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Oct. 2nd, 2025

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Planning Division
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Comment on Use Permit #24-0009 Renewable Properties Solar Farm

To whom it may concern:

I'm writing as a multi-decades resident and the director of Battle Creek Alliance (BCA) and Defiance Canyon Raptor Rescue (DCRR), located in Manton, Shasta County. I have resided in Manton since 1989, approximately 2 miles east of the project.

The proposed project would be of financial benefit to the absentee landowners of the property, the solar company, and PG&E. It would be of no benefit to any of the residents of the community (human, fauna, flora) or the overall environment. The project submitter, Renewable Properties (RPCA), said at the community meeting on September 9th, 2025 that the project would not provide power when PG&E is not functioning, and would provide no reduction in energy costs to residents.

These comments are presented to meet the "fair argument" standard that CEQA requirements have not been met by RPCA's assessments, or Shasta County's use of a Initial Study/Mitigated Negative Declaration (IS/MND), for this project. An EIR (Environmental Impact Report) must be prepared when there exists substantial evidence supporting a fair argument that the project may have potentially significant environmental impacts.

Qualifications of Marily Woodhouse

I have studied wildlife, watersheds, botany, soils, and California natural history intensively through courses at Shasta College and independent study since 2007. I've also learned the land on a daily basis through working and caring for my own 20 acres of land, and traveling by foot, horse, and truck since 1989 for both work and pleasure throughout the

northeastern counties. My writing, photography, production of videos, and presentations are all to educate and create respect and knowledge of the amazing natural world's ecology that surrounds and supports us.

I am the permit holder of record for Defiance Canyon Raptor Rescue (wildlife rescue and rehabilitation). There are both state and federal permits required for wildlife rehabilitation. These permits have specific requirements that must be met to obtain them including 400 hours of experience and training. I had 1200 hours of experience and training by 2016 when the initial applications were filed. Some of my training was at UC Davis and through the International Wildlife Rehabilitation Council. There is a requirement to receive continuing education credits every year as well. I work closely with the Wildlife Health Laboratory for the California Department of Fish and Wildlife (CDFW), and their biologists and wardens locally, as well as law enforcement (CHP, Sheriff Departments) and public callers who have found injured wildlife.

There are only ~80 permitted wildlife rehabilitators in the state, although there are additional satellite facilities under some of those permits. The majority of the ~80 permits do not include eagles. I have the only eagle permit and expertise for tens of thousands of square miles in the North State, receiving calls from Shasta, Tehama, Trinity, Lassen, Modoc, Plumas, and Siskiyou counties and rarely Butte and Glenn counties. The only other northern California eagle permit holders (north of Sacramento) are in Arcata, Davis, and Roseville.

I have worked closely with CEQA attorneys from several law firms including Shute, Mihaly, Weinberger in San Francisco, and attorneys from the Center for Biological Diversity and other environmental organizations.

I have worked as an environmental consultant to the California Sierra Club, Lassen Forest Preservation Group, and Sierra Forest Legacy.

I received the Anthony Environmental Grassroots Prize through the Rose Foundation and the Environmental Champion award from Shasta Environmental Alliance.

I trained with the CDFW founder of the SWAMP (Surface Water Ambient Monitoring Program) and watershed groups from Bear Creek, Big Chico Creek, and Yreka Creek and have collected over 18,000 samples of water quality data in the Battle Creek watershed since 2009. This data was used for a research paper regarding Battle Creek watershed and published in Environmental Management in 2019.
https://pubmed.ncbi.nlm.nih.gov/29644425/

I produced a documentary, "Clearcut Nation" (2013), regarding logging effects in California which includes interviews with wildlife biologist Monica Bond, Ph.D., hydrologist Tom Myers, Ph.D., fire ecologist Dennis Odion, Ph.D., and botanist Julie Kierstead, M.S. https://youtu.be/Dde1dv86M7Q An additional short film, "Death by a Thousand Cuts (to the nth degree), is posted at: https://youtube.com/shorts/ivYjJJ6KySQ

I was a wolf pup "nanny" at the International Wolf Center in Ely, Minnesota in 2004, working with the wolf pups who were to become resident Ambassadors for their species there.

Wildlife and CEQA (California Environmental Quality Act) Issues

The California Supreme Court has called an EIR the “heart” of CEQA, likening it to an “environmental alarm bell” that provides the essential service of alerting the public and decision-makers to ecological changes before they occur. (*Laurel Heights Improvement Ass’n v. Regents of University of California (1988)*, 47 Cal.3d at 392.) This project has no EIR and its Biological Assessments are superficial, insufficient, and uninformed regarding the area. Rather than providing an in depth analysis, the assessment area was truncated to only 25 acres, not even including the adjacent riparian area and one of the main forks of Battle Creek. There is no acknowledgement of cumulative effects already occurring from other projects throughout the area, which is exactly what CEQA analysis is supposed to prevent.

The populated area of Manton has been mostly owned by individual small or large private landowners since the 1920s. Due to that, there are very few documented surveys of the flora, fauna, and tribal sites in the area. There is a wealth of diverse natural wildlife and history of the Yana people who lived here that has been completely ignored/dismissed by the insufficient Biological Assessments and the list of "Sources of Documentation for the Initial Study" on pages 32-34 of the Shasta County Environmental Initial Study & Mitigated Negative Declaration document released on Sept. 5th, 2025 (IS/MND). The majority of the sources listed in that document are overviews that have little pertinence to the actual area or significant effects occurring here.

The CEQA checklist consists mainly of check boxes between pages 6-30 of the IS/MND. The only supporting evidence to the majority of check boxes being marked as "no impact" or "less than significant impact" are the few documents the project submitter, RPCA, has produced themselves. The company's consultant, Rincon Consultants Inc, made only brief 7 hour site visits in April and June 2025, despite CDFW's remarks on pg 3 of their July 16th, 2025 letter included in the Sept. 5th IS/MND document, regarding the need for surveys. E.g.: " CDFW recommends that the following CESA-listed and Fully Protected Species, which have potential to occur within or near the Project parcel, are assessed and/or surveyed by a qualified professional using species-specific protocols recommended below prior to the development and release of the CEQA document." Those surveys have not occurred.

Overall, the biological surveys are completely dismissive of the wealth of flora and fauna here, despite stating on pg. 17 of the July 2024 Rincon Biological Resources Assessment document under the 4.4 heading "Wildlife Movement": "The Project Area is mapped within an area of essential connectivity by CDFW, due to the fact that it is located in a larger area with little development or man-made barriers, and it is ecologically diverse, and able to

support a variety of migratory wildlife species. CDFW considers the larger area between SR 44 to the north and Spring Creek to the south as a corridor that has the ability to connect similar habitats to the east along SR 89 and SR 36, which then allows movement north to Lassen Volcanic National Park and south to Lake Oroville (CDFW 2023b.)"

Rincon Consulting did not conform to any survey protocols used by professionals. CDFW has an extensive list for individual species at https://wildlife.ca.gov/Conservation/Survey-Protocols For more general protocols and guidelines the Bird Survey Guidelines site states: "Clearly a single visit is unlikely to provide a robust level of information. **As standard it is recommended that six bird survey visits be undertaken as part of a survey for breeding birds**. Six visits is considered sufficiently robust to identify the majority of bird species using lowland deciduous woodland in the breeding season and establish a good understanding of the numbers and distribution of species present. Lowland deciduous woodland is one of the most complex habitats to survey, due to the range of bird species it can support, and the dense vegetation leading to a heavy reliance on vocal encounters. Six visits is therefore considered to be a proportionate survey effort for all terrestrial and freshwater habitats. Generally, surveys of the breeding bird community should start between half an hour before sunrise and half an hour after sunrise. Surveys should typically be concluded by around mid-morning (10–11 am, with some regional variation) as activity levels (and hence detectability) of many species will have tailed off. Therefore, as a general framework, breeding bird survey visits should be spread evenly between late March and early July in order to ensure that the surveys cover resident breeders which start breeding early, as well as migrant breeders which arrive later."
https://birdsurveyguidelines.org/methods/survey-method/

I have documented 57 species of birds on my land including rare birds for this area: CA spotted owl (Strix occidentalis), hairy woodpecker (Picoides villosus), red-naped sapsucker (Sphyrapicus nuchalis), rufous-crowned sparrow (Aimophila ruficeps), also many visits by bald eagles and rarely golden eagles. (Woodhouse eBird list.) I don't go out to see wildlife specifically. I see them because of being here in the area most of the time and outside for nearly 4 decades. Seeing wildlife is directly affected by the time of year and the time of day, but also by being one quiet person, instead of a group.

Most of the land in the Manton area is behind fence lines. Along with the low human population, that accounts for the lack of robust counts of wildlife species here. I've documented 33 sightings of bald eagles in the vicinity, but those are primarily the only ones in eBird, and were seen either on my land or near the roadways. I've seen many more that were not entered into eBird. Various people have told me where they have seen eagles frequently (which are not listed in eBird). I know of one bald eagle and one golden eagle who have been injured and killed on Manton Road since i began doing wildlife rescue. A number of the eagles seen have been fledglings (less than 1 year old) and sub-adults (2-5 years old). This is evidence of there being unknown nests in the vicinity.

On Sept. 28th, 2025 an eagle feather was found on the land of the residents of 30805 Battle Creek Bottom Rd. while i was there. That land is adjacent to the RPCA project area on the southwest corner. I identified the feather by the groove in the shaft, which is particular to eagles.

The USFWS (US Fish and Wildlife Service) updated their eagle nest survey protocol in 2020: "The U.S. Fish and Wildlife Service (Service) protocol for data collection to support an eagle incidental take permit application recommends surveys for occupied nesting territories be conducted potentially out to 10 miles around the perimeter of the area where take may occur (USFWS 2020)." Jackman and Jenkins (2004) contains much more detailed protocols for surveys. Their summary is on pages 28-30 of the document. Additionally, USFWS has determined buffers for industrial disturbance (USFWS 2017).

RPCA has done no surveys of eagles, which appears to be a violation of both State and Federal law.

A couple in Redding has been monitoring 23 bald eagle nests in Shasta and Tehama counties for many years during nesting season/hatch in April. They provided the following numbers of how many eaglets were hatched from 2021 to 2025, which shows a significant 5 year long decrease:

28 eaglets in 2021

24 eaglets in 2022

18 eaglets in 2023

11 eaglets in 2024

10 eaglets in 2025

I've received rescue calls for a sharp-shinned hawk and a saw-whet owl in Manton, and a flammulated owl in Shingletown during 2025. Even with the decades i've spent here, i had no idea those species were here and have never seen them when they weren't injured; there is no documentation in eBird records for them in this area, except for a one time sighting of a sharp-shinned hawk. This is evidence that many species live here who have not been recorded.

I, and others, have also seen wolverine (Gulo gulo luscus), a Sierra Nevada red fox (Vulpes vulpes necator), ringtails (Bassariscus astutus), Pacific marten (Martes caurina sierrae), and fishers (Pekania pennanti). Figure 1 is a map of some sightings of rare wildlife in the Manton, and solar project, area. Not marked on the map is a foothill yellow-legged frog (Rana boylii) seen in Digger Creek off of Forwards Mill Rd. in 2007, a western pond turtle (Actinemys marmorata) seen in a seep above Digger Creek 10/31/11, a western pond turtle

seen on Forwards Mill Rd. 4/11/24; American (formerly northern) goshawks (Astur atricapillus) on Manton Rd. 2/14/19 and 7/12/25. It is unlikely that any of these were added to the CNDDB database. I can't access it because it has an expensive fee. It's also often safer for wildlife if people don't know exactly where they are.

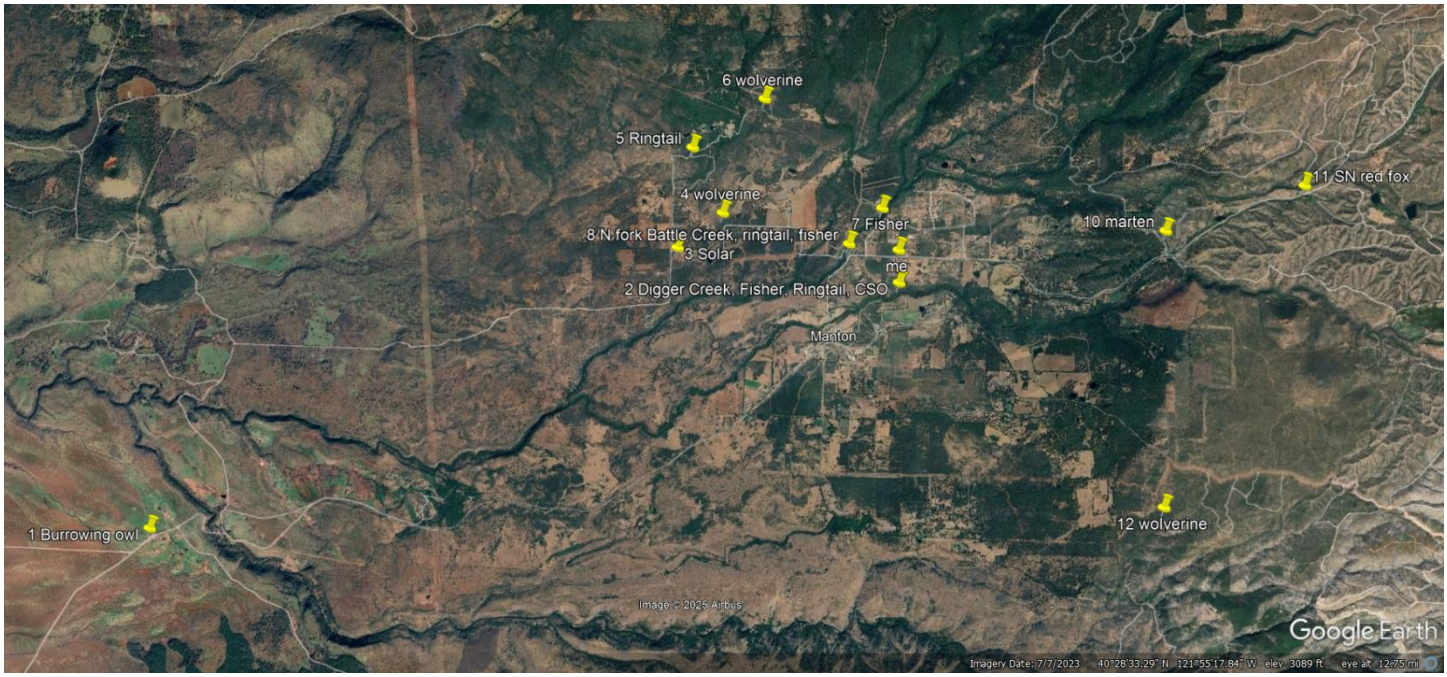

Fig. 1. Sightings of rare wildlife, Manton 1. Manton Rd. burrowing owl Jan to Feb, 2025; goshawk 2019 & 2025 2. Digger Creek, my land, 2 fishers, ringtails, CA spotted owl, elk 3. Solar project 4. Wolverine 2010, (Robinson) 5. Rocky Oaks, ringtail juvenile 6.Wilson Hill Rd., wolverine night 2004 8. N fork Battle Creek: ringtail; collared fisher, (CDFW) 10. Ponderosa, marten 6/2011 11. Sierra Nevada red fox, Rock Creek Rd. 12. Wolverine, Ponderosa Way, Cluff's, spring 2008

