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First name: Margaret

Last name: Willits

Organization:

Title:

Comments:

Initial statement

Rare plants, unlike rare wildlife species often have fairly limited ranges. Generally there are no scientific papers on them except for the one that initially described the species. It is very important that the local knowledge that has been built up about these species be drawn upon in the analysis. That is the best available science.

This analysis has not done that. It has not used the prefield review developed for the Stanislaus NF which would have ruled out a number of species that are still considered here. It also has not used the analysis and write-up about each species developed for the last sensitive plant and watchlist revision which addresses numbers of plants and possible threats. It is not drawing on the best available information for these species. That reduces its ability to ensure the protection is adequate or to even address known threats.

Specifics

1. Qualifications of the preparer p. 1 The Biological Evaluation for Botanical Species does not list the name of the preparer. In addition there is no list of preparers in the DEIS. There is no documentation of their fields of study. That information has always been a part of the analysis as a documentation of the adequacy of the work.

CNPS has a certification for botanical consultants neither of the two principles listed on the website for Janelle Nolan and Associates has this certification. When it was established Julie Kierstad, a forest botanist, took the consulting botanist test without studying at all and was able to pass. So it seems to fit the knowledge requirements for that position. This list was established to provide a simple measure of the skills levels of those who work in botany. The list is fairly long now. There are plenty of certified consulting botanists available.

<https://connect.cnps.org/Botanists/Certified-Botanists-Register/> This list includes those certified as consulting botanists (CCB) and field botanists (CFB).

In all three landscape projects on the Stanislaus NF (SERAL, SERAL 2, and MAC), I do not think the botanical subject matter specialists have met this skill and knowledge level.

2. Additional information on Sensitive plants

One occurrence of *Cypripedium montanum* was found on the Calaveras District after the Darby fire. It was not protected from cattle and was eaten soon after it emerged. It has not been found since. Based on this, *Cypripedium montanum* has occurred in the project area.

Erythronium tuolumnense has been reported at seen on the Calaveras side from the Oxidine trail. This report has never been checked.

Allium tribracteatum occurs in Wilseyville just off the forest and is known on SPI land within the Calaveras Ranger District. It has been reported on the district in the past. It is very likely that it is present.

We have surveyed for *Hulsea brevifolia* for many years and have not found it on Groveland, MiWok, and Summit. It is very unlikely to be in the project area.

If *Tauschia howellii* has been found to the north and the south, how can it be ruled out? *Meesia triquetra* has been primarily found on two other forest to the north (Lassen) and south (Sierra), but there are still a couple of occurrences on the Stanislaus.

3. Quality of Analysis

There are problems with quality of data, lack of suitable analysis, and unsupported determinations.

Significant data quality problems with Appendix A

P. 38 "Refer to Appendix A for a list of FSS plant population known to occur within the Proposed

Project area, date of most recent survey, and whether the population overlaps with a proposed treatment area."

Appendix A only has the date of the most recent survey. Whether the population overlaps (intersects) with a proposed treatment area is in a different table.

Appendix A-6-8. The survey dates are almost all 2012 to 2017. For the Calaveras district many of the survey dates are in April for *Botrychiums* that aren't usually visible until late summer (note the dates for the Eldorado occurrences). I question the validity of those surveys. Those in November area also questionable you likely can't even access those sites at that time of year. In addition the surveys for *Diplacus pulchellus* September are at a time much past the blooming period for this species. There are also survey dates for the *Lewisia*s in September and November. The leaves of these species contract and disappear. Surveys at that time are not valid. The same could be said for surveys for *Lomatium stebbinsi* that are later than June. There are many on these lists.

suitable %

timing unsuitable total unsuitable

Botrychium crenulatum 5 10 15 67%

Botrychium

minganense 1 1 2 50%

Botrychium montanum 2 0 2 0%

Diplacus pulchellus 13 2 15 13%

Horkelia parryi 1 1 2 50%

Lewisia kelloggii ssp.

hutchisonii 0 12 12 100%

Lomatium stebbinsi 18 32 50 64%

this

species is

identifiabl

e over a

long

period of

Peltigera gowardii time

total 40 58 98 59%

Lewisia kelloggii ssp. *Hutchisonii* is highlighted because it was the one species where survey months were indicated in the species descriptions yet NONE of the survey dates fall in that range.

The understanding in one area is not carried over to other areas.

Determining which species can occur in the project area

There are a number of species that are listed as occurring on serpentine. Serpentine is not listed in the description of unique or special interest plant communities. Yet they are still considered possible in the project area.

In contrast. the BE states that there is no suitable habitat for *Erythronium tuolumnense*. The Tuolumne fawnlily grows on rocky volcanic, meta-sedimentary, and, to a lesser extent, granitic soils. Poison oak is a habitat indicator. It is often near streams. This is not a very limited habitat.

