Sierra Forest Legacy
DEFENDERS OF WILDLIFE
CALWILD
Sierra Foothills Audubon
LASSEN FOREST PRESERVATION GROUP
Forest Unlimited
Preserving, Protecting & Enhancing Forests and Watersheds
Friends of Bell Meadow

April 1, 2024

SERAL Interdisciplinary Team
Stanislaus National Forest, Attn: SERAL 2.0
19777 Greenley Road
Sonora, CA 95370.

Submitted via: https://cara.fs2c.usda.gov/Public//CommentInput?Project=63557

Re: Comments on Draft Environmental Impact Statement (DEIS) for Social and Ecological Resilience Across the Landscape 2.0 (SERAL 2) (https://www.fs.usda.gov/project/?project=63557)

To the Interdisciplinary Team,

We submit the following comments on the DEIS for the SERAL 2 Project ("Project"). We support land management actions that reduce wildfire risk for people and nature while maintaining and protecting sensitive species and ecosystems. We are especially supportive of actions that restore the function of beneficial fire to landscapes, since it is through this natural disturbance process that resilience will be restored and biodiversity conserved. To this end, we very much appreciate the inclusion of prescribed fire in the proposed action (PA) over much of the project area and that this also includes some areas with prescribed fire as the first entry.

We are concerned, however, that the PA as currently described does not strike the right balance between protecting sensitive resources and logging. We raised the majority of the issues below during scoping, but few changes were made to the PA or the DEIS to address them.

I. Use of Emergency Situation Determination (ESD) for the Project

We raised our objection to the used of this authority in our scoping comments. The response to our comment in the DEIS basically states that "we" (the Forest Service) have the discretion to use this authority and have decided to use it on most of the project. We continue to object to the use of this authority on the majority of the logging proposed in the project area, especially because the predecisional objection process under 36 CFR 218 would be waived.

We continue to have concerns about the inconsistencies between the PA providing less conservation than the recently approved revised forest plans for the Sierra and Sequoia National Forests. The objection process is the only administrative opportunity for the Regional Forester to review objections, confer with the parties, and addressed conflicts. Such an opportunity for objection is critical in this case to administratively address inconsistencies in CSO conservation between adjacent national forests.

We also do not believe that it is necessary to use ESD to advance implementation. It is our understanding that due to the backlog of work related to SERAL 1, implementation of most treatments proposed by SERAL 2 is not possible for 2 to 3 years at least. This appears to be the case for both your agency and the private sector that would implement the project. We also note that many of the treatments cannot occur immediately. Some only can occur 5-7 years or 10-12 years after an initial action, and or will take 10-20 years to complete, given the current levels of funding, seedling supply, and workforce (both agency and private sector). These are long term actions that will take many years to implement and are not emergency actions.

Emergency authorities, as noted in the scoping letter, truncate public involvement; they also limit the consideration of alternatives and limit judicial review. The portion of the PA to be included in the ESD includes controversial forest plan amendments to allow habitat degradation for species at-risk. Limiting the alternatives considered to the No Action and PA prevents the evaluation of alternatives that could achieve the project objectives and provide better protection for the sensitive resources.

The ESD process significantly limits public engagement. We object to your agency using emergency authorities for the majority of this project, especially since your agency and partners currently do not have the capacity to speedily implement the "emergency action" project and most of the actions themselves will be implemented over the long term.

II. California Spotted Owl

California spotted owl (CSO) is a Forest Service Sensitive Species and has been proposed for listing under the Endangered Species Act (88 FR 11600). Threats that compel the listing include habitat destruction and modification from logging, high severity wildfire, and climate change (USDI Fish and Wildlife Service 2022, p. iii).

We raised the issues below in our scoping comments and have reiterated that content again here. We also raise below additional points based on information provided in the DEIS.

A. The Project-Specific Forest Plan Amendments Provide Less Conservation than the Recently Adopted Forest Plans for the Sierra and Sequoia National Forests.

Your agency, the USDA Forest Service, recently adopted revised forest plans for the Sierra and Sequoia National Forests that are immediately adjacent to and south of the Stanislaus National Forest. Revision of these forest plans included plan components to implement the CSO strategy developed by your agency in 2019 (USDA Forest Service 2019). The Records of Decision issued in May 2023 for the Sierra and Sequoia National Forests find that the adopted plan components are required to "provide the ecological conditions necessary to maintain a viable population of each species of conservation concern in the plan area." (See for example USDA Forest Service 2023c, p. 20[1]). The Records of Decision also found that the plans provide "both ecosystem-level plan components to improve forest resilience and maintain habitat, and species-specific plan components that avoid potential near-term adverse impacts to breeding spotted owls and their habitat." (See for example Ibid, p. 19.) Thus, your agency determined that the suite of adopted plan components was required to meet the National Forest Management Act as implemented using the 2012 Planning Rule.

Contrary to the revised forest plans, the project-specific forest plan amendment in the PA includes numerous plan components that are not consistent with the revised forest plans adopted in May 2023. The proposed plan components allow habitat to be degraded to a greater extent than the newly revised forests plans. The following are examples of key differences between the revised forest plans and the PA that result in less conservation and greater risk to CSO's viability under the PA compared to the revised forest plans.

1. Desired Conditions for Territories

The revised forest plans establish desired conditions for CSO territories that target the highest quality habitat:

> **SPEC-CSO-DC 02**
> At least 40 percent (for dry vegetation type and site conditions) or at least 60 percent (for moist vegetation type and site conditions) of each California spotted owl territory **<u>consists of the highest quality nesting and roosting habitat</u>** (see definition above) in large enough patches to provide interior stand conditions, generally 1 to 2 tree heights from an edge. [Emphasis added][2]

(USDA Forest Service 2023b, p. 62) In contrast, the PA conflates the ranking of habitat quality within the territory with the desired condition, mistakenly allowing lesser quality habitat to satisfy the desired condition in a territory. For example, even when only low quality habitat currently exists within a CSO territory, the PA considers that habitat to be the desired condition for the territory.

This is a critical difference between the revised forest plans and the PA. If the desired conditions are not met in the territory, then the revised forest plans limit how logging can modify habitat. The PA, on the other hand, allows lower quality habitat to satisfy the desired condition and therefore allows more intensive logging, and consequently more habitat reduction and degradation. Even though over 90% of the territories within the project boundary have far less than 40% in highest quality habitat, limits to logging, as can be seen by reviewing the "notes"

---

[1] For simplicity, we will refer to the revised forest plan for the Sierra National Forest in this comment section. We note that with respect to CSO the plan components adopted for the revised forest plans for the Sierra and Sequoia National Forests are the same.
[2] The latter portion of the desired condition was omitted for brevity.

column of Table B.02-4 (Scoping PA, p. 57), are rarely invoked because the table concludes that desired conditions have been met.

In response to our scoping comment, the Forest Service (DEIS, Volume 2, p. 19) states that the desired conditions for the newly revised plans are contrary to the best available science (BASI). This claim in SERAL is contrary to the other claims that the Forest Service makes for the revised forest plans for the Sierra and Sequoia National Forests. Related to the revised forest plans, the Forest Service states that the adopted plan components are necessary to provide for the ecological conditions to support the persistence of CSO and are based on BASI (USDA Forest Service 2023c). It is arbitrary and inconsistent for the agency to makes conflicting claims about the use of BASI and compliance with the 2012 Planning Rule.

2. Definition of "Maintain or Improve Habitat Quality"

Several plan components related to protected activity centers (PACs), territories, and survey requirements are linked to the requirement to "maintain or improve" habitat quality. The revised forest plans define maintain and improve as follows:

> **Management activities that maintain or improve habitat quality in the highest quality and best available nesting and roosting habitat would**:
> - Retain existing CWHR canopy cover class (e.g., do not reduce 5D to 5M);
> - Retain clumps of the largest available trees greater than 24 inches diameter at breast height; and
> - Retain at least two canopy layers at the stand/patch scale in areas where large trees occur.