The Federal and State Listing of these species is as follows (CNDDB 2025, Keane 2006):

Bald eagle, golden eagle, wolverine, fisher, ringtail: Fully protected

Burrowing owl: State candidate for listing

Sierra Nevada red fox: State listed, threatened

Western pond turtle: Federally proposed, threatened

California spotted owl: Federally proposed, endangered

American goshawk: State species of concern

RPCA states the solar panels: "will be surrounded by chain link security fencing with a six-inch gap at the bottom. Approximately one foot of barbed wire will surround the top portion of the fencing." I've received a number of raptors who have been injured in barbed wire fences over the years. The wire cuts them so badly that they cannot recover. Figures 2 and 3 are photographs of a short-eared owl caught in a barbed wire fence, and the wound on a red-tailed hawk who was also hurt by barbed wire who were brought to me. These are

representations of many other birds brought to wildlife rescue organizations everywhere. I've also seen deer who have broken a leg when trying to jump tall fences, one just a few doors down from the proposed project site. Wildlife here does not need more impediments to their health and movement.

Fig. 2. Short-eared owl with wing shredded by barbed wire, brought to DCRR. Owls are the most common victims of wire injuries.

Fig. 3. Red-tailed hawk wing destroyed by barbed wire, brought to DCRR.

RPCA and Rincon have put little field effort into their biological assessments. Sitting at a desk and reviewing documents to cut and paste into a list in order to get a project approved in an area they know nothing about is disrespectful. More importantly, it does not conform to protective laws. Of course the company says there will be no effects. It's easy to say that when you don't care, look for nothing, and have a vested interest in getting a project approved.

Other Wildlife

The importance of insect populations is routinely overlooked during projects which will affect the local ecology.

Habitat loss, pesticides and climate change are threatening insect populations worldwide. In 2019, *Biological Conservation* reported that 40% of all insects species are declining globally and that a third of them are endangered. (Sanchez-Bayo 2019)

"In *The Insect Crisis: The Fall of the Tiny Empires That Run the World*, (2022), acclaimed journalist Oliver Milman dives into the torrent of recent evidence that suggests this kaleidoscopic group of creatures is suffering the greatest existential crisis in its remarkable 400-million-year history. It is a devastating examination of how collapsing insect populations worldwide threaten everything from wild birds to the food on our plate.

These losses not only further tear at the tapestry of life on our degraded planet; they imperil everything we hold dear, from the food on our supermarket shelves to the medicines in our cabinets to the riot of nature that thrills and enlivens us."

I can't say with any accuracy what is happening to insect populations locally, but there are fewer to none of some ants, wasps, moths, and butterflies at my house than there were in the '90s. As for the microbes in soil: "Even though microbes in soil are essential for life on earth, scientists readily admit they still know relatively little about them. What they do know is that they are very, very plentiful and very, very diverse…

…A gram of soil — about a quarter of a teaspoon — can easily contain a billion bacterial cells and several miles of fungal filaments," says Scow.

And how many different types of organisms might be in the soil? 'Soil is overwhelmingly diverse, with an estimated 10,000 to 50,000 different taxa in a teaspoon of soil. These numbers are difficult to guess and keep getting adjusted as we learn more about the soil microbiome through sequencing efforts,' says Scow, referencing genomic sequencing, which identifies organisms by their unique genetic traits." (Howard 2017).

Edwards et al. (2025) notes: "The scope and scale of butterfly declines suggest multiple and broadly acting threats, including habitat loss, climate change, and pesticide use [(6); fig. S4]. Insecticides have been identified as leading causes of butterfly declines in recent analyses in the midwestern US and California." The RPCA project will contribute to habitat loss, climate change, and pesticide use, which no mitigation will repair.

Fish, Battle Creek Restoration Project

The 2024 Rincon Biological Resources Assessments document states on pages B-6 and B-7 regarding Chinook salmon and steelhead: "Suitable aquatic habitat for this species is not present within or adjacent to the Project Area." That is incorrect. There is no mention of the past 25 year long restoration project and the $168 million dollars spent and the work done to restore these fishes to Battle Creek, including the North Fork adjacent to this project area.

Lewis et al. (2019) noted: "The Battle Creek watershed in northern California was historically important for its Chinook salmon populations, now at remnant levels due to land and water uses."

USFWS (US Fish and Wildlife Service) uses river miles (RM) to delineate where work has been done. RM 0 is at the confluence of the North and South Forks of Battle Creek, downstream of this project to the west. At Eagle Canyon Dam, RM 5.21, ~1.4 miles downstream of the solar project, work has been completed to make it passable. USFWS believes that NMFS criteria is met and that it is passable by all species. At RM 5.41, closer to the solar project, an augmentation has made the former barrier completely passable at

all flows to all species. The habitat adjacent to the planned solar farm is highly suitable habitat for winter-run and spring-run Chinook salmon and steelhead. The point of the restoration project is to get these fish to these areas.

RJ Bottaro, Battle Creek Program Manager for US Fish and Wildlife told me on Sept. 11, 2025 (Bottaro 2025) that "Winter-run and spring-run Chinook salmon and steelhead were seen passing Eagle Canyon Dam video monitoring. And some got as high as North Fork Feeder Dam RM 9.42 and they could go up to RM 13.17." Winter-run Chinook are listed as Endangered by both the State and Federal lists, due to their low population numbers; spring-run Chinook are listed as Threatened by both agencies. Nothing should be allowed to jeopardize this lengthy and expensive project designed to restore the lost numbers of these fishes who have been so impacted by habitat destruction from logging/other land use upstream and PG&E dams.

Because RPCA only assessed the immediate acres that their project would cover, there is no valid CEQA assessment contained in the RPCA documents.

Cumulative Effects Ignored

It's common practice by project proponents to dismiss cumulative effects from their discussions with the excuse "It's just one small project" but that is addressed by the very bedrock of CEQA: that small, or larger, projects repeated over and over again in areas, combine to cause large effects. Case Law has ruled on this many times. One Court of Appeal stated that an insufficient cumulative impacts analysis "avoids analyzing the severity of the problem and allows approvals of projects, which, taken in isolation, appear insignificant, but when viewed together, appear startling." (*Kings County Farm Bureau v. City of Hanford,* 221 Cal.App.3d 692, 721.) The same ruling at 718 remarked "thousands of relatively small sources of pollution [can] cause a serious environmental problem."

Barnosky et al. (2012) detailed how quickly biological systems can change, both at the small regional level to the macro level:

"It is now well documented that biological systems on many scales can shift rapidly from an existing state to a radically different state… Biological ‘states’ are neither steady nor in equilibrium; rather, they are characterized by a defined range of deviations from a mean condition over a prescribed period of time. The shift from one state to another can be caused by either a ‘threshold’ or ‘sledgehammer’ effect. State shifts resulting from threshold effects can be difficult to anticipate, because the critical threshold is reached as incremental changes accumulate and the threshold value generally is not known in advance. By contrast, a state shift caused by a sledgehammer effect—for example the clearing of a forest using a bulldozer—comes as no surprise. In both cases, the state shift is relatively abrupt and leads to new mean conditions outside the range of fluctuation evident in the previous state."

The "It's just one small project" excuse has been employed for decades a few miles upstream of this project. Over 60 logging plans which cover over 61,000 acres have been approved and cut since the 1990s; this does not include post-fire salvage logging which has some overlap with the logging plans. Figures 4 to 7 illustrate the vast changes which have occurred, also documented in the Lewis et al. (2019) research paper regarding Battle Creek watershed, e.g. "...a high temporal concentration of projects in space within a watershed is likely to degrade water quality and aquatic ecosystems via sedimentation."

All the projects pictured in the following Figures have been approved as having "no significant effects" but no analysis has ever been performed of the cumulative effects of all the projects together. This project would be another brick in the wall of destruction in the Manton area.

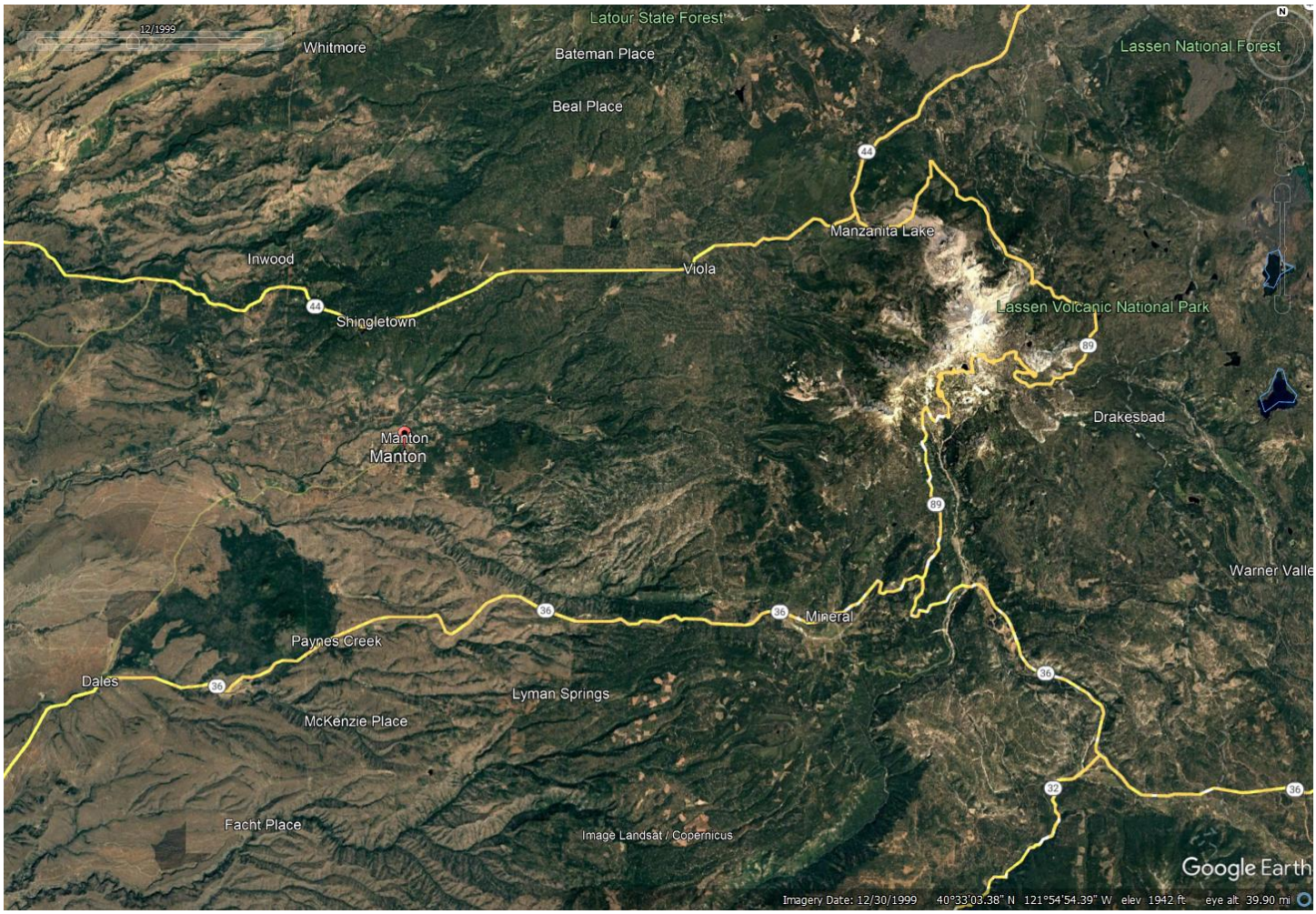

Fig. 4. The Manton area in 1999, before the industrial timberland logging geared up.