What is the reason and proof that there is no suitable habitat?

Lack of understanding of which factors are most limiting for some species

This seems to have overlooked that lava caps have thin soils. This is related to many of the effects to lava cap species. The particularly applies to *Allium tribracteatum* and *Lomatium stebbinsi*, which grow in the areas of thinnest soil.

1. Impacts to the soil surface can impact the perennating structures because they are not protected under a deep layer of soil. Unlike other bulbs that pull down to where they are protected from fire and the roots are closer to water, these are quite vulnerable to fire. The analysis lumps them with other geophytes and states that they would not be affected by fire.
2. Those bulbs and corms are more vulnerable to being eaten by turkeys where they occur

(usually near subdivisions).

3. The thin soils store little water. *Allium tribracteatum* and *Lomatium stebbinsii* rely on melting snow to maintain enough moisture for them to flower and go to seed. They begin growing as the snow is melting. The change in the elevation level of reliable snow by about 1000' means that many populations may no longer be extant or viable. Based on the numbers and sizes of the populations in the lower band, this could lead to a trend toward listing. This change is happening faster than they can move up in elevation. The thin soils also do not protect them as well from cold and there have been more fluctuations in temperatures with climate change.

4. During the extensive drought, these species survived in the shade of rocks and trees. The removal of trees that are on the lava caps or at the south and west end, could lead to their elimination with drought or simply warmer temperatures.

5. The concentration of water by water bars or by end-lining trees off of a lava cap can lead to erosion down to bedrock for hundreds of feet below.

6. Weeds that remove this limited water such as medusahead and fillary can also cause significant effects. Fillary was shown by a PG&E study to be correlated with less *Lomatium*. These effects have also been ignored by omitting the fact of the thin soils in the description and the lack of species or habitat specific analysis..

Botrychiums also show a lack of a close look. Without local information and without looking at the occurrences in GIS with different soils or geological information, this author does not realize that volcanics have proved to be habitat for *Botrychiums* on this forest, both andesite and rhyolite. This analysis should address what actually is on these districts not general ideas of habitat for the whole state or whole range. Did they look at the comments in NRIS or the occurrence reports on file?

Compare this treatment of four species with the following treatment of a single species when information was clearly provided by the Eldorado. This is very uneven coverage.

P. 42 "is often associated with lava cap habitats on clay, volcanic, or granitic soils."

Lava caps are volcanic. This sentence does not make sense.

P. 44 The elevation range given for *Lomatium stebbinsii* appears to be an elevation range for *Allium tribracteatum* which includes the population in Wilseyville. Please use the elevation for *Lomatium stebbinsii*.

The description of *Peltigera gowardii* does not mention that it can die if it dries out.

Lack of specific analysis with known populations and clear area of concern

Table 3 shows that all of the populations of *Peltigera gowardii* on the Stanislaus and the great majority of those on the Eldorado are in thinning units. This is something that would seem to call for a closer look.

An example of analysis with *Peltigera gowardii* would be to look at each population in GIS. If there will be opening on both sides of the stream where it occurs that allow cattle to move from one side to the other more easily increasing impacts as they more easily and repeatedly cross the stream where the *Peltigera gowardii* is growing. . If there are openings or more open forest on both sides above the population, cattle may move in and eat willows that may be providing shade allowing the temperature of the water to increase. The thinning itself may increase the temperature of the stream as well. No close look has been made and there is no mitigation for these types of indirect effects.

Instead of looking for patterns like this, the analyst simply presented numbers of populations that would be affected.

In general there is no evaluation of the level of effects, which could be major and which are minor. It seems to overlook clear indications of potential problems. It is hard to make a supported determination without that sort of analysis.

The lava caps on ridges mean that many of those species are in the areas where fuelbreaks are proposed. This also is not looked at closely even though it has been an issue on most projects on this forest where there are lava caps.

Analysis which seems to assume the management requirements are enough instead of evaluating what management requirements are needed.

This is the entire effects analysis for special interest/watchlist plants:

EFFECTS

SPECIAL INTEREST (Watch List) Plants:

As described previously, 15 special interest plant species have known occurrences within the proposed MAC Project area. Additionally, other special interest plant species with suitable habitat in the MAC Project area may be present. These species could potentially be directly or indirectly affected by project activities such as ground-disturbing activities (including forest thinning, forest reduction, and fuelbreaks), prescribed fire, targeted grazing, herbicide use, and potential spread of NNIPs. A number of management requirements have been incorporated into the Project description to minimize effects to rare plants. These management requirements include cleaning equipment and vehicles prior to entering the forest to prevent the spread of NNIPs, early detection and manual treatment of NNIPs infestations, and continued monitoring following project activities to ensure that infestations are not expanding into other parts of the MAC Project area.