(USDA Forest Service 2023, p. 59). In contrast, the PA defines "maintain or improve" to include actions that reduce habitat quality, e.g., reducing canopy cover class. For instance, our review of the data provided in the scoping package for the SERAL project suggests that CWHR 5D would be reduced to CWHR 5M, a reduction in canopy class, on over 800 acres in territories. And, roughly 250 acres in territories could be reduced from CWHR 5M to CWHR 5P. The DEIS (Volume 2, p. 19) acknowledges this level of habitat degradation, but simply relies on statements about meeting NRV[3] to justify this habitat loss.

The definition of "maintain or improve" in the PA also affects another plan component in ways that exposes CSO to more risk and habitat degradation or loss. The PA includes a standard about surveys indicating that pre-implementation surveys are not required for actions planned outside of PACs that "maintain or improve" habitat (PA, p. 64, SPEC-CSO-STD-01). This means for the PA that pre-implementation surveys are not required for actions that reduce habitat quality, e.g., change canopy cover class. This increases the risk that occupied owl sites will be negatively affected by logging either from disturbance or habitat alteration and destruction. The DEIS (Volume 2, p. 20) did not directly address this, but rather indicated that surveys were being completed prior to all activities. If it is the intention to complete surveys prior to all actions, then the sentence on pre-implementation surveys should be removed:

[3] See elsewhere in these comments regarding inappropriate methodology used to determine NRV and the underestimate of moist mixed-conifer in the project area.

> For vegetation treatments that maintain or improve habitat quality in California spotted owl nesting and roosting habitat outside of protected activity centers, pre-implementation surveys are not required.

(SERAL forest plan amendments, p. 3). If this sentence is not removed, then the potential impacts of habitat alteration in areas where birds may occur should be disclosed.

3. Standard for Management in a Territory

The desired condition in the revised forest plans is linked to a standard that directs how habitat within the territory is to be maintained if desired conditions are not met. This standard requires that if desired conditions are not met, then highest quality habitat must be maintained (USDA Forest Service 2023b, p. 63, SPEC-CSO-STD-03). Further, the standard requires that for territories with pair status, best available habitat must be maintained to meet desired conditions with CWHR 4D prioritized over 4M (Ibid.).[4]

The standard in the PA (PA, p. 64, SPEC-CSO-STD-07) only requires the retention of highest quality habitat if the desired condition that includes lower quality habitat has not been met. The standard in the PA also does not address retention of the next best habitat available, CWHR 4D, if there is insufficient highest quality habitat. The omission of retaining CWHR 4D habitat is especially concerning, since there is so little CWHR 5M and 5D habitat in the project area and CSO are likely depending on CWHR 4D to a much greater extent to meet reproductive requirements.

The combined effect of the misstated desired condition for the territory and the more liberal standard for territory management in the PA is to reduce the quality and quantity of reproductive habitat. To get a sense of the potential for habitat degradation under the PA, we examined the habitat quality in territories under Forest Service ownership with at least 600 acres within the project boundary. **Of the 44 territories we examined using the data provided in the scoping package (PA, Table B.02-4), only 4 meet the desired conditions as stated in the revised forest plans.[5] In contrast, 42 of the 44 territories meet the desired condition as stated in the PA.[6]** This means that the PA will result in greater reduction in habitat quality and less constraint on habitat reducing activities compared to the revised forest plans.

4. Landscape Analysis: Moist Mixed Conifer Versus Dry Mixed Conifer

For both the PA and the revised forest plans, a landscape analysis is needed to determine if territories are dominated by moist or dry conditions and to establish the range of 40% to 60% of the territory in a specific desired condition. The revised forest plans include an appendix that

---

[4] See revised forest plan for Sierra National Forest for a comprehensive table describing how the plan components work together (USDA Forest Service 2023, p. 61, Table 8).

[5] This lack of highest quality habitat is confirmed by the analysis provided in the Case Study (p. 23) that was included in the SERAL project file (https://usfs-public.app.box.com/v/PinyonPublic/file/1445723937236)

[6] These numbers regarding desired conditions in territories are roughly confirmed by the Forest Service in the Case Study.

establishes a method for assessing conditions and assigning the desired condition for each territory (USDA Forest Service 2023b, Appendix H, p. 181-182). This method uses the Sierran Mixed Conifer and Red Fir WHR types established in the Existing Vegetation along with topographic position data to assign a territory to “Moist Mixed Conifer” or “Dry Mixed Conifer.” The distinction between “moist” and “dry” is primarily based on topographic position, i.e., moist = drainage bottom, northeast slope; dry = ridge, southwest slope.

In contrast, the PA relies on an analysis that assigns “Moist Mixed Conifer” or “Dry Mixed Conifer” to the landscape, but does not specifically identify the criteria that were used to distinguish “moist” from “dry.” The project file includes a case study that compares the approach in SERAL 2 to the approach adopted in the revised forest plans for the Sierra and Sequoia National Forests (“Case Study”). The Case Study claims that the determination of Moist Mixed Conifer versus Dry Mixed Conifer was based on the methods in Huang et al. (2018) and Safford and Stevens (2017). This assertion is incorrect for a number of reasons. First, Huang et al. (2018) (cited in the Case Study), does not define the attributes that separate “Moist Mixed Conifer” or “Dry Mixed Conifer” as forest types. The reference cited describes the method (commonly called F3) to process remotely sensed data and apply it to landscapes. In fact, the only citation provide that defines “Moist Mixed Conifer” or “Dry Mixed Conifer” is Safford and Stevens (2017). The definitions of “Moist Mixed Conifer” or “Dry Mixed Conifer” are based on LANDFIRE BpS descriptions.

Second, the seral stage analysis used in Safford and Stevens (2017) also used LANDFIRE data to evaluate the abundance of seral stages. If the method used in Safford and Stevens (2017) is applied to SERAL 2, a significantly different distribution of desired seral stages would result with substantially greater amounts of Moist Mixed Conifer estimated on the landscape. We would also expect that the Safford and Stevens (2017) method would identify that the amount of CWHR 5M/5D is underrepresented on more of the landscape compared to the method used in SERAL 2.

Figure 1 illustrates the differences in distribution of “Moist Mixed Conifer” and “Dry Mixed Conifer” for the method used in Safford and Stevens (2017) versus SERAL 2. Two points of comparison are important to note. First, the overall amount of “moist mixed conifer” is greater using the method applied by Safford and Stevens. Second, territories themselves generally contain more “moist mixed conifer” type using the method applied by Safford and Stevens.