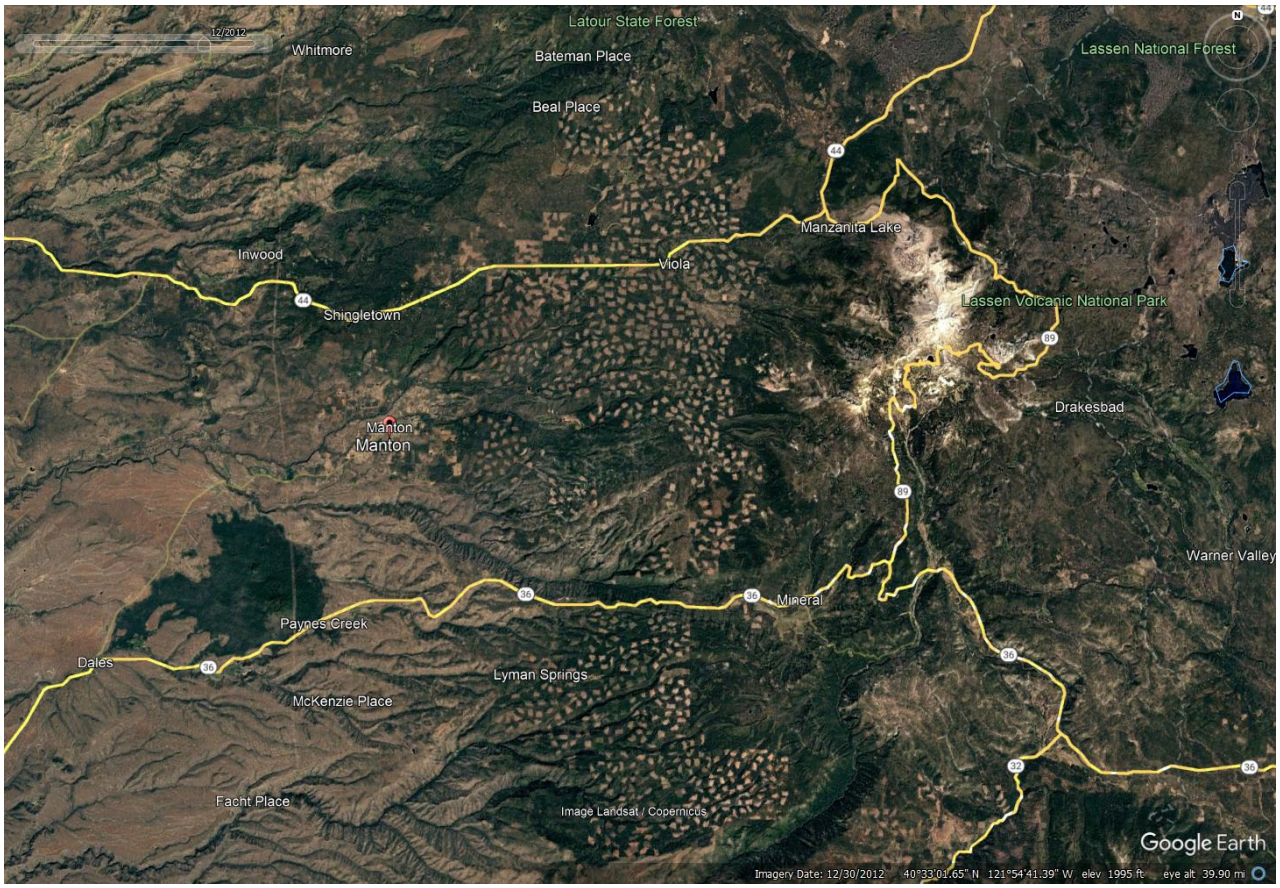

Fig. 5. The Manton area by 2012. The regularly spaced brown holes are logged clearcuts on the industrial timberland. Each hole averages around 20 acres.

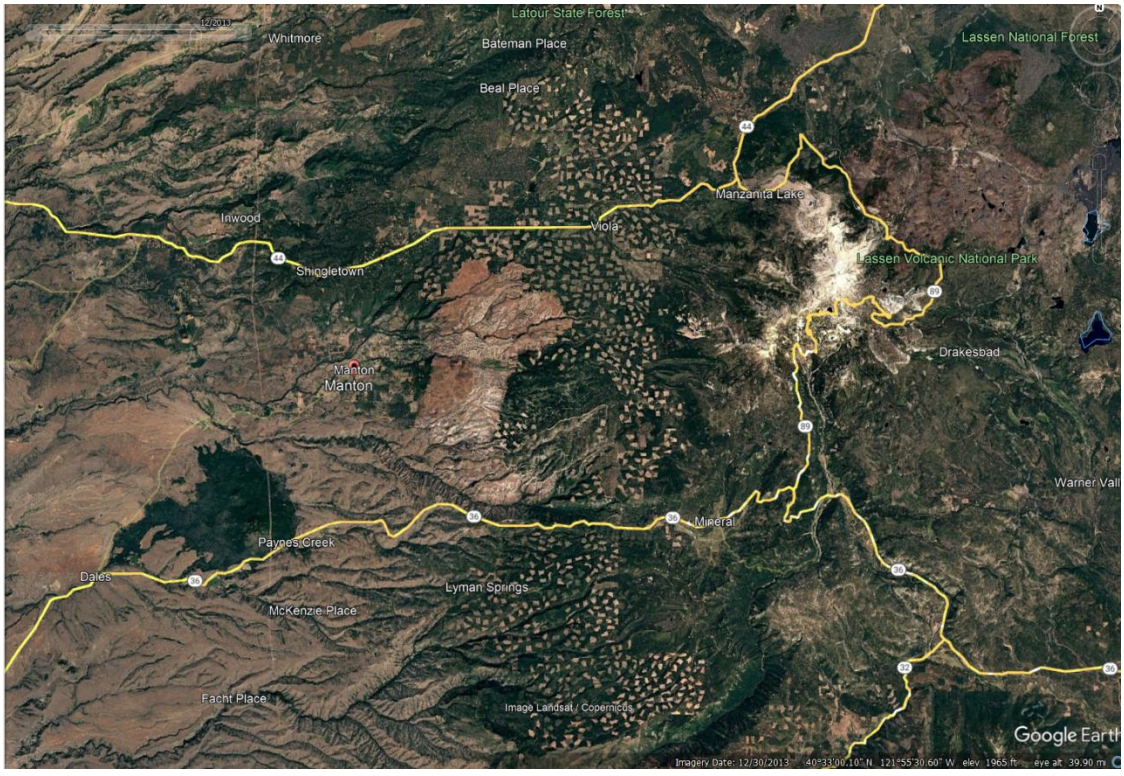

Fig. 6. The Manton area in 2013, post-2012 fire of 27,676 acres on the logged land (large boot shaped area near the center of the image, extending to Hwy 44 to the north and Hwy 36 to the south).

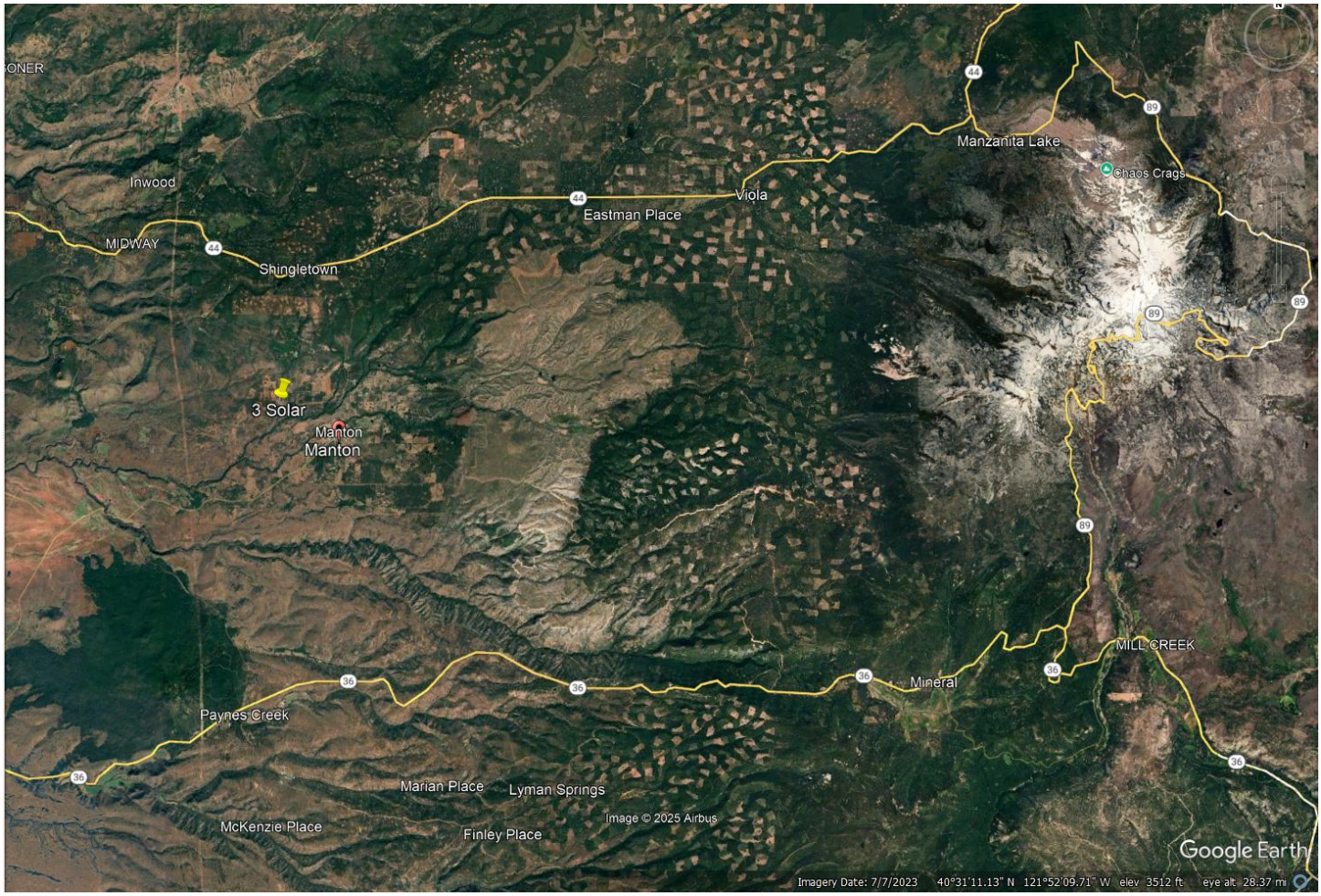

Fig. 7. Manton area now. The solar project is marked by the yellow pushpin. Some of the burnt area from the nearly million acre Dixie Fire in 2021 can be seen east of Mt. Lassen.

The July 2024 Biological Resource Assessment by Rincon stated "The Project Area has been recently modified for fire prevention purposes to reduce fuel load on the parcel" (page 11).

On Oct. 1st, 2025, our investigation into the previous bulldozing and mastication of the land revealed that the "fire prevention modification" was carried out as part of an 11,000 acre project through the Western Shasta Resource Conservation District (WSRCD) The project was allowed and filed as exempt from CEQA. (WSRCD July 2022, WSRCD Notice of CEQA Exemption 2022).

Phrases in the WSRCD documents have no relevance or truth regarding what was actually done: "Categorical Exemption: 15304, which exempts minor alterations in the condition of land, water, and/or vegetation which do not involve removal of healthy, mature, scenic trees except for forestry or agricultural purposes" and "There will be no soil disturbance greater than 1 acre" and "Much of the thinning activity and tree removal will be conducted under California Forest Practice Rules (FPRs) exemptions." Let's be clear: **11,000 acres with exemptions from any substantive environmental study or rules,** occurred in areas already highly impacted with multiple documented impacts. Now, the RPCA project(s) want to add another layer of no substantive evidence while they add to the cumulative impacts

by avoiding an EIR or robust surveys. Figure 8 is the map from the WSRCD (July 2022, pg15), which clearly exposes the lies in the exemptions.

