine.

Herbicides that might possibly be used in reforestation have been the subjects of extensive testing and research under a certified regulatory program under CEQA administered by the Department of Pesticide Regulations (DPR) Through this functional equivalent process, DPR has determined that a herbicide, if used as prescribed on the label will not have a significant impact on the environment. The term label is misleading as they are booklets up 30 to 50 pages in length. The testing and research includes evaluation of conditions under which the herbicides may be applied for various uses including forestry, yard & garden, agricultural field crops, orchards, vineyards, pastures and right-of-ways. The active ingredient of a given herbicide can be registered and labeled for use under one or more of these categories. Herbicide use on SPI's forested property requires a written recommendation by a licensed Pest Control Advisor (PCA) and application by a licensed Pest Control Operator (PCO).

Forest application of herbicides may occur on average once or twice on any given forest acre, over a period of 50 to 80 years. Use and application are conducted by licensed pest control advisers and pest control applicators. In a forest setting, professional application in a workmanlike manner is required for maintenance of a license, and hence future employment is in jeopardy if compliance is not achieved. In forest use, application of herbicides is not intended to kill or eliminate entire populations of the targeted species. We wish to encourage a healthy understory as a beneficial environment for the varied species of plant and animals that utilize our forests. In fact, our professional foresters and pest control advisors have noticed that areas that have been sprayed in the past actually have greater diversity of plant and animal life than those areas that have not been sprayed. This professional opinion is supported by research conducted by University of California research and by SPIs' in process plantation diversity study detailed below in this discussion (DiTomaso, 1997). SPI is conducting a plantation species diversity study which will be discussed later in this analysis.

The DPR regulatory program is a functional equivalent of an Environmental Impact Report (EIR) certified by the California Secretary of Resources pursuant to PRC Section 21080.5. The DPR regulatory program is designed to study and test pesticides and mitigate potential environmental effects by the totality of the registration, label and commercial application control processes. These processes include the US EPA label (which is a binding legal document) that prescribes limitations on use and mitigations for proper use. California may add additional restrictions beyond the EPA label and does so through the classification of an EPA labeled pesticide as a California "restricted pesticide". California's DPR process also requires additional site-specific analysis, before any commercial application of pesticides (including herbicides). The analysis takes the form of a written recommendation for herbicide use prepared by a licensed pest control advisor. Finally, this program requires that the application of any pesticides be done by licensed qualified applicators.

When a pesticide is registered in California it has been determined through thorough, detailed testing and analysis (building upon the US EPA testing) that if applied according to the label restrictions there will not be