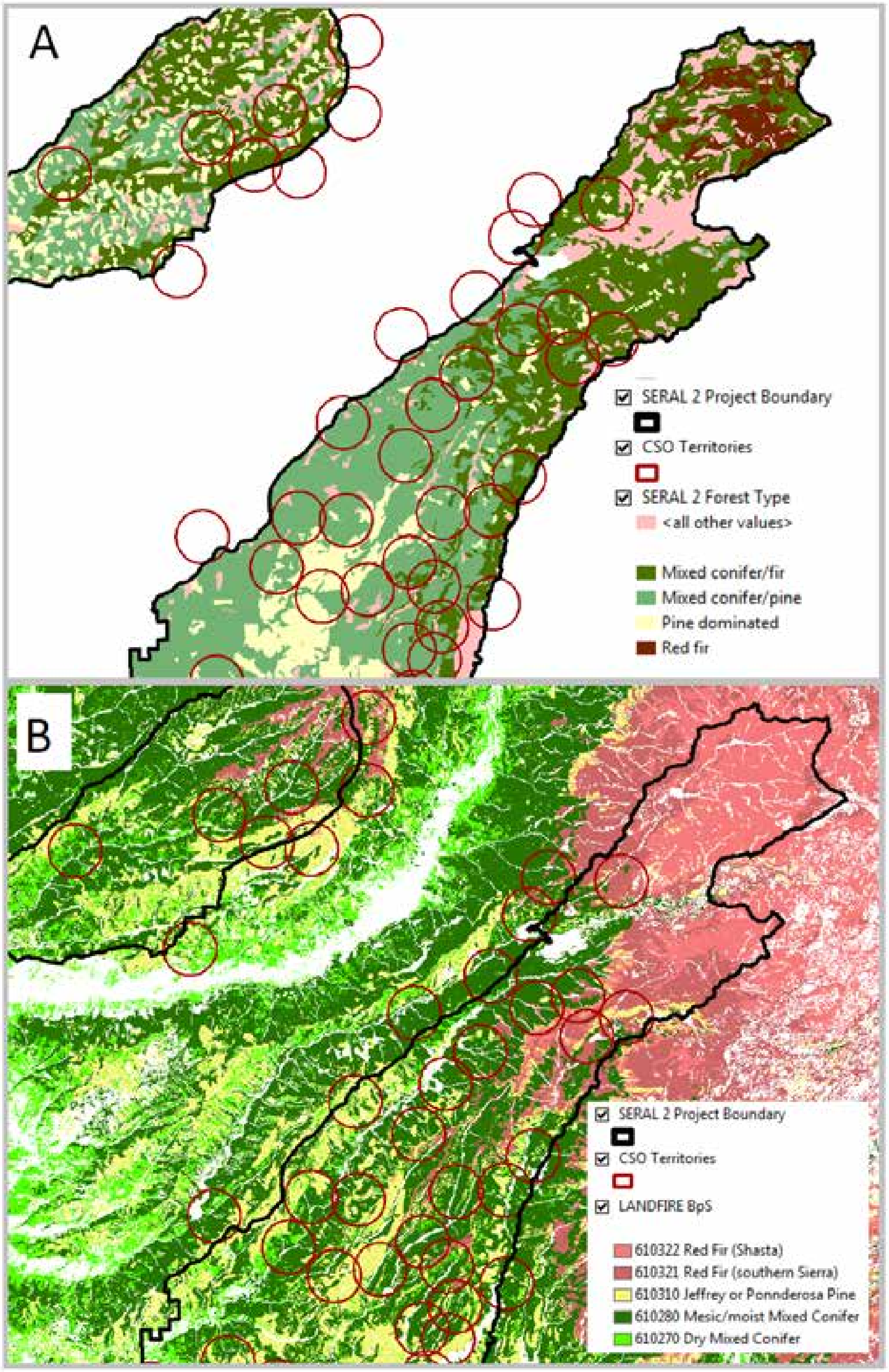

Figure 1. Northern portion of the SERAL 2 project area comparing distribution of "Moist Mixed Conifer" and "Dry Mixed Conifer" using the method in SERAL 2 (A, top panel) and Safford and Stevens (2017) (B, bottom panel). Maps also reflect pine type and red fir. Data for Safford and Stevens (2017) method taken from LANDFIRE BpS and data for SERAL 2 taken from the project file.

Third, the SERAL 2 analysis also diverges from Safford and Stevens (2017) in how each seral stage is defined. Safford and Stevens (2017) based their definitions on those provided in the LANDFIRE BsP for seral stage that have different diameter breaks and canopy cover breaks compared to CWHR which is used in SERAL 2. The following table summarizes the seral stage (“successional class”) used in Safford and Stevens (2017).

Table 1. Dry mixed conifer and mesic mixed conifer used in Safford and Stevens (2017) and defined by LANDFIRE BpS descriptions #0610270 and 0610280, respectively. See Attachment A of these comments for full BpS descriptions for these types. SERAL attributes taken from Case Study.

Stage	**Overstory canopy cover breaks (Safford and Stevens 2017)**	**Tree diameter classes (Safford and Stevens 2017)**	**Overstory canopy cover breaks (SERAL 1 and 2)**	**Tree diameter classes (SERAL 1 and 2)**
Early development		<5” DBH		<6” DBH
Mid Development Open	0% to 50%	9”-21” DBH	10-40%	6” - <24” DBH
Mid Development Closed	51% to 100%	9”-21” DBH	>40%	6” - <24” DBH
Late Development Open	0% to 50%	>33” DBH	10-40%	>24” DBH
Late Development Closed	51% to 100%	>33” DBH	>40%	>24” DBH

The method used in SERAL 2 (and SERAL 1) failed to adjust their canopy breaks and diameter breaks to account for these differences and failed to discuss how the differences in definitions impact the analysis. This is especially important since the diameter class breaks used in Safford and Stevens (2017) that are derived from the BpS descriptions are not continuous and have a gap for diameters 22” to 33” DBH that need to be interpreted and explained. The revised plans for the Sierra and Sequoia National Forests recognized these differences and used information in Safford and Stevens (2017) and LANDFIRE information along with other science information to develop the seral stage descriptions and distributions that align with CWHR descriptions in those recently approved forest plans.

The Case Study also completed an evaluation of “Moist Mixed Conifer” and “Dry Mixed Conifer” using the methods identified in the revised plans for the Sierra and Sequoia National Forests. This method found that 20 of the 56 CSO territories in the SERAL 2 project area fit the definition of “Moist Mixed Conifer.” In contrast, SERAL 2 elected not to determine if a territory was “dry” or “moist,” but chose to determine desired condition by their delineations of “Moist Mixed Conifer” and “Dry Mixed Conifer.” Since the SERAL 2 method underestimates the amount of “Moist Mixed Conifer,” greater reduction in habitat quality is allowed and lesser amounts of higher quality habitat result in SERAL 2 compared to the recently revised forest plans.

The underestimation of “moist mixed conifer” in SERAL 2 translates into desired conditions for territories that provide a lesser amount of suitable habitat compared to the approach used for the revised forest plans or the method used in Safford and Stevens (2017).

Despite the claims in the DEIS and project file, the SERAL 2 (and SERAL 1) analysis does not follow Safford and Stevens (2017) or Huang et al. (2018) with respect to defining “Moist Mixed Conifer” and “Dry Mixed Conifer” and quantifying seral stage distribution in the project area. This misapplication of methods results in the underestimation of “moist mixed conifer” in SERAL 2. It also translates into desired conditions for territories that provide a lesser amount of suitable habitat compared to the approach used for the revised forest plans or the method used in Safford and Stevens (2017).

5. Failure to Provide for Conservation Consistent with the Recently Revised Forest Plans is Arbitrary

The project-specific forest plan amendments in the PA provide for less conservation for CSO compared to the recently revised forest plans for Sierra and Sequoia National Forests. Your team is aware of the newly adopted forest plans. Your response to the differences we raised in our scoping comments was to provide a defense of the PA in the DEIS (Volume 2, Response to Comments) and the Case Study. Your arguments for providing less conservation to this at-risk species are not compelling. In contrast, Forest Service decision makers have made findings that the revised forest plans were based on the best available science information and that the plan components were necessary to provide for the ecological conditions to support viable populations of CSO. The PA dismisses these forest plan components and analytical approaches found to be essential to CSO conservation in the revised forest plans. The PA also results in less conservation and greater risk to this species that has been proposed for listing under the Endangered Species Act. The PA is inconsistent with recently adopted forest plan components and is arbitrary.

We find it especially concerning that the Forest Service is unable to provide a consistent and aligned approach to CSO conservation within the range of this at-risk species that is based on the same interpretation and application of the best available science. The Case Study highlights the dissonance and disagreement within the agency on various points. We also think this dissonance and disagreement within the agency create a problem when consulting with other agencies like the US Fish and Wildlife Service (USFWS). Presently, the Forest Service and USFWS are working a programmatic biological opinion (PBO) for CSO in anticipation of its listing under the Endangered Species Act. The PBO is intended to make the consultation process more efficient and to provide for the necessary conservation for CSO. If internally the Forest Service is unable to agree on the conservation measures necessary to provide the ecological conditions to support CSO, then these negotiations with the USFWS could be a wasted effort. This is especially true if the respective national forests are applying different measures that result in greater or lesser conservation benefit.