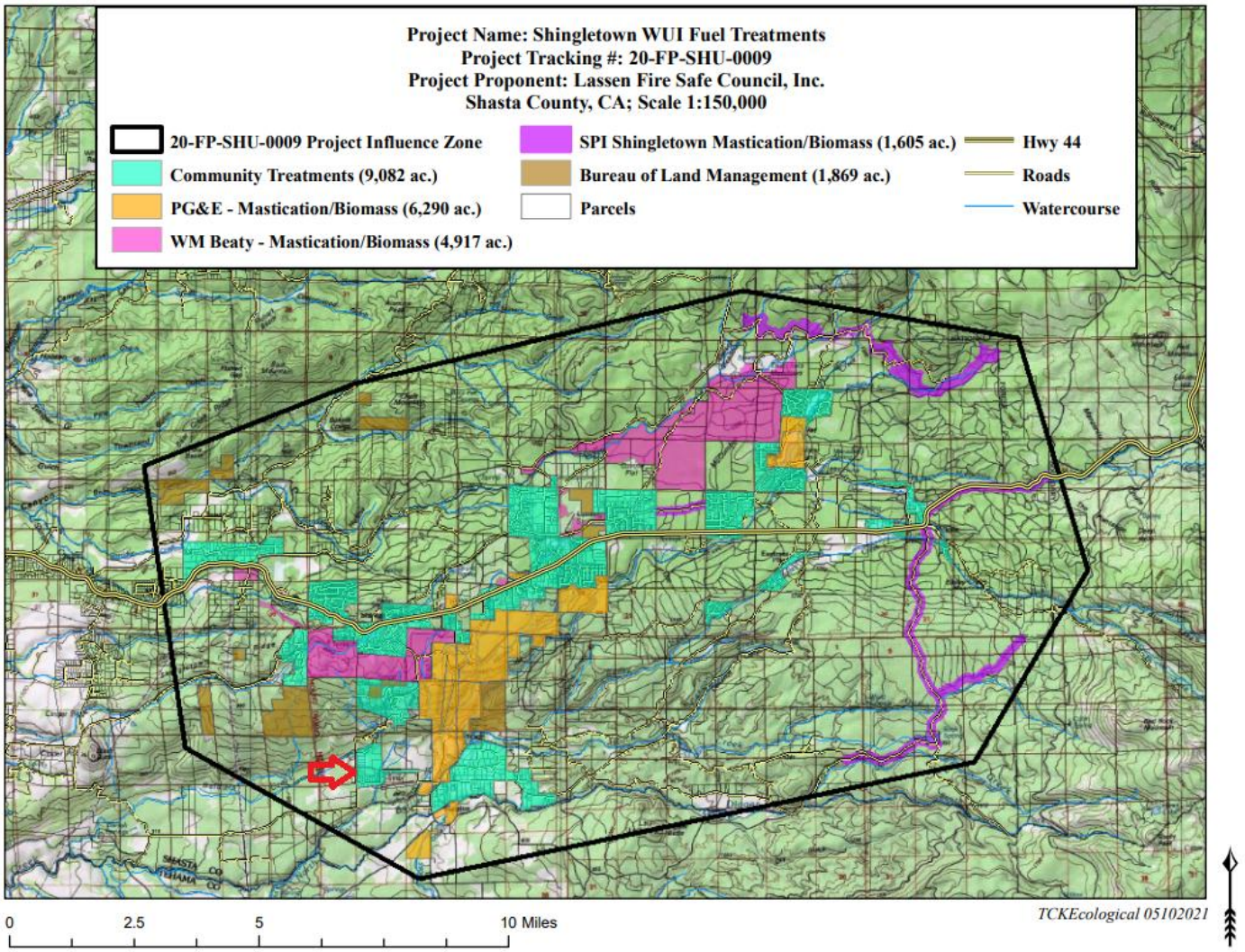

Fig. 8. WSRCD map of 11,000 acres of fuel treatments, which were exempted from any environmental review. Red arrow is the RPCA project area, which does not include even an EIR.

Additional maps of the past industrial "management" history here, and in the areas of the Dixie and Camp fires, are included in Appendix A, along with extensive research quotes and references regarding "Fuel Reduction Logging Exacerbates Wildfire Effects and Puts Communities at Greater Risk." (JMP 2024)

Blue Oak/Foothill Pine Woodlands, Habitat and Diversity

It's well understood by science that oak woodlands, including blue oaks (Quercus douglasii), are incredibly important habitat in California.

They are drought-tolerant and provide food and shelter for birds, deer, squirrels, and insects, just to name a few. They are host species for butterflies and moths. California's oak woodlands sustain higher levels of biodiversity than any other terrestrial ecosystem in the state. More than 300 species depend on oak woodlands for food and shelter (CWF/CA Oaks)

"Ancient blue oak trees are still widespread across the foothills of the Coast Ranges, Cascades, and Sierra Nevada in California. The most extensive tracts of intact old-growth blue oak woodland appear to survive on rugged and remote terrain in the southern Coast Ranges and on the foothills west and southwest of Mt. Lassen [proposed project area]... These beautiful endemic woodlands constitute one of the largest and most diverse ecosystems in the state, but they have not received a fraction of the attention of California's justly famous conifer forests... the canopy trees in ancient blue oak forests often predate European settlement and these native woodlands preserve a major component of the eroding biodiversity of California." (Stahle et al., 2013)

Yet, the 12/4/24 Rincon Oak Woodland Technical Memorandum document, written in response to the Shasta County Planning Division requesting an oak woodland study, was dismissive and unknowledgeable of the acres in the project and oak woodlands in general. Some incorrect assertions in the letter are: "No oak woodlands are present on the site, and therefore an oak woodland study is not warranted for the Project...the oak trees in the remainder of the Project Area are young and some are not in optimal health. The ecological value provided by these individual trees is much less than a mature oak woodland would provide..." Not all the trees are "young", and young trees are the future big trees; trees not in "optimal health" have ecological value because they provide nesting cavities and soil enrichment when they die and fall.

In a contradiction of themselves, Rincon wrote in their 7/2025 Botanical Survey "Vegetation communities mapped in the Project area during the survey include blue oak (Quercus douglassi) woodlands (14.63 acres)" (Page 1.) This is probably more accurate than when they avoided an oak woodland study when the County requested it, but the study has not been done.

The acres in the project area, as well as the rest of the landowner's acres, already have been recently highly disturbed by bulldozing, masticating, and herbiciding the understory, damaging the habitat quality (see Figures 8, 9, 10, 11). But there are many oak trees still there, including blue and live oaks. A large omission in the Rincon document is that there is no mention of how slowly these trees grow, averaging **adding only 1" of diameter every 10 years,** in decent climate conditions. The oaks within the boundaries of the project area, pictured in Figures 10 and 11, are at least 150 years old, possibly 200 years old or more. To destroy these is not beneficial to wildlife, people, or the local climate. It does not conform to CEQA or Fish and Wildlife codes. The Calif. Forest Practice Rules (CFPR) require the landowner to “maintain functional wildlife habitat in sufficient condition for continued use

by the existing wildlife community within the planning watershed." Subch. 2, Article 1, § 897 (B) (1) (b). Functional wildlife habitat is defined in the Rules:

"Functional wildlife habitat means vegetative structure and composition which function to provide essential characteristics for wildlife feeding, reproduction, cover and movement between habitats. The habitat components must be in sufficient quantities and arrangement to support the diverse assemblage of wildlife species that are normally found on or use forestlands within that area. Within this definition the following terms mean:

Function(al): Refers to ecological relationships between both the habitat components and needs of the species which allows for all of the normal life cycle including, migration corridors, genetic pathways, food availability, temperature protection, moisture retention, nutrient cycling, denning, spawning, nesting, and other functions necessary to complete a life cycle.

Composition: Refers to the types, abundance, distribution, and ecological relationships of species of terrestrial and aquatic vegetation within the forest stand including dominance, richness, trophic levels and other population and community features at levels which affect the long-term survival of individual forest species.

Structure: Refers to the physical arrangement of and relationships between living and nonliving terrestrial and aquatic components within the forest stand including, age, size, height and spacing of live vegetation in the forest in addition to seeps, spawning gravels, pools, springs, snags, logs, den trees, meadows, canopy coverage, levels of canopies and other physical features necessary to allow species to function. (Subchapter 1, Article 1, § 895.1)."

Figure 9 is from the 2024 Rincon Biological Assessment (page1) which illustrates the soil disturbance from the WSRCD project. Figures 10 and 11 are photos of the project area in its current state.

If the oaks are cut here, they will not be replaced in even a very long lifespan of a baby born today in 2025.

The irreplaceable wildlife habitat will suffer more long term, irreparable loss which the RPCA and County documents check off as "no impact". (IS/MND 9/5/25 pages 4-30.) "No impact" checkboxes are not fact-based, quantitative, substantive, CEQA-required evidence.

Fig. 9. WSRCD project soil disturbance, RPCA site. According to WSRCD there was "no soil disturbance greater than 1 acre" over the 11,000 acres of their project, which was exempted from CEQA and Forest Practice Rules.

Fig. 10. Blue oaks on proposed project property, photographed 2/11/25

Fig. 11. Blue oaks and live oaks on proposed project property, photographed 2/11/25

Gaman (2008) notes that "Oak woodlands also sequester carbon in the form of understory shrubs, grasses and forbs, downed woody debris (decaying logs and twigs) and soil borne carbon (not including below ground tree root systems)"...

Additionally, the Gaman study quantified Oak Forests Carbon (total sequestered by County and Oak Type) finding that in Shasta County blue oaks sequestered 56,611 metric tons, and live oaks 2,510,751 metric tons. (Note: These figures include above and below ground carbon sequestered in live and dead trees. They do not include litter and duff, down logs or soil borne carbon.)

Notably, the amount of greenhouse gases (GHG) being released in Shasta County from tree removal was documented in 2024: "In Shasta County, the annual emissions estimate of 2.07 MMT CO2-e/yr exceeds those associated with building energy use, transportation, solid waste, water use and agriculture combined." (Talberth 2024)

Noted botanist Julie Kierstead clearly explains the importance of plants and diversity in her interview for the documentary "Clearcut Nation" (BCA 2013): "In diversity, there is stability, and in stability there is safety. Not just for photosynthesis and production of air, oxygen--all those things make it possible for us to keep living here. So, plant diversity is fundamental to our ability as a species to survive whatever comes on this planet."

Climate and Fire Impacts

Manton is part of the Mediterranean climate of California, characterized by hot, dry summers and cool, wet winters, but it has changed significantly in the decades that i've been here. It has become significantly hotter and fires have become more frequent and often devastating, and occur in more months of the year. Night time temperatures show the most change, staying hotter than they did in the past. Hotter night temperatures exacerbate heat stress by preventing the body from recovering from daytime heat, leading to increased risks of illness, mortality, poor sleep quality, and negative impacts on mental and physical health, whether you're a person, an animal, or a plant. (Climate Central, 2025) RPCA's project will increase the impacts. None of RPCA's "mitigations" will help. What would help is to not destroy more canopy cover from older, grown vegetation.

Figure 12 shows the ongoing increasing trend in temperatures in this area and Figure 13 shows the concurrent decreasing trend in rainfall.

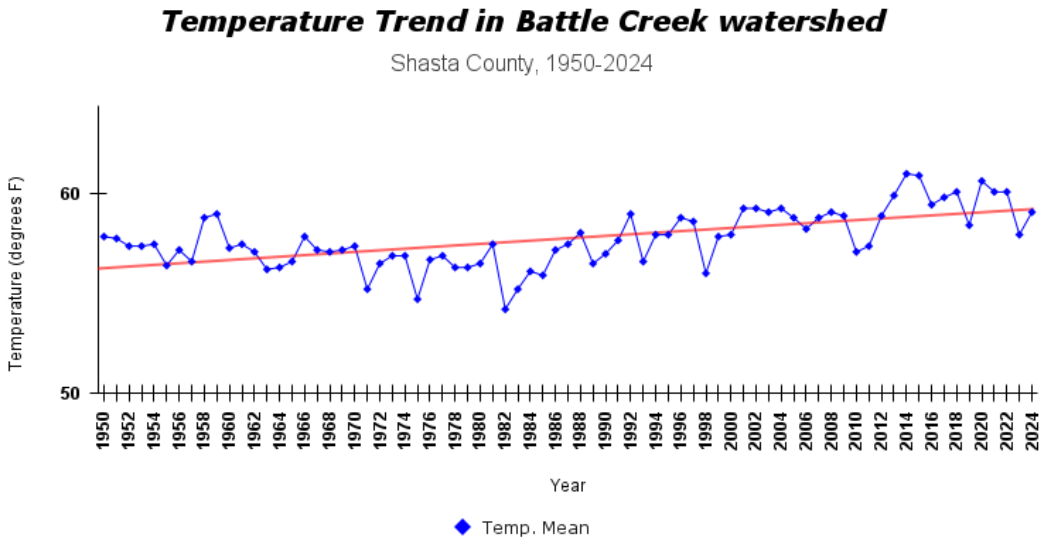

Fig. 12. Temperature trending upward. Data: PRISM Group, Oregon State University, https://prism.oregonstate.edu Data accessed Sept. 2025

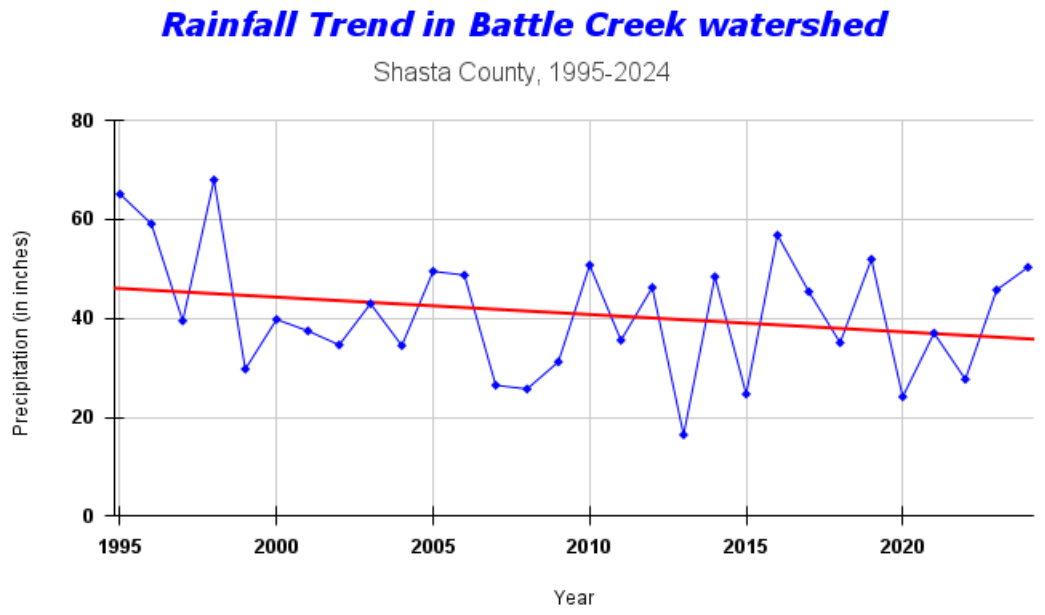

Fig. 13. Rainfall trending downward. Data: PRISM Group, Oregon State University, https://prism.oregonstate.edu Data accessed Sept. 2025

Potential wildfire impacts are only listed as "no impact" with no substantive or substantial evidence or facts presented on pages 28-29 of the IS/MND.