Activities such as forest thinning, prescribed burning, and targeted grazing will be implemented under the guidance of a qualified botanical resource specialist, with appropriate surveys, mapping, and buffers established around sensitive plant populations and special interest plant communities such as lava caps, fens, and meadows. Herbicide use will follow strict state and federal regulations, where applications within special interest plant communities such as fens, lava caps, and meadows will be restricted to suitable weather conditions and with appropriate exclusion zones. These management requirements will be implemented to minimize the impacts on special interest plant species and to prevent the spread of invasive species. If new special interest plant species are discovered within the MAC Project area during implementation, further consideration to limit impacts will be required. Therefore, the MAC Project is not expected to cause cumulative effects for special interest plant species within the proposed MAC Project area.

MITIGATION

None required.

The management requirements help to protect some of the special habitat where rare plants may grow. This does not consider which of these plants would be protected by measures that protect lava caps, meadows, and other habitat. It does not consider that these species will not be surveyed for. Yet it states this could not cause [contribute to?] cumulative effects for these species. That is the equivalent of saying "No Effect." That was only stated for those species who definitely were known not to be in the project area in the section on sensitive plants. How is it supported for all of these species in this very brief and general analysis of effects? There is no support for this statement/determination.

Taxus Brevifolia There is no mention that it is sensitive to fire despite comment 40. There is a lot of fire planned. The mitigations must be in this document if they are to apply to the determinations here. I don't see how you can have the existing determination for yew without a measure to not burn around them and not allow fires to back in. Those will kill the yew.

There is also no mention of yews on Calaveras. The former silviculturist/biologist/botanist, Aileen Palmer, carefully moved a PAC and thinned and then moved it back in order to protect the yew in that PAC. How is it that information is no longer available?

Again this is not using the best available local information. This states, likely from CalFlora, but not cited, that *Perideridia bacigalupii* is on serpentine. If the analyst had read the analysis for classifying it as watchlist, they would know that it occurs on a different habitat on the Stanislaus NF. My comment on the proposed action also indicated that it is on meta-sedimentary materials here and was ignored.

There are no measures to protect all the orchids -*Piperias*, *Corallorhizas*, *Goodyera*-that grow out

in general forest and may be sensitive to fire and added light and dryness. Opening up the understory will make the *Goodyera* even more vulnerable to illegal collectors.

No orchids were found in surveys of units in the Experimental Forest in the 1920s. It is likely when there was more burning and a more open canopy that they survived in riparian areas. Now there are cattle in those areas instead of elk and other herbivores that did not linger due to the presence of grizzlies and other predators. That would no longer be as much of a refuge.

None of this has been addressed, even when the sensitivity of yew to fire was mentioned in a comment on the proposed action.

Weed Risk

The weed risk is very short. The determination of Habitat Alteration Expected as Result of Projects is moderate with only two paragraphs to support it. There is no mention fire and how invasive species can greatly increase after fire. There is no mention that this project is using Forest Plan amendments to open the canopy more than it has been opened in other projects. This is not adequate to support this determinations. Except for fuelbreaks it only lists what is going to occur without evaluating the possible effects. This is inadequate analysis to support this determination.

The specialist does not seem to understand some of the effects of thinning. On page 57 they stated "Canopy cover will not be affected within fuel reduction treatments because they are designed to thin smaller trees underneath a mostly intact upper canopy."

Canopy cover might be a good indicator in the tropics where the sun is directly overhead, but does not mean the same thing here. If there is understory, it is capturing light that reaches that level. Removal of that understory will increase the light that reaches the ground. There will also be greatly increased airflow. Both of these can have a drying effect. Increased airflow can also increase the spread of seeds that are spread by wind.

Tocalote is in low numbers on both districts. That species can spread quickly by cattle and is quite extensive on the low elevation portions of the Sugar Pine District. It is moving north. I encourage you to make that a high priority to eradicate if it is in a cattle allotment before it spreads.

Italian thistle spreads rapidly after fire or other canopy opening and the seeds can be carried relatively long distances. It will greatly increase if it is not eradicated before the canopy is opened. *Cirsium vulgare* formed large dense areas in openings created by fire and landslide in the wilderness.

In order to address the risk of burn piles amplifying weeds, I suggests: Monitor burn piles near weeds with wind-borne seeds in the second year after the burning. If significant weeds are found, hand pull them on the monitor sites and at other sites with that condition. This monitoring would be an important step toward minimizing weed increase. Large amounts of bull thistle developed on one of the first forest thinning projects the Highway project on the Sugarpine District.