B. Treatments in PACs Result in Habitat Degradation When Habitat Quality is Already Low

The DEIS does not consider the existing lack of high-quality habitat in PACs when evaluating impacts to CSO. On average PACs in the project area have about 60 acres of high-quality nesting and roosting habitat, i.e., CWHR 5M/5D. Thirty-eight of the 51 PACs have 100 acres or less of high-quality nesting and roosting habitat. In PACs with low amounts of high-quality habitat, dense habitat with moderate tree sizes, i.e., CWHR 4D, should be retained in greater amounts to compensate for their lack of high-quality habitat. This is especially important in the following twelve PACs with low amounts of CWHR 5M/5D where larger amounts of CWHR 4D is targeted for logging: TOU0261, TOU0241, TOU0239, TOU0215, TOU0165, TOU0156, TOU0132, TOU0126, TOU0101.

The low existing habitat quality combined with the logging proposed in PACs increases the risk that nest sites will be abandoned. The scale of treatments proposed in the PA for SERAL 2 combined with SERAL 1 is unprecedented. It is unknown from the literature how CSO will respond to up to 100 acres of habitat alteration in PACs. Only three studies have investigated experimental logging impacts to California spotted owls. They consistently showed negative impacts to CSO occupancy and other demographic parameters (Keane et al. 2017), and these studies did not treat PACs as intensively as proposed here.

Combined with the habitat alteration and degradation proposed in CSO territories outside of PACs, these actions pose the risk of territory abandonment and long-term negative impacts to CSO (Seamans and Gutierrez 2007; Tempel et al. 2016; Tempel et al. 2014; Stephens et al. 2014). This setting argues for a more cautious approach to CSO management than is presented in the PA and DEIS.

C. “Creating” Woodrat Habitat

We agree that woodrats are a valuable prey item for CSO. The creation of woodrat habitat requires more than simply creating forest openings as suggested in the DEIS (p. 59). To support woodrats the habitat needs to be at the right elevation (generally elevations less than 5,000 feet) and have the right habitat structure and food sources. Important among these are large down logs and large black oak to produce mast (Innes et al. 2007). Woodrats are also associated with well-developed riparian areas and shrubs/understory (Sakai and Noon 1997). Areas that presently support flying squirrels cannot be converted into woodrat habitat by simply logging. Reducing canopy cover and opening up stands can result in abandonment of habitat occupied by flying squirrels as was shown following logging in and adjacent to the Stanislaus-Tuolumne Experimental Forest (Sollman et al. 2016).

Claims that creating openings and more open stands to benefit woodrats must be evaluated in the context of current availability of black oak and other habitat elements. The trade-off of the immediate loss of occupancy of flying squirrels must be evaluated against the uncertain future benefit of the logged area providing woodrat habitat. Such a discussion should be included in the DEIS.

D. High Risk to Owl Persistence, Yet No Monitoring Is Proposed

SERAL 2 far exceeds the scale and intensity of any experimental treatments to date on CSO. Combined with SERAL 1, these two projects introduce significant uncertainty regarding the persistence of CSO across over304,000 acres occupied by at least 100 owl pairs. These two projects threaten the sustainability of CSO on this landscape at a time when declines in CSO have been recognized and listing under the Endangered Species Act has been proposed.

The DEIS (p. 57) points to impacts from wildfire as likely to affect PAC occupancy raising concerns about negative effects on 10% of the PACs. Yet, here in SERAL 1 and 2 logging will reduce habitat quality in roughly 65% of the PACs on the Stanislaus National Forest. The potential for negative impact is much larger than that reported on the Lassen National Forest.

Despite the risk and threats from the SERAL projects, no coherent monitoring program has been designed or implemented. The DEIS (Volume 2) reports completing owl surveys, but this is not monitoring or the examination of cause and effect of treatments on CSO persistence. Before any further logging actions are taken that impact CSO and its habitat, a monitoring plan to evaluate treatments impacts on CSO should be designed and implemented.

E. Increased Conservation for CSO is Needed

As we stated in our scoping comments, additional conservation measures for this at-risk species are necessary to reverse its decline. We ask that you include the following in the PA as revised plan components or design measures to provide for the ecological conditions necessary to maintain viable populations of this species:

- Adopt the following definition, plan components, explanatory table, and analysis approach from the newly revised forest pan for the Sierra National Forest:
    - Definition of “maintain and promote” habitat in USDA Forest Service 2023 (p. 61)
    - SPEC-CSO-DC-02
    - SPEC-CSO-STD-03
    - USDA Forest Service 2023b, p. 61, Table 8
- Revise landscape analysis to utilize either the definitions and approach in Safford and Stevens (2017) or the revised forest plan for the Sierra National Forest (USDA Forest Service 2023b, p. 181, Appendix H). Revise Table B.01-4. Restoration Needs, and adjust desired conditions for territories accordingly.
- Maintain at least 50% canopy cover in treated units within PACs to improve suitability.
- Maintain and promote, as defined in USDA Forest 2023b (p. 61), highest quality habitat wherever it occurs in the project area (not just in territories to meet desired conditions), because it is in such low abundance in the project area.
- Retain CWHR 4D in PACs with low amounts of highest quality nesting and roosting habitat to provide for required nesting and roosting habitat. This applies to PACs

TOU0261, TOU0241, TOU0239, TOU0215, TOU0165, TOU0156, TOU0132, TOU0126, TOU0101 (based on review of DEIS, p. 62-63).

- Retain CWHR 4D in territories of all occupancy status (not just pairs) to satisfy desired conditions when highest quality habitat is in low amounts.
- Retain 60% or higher amounts of highest quality and best available habitat in all territories to compensate for such low amounts of higher quality habitat across the landscape.

We asked in our scoping comments that if these measures were not included in the PA, that an alternative be developed to address these issues. Such an alternative was not included in the DEIS since (as stated in the DEIS, Volume 2) additional alternatives are not required when utilizing ESD. The DEIS also implies that the measures above were evaluated, but no such analysis has been provided in the DEIS. Claims are made that various objectives of the project cannot be met with these modifications, but there is no analysis to support these claims. We ask again that if these measures are not included in the PA that an alternative be included in the DEIS to evaluate the conservation measures above.

III. American Goshawk

There are 23 American goshawk (AMGO) PACs in the project area (BE, p. 19-20). It is unclear from the PA what is being proposed in these PACs. According to the forest plan, no logging is allowed in PACs that occur outside of the defense and threat zones of the wildland urban interface (WUI). We assume that this forest plan direction is being followed, but ask that this be confirmed.

We also note that there is no pre- and post-treatment effects analysis of habitat for AMGO. We are especially concerned that AMGO sites in the North Fork Tuolumne and Clavey watersheds retain sufficient nesting habitat with appropriate structure. In this area, white fir stands often dominate the area and provide the ecological conditions necessary to support AMGO. We are concerned that thinning in SERAL 2 will target these areas and degrade habitat conditions for these important habitat areas. This should be addressed in the DEIS.

V. Use of Herbicides to Maintain Fuel Breaks

We understand that this aspect of the project is not subject to ESD. The PA includes the application of herbicide to control shrubs and other plants on up to 13,000 acres in fuel breaks. The herbicides and associated surfactants proposed for use are known to be hazardous to humans and wildlife. For example, glyphosate has been identified by the World Health Organization as a potential carcinogen and a ban on its sales and use has been proposed by the European Union (Agathokleous 2022).

The proposed fuel breaks are features that you intend to use to manage fire for the indefinite future, and we object to the use of herbicides for their ongoing maintenance. In our scoping comments, we asked that maintenance treatments be designed to minimize the use of herbicides and maximize the use of non-chemical control methods. For instance, we asked that the creation of fuel breaks be sequenced with prescribed fire as a follow up treatment to maintain desired fuel profiles and begin the process of reintroducing fire to the landscape.

No changes were made between scoping and DEIS in response to this comment. We again ask that you minimize the use of herbicides by first prioritizing the use of other methods to control competing vegetation. If you do not include design measures in the PA to address this issue, we ask that you develop an alternative to evaluate the impacts minimizing the use of herbicides and prioritizing the use of other methods of control.