Figure14 is a graphic from Barron-Gafford et al. (2016) which explains the difference between how natural land and a solar installation affect the energy exchange. The study found that "temperatures over a PV plant were regularly 3-4 degrees C warmer than wildlands at night."

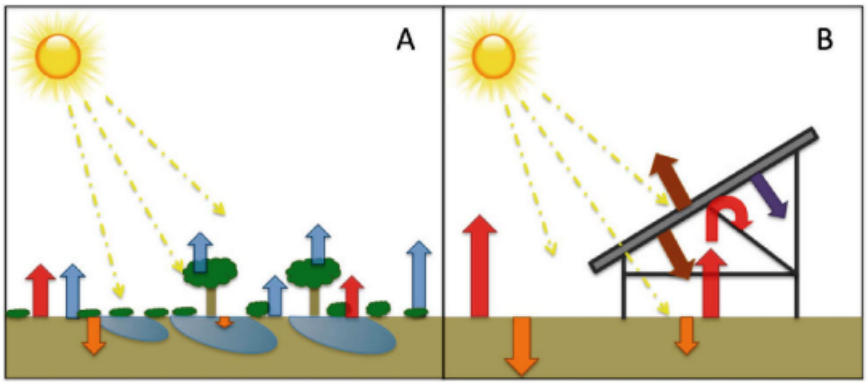

Figure 1. Illustration of midday energy exchange. Assuming equal rates of incoming energy from the sun, a transition from (**A**) a vegetated ecosystem to (**B**) a photovoltaic (PV) power plant installation will significantly alter the energy flux dynamics of the area. Within natural ecosystems, vegetation reduces heat capture and storage in soils (orange arrows), and infiltrated water and vegetation release heat-dissipating latent energy fluxes in the transition of water-to-water vapor to the atmosphere through evapotranspiration (blue arrows). These latent heat fluxes are dramatically reduced in typical PV installations, leading to greater sensible heat fluxes (red arrows). Energy re-radiation from PV panels (brown arrow) and energy transferred to electricity (purple arrow) are also shown.

Fig. 14. Barron-Gafford et al. (2016)

Fire danger is a more difficult fact of life than ever in places like Manton, due to climate heating. Many residents here have lost their fire insurance. Figure 15 is the Cal Fire Fire Hazard Severity Zone map of the Manton area which shows the level of fire danger in the area as "very high" to "high". The RPCA and County documents disregard such facts, thereby having no connection to the reality that exists for everyone who lives here.

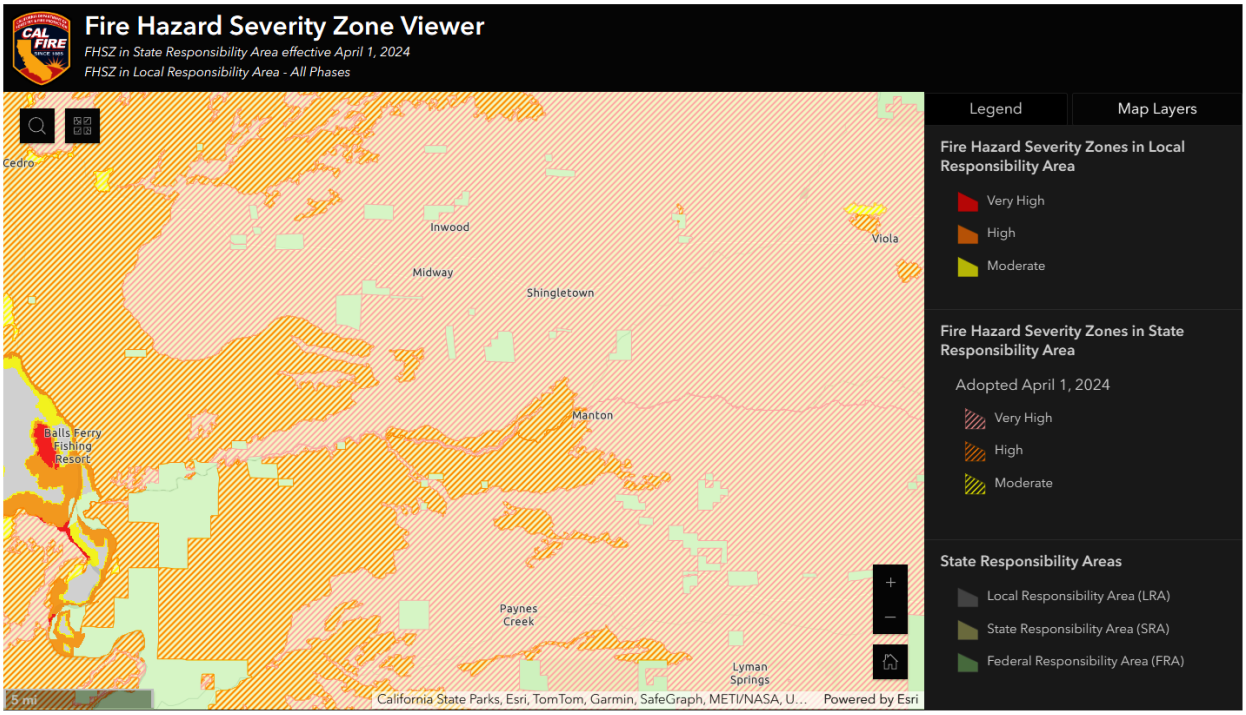

Fig.15. Fire Hazard Zone map of Manton area.

Loss of forest cover at the local, micro level feeds into higher temperatures and less water and increases fire danger. It also feeds into the macro level of climate change effects, releasing CO2 into the atmosphere instead of storing it in the bodies and roots of the forest vegetation. (JMP 2024, Talberth 2024, Barnosky et al. 2012, BCA, "Death by 1,000 cuts (to the nth degree)" 2025)

The extensive 2024 UN aridity report from its Science Policy Interface details the multi-faceted problems that are occurring throughout the world. Increasing aridity, which is extremely apparent in Manton to anyone who has been here for some length of time, has consequences on ecosystems and land degradation processes, along with wildfire danger. Figure 16 describes these issues, which have been completely ignored by the documents for this project, and will add to the cumulative impacts already occurring here.

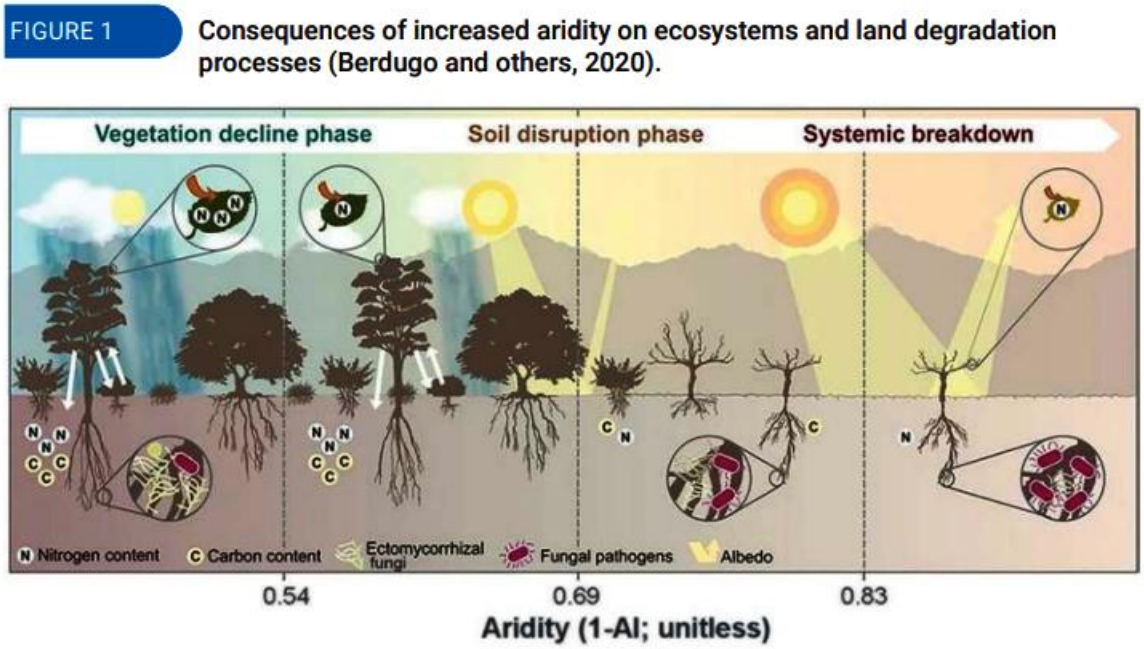

Fig. 16. "The Global Threat of Drying Lands" (2024) United Nations Convention to Combat Desertification.

Soil

The "3.1. Soil" heading in the July 2025 Rincon document provides a brief list of the soil names in the area of the project, but neglects to include the descriptions of the soils' erosion hazards. The Rincon information includes no mention of the fact that while the immediate 25 acres of the project are relatively flat, it abuts the canyon edge of North Fork Battle Creek which has steep slopes. Figure 17 is the NRCS map of the soil types from the south project area to the creek. The elevation is approximately 1950' at the northwest corner of Wilson Hill Rd./Battle Creek Bottom and 1800' elevation at the creek bed. The elevation change is common around all of the creeks in the area. In heavy rain events water

flows downhill, which doesn't seem to be understood in the selection of such a small area to utilize in the RPCA assessments. Figures 17 and 18 describe the Guenoc soil series and its possibility for high erosion and rapid runoff, which is ignored by the RPCA documents.

Additionally, the description reveals that the soil is underlain by Andesite bedrock (volcanic rock) as near to the surface as 20". A Manton resident who owns a construction company pointed out at the Community meeting on Sept. 9th that RPCA apparently has no understanding of the area when they think they are going to get "driven steel piers" into that soil to attach each of the over 9,000 solar panels to. It will require an extreme amount of heavy equipment, excavation, and soil disturbance, as well as likely increasing the cost of the project because of all the extra hours and days of work.

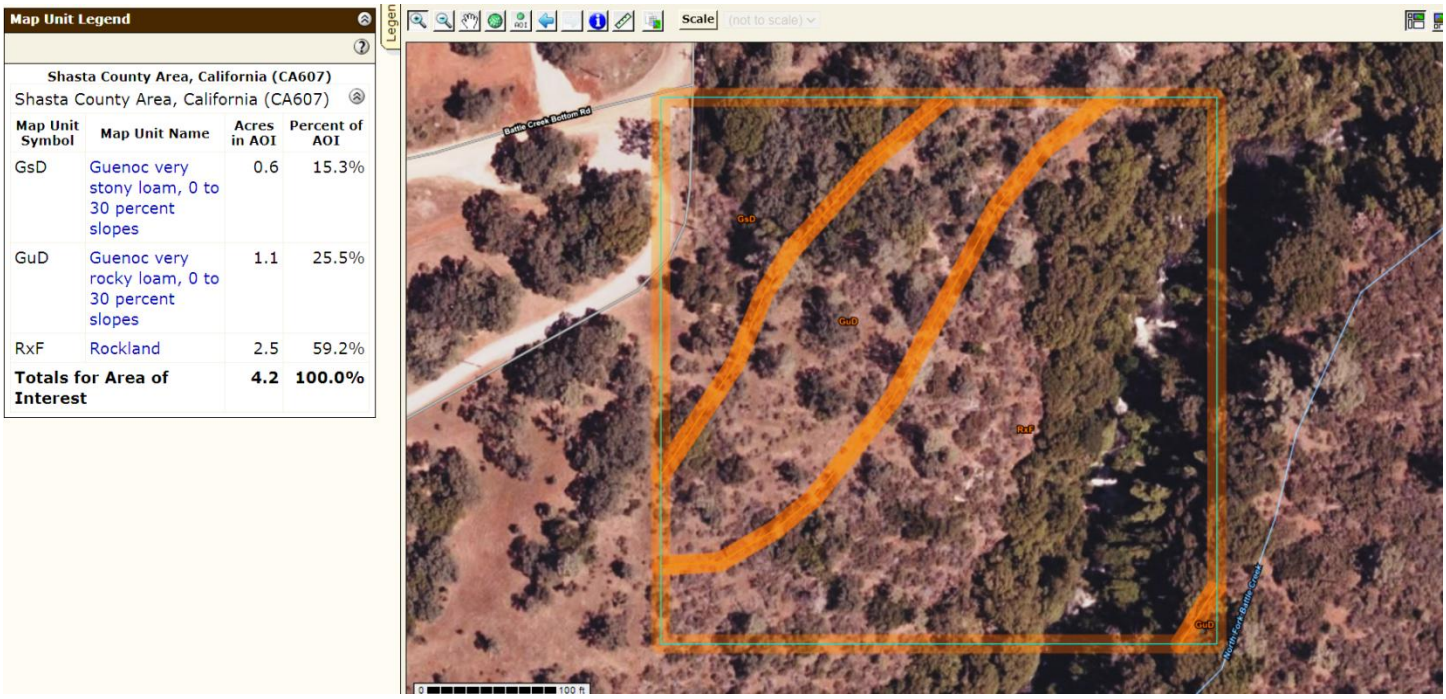

Fig. 17. NRCS map of soil types on the slope down to North Fork Battle Creek. Map accessed Sept. 2025.

water throughout the year. This land type is excessively drained. Permeability is rapid. Runoff is very slow, and the hazard of erosion, or flood scour, is severe.

The areas of Gravel pits are used as sites for urban and industrial developments. They have no value for farming. Capability unit VIIIw–1(17); range site, not assigned; woodland suitability group, not assigned; wildlife group 2.