C-3 States that lava caps are vulnerable to invasions by NNIP such as yellow star thistle. This species and have roots that go down 6' and tend to compete with shrubs. They tend to expand in swales where there is a little more moisture. They are fairly unlikely to establish on a lava cap.

Cumulative effects

When three landscape level project occur on most of the Stanislaus NF that has not burned, and the management requirements and proposed action are about the same, the potential for huge cumulative effects to any species that may not do well with fire or other actions is huge. The care in this third analysis should be better to compensate for this risk.

Eric Knapp was going to track the effects to orchids with their sample treatments and burns in the Experimental Forest. I do not know if that happened. It would be very helpful for considering effects for these species. Without any determination of effect based on reliable information, there is a viability concern for the Stanislaus for these species if fire can remove them from most of the project areas of SERAL, SERAL2, and MAC.

A mitigation would be to leave some islands where these species occur unburned so that they can colonize out from there.

If there is no monitoring to know trends, this can hide a lot of significant effects. Simply taking the existing instead of looking at past effects in the absence of current information for most of the populations misses a lot.

References

References were not available on the website for most of this comment period. They were only available by request.

There were no citations for much of the information in the first paragraphs of the descriptions of known species.

The citations for the information in tables just say CalFlora without providing a URL and a date in the reference section.

In summary

There are numerous errors in the information presented. Some of the information on these species that would point to major issues has not even been mentioned. There is not sufficient analysis to support most of the determinations. Analysis is very limited with 9 pages for sensitive plants (aside from tables), less than a page for Special interest (watch list) plants, and three pages for weeds excluding tables and quotes of management requirements.

This does not constitute a deep look.

4. Management Requirements

Many of the management requirements related to sensitive plants specify a qualified botanical resource specialist approved by a responsible official for making decision. Based on the botanical resource specialists that were selected to prepare this document and that reviewed it for the Stanislaus, there is no evidence that they can evaluate the risks enough to make an informed decision.

There is no support for the management requirements protecting the resources as they stand.

In addition, they still provide enough wiggle room that they will not assure that what is needed for a determination will hold. Comment 38 addressed this and only one Management requirement was modified.

B.ii still says "where possible."; B.iii "To the extent possible". Plan treatments of weeds so that shredding can proceed without spreading seed. To be shredding when seed is present indicates poor coordination of the activities and poor treatment of weeds prior to actions by heavy equipment.

In C.i. Change "Avoid" to "do not."

C.ii and C.iii: address the issue of impacts to these species of spring and fall burns and which species can tolerate it when in this document instead of leaving it up to a decision of someone later. Civ if fire burns across the lava caps it can impact the roots of sensitive and rare plants in those thin soils. It also burns up plant material that may shade the rare plants. It leads to the buildup of annual grasses which carry fire more than what existed before the fire. Specify cutting line burn out from the edge of the lava cap opening.

Cv There is no table showing the growing period and when each species is identifiable which would aid in determining protection from activities and timing for surveys. Surveys are meaningless without this information. Discussion of using LOPs is also moot without this information.

That table should be updated with the information that *Bruchia bolanderi* can only be identified when it has capsules which is late August to September.

C.vi.: Address the buffers needed for different activities and different species in this document.

Consider the plants that are mycorrhizally connected to the rare plants and those that shade them as well as the plants. Again specify these buffers now so they are available for review and specify the growing period for each species to aid with any LOPs.

For *Cypripedium montanum*, any Douglas-fir near them should be protected. For botrychiums, any incense cedar, or in meadows any conifer near them should be protected. Deciduous canopy is important for species that grow primarily in the spring.

Provide for some flexibility by stating specific standards of how much could be impacted.

There is no reason to leave these for later and the use with this documents of specialist who did not

carefully evaluate the risks points to the need to resolve these in the document. The determinations cannot be supported with these Management Requirements for sensitive plants.

5. Significant gap in surveys on the Calaveras District

Only ten acres have been surveyed on Calaveras in the most recent five years (p. 37). Map 3 on page 39 is a dramatic visualization of this.

6. Unsurveyed suitable habitat

What provision is there for protecting unsurveyed suitable habitat? On Calaveras there are a lot of lava caps so far from the road they may never be surveyed at the correct time. Lava Caps will be protected. There could be other habitat for early species that also may not be surveyable.

Simple errors

P2 The MAC Project area falls within areas administered by four counties (Alpine, Amador, El Dorado, Tuolumne, and Calaveras counties).

There are five counties in this list.

Botrychium spp. To note that more than one species is being considered.

My experience

I have over 20 years of experience working with these plants and writing Biological Evaluations on the Sugar Pine District. I spent one season observing yew in northwestern California for my master's thesis.