VII. Fuel Reduction in Inventoried Roadless Areas (IRAs)

The PA includes 3,344 acres of mastication and mechanical treatment for fuel breaks in IRAs. The DEIS is correct that the Roadless Area Conservation Rule does not prohibit such actions, but it also states that they should be evaluated based on site conditions. The section in the DEIS is in its evaluation and provides no information about the specific conditions of the site and the necessity for the fuel break.

The DEIS does not address the necessity or purpose for creating this disturbance in the IRA. No mention is made of the need for this fuel break to protect communities or other assets. The specific content for the fuel break in an isolated roadless area must be addressed in the DEIS to establish importance, necessity and purpose for the disruption in the IRA.

There is also no discussion of the design measures that will be implemented to ensure that temporary roads do not become user created roads. The reduction of shrubs and understory trees for a fuel break also creates an open linear feature that can become highly accessible to motorized vehicles. Design measures must be included in the PA to ensure that creating the fuel break does not lead to illegal motorized use and damage to resources. These potential impacts must also be disclosed in the DEIS.

VIII. "Speculative" Decision for Future Salvage Logging

We understand that this aspect of the project is not subject to ESD. The PA includes post-disturbance logging to salvage trees affected by fire, insects and disease. Management requirements are noted for this salvage logging. This speculative decision-making is referred to as condition-based management (CBM). The salvage logging aspect of the PA is nearly identical to the speculative management that was included in SERAL 1. We object to the use of this controversial approach to management for the same reasons we raised in our comments on SERAL 1. And as we noted in our comments on SERAL 1, there are many other environmental decision-making processes that can be used to expeditiously address the desire to salvage dead or dying trees, including categorical exclusions and environmental assessments combined with shortened decision-making timelines that can be requested of the Council on Environmental Quality.

We are concerned about a trend in Forest Service projects to use CBM as part of the National Environmental Policy Act (NEPA) process. The idea of CBM has been circulating in the Forest Service for several years. In 2019 a definition was proposed for inclusion in Forest Service regulations on implementing NEPA (36 CFR Part 220), but was abandoned in the final rulemaking. The American Bar Association recently reviewed the status of CBM and offered the following as a description of CBM:

> CBM projects use an overarching set of “goal variables”—predetermined management criteria that guide implementation—that Forest Service staff apply to on-the-ground natural resource “conditions” encountered during the course of project implementation, a period that can span years or even decades: essentially, when the Forest Service finds X resource condition on the ground, it applies Y timber harvest prescription. However, basic information regarding the project’s details—such as unit location, timing, road building, harvesting methods, and site-specific environmental effects—is not provided at the time the Forest Service conducts its NEPA environmental review (when the public can weigh in), nor when it gives its final approval to a project (when the public can seek administrative review). Instead, site-level disclosures are made after NEPA environmental and administrative review is complete, depriving the public of opportunities to comment and influence the decision based on localized conditions.

(Cliburn et al. 2021). Management frameworks that establish goals and approaches to achieving them can make project planning more efficient. This is what a well-designed forest plan can provide. This type of guidance also can be provided by “left-side analysis” that has formed the basis of landscape planning completed by the Forest Service for the past 25 years.

The problem, however, comes with the Forest Service’s attempt to marry CBM with the requirements of NEPA. NEPA requires federal agencies to disclose to the public and in advance of environmental decision-making the likely site-specific impacts of project related activities. In a recent legal case, the courts held that the Forest Service’s Prince of Wales Landscape Level Analysis Project—a 15-year logging project on Prince of Wales Island in the Tongass National Forest using CBM—violated NEPA because it failed to provide the site-specific analysis that was needed to satisfy NEPA’s “hard-look” standard. See *Se. Al. Conservation Council v. U.S. Forest Serv.*, 413 F. Supp. 3d 973 (D. Alaska 2019).

Central to our concern is the identification of the locations for the proposed treatments and disclosure of the site-specific impacts of the proposed treatments on the affected resources. NEPA requires such analysis and disclosure. This is recognized in the draft document on CBM developed by the Forest Service. Importantly, that document states, “It is incumbent upon the Forest Service to provide enough site-specificity in the proposed action, existing conditions, and effects analysis in order to comply with NEPA” (USDA Forest Service 2023a). As we stated in our scoping comments, we expect any NEPA documents completed for the Project to meet this standard regarding site-specificity. In response to our comment, the DEIS (Volume 2) claims without providing evidence and contrary to Forest Service guidance (USDA Forest Service 2023a) that it is not necessary to evaluate site specific conditions in order to estimate impacts.

Thank you for the opportunity to provide comments on the SERAL 2 DEIS. Please add the individuals listed below to your email circulation list for this project. If you have specific questions about these comments, please contact Susan Britting (britting@earthlink.net).

Sincerely,

Susan Britting, Ph.D.
Sierra Forest Legacy
(530) 919-9844
britting@earthlink.net

Charles Little
Friends of Bell Meadows
barcaabuelo@gmail.com

Pamela Flick
Defenders of Wildlife
pflick@defenders.org

Charles S. Little
Fire Issues Chair
Forest Unlimited
barcaabuelo@gmail.com

Don Rivenes
Conservation Chair
Sierra Foothills Audubon Society
rivenes@sbcglobal.net

Trish Puterbaugh
Lassen Forest Preservation Group
pmputerbaugh@yahoo.com

André Sanchez
Community Engagement & Conservation
Policy Manager
CalWild
asanchez@calwild.org

Attachment A: LANDFIRE BpS for Mesic Mixed Conifer and Dry Mixed Conifer

References

Agathokleous, E. 2022. European Union's imminent ban on glyphosate: Hormesis should be considered in new chemical screening and selection. *J. For. Res.* **33**, 1103–1107 (2022). https://doi.org/10.1007/s11676-022-01474-5

Cliburn, A, Quackenbush, P., Prokott, M., Murphy, J. and Overstreet, M. 2021. The U.S. Forest Service's Expanding Use of Condition-Based Management: Functional and Legal Problems from Short-Circuiting the Project-Planning and Environmental Impact Statement Process. Forest Resources, American Bar Association. May 10. 2021. https://www.americanbar.org/groups/environment_energy_resources/publications/fr/20210510-the-us-forest-services-expanding-use-of-condition-based-management/

USDA Forest Service 2019. Conservation Strategy for the California Spotted Owl in the Sierra Nevada. Version 1.0. Pacific Southwest Region. R5-TP-043. April 2019. https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd624135.pdf

USDA Forest Service 2023a. Condition-Based Management. Frequently Asked Questions. Ecosystem Management Coordination. February 2023 (draft).

USDA Forest Service 2023b. Land Management Plan for the Sierra National Forest. Pacific Southwest Region. R5-MB-331-A. May 2023. https://usfs-public.app.box.com/v/PinyonPublic/file/1224226105088

USDA Forest Service 2023c. Record of Decision for the Land Management Plan for the Sierra National Forest. Pacific Southwest Region. R5-MB-331-A. May 2023. https://usfs-public.app.box.com/v/PinyonPublic/file/1224238933149

USDI Fish and Wildlife Service 2022. Species Status Assessment Report for the California Spotted Owl (Strix occidentalis occidentalis). https://ecos.fws.gov/ServCat/DownloadFile/227751

LANDFIRE Biophysical Setting Model

Biophysical Setting: **0610270** **Mediterranean California Dry-Mesic Mixed Conifer Forest and Woodland**

☐ *This BPS is lumped with:*
☐ *This BPS is split into multiple models:*

General Information

Contributors (also see the Comments field) **Date** 9/14/2005

Modeler 1	Joe Sherlock	jsherlock@fs.fed.us	**Reviewer**
Modeler 2	Neil Sugihara	nsugihara@fs.fed.us	**Reviewer**
Modeler 3	Hugh Safford	hughsafford@fs.fed.us	**Reviewer**

Vegetation Type
Forest and Woodland

Map Zone
6

Model Zone
☐ Alaska ☐ N-Cent.Rockies
☑ California ☐ Pacific Northwest
☐ Great Basin ☐ South Central
☐ Great Lakes ☐ Southeast
☐ Northeast ☐ S. Appalachians
☐ Northern Plains ☐ Southwest

Dominant Species*
PIPO ABCO
PILA
QUKE
CADE27

General Model Sources
☑ Literature
☐ Local Data
☑ Expert Estimate

Geographic Range
This type occurs all over California, from the San Bernardino mountain range thru the western slope of the Sierra Nevada mountain range, to the Klamath-Siskiyou region, and it may include interior coast ranges. Type intergrades with mixed conifer in southern Oregon, and may be extremely similar to it.