Guenoc Series

The Guenoc series consists of well-drained soils that are underlain by volcanic rocks. These soils are on lava flows in the foothills east of the Sacramento River between Millville, Black Butte, and Oak Run. Slopes range from 0 to 50 percent. Elevation ranges from 800 to 1,500 feet. The annual precipitation is 30 to 40 inches, and the average annual air temperature is about 60° F. The 32° F. growing season is 200 to 225 days, and the 28° F. growing season is 250 to 300 days. The vegetation consists of annual grasses, blue oak, interior live oak, manzanita, and Digger pine.

In a representative profile the surface layer is reddish-brown, slightly acid very stony loam about 5 inches thick. The subsoil is dark-red, slightly acid cobbly clay loam and dark-red, medium acid very cobbly heavy clay loam. Andesite bedrock is at a depth of about 23 inches.

California.

Guenoc soils generally are near areas of Aiken, Cohasset, Inks, Supan, Toomes, and Tuscan soils.

Guenoc very stony loam, 0 to 30 percent slopes (GsD).—This soil has moderately slow permeability. Runoff is medium to rapid, and the hazard of erosion is moderate to high. Available water capacity is 4 to 6 inches. Andesite bedrock is at a depth of about 30 to 40 inches. Stones cover 3 to 15 percent of the surface.

Included with this soil in mapping were small areas of Aiken and Supan soils and small areas of soils that have only a few stones on the surface.

This Guenoc soil is used mainly as range. The small included areas that have only a few stones on the surface are used for dryland hay and grain. Capability unit VIs–1 (15, 18); Shallow Loamy range site; woodland suitability group, not assigned; wildlife group 5.

Guenoc very rocky loam, 0 to 30 percent slopes (GuD).—This soil has the profile described as representative for the series. Permeability is moderately slow. Runoff is slow to rapid, and the hazard of erosion is slight to high. Available water capacity is 3 to 4.5 inches, Andesite bedrock is at a depth of 20 to 30 inches. Exposed bedrock outcrops cover 10 to 25 percent of the surface.

Included with this soil in mapping were small areas of Aiken, Supan, and Toomes soils.

Fig. 18. Description of the Guenoc soil's runoff and erosion hazard. (Shasta Soil Survey (1974)

The USDA Plant Hardiness Zone Map is the standard by which gardeners and growers can determine which perennial plants are most likely to thrive at a location. The map is based on the average annual extreme minimum winter temperature. When i moved to Manton in 1989, the temperatures placed it in the Plant Hardiness Zone of 7. It was moved upward to 8b by 2012 and to 9a by 2023 (Figure 19). This is reflected in the water quality data collected by BCA beginning in 2009, which includes air, water, and soil temperature.

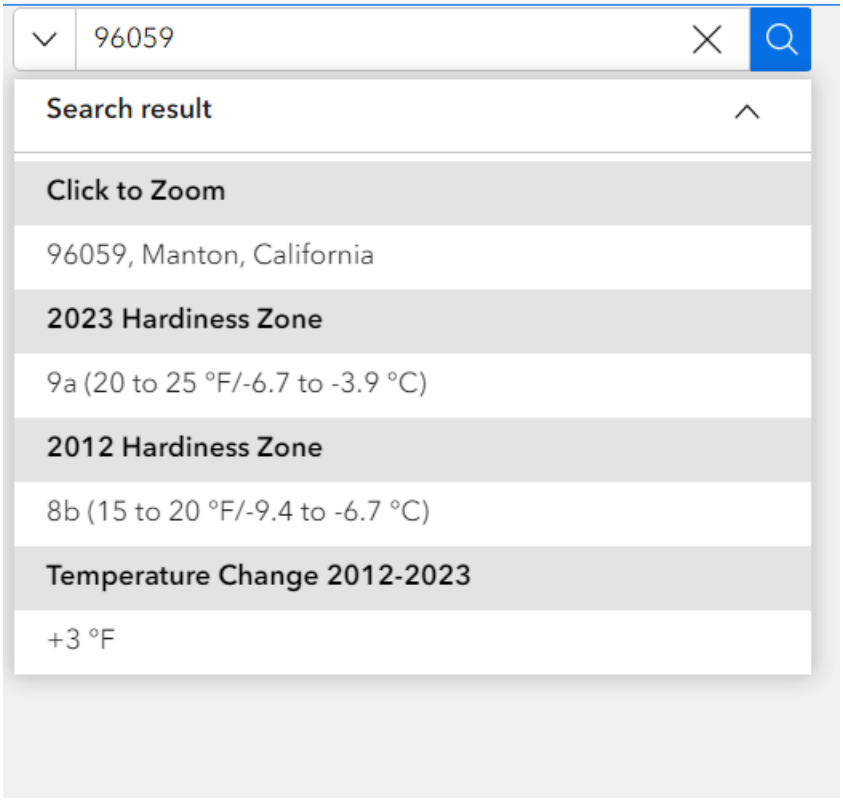

Fig.19. USDA record of Plant Hardiness Zone change for Manton. (USDA 2023)

As long ago as 1956, US Forest Service research wrote: “Conversion which opens up the canopy by removal of trees permits freer air movement and more sunlight to reach the ground. The increased solar radiation in turn results in higher temperatures, lower humidity, and lower fuel moisture. The magnitude of these changes can be illustrated by comparing the fireclimate in the open with that in a dense stand... Temperature profiles in a dense, mixed conifer stand illustrate this process. By 8 o'clock in the morning, air within the crowns had warmed to 68° F. Air temperature near the ground was only 50°. By 10 o'clock temperatures within the crowns had reached 82° and, although the heat had penetrated to lower levels, air near the surface at 77° was still cooler than at any other level. At 2:00 p.m., air temperature within the stand had become virtually uniform at 87°. In the open less than one-half mile away, however, the temperature at the surface of pine litter reached 135° at 2:00 p.m." (Countryman, 1956.)

BCA has been recording soil temperatures in the logged and unlogged areas around Manton since 2009. (BCA 2009). Countryman's data, and others in intervening years, is similar to what has been recorded over 60 years later. (Figures 20 and 21.) There is no doubt that removing canopy cover increases the temperature where the removal occurs, causing the detrimental effects of drier, hotter air and soil, which increases fire danger.

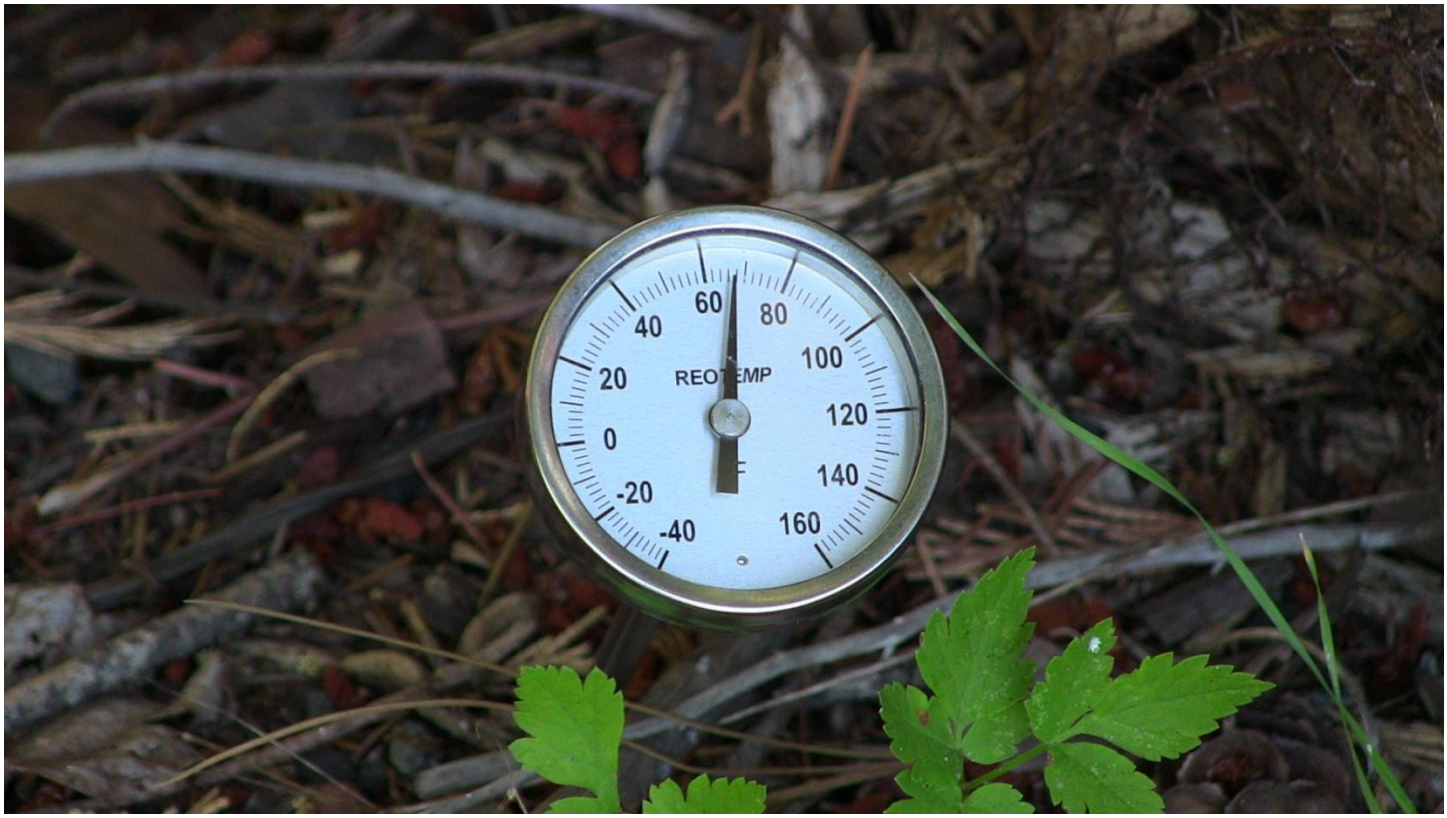

Fig. 20. Soil temperature in uncut area, 67°, Manton. BCA data.

Fig. 21. Soil temperature in cut area, same day, Manton. 90°. BCA data.

Archeological History of Use by the Yana

The Yana People's history of life in this area has been completely ignored by RPCA.

Instead of notifying their remaining people at the Redding Rancheria, RPCA only notified the Nomlaki Tribe in Corning. That tribe did not live in Manton. Figure 22 is a map of the tribal territories.

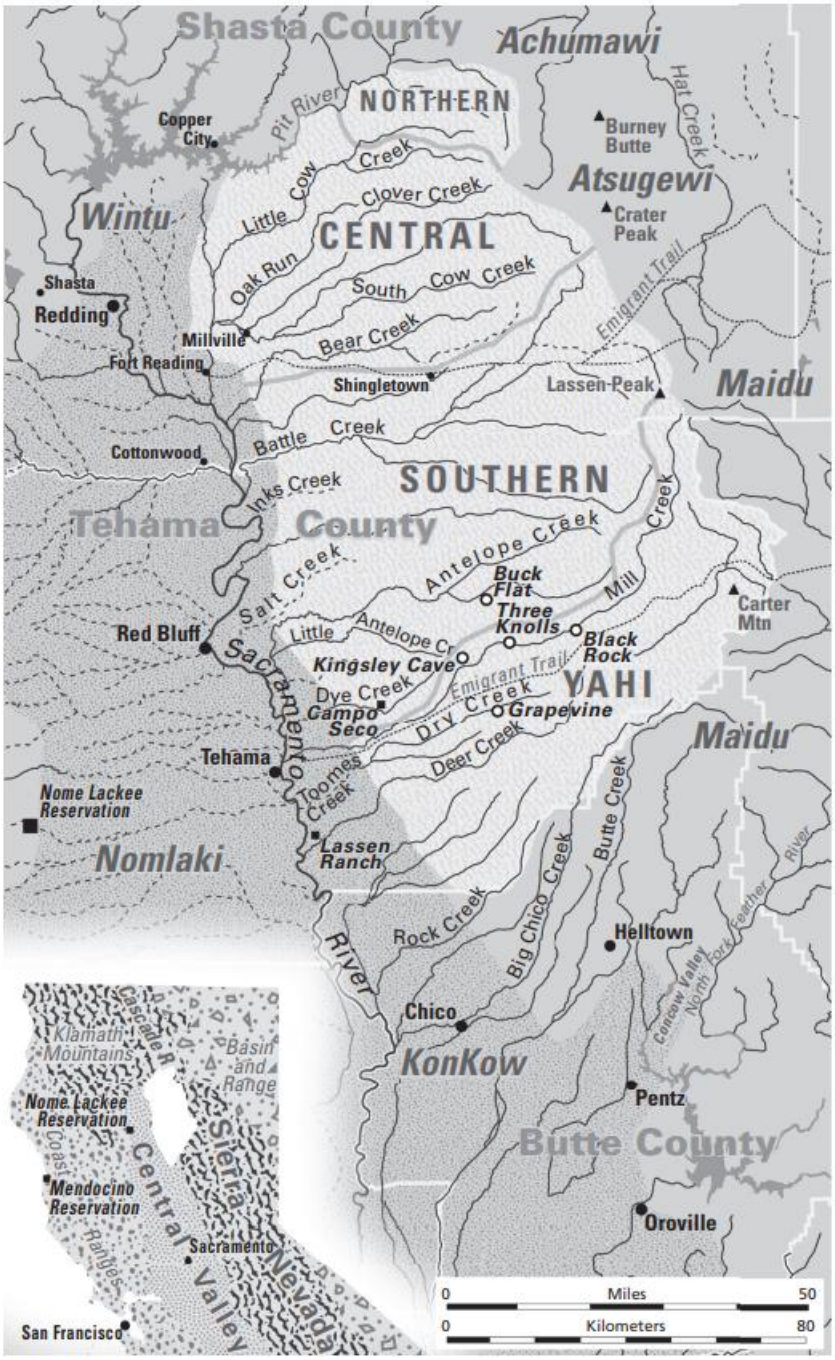

Fig. 22. Map of Yana tribal lands in northern California. (Madley, 2022.)