Biophysical Site Description
South and west-facing aspects, throughout the geographic range. Generally above 5000ft at the southern extent to about 1000ft elevation in the north. Upper elevations defined by ecotone with red fir and lodgepole.

Vegetation Description
Mixed conifer forests are typically composed of three or more species, with ponderosa pine, sugar pine, and Douglas-fir, white fir, and incense cedar. California black oak, or other hardwood species, are also common components. Douglas-fir is not a major component and may drop out south of Yosemite National Park. Incense cedar may compose a larger proportion of BpS in the south.

Disturbance Description
Surface fire occurs at an average generally between 5-10yrs; mixed severity occurs about every 50yrs; overall FRI=8-10yrs (Taylor and Skinner 2003, Taylor and Skinner 1998). Insect/pathogen drought-related mortality occurs every 7-10yrs. Snow breakage occurs in class B about every 5yrs.

Adjacency or Identification Concerns
Extends between the low elevation hardwood forests to the red fir forests of the upper elevations. Can be found at lower elevations than BpS 1028.

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.
**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

CALVEG types that are included in the model are MP, PP, and QK.

Native Uncharacteristic Conditions

Scale Description

Small patch size mosaic, driven by variations of surface fire intensity and insect/pathogen-related mortality. Also includes coarser texture, at the 100s to 1,000s of acres scale, that are less frequent.

Issues/Problems

It is difficult to generalize across the latitudinal range of MCON - there is a considerable variation in the frequency of fire by fire type as you go from north to south.

Due to the vegetative effects of the mixed severity fire regime, mapping is difficult. Also, the limitations of the LF modeling process (fuel accumulation, five boxes and inability to model climate variability) prevent our representing some of the nuance of this system. As a result, replacement fire appears to be too short, but the overall fire regime and landscape proportions are representative.

BpS 1098 can be regarded as a successional stage (class A) within this BpS.

Comments

Modified from the Rapid Assessment model R1MCONss.

Vegetation Classes

Class A **20 %**

Early Development 1 All Structures

Upper Layer Lifeform

- [ ] Herbaceous
- [ ] Shrub
- [x] Tree

Fuel Model

Indicator Species* and Canopy Position

PIPO	Upper
PILA	Upper
QUKE	Mid-Upper
ARPA6	Mid-Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	100 %
Height	Tree 0m	Tree 10m
Tree Size Class	Sapling >4.5ft; <5"DBH	

- [x] Upper layer lifeform differs from dominant lifeform.

Shrubs may be the dominant lifeform with canopy cover 0-100% and heights up to 3m.

Description

Early succession, after localized mortality, or mixed severity fire, comprised of grass, shrubs, and tree seedlings to saplings.

In some cases, tree seedling may develop a nearly continuous canopy and succeed relatively quickly to mid-development conditions. In other cases, chaparral conditions may dominate class A and persist for long periods of time. Shrub species may include: Arctostaphylos patula; Quercus vaccinifola; Ceanothus spp; and Chrysolepis sempervirens.

Replacement fire occurs about every 50yrs, mixed about every 200 yrs. Annually, there is a 0.01 probability that the class succeeds directly to Class B, and 0.005 probability that it succeeds to Class C. After 50 years these patches pass to Class B.

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.
**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

Class B 10 %

Mid Development 1 Closed

Upper Layer Lifeform

- [ ] Herbaceous
- [ ] Shrub
- [x] Tree

Fuel Model

Indicator Species* and Canopy Position

PIPO	Upper
PILA	Upper
QUKE	Mid-Upper
ABCO	Low-Mid

Structure Data (for upper layer lifeform)

	Min	Max
Cover	51 %	100 %
Height	Tree 10.1m	Tree 25m
Tree Size Class	Medium 9-21"DBH	

- [ ] Upper layer lifeform differs from dominant lifeform.

Description

Pole to medium sized conifers with canopy cover >50%.

Replacement fire occurs about every 75yrs, mixed fire (MFRI=20yrs) usually moves that patch to Class C, but one fifth of these fires leave the patch is Class B. Surface fire occurs about every 36yrs. Insect/disease occurs about every 200yrs, usually with little effect, but one-fifth of the occurrences open the patch up to Class C. After 50yrs this class naturally succeeds to Class E.

Class C 25 %

Mid Development 1 Open

Upper Layer Lifeform

- [ ] Herbaceous
- [ ] Shrub
- [x] Tree

Fuel Model

Indicator Species* and Canopy Position

PIPO	Upper
PILA	Upper
QUKE	Mid-Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	50 %
Height	Tree 10.1m	Tree 25m
Tree Size Class	Medium 9-21"DBH	

- [ ] Upper layer lifeform differs from dominant lifeform.

Description

Pole to medium sized conifers with canopy cover <50%.

Replacement fire occurs about every 315yrs, mixed fire (MFRI=30yrs) usually keeps that patch in Class C, but one sixth or so of these fires reset the patch to Class A. Surface fire occurs about every 15yrs. Insect/disease occurs about every 500yrs, usually with little effect. After about 32yrs without fire these stands close up to become Class B. Patches stay in this Class for more than 100yrs.

Class D 40 %

Late Development 1 Open

Upper Layer Lifeform

- [ ] Herbaceous
- [ ] Shrub
- [x] Tree

Fuel Model

Indicator Species* and Canopy Position

PIPO	Upper
PILA	Upper
QUKE	Mid-Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	50 %
Height	Tree 25.1m	Tree >50.1m
Tree Size Class	Very Large >33"DBH	

- [ ] Upper layer lifeform differs from dominant lifeform.

Description

Overstory of large and very large trees with canopy cover <50%. Occurring in small to moderately-sized patches on southerly aspects and ridge tops. Multi-aged.

Replacement fires are rare (MFRI>1000yrs). Mixed fire (MFR=30yrs) usually leaves the patch in Class D, but rarely it can reset the patch to Class A. Surface fires are frequent (MFR=11yrs) and maintain the open

---

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.
**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

characteristic of this Class. Insect/disease is also rather rare (annual probability=0.001). This Class can self-perpetuate. Also, after 35yrs with no fire, this class will transition to Class E.

Class E 5 %

Late Development 1 Closed

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☑ Tree

Fuel Model

Indicator Species* and Canopy Position

PIPO	Upper
PILA	Upper
ABCO	Mid-Upper
PSME	Mid-Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	51 %	100 %
Height	Tree 25.1m	Tree >50.1m
Tree Size Class	Very Large >33"DBH	

☐ Upper layer lifeform differs from dominant lifeform.

Description

Overstory of large and very large trees with canopy cover >50%. Occurring in small to moderately-sized patches on north aspects and lower slope positions. Understory characterized by medium and smaller-sized shade-tolerant conifers.

Replacement fires occur about every 160yrs. Half the mixed fires (MFRI=60yrs) cause no transitions, but can reset the patch to Class A (MFRI=70yrs), or open the stand up to Class D (MFRI=330yrs). Surface fires are infrequent (MFRI=50yrs). Insect/disease is also infrequent (mean return=250yrs), and usually has little effect on stand structure, but one quarter of the time can open the patch up to a Class D. This Class can maintain.

Disturbances

Fire Regime Group:** I

Historical Fire Size (acres)

Avg 0
Min 0
Max 0

Fire Intervals

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	150			0.00667	7
Mixed	35			0.02857	30
Surface	17			0.05882	63
All Fires	11			0.09406	

Fire Intervals (FI):
Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class.