Page 62 of the IS/MND specifically states that the project is within the Yana territory, yet RPCA didn't notify them or include their knowledge of the area:

"The project is located in a region utilized by Yana populations at the time of Euro-American contact. Indigenous populations used the local region for seasonal and/or permanent settlement, as well as for the gathering of plants, roots, seeds, domestic materials, and hunting seasonal game..."

Battle Creek and its tributaries were used for Yana village sites. Anecdotally, there are many people locally who have found arrowheads and other artifacts from the past people who lived here. Two men who lived in Manton were arrested for grave looting and sentenced in 1996. "What they had hidden from authorities turned out to be what one witness would later describe as 'the most impressive collection of Indian artifacts in northern California,' including spear points, beads, stone bowls, drills, mortars, pestles, charm stones, and arrow shaft straighteners." (Common Ground, 1996).

Madley (2022) wrote regarding Yana history: " ...volunteers sought out Native Americans, and when they “came upon them somewhere on Battle Creek [probably in Southern Yana territory], [they] killed some fifteen” (E.W. Inskeep to Editors, April 28, 1858, and editor in Red Bluff Beacon, May 5, 1858, 2). Soon thereafter, the Beacon described how a posse searching for stock rustlers in “Antelope Canyon” (also probably in Southern Yana territory) wounded and then executed an Indigenous man there before announcing matter-of-factly: “Another Indian was killed on Battle Creek yesterday” (Red Bluff Beacon, May 19, 1858, 2)." These are just two examples of the Yana past in Battle Creek, of many.

The legality of notifications to tribes is unclear to me, but what is clear is that RPCA and the County have continued the erasure of Yana history here, by dismissing any kind of tribal involvement in their proposed project.

Conclusion

Every form of life who lives in the Manton area does not need any more extractive companies extracting more to add to the significant cumulative effects which are already occurring. The RPCA, Rincon, and County documents are just words on paper which do not comply with CEQA and are disassociated from reality. The documents produced by those entities omit any mention of many issues, and narrow the scope of the potential impacts to the small area of the project. The project's contribution to cumulative effects will not occur in a walled off area, or on its own little island.

Case law has found “CEQA requires a ‘general description’ of the technical aspects of . . . the project. The description must contain sufficient detail to enable the public and the decision makers to understand the environmental impacts of the proposed project. The description cannot narrow the scope of the environmental review or minimize the project’s

impacts on the environment." (*Dry Creek Citizens Coalition v. County of Tulare* (1999) 70 Cal.App.4th 20, 36)

In March, 2025, a Shasta County judge set aside the approval of another project which had no EIR, and insufficient assessments required by CEQA. Both the Shasta County Planning Commission and the Board of Supervisors had approved the plan despite the residents' submission of substantial evidence. The Judge wrote regarding the substantial evidence submitted by the petitioners: "The CEQA Guidelines amplify this statutory definition [of substantial evidence] by adding that substantial evidence includes "enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions may also be reached." (14 CCR §15384)" (Shasta County Superior Court, 2025)

Actual science, actual law, and actual history do not uphold the unsupported assertions made in the RPCA, Rincon, and Shasta County documents. This project should not receive approval.

Marily Woodhouse, Director

Battle Creek Alliance

Defiance Canyon Raptor Rescue

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Appendix A

Source: John Muir Project, P.O. Box. 897, Ridgecrest, CA 93556

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Ridgecrest, CA 93556
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JOHN MUIR PROJECT

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"Fuel Reduction" Logging Exacerbates Wildfire Effects and Puts Communities at Greater Risk

A large body of scientific evidence and opinion, including from a growing group of U.S. Forest Service scientists, contradicts the current approach of "thinning" forest wildlands ostensibly to curb wildfires and stop them from reaching and impacting communities. Research concludes that thinning—including thinning-plus-burning—and post-fire logging/clearcutting increase overall tree mortality and carbon emissions, make wildfires spread faster toward homes and/or burn more severely. Our current funding and management focus on tree cutting and removal in wildland forests, rather than focusing on home hardening, defensible space pruning around homes, and evacuation planning and assistance, is putting nearby communities at greater risk.

Calkin, D.E., Barrett, K., Cohen, J.D., Finney, M.A., Pyne, S.J., and Quarles, S.L. (**co-authored by U.S. Forest Service**). 2023. Wildland-urban fire disasters aren't actually a wildfire problem. Proceedings of the National Academy of Sciences of the United States of America. 120: e2315797120.

> "The best way to make existing wildfire-vulnerable developments ignition resistant is to work within the limited area of the 'home ignition zone'—a home and its surroundings within 100 feet (which may include neighboring homes)."
>
> The authors noted that wildfires are driven by climate and climate change, and criticized the current federal management approach embodied in the 2022 Wildfire Crisis Strategy, and in the 2021 Infrastructure Act and 2022 Inflation Reduction Act, that is focused on thinning tens of millions of acres of public, private, and Tribal forests in the western U.S. The scientists concluded that the "best way" to protect homes and lives is to focus attention and resources directly on communities, using proven methods to make them fire safe, noting that the current approach is leading to more, not fewer, losses of homes and lives. They promoted "direct funding and technical assistance to communities", instead of spending many billions of dollars managing forests distant from homes. The authors concluded that we must recognize that

wildfire in forests and other wildlands is not only inevitable, but also there is an "ecological necessity" that wildfires occur for native biodiversity benefits.

Cohen, J.D. (**U.S. Forest Service**). 2000. Preventing disaster: home ignitability in the wildland-urban interface. Journal of Forestry 98: 15-21.

The only relevant zone to protect homes from wildland fire is within approximately 100 feet or less from each home—not out in wildland forests.

Gibbons P, van Bommel L, Gill MA, Cary GJ, Driscoll DA, Bradstock RA, Knight E, Moritz MA, Stephens SL, Lindenmayer DB. 2012. Land management practices associated with house loss in wildfires. PLoS ONE **7**: Article e29212.

Defensible space pruning within less than approximately 100 feet from homes was effective at protecting homes from wildfires, while vegetation management in remote wildlands was not.

Syphard, A.D., T.J. Brennan, and J.E. Keeley. 2014. The role of defensible space for residential structure protection during wildfires. Intl. J. Wildland Fire 23: 1165-1175.

Vegetation management and removal beyond approximately 100 feet from homes provides no additional benefit in terms of protecting homes from wildfires.

Balch, J.K., et al. 2024. The fastest-growing and most destructive fires in the U.S. (2001-2020). Science 386: 425-431.

The authors concluded that fast-moving wildfires comprise less than 3% of all U.S. fire events but account for 89% of all structures damaged or destroyed, and that fires move fastest in ecosystems that have "low wind friction" due to sparse or absent tree cover which is associated with a dominance of grasses. Firefighters quickly become "overwhelmed" by fast-moving fires.

Hakkenberg, C.R., et al. 2024. Ladder fuels rather than canopy volumes consistently predict wildfire severity even in extreme topographic-weather conditions. Communications Earth & Environment 5: Article 721.

In a huge analysis of 42 recent (2019-2021) wildfires in California's forests, dense, mature/old forests with higher canopy cover, higher biomass, and higher densities of "ladder fuels" (defined as seedlings and saplings beneath the forest canopy, less than 33 feet tall), had significantly ***lower*** wildfire severity (Figure 3 of the study). Younger forests with lower canopy cover, lower biomass, and intermediate densities of seedlings and saplings had the highest wildfire severity.

USFS (U.S. Forest Service). 2022. Gallinas-Las Dispensas Prescribed Fire Declared Wildfire Review. U.S. Forest Service, Office of the Chief, Washington, D.C.

Thinning followed by burning caused a massive fire that destroyed communities.

Thinning reduced canopy cover, increasing growth of combustible grasses; associated pile burning caused a huge wildfire, spreading rapidly through thinned areas, burning many homes.

Lesmeister, D.B., et al. (**co-authored by U.S. Forest Service**). 2019. Mixed-severity wildfire and habitat of an old-forest obligate. Ecosphere10: Article e02696.

Denser, older forests with high canopy cover had lower fire severity and "buffer the negative effects of climate change" regarding wildfires.

"Thinned forests have more open conditions, which are associated with higher temperatures, lower relative humidity, higher wind speeds, and increasing fire intensity. Furthermore, live and dead fuels in young forest or thinned stands with dense saplings or shrub understory will be drier, making ignition and high heat more likely, and the rate of spread higher because of the relative lack of wind breaks provided by closed canopies with large trees."

Lesmeister, D.B., et al. (**co-authored by U.S. Forest Service**). 2021. Northern spotted owl nesting forests as fire refugia: a 30-year synthesis of large wildfires. Fire Ecology 17: Article 32.

More open forests with lower biomass had higher fire severity, because the type of open, lower-biomass forests resulting from thinning and other logging activities have "hotter, drier, and windier microclimates, and those conditions decrease dramatically over relatively short distances into the interior of older forests with multi-layer canopies and high tree density…"

Reilly, M.J., et al. (**co-authored by U.S. Forest Service**). 2022. Cascadia Burning: The historic, but not historically unprecedented, 2020 wildfires in the Pacific Northwest, USA. Ecosphere 13: e4070.

Weather conditions primarily determined fire severity, and forest density was not a factor.

"We found minimal difference in burn severity among stand structural types related to previous management in the 2020 fires. Adaptation strategies for similar fires in the future could benefit by focusing on ignition prevention, fire suppression, and community preparedness, as opposed to fuel treatments that are unlikely to mitigate fire severity during extreme weather."

North, M.P., S.L. Stephens, B.M. Collins, J.K. Agee, G. Aplet, J.F. Franklin, and P.Z. Fule (**co-authored by U.S. Forest Service**). 2015. Reform forest fire management. Science 349: 1280-1281.

"…fire is usually more efficient, cost-effective, and ecologically beneficial than mechanical treatments."

Lydersen, J. M., M. P. North, and B. M. Collins (**co-authored by U.S. Forest Service**). 2014. Severity of an uncharacteristically large wildfire, the Rim Fire, in forests with relatively restored frequent fire regimes. Forest Ecology and Management 328:326–334.

In the Rim fire of 2013, the authors found that mature mixed-conifer and ponderosa pine forests with "a greater small tree density tend[ed] to burn with lower severity."

Meigs, G.W., et al. (**co-authored by U.S. Forest Service**). 2020. Influence of topography and fuels on fire refugia probability under varying fire weather in forests of the US Pacific Northwest. Canadian Journal of Forest Research 50: 636-647.

> Forests with higher pre-fire biomass are more likely to experience low-severity fire.

Thompson, J.R., Spies, T.A., Ganio, L.M. (**co-authored by U.S. Forest Service**). 2007. Reburn severity in managed and unmanaged vegetation in a large wildfire. Proceedings of the National Academy of Sciences of the United States of America 104: 10743–10748.

> "Areas that were salvage-logged and planted after the initial fire burned more severely than comparable unmanaged areas."

Thompson, J.R., Spies, T.A. (**co-authored by U.S. Forest Service**). 2009. Vegetation and weather explain variation in crown damage within a large mixed-severity wildfire. Forest Ecology and Management 258: 1684-1694.

> Mature forests with higher canopy cover had lower fire severity.

Thompson, J., and T.A. Spies (**co-authored by U.S. Forest Service**). 2010. Exploring Patterns of Burn Severity in the Biscuit Fire in Southwestern Oregon. Fire Science Brief 88: 1-6.

> "Areas that burned with high severity…in a previous wildfire (in 1987, 15 years prior) were more likely to burn with high severity again in the 2002 Biscuit Fire. Areas that were salvage-logged and planted following the 1987 fire burned with somewhat higher fire severity than equivalent areas that had not been logged and planted."

Graham, R., et al. (**U.S. Forest Service**). 2012. Fourmile Canyon Fire Findings. Gen. Tech. Rep. RMRS-GTR-289. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 110 p.

> Thinned forests "were burned more severely than neighboring areas where the fuels were not treated", and 162 homes were destroyed by the Fourmile Canyon Fire (see Figs. 45 and 46).

Morris, W.G. (**U.S. Forest Service**). 1940. Fire weather on clearcut, partly cut, and virgin timber areas at Westfir, Oregon. Timberman 42: 20-28.

> "This study is concerned with one of these factors - the fire-weather conditions near ground level - on a single operation during the first summer following logging. These conditions were found to be more severe in the clear-cut area than in either the heavy or light partial cutting areas and more severe in the latter areas than in virgin timber."

Countryman, C.M. (**U.S. Forest Service**). 1956. Old-growth conversion also converts fire climate. Fire Control Notes 17: 15-19.

Partial cutting (thinning) increases wildfire severity, due to microclimate impacts, regardless of whether or how the slash debris is treated.

"Although the general relations between weather factors, fuel moisture, and fire behavior are fairly well known, the importance of these changes following conversion and their combined effect on fire behavior and control is not generally recognized. The term 'fireclimate,' as used here, designates the environmental conditions of weather and fuel moisture that affect fire behavior. It does not consider fuel created by slash because regardless of what forest managers do with slash, they still have to deal with the new fireclimate. In fact, the changes in wind, temperature, humidity, air structure, and fuel moisture may result in greater changes in fire behavior and size of control job than does the addition of more fuel in the form of slash."