Sources of Fire Regime Data

☑ Literature
☐ Local Data
☑ Expert Estimate

Additional Disturbances Modeled

☑ Insects/Disease ☐ Native Grazing ☐ Other (optional 1)
☐ Wind/Weather/Stress ☐ Competition ☐ Other (optional 2)

References

Beaty R.M. and A.H. Taylor. 2001. Spatial and temporal variation of fire regimes in a mixed conifer forest landscape, Southern Cascades, California, USA Department of Geography, The Pennsylvania State University, University Park, PA, USA. Journal of Biogeography 28: 955-966.

Bekker, M.F. and A.H. Taylor. 2001. Gradient Analysis of Fire Regimes in Montane Forests of the Southern Cascade Range, Thousand Lakes Wilderness, California, USA. Plant Ecology 155: 15–28.

Brown, James K. and Jane Kapler Smith, eds. 2000. Wildland fire in ecosystems: effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42-vol. 2. Ogden, UT: USDA Forest Service, Rocky Mountain Research Station.

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.
**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

257 pp.

Caprio, A.C. and T.W. Swetnam. 1995. Historic fire regimes along an elevational gradient on the west slope of the Sierra Nevada, California. In: Brown, James K., Robert W. Mutch, Charles W. Spoon and Ronald H. Wakimoto, tech. coords. 1995. Proceedings of the Symposium on Fire in Wilderness and Park Management: Past Lessons and Future Opportunities. 30 March - 1 April 1993, Missoula, MT. Gen. Tech. Rep. INT-GTR-320. Ogden, UT: USDA Forest Service, Intermountain Research Station.

Frost, Evan J. and Rob Sweeney. 2000. Fire Regimes, Fire History and Forest Conditions in the Klamath-Siskiyou Region: An Overview and Synthesis of Knowledge. Wildwood Environmental Consulting. Prepared for the World Wildlife Fund, Klamath-Siskiyou Ecoregion Program, Ashland, OR. December, 2000

Kilgore, B.M. and D. Taylor. 1979. Fire history of a sequoia-mixed conifer forest. Ecology 60(1): 129-142.

McKelvey, K.S. et al. 1996. An Overview of Fire. In: the Sierra Nevada Sierra Nevada Ecosystem Project: Final report to Congress, vol. II, Assessments and scientific basis for management options. Davis, CA: University of California, Centers for Water and Wildland Resources, 1996.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.

Skinner, C.N. and C. Chang. 1996. Fire Regimes, Past and Present. In: the Sierra Nevada Sierra Nevada Ecosystem Project: Final report to Congress, vol. II, Assessments and scientific basis for management options. Davis: University of California, Centers for Water and Wildland Resources, 1996.

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

Taylor, A.H. and C.N. Skinner. 2003. Spatial patterns and controls on historical fire regimes and forest structure in the Klamath Mountains. Ecological Applications 13: 704-719.

Taylor, A.H. 2000. Fire regimes and forest changes in mid and upper montane forests of the southern Cascades, Lassen Volcanic National Park, California, USA. Journal of Biogeography 27: 87-104.

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.
**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

LANDFIRE Biophysical Setting Model

Biophysical Setting: **0610280** **Mediterranean California Mesic Mixed Conifer Forest and Woodland**

☐ *This BPS is lumped with:*
☐ *This BPS is split into multiple models:*

General Information

Contributors (also see the Comments field) **Date** 9/13/2005

Modeler 1 Joe Sherlock jsherlock@fs.fed.us **Reviewer**
Modeler 2 Neil Sugihara nsugihara@fs.fed.us **Reviewer**
Modeler 3 Hugh Safford hughsafford@fs.fed.us **Reviewer**

Vegetation Type

Forest and Woodland

Map Zone

6

Model Zone

☐ Alaska ☐ N-Cent.Rockies
☑ California ☐ Pacific Northwest
☐ Great Basin ☐ South Central
☐ Great Lakes ☐ Southeast
☐ Northeast ☐ S. Appalachians
☐ Northern Plains ☐ Southwest

Dominant Species*

ABCO CADE27
PSME
PILA
PIPO

General Model Sources

☑ Literature
☐ Local Data
☑ Expert Estimate

Geographic Range

This type occurs all over California, from the San Bernardino mountain range thru the western slope of the Sierra Nevada mountain range, to the Klamath-Siskiyou region, and it may include interior coast ranges. Type intergrades with mixed conifer in southern Oregon, and may be extremely similar to it.

Biophysical Site Description

Favorable slopes, primarily north and east aspects throughout the geographic range. Generally above 5000ft elevation at the southern extent to above 1000ft in the north. Upper elevations defined by ecotone with red fir, and lodgepole. Lower elevations defined by ecotone with drier mixed conifer types.

Vegetation Description

Mixed conifer forests are typically composed of three or more species, with white fir, Douglas-fir, ponderosa pine, sugar pine, and incense cedar. Tanoak and bigleaf maple are occasional associates. Giant sequoia forests are included within this BpS. Douglas-fir drops out south of Yosemite National Park. Incense cedar may compose a larger proportion of BpS in the south.

Disturbance Description

Surface fire occurs at an average generally between 10-20yrs (Taylor and Skinner 2003, Taylor and Skinner 1998). Kilgore and Taylor (1979) reported a MFRI of 19-39yrs (N/NE aspects), which may favor mixed and replacement fires of longer return intervals. Most medium and high severity fires may actually occur on mid and upper slope positions (Taylor and Skinner 1998, Taylor 2002, Beaty and Taylor 2001).

Insect/drought-related mortality affects this BpS, especially when combined with periodic drought, causing individual and small patch effects.

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.
**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

Adjacency or Identification Concerns

Extends between the low elevation hardwood forests up to the red fir forests of the upper elevations. Generally occurs above BpS 1027.

CALVEG types that are included in the model are DF, DW, DP, MB, MF (depending on RF content), MK, WF (depending on site productivity), and BT.

This BpS has been exploited currently in the recent past - due to logging as well as fire suppression. It would have been a more frequent type on the landscape historically (Provencher, pers comm).

Native Uncharacteristic Conditions

Extent of high density forest is higher today, primarily due to effective fire suppression. Species composition has shifted to higher levels of shade tolerant conifer in the absence of frequent surface fire.

Scale Description

Literature suggests an historical average fire size of 50-200ha (Agee 1993, Taylor, various). Small to medium patch size mosaic, driven by variations of surface fire intensity and insect/pathogen-related mortality. Also includes coarser texture, at the 100s to 1000s of acres scale, that are less frequent.

Issues/Problems

It is unknown if there is a need for a northern (latitude) versus a southern MCON BpS. This version is intended to respond to literature inferences that "north" slopes, perhaps especially in the northern Sierra Nevada through the Klamath region, have a longer fire regime and larger patch size than estimated by work in the southern and central Sierra Nevada. Likewise, the Klamath region literature also indicates that the topographic complexity also contributes to disparity between the two types. Even though a MFRI difference may exist between N and S aspects, Skinner and Taylor 1998 found that the numbers were not statistically significant in their study. Difference in severity between aspects may be more important.

Due to the vegetative effects of the mixed severity fire regime, mapping is difficult. Also, the limitations of the LF modeling process (fuel accumulation, five boxes and inability to model climate variability) prevent our representing some of the nuance of this system. As a result, replacement fire appears to be too short, but the overall fire regime and landscape proportions are representative.

BpS 1098 can be regarded as a successional stage (class A) within this BpS.

Comments

Modified from R1MCONns.

For R1MCONs, Shlisky adjusted ratio of replacement to mixed fire from 0.8 to 1.25 from previous version based on reviewer feedback. Shlisky also added insect/pathogen and snow breakage (wind/weather/stress) probabilities included in description but not in previous model version. Very little data on reference percent of PNVG by state. Current pathways show late-seral open succeeding to late-seral closed - need to consider if late-seral open can succeed to itself; then succeeding to late-seral closed in the absence of fire.

Vegetation Classes

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.
**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

Class A **20 %**

Early Development 1 All Structures

Upper Layer Lifeform

- [ ] Herbaceous
- [ ] Shrub
- [x] Tree

Fuel Model

Indicator Species* and Canopy Position

ABCO	Upper
PIPO	Upper
PILA	Upper
PSME	Upper

Structure Data (for upper layer lifeform)

	Min	*Max*
Cover	0 %	100 %
Height	Tree 0m	Tree 10m
Tree Size Class	Sapling >4.5ft; <5"DBH	

- [x] Upper layer lifeform differs from dominant lifeform.

Shrubs may be the dominant lifeform with canopy cover 0-100% and heights up to 3m.

Description

Early succession after stand replacement disturbance.

In some cases, tree seedling may develop a nearly continuous canopy and succeed relatively quickly to mid-development conditions. In other cases, chaparral conditions may dominate class A and persist for long periods of time. Shrub species may include: Arctostaphylos patula; Quercus vaccinifola; Ceanothus spp.

Replacement fire occurs about every 66yrs, mixed about every 200yrs. Annually, there is a 0.01 probability that the class succeeds directly to Class B, and 0.005 probability that it succeeds to Class C. After about 50yrs patches would pass from this condition to Class B.

Class B **15 %**

Mid Development 1 Closed

Upper Layer Lifeform

- [ ] Herbaceous
- [ ] Shrub
- [x] Tree

Fuel Model

Indicator Species* and Canopy Position

ABCO	Upper
PIPO	Upper
PSME	Upper
PILA	Upper

Structure Data (for upper layer lifeform)

	Min	*Max*
Cover	51 %	100 %
Height	Tree 10.1m	Tree 25m
Tree Size Class	Medium 9-21"DBH	

- [ ] Upper layer lifeform differs from dominant lifeform.

Description

Pole to medium sized conifers with canopy cover >50%.

Replacement fire occurs about every 200yrs, mixed fire (MFR=40yrs) usually moves that patch to Class C, but about one third of these fires leave the patch is Class B. Surface fire occurs about every 65yrs. Insect/disease occurs about every 200yrs with little effect. This condition can endure for 50yrs.

Class C **20 %**

Mid Development 1 Open

Upper Layer Lifeform

- [ ] Herbaceous
- [ ] Shrub
- [x] Tree

Fuel Model

Indicator Species* and Canopy Position

PIPO	Upper
ABCO	Upper
PILA	Upper
PSME	Upper

Structure Data (for upper layer lifeform)

	Min	*Max*
Cover	0 %	50 %
Height	Tree 10.1m	Tree 25m
Tree Size Class	Medium 9-21"DBH	

- [ ] Upper layer lifeform differs from dominant lifeform.

Description

Pole to medium sized conifers with canopy cover <50%.

Replacement fire occurs about every 130yrs, mixed fire (MFR>30yrs) keeps that patch in Class C. Surface fire

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.
**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

occurs about every 25yrs. Insect/disease occurs about every 500yrs, usually with little effect. After about 35yrs without fire these stands close up to become Class B. This condition can endure for more than 100yrs.

Class D **25 %**

Late Development 1 Open

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model

Indicator Species* and Canopy Position

ABCO	Mid-Upper
PIPO	Upper
PILA	Upper
PSME	Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	50 %
Height	Tree 25.1m	Tree >50.1m
Tree Size Class	Very Large >33"DBH	

☐ Upper layer lifeform differs from dominant lifeform.

Description

Overstory of large and very large trees with canopy cover <50%. Occurring in small to moderately-sized patches on southerly aspects and ridge tops.

Replacement fires are rare (MFRI =285yrs). Mixed fire (MFR=35yrs) leaves the patch in Class D. Surface fires are frequent (MFR=15yrs) and maintain the open characteristic of this Class. Insect/disease is also rather rare, and has little effect on stand structure. After about 35yrs without fire these stands close up to become Class E. This Class can maintain.

Class E **20 %**

Late Development 1 Closed

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model

Indicator Species* and Canopy Position

ABCO	Mid-Upper
PIPO	Upper
PILA	Upper
PSME	Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	51 %	100 %
Height	Tree 25.1m	Tree >50.1m
Tree Size Class	Very Large >33"DBH	

☐ Upper layer lifeform differs from dominant lifeform.

Description

Overstory of large and very large trees with canopy cover >50%. Occurring in small to moderately-sized patches on north aspects and lower slope positions. Understory characterized by medium and smaller-sized shade-tolerant conifers, primarily ABCO.

Replacement fires occur about every 260yrs. Mixed fires can either reset the patch to Class A, open the stand up to Class D, or have little effect. Surface fires are rare (MFRI nearly 100yrs) and have little effect on stand condition. Insect/disease is also infrequent (MFRI=250yrs), and can either open the patch up to a Class D, or have little impact on stand condition. This Class can self-maintain.

Disturbances

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.
**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

Fire Regime Group:** I

Historical Fire Size (acres)

Avg
Min
Max

Sources of Fire Regime Data

- [x] Literature
- [ ] Local Data
- [x] Expert Estimate

Fire Intervals	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	150			0.00667	12
Mixed	45			0.02222	39
Surface	35	10	40	0.02857	50
All Fires	17			0.05746	

Fire Intervals (FI):
Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class.

Additional Disturbances Modeled

- [x] Insects/Disease
- [ ] Wind/Weather/Stress
- [ ] Native Grazing
- [ ] Competition
- [ ] Other (optional 1)
- [ ] Other (optional 2)

References

Beaty R.M. and A.H.Taylor. 2001. Spatial and temporal variation of fire regimes in a mixed conifer forest landscape, Southern Cascades, California, USA. Department of Geography, The Pennsylvania State University, University Park, PA, USA. Journal of Biogeography 28: 955-966.

Bekker, M.F. and A.H. Taylor. 2001. Gradient Analysis of Fire Regimes in Montane Forests of the Southern Cascade Range, Thousand Lakes Wilderness, California, USA. Plant Ecology 155: 15–28.

Brown, James K. and Jane Kapler Smith, eds. 2000. Wildland fire in ecosystems: effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42-vol. 2. Ogden, UT: USDA Forest Service, Rocky Mountain Research Station. 257 pp.

Caprio, A.C. and T.W. Swetnam. 1995. Historic fire regimes along an elevational gradient on the west slope of the Sierra Nevada, California. In: Brown, James K., Robert W. Mutch, Charles W. Spoon and Ronald H. Wakimoto, tech. coords. 1995. Proceedings of the Symposium on Fire in Wilderness and Park Management: Past Lessons and Future Opportunities. 30 March - 1 April 1993, Missoula, MT. Gen. Tech. Rep. INT-GTR-320. Ogden, UT: USDA Forest Service, Intermountain Research Station.

Frost, Evan J. and Rob Sweeney. 2000. Fire Regimes, Fire History and Forest Conditions in the Klamath-Siskiyou Region: An Overview and Synthesis of Knowledge. Wildwood Environmental Consulting. Prepared for the World Wildlife Fund, Klamath-Siskiyou Ecoregion Program, Ashland, OR. December, 2000.

Kilgore, B.M. and D. Taylor. 1979. Fire history of a sequoia-mixed conifer forest. Ecology 60(1) 1979: 129-142.

McKelvey, K.S. et al. 1996. An Overview of Fire. In: the Sierra Nevada Sierra Nevada Ecosystem Project: Final report to Congress, vol. II, Assessments and scientific basis for management options. Davis, CA: University of California, Centers for Water and Wildland Resources.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.
**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

Skinner, C.N. and C. Chang. 1996. Fire regimes, past and present. In: Sierra Nevada Ecosystem Project: final report to Congress, Vol. II, Assessments and scientific basis for management options. Davis, CA: University of California Davis, Centers for Water and Wildland Resources. 1041-1070.

Taylor, A.H. 2000. Fire regimes and forest changes in mid and upper montane forests of the southern Cascades, Lassen Volcanic National Park, California, U.S.A. Journal of Biogeography 27: 87-104.

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

Taylor, A.H. and C.N. Skinner. 2003. Spatial patterns and controls on historical fire regimes and forest structure in the Klamath Mountains. Ecological Applications 13: 704-719.

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.
**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.