"Conversion which opens up the canopy by removal of trees permits freer air movement and more sunlight to reach the ground. The increased solar radiation in turn results in higher temperatures, lower humidity, and lower fuel moisture. The magnitude of these changes can be illustrated by comparing the fireclimate in the open with that in a dense stand."

"A mature, closed stand has a fireclimate strikingly different from that in the open. Here nearly all of the solar radiation is intercepted by the crowns. Some is reflected back to space and the rest is converted to heat and distributed in depth through the crowns. Air within the stand is warmed by contact with the crowns, and the ground fuels are in turn warmed only by contact with the air. The temperature of fuels on the ground thus usually approximates air temperature within the stand."

"Temperature profiles in a dense, mixed conifer stand illustrate this process (fig. 2). By 8 o'clock in the morning, air within the crowns had warmed to 68° F. Air temperature near the ground was only 50°. By 10 o'clock temperatures within the crowns had reached 82° and, although the heat had penetrated to lower levels, air near the surface at 77° was still cooler than at any other level. At 2:00 p.m., air temperature within the stand had become virtually uniform at 87°. In the open less than one-half mile away, however, the temperature at the surface of pine litter reached 153° at 2:00 p.m."

"Because of the lower temperature and higher humidity, fuels within the closed stand are more moist than those in the open under ordinary weather conditions. Typically, when moisture content is 3 percent in the open, 8 percent can be expected in the stand."

"Moisture and temperature differences between open and closed stands have a great effect on both the inception and the behavior of fire. For example, fine fuel at 8-percent moisture content will require nearly one-third more heat for ignition than will the same fuel at 3-percent moisture content. Thus, firebrands that do not contain enough heat to start a fire in a closed stand may readily start one in the open."

"When a standard fire weather station in the open indicates a temperature of 85° F., fuel moisture of 4 percent, and a wind velocity of 15 m.p.h.--not unusual burning conditions in the West--a fire starting on a moderate slope will spread 4.5 times as fast in the open as in a closed stand. The size of the suppression job, however, increases even more drastically."

> "Greater rate of spread and intensity of burning require control lines farther from the actual fire, increasing the length of fireline. Line width also must be increased to contain the hotter fire. Less production per man and delays in getting additional crews complicate the control problem on a fast-moving fire. It has been estimated that the size of the suppression job increases nearly as the square of the rate of forward spread. Thus, fire in the open will require 20 times more suppression effort. In other words, for each man required to control a surface fire in a mature stand burning under these conditions, 20 men will be required if the area is clear cut."
>
> "Methods other than clear cutting, of course, may bring a less drastic change in fireclimate. Nevertheless, the change resulting from partial cutting can have important effects on fire. The moderating effect that a dense stand has on the fireclimate usually results in slow-burning fires. Ordinarily, in dense timber only a few days a year have the extreme burning conditions under which surface fires produce heat rapidly enough to carry the fire into the crowns. Partial cutting can increase the severity of the fireclimate enough to materially increase the number of days when disastrous crown fires can occur."

SNEP (**co-authored by U.S. Forest Service**). 1996. Sierra Nevada Ecosystem Project, Final Report to Congress: Status of the Sierra Nevada. Vol. I: Assessment summaries and management strategies. Davis, CA: University of California, Davis, Center for Water and Wildland Resources.

> "Timber harvest, through its effects on forest structure, local microclimate, and fuel accumulation, has increased fire severity more than any other recent human activity."

Chen, J., et al. (**co-authored by U.S. Forest Service**). 1999. Microclimate in forest ecosystem and landscape ecology: Variations in local climate can be used to monitor and compare the effects of different management regimes. BioScience 49: 288–297.

> When moving from open forest areas, resulting from logging, and into dense forests with high canopy cover, "there is generally a decrease in daytime summer temperatures but an increase in humidity…"
>
> The authors reported a 5° C difference in ambient air temperature between a closed-canopy mature forest and a forest with partial cutting, like a commercial thinning unit (Fig. 4b), and noted that such differences are even greater than the increases in temperature predicted due to anthropogenic climate change.

Dombeck, M. (**U.S. Forest Service Chief**). 2001. How Can We Reduce the Fire Danger in the Interior West. Fire Management Today 61: 5-13.

> "Some argue that more commercial timber harvest is needed to remove small-diameter trees and brush that are fueling our worst wildlands fires in the interior West. However, small-diameter trees and brush typically have little or no commercial value. To offset losses from their removal, a commercial operator would have to remove large, merchantable trees in the overstory. Overstory removal lets more light reach the forest floor, promoting vigorous forest regeneration. Where the overstory has been entirely removed, regeneration produces thickets of 2,000 to 10,000 small trees per acre, precisely the small-diameter materials that are causing our worst fire

problems. In fact, many large fires in 2000 burned in previously logged areas laced with roads. It seems unlikely that commercial timber harvest can solve our forest health problems."

Hanson, C.T. 2021. Is "Fuel Reduction" Justified as Fire Management in Spotted Owl Habitat? Birds 2: 395-403.

Thinning followed by burning and post-fire logged areas had higher overall fire severity.

"Within the forest types inhabited by California Spotted Owls, high-severity fire occurrence was not higher overall in unmanaged forests and was not associated with the density of pre-fire snags from recent drought in the Creek Fire, contrary to expectations under the fuel reduction hypothesis. Moreover, fuel-reduction logging in California Spotted Owl habitats was associated with higher fire severity in most cases. The highest levels of high-severity fire were in the categories with commercial logging (post-fire logging, private commercial timberlands, and commercial thinning), while the three categories with lower levels of high-severity fire were in forests with no recent forest management or wildfire, less intensive noncommercial management, and unmanaged forests with re-burning of mixed-severity wildfire, respectively."

Baker, B.C., and C.T. Hanson. 2022. Cumulative tree mortality from commercial thinning and a large wildfire in the Sierra Nevada, California. Land 11: Article 995.

Thinning followed by burning increases overall fire severity.

"Similar to the findings of Hanson (2022) in the Antelope Fire of 2021 in northern California, in our investigation of the Caldor Fire of 2021 we found significantly higher cumulative severity in forests with commercial thinning than in unthinned forests, indicating that commercial thinning killed significantly more trees than it prevented from being killed in the Caldor Fire…Despite controversy regarding thinning, there is a body of scientific literature that suggests commercial thinning should be scaled up across western US forest landscapes as a wildfire management strategy. This raises an important question: what accounts for the discrepancy on this issue in the scientific literature? We believe several factors are likely to largely explain this discrepancy. First and foremost, because most previous research has not accounted for tree mortality from thinning itself, prior to the wildfire-related mortality, such research has underreported tree mortality in commercial thinning areas relative to unthinned forests. Second, some prior studies have not controlled for vegetation type, which can lead to a mismatch when comparing severity in thinned areas to the rest of the fire area given that thinning necessarily occurs in conifer forests but unthinned areas can include large expanses of non-conifer vegetation types that burn almost exclusively at high severity, such as grasslands and chaparral. Third, some research reporting effectiveness of commercial thinning in terms of reducing fire severity has been based on the subjective location of comparison sample points between thinned and adjacent unthinned forests. Fourth, reported results have often been based on theoretical models, which subsequent research has found to overestimate the effectiveness of thinning. Last, several case studies draw conclusions about the effectiveness of thinning as a wildfire management strategy when the results of those studies do not support such a conclusion, as reviewed in DellaSala et al. (2022)." (internal citations omitted)

DellaSala, D.A., B.C. Baker, C.T. Hanson, L. Ruediger, and W.L. Baker. 2022. Have western USA fire suppression and megafire active management approaches become a contemporary Sisyphus? Biological Conservation 268: Article 109499.

> **Thinning followed by burning increases overall fire severity.**
>
> With regard to a previous U.S. Forest Service study claiming that commercial thinning effectively reduced fire severity in the large Wallow fire of 2011 in Arizona, DellaSala et al. (2022, Section 5.1) conducted a detailed accuracy check and found that the previous analysis had dramatically underreported high-severity fire in commercial thinning units, and forests with commercial thinning in fact had higher fire severity, overall.
>
> DellaSala et al. (2022, Section 5.2) also reviewed several U.S. Forest Service studies relied upon by Prichard et al. (2021) for the claim that commercial thinning is an effective fire management approach and found that the actual results of these cited studies did not support that conclusion.

Beschta, R.L.; Frissell, C.A.; Gresswell, R.; Hauer, R.; Karr, J.R.; Minshall, G.W.; Perry, D.A.; Rhodes, J.J. 1995. Wildfire and salvage logging. Eugene, OR: Pacific Rivers Council.

> "We also need to accept that in many drier forest types throughout the region, forest management may have set the stage for fires larger and more intense than have occurred in at least the last few hundred years."
>
> "With respect to the need for management treatments after fires, there is generally no need for urgency, nor is there a universal, ecologically-based need to act at all. By acting quickly, we run the risk of creating new problems before we solve the old ones."
>
> "[S]ome argue that salvage logging is needed because of the perceived increased likelihood that an area may reburn. It is the fine fuels that carry fire, not the large dead woody material. We are aware of no evidence supporting the contention that leaving large dead woody material significantly increases the probability of reburn."

Morrison, P.H. and K.J. Harma. 2002. Analysis of Land Ownership and Prior Land Management Activities Within the Rodeo & Chediski Fires, Arizona. Pacific Biodiversity Institute, Winthrop, WA. 13 pp.

> Previous logging was associated with higher fire severity.

Donato DC, Fontaine JB, Campbell JL, Robinson WD, Kauffman JB, Law BE. 2006. *Science* 311: 352.

> "In terms of short-term fire risk, a reburn in [postfire] logged stands would likely exhibit elevated rates of fire spread, fireline intensity, and soil heating impacts…Postfire logging alone was notably incongruent with fuel reduction goals."

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

> "In all seven sites, combined mortality [thinning and fire] was higher in thinned than in unthinned units. In six of seven sites, fire-induced mortality was higher in thinned than in unthinned units…Mechanical thinning increased fire severity on the sites currently available for study on national forests of the Sierra Nevada."

Platt, R.V., et al. 2006. Are wildfire mitigation and restoration of historic forest structure compatible? A spatial modeling assessment. Annals of the Assoc. Amer. Geographers 96: 455-470.

> "Compared with the original conditions, a closed canopy would result in a 10 percent reduction in the area of high or extreme fireline intensity. In contrast, an open canopy [from thinning] has the opposite effect, increasing the area exposed to high or extreme fireline intensity by 36 percent. Though it may appear counterintuitive, when all else is equal open canopies lead to reduced fuel moisture and increased midflame windspeed, which increase potential fireline intensity."

Cruz, M.G, and M.E. Alexander. 2010. Assessing crown fire potential in coniferous forests of western North America: A critique of current approaches and recent simulation studies. Int. J. Wildl. Fire. 19: 377–398.

> The fire models used by the U.S. Forest Service falsely predict effective reduction in crown fire potential from thinning:
>
> "Simulation studies that use certain fire modelling systems (i.e. NEXUS, FlamMap, FARSITE, FFE-FVS (Fire and Fuels Extension to the Forest Vegetation Simulator), Fuel Management Analyst (FMAPlus), BehavePlus) based on separate implementations or direct integration of Rothermel's surface and crown rate of fire spread models with Van Wagner's crown fire transition and propagation models are shown to have a significant underprediction bias when used in assessing potential crown fire behaviour in conifer forests of western North America. The principal sources of this underprediction bias are shown to include: (i) incompatible model linkages; (ii) use of surface and crown fire rate of spread models that have an inherent underprediction bias; and (iii) reduction in crown fire rate of spread based on the use of unsubstantiated crown fraction burned functions. The use of uncalibrated custom fuel models to represent surface fuelbeds is a fourth potential source of bias."

DellaSala et al. (2013) (letter from over 200 scientists):

> "Numerous studies also document the cumulative impacts of post-fire logging on natural ecosystems, including…accumulation of logging slash that can add to future fire risks…"

DellaSala et al. (2015) (letter from over 200 scientists):

> "Post-fire logging has been shown to eliminate habitat for many bird species that depend on snags, compact soils, remove biological legacies (snags and downed logs) that are essential in supporting new forest growth, and spread invasive species that outcompete native vegetation and, in some cases, increase the flammability of the new forest. While it is often claimed that such logging is needed to restore conifer growth and lower fuel hazards after a fire, many studies have shown that logging tractors often kill most conifer seedlings and other important re-establishing vegetation and actually increases flammable logging slash left on site. Increased chronic sedimentation to streams due to the extensive road network and runoff from logging on steep slopes degrades aquatic organisms and water quality."

Bradley, C.M. C.T. Hanson, and D.A. DellaSala. 2016. Does increased forest protection correspond to higher fire severity in frequent-fire forests of the western USA? Ecosphere 7: article e01492.

> In the largest study on this subject ever conducted in western North American, the authors found that the more trees that are removed from forests through logging, the higher the fire severity overall:
>
> "We investigated the relationship between protected status and fire severity using the Random Forests algorithm applied to 1500 fires affecting 9.5 million hectares between 1984 and 2014 in pine (*Pinus ponderosa*, *Pinus jeffreyi*) and mixed-conifer forests of western United States, accounting for key topographic and climate variables. We found forests with higher levels of protection [from logging] had lower severity values even though they are generally identified as having the highest overall levels of biomass and fuel loading."

Dunn, C.J., et al. 2020. How does tree regeneration respond to mixed-severity fire in the western Oregon Cascades, USA? Ecosphere 11: Article e03003.

> Forests that burned at high-severity had lower, not higher, overall pre-fire tree densities.

Moomaw et al. (2020) (letter from over 200 scientists: https://johnmuirproject.org/2020/05/breaking-news-over-200-top-u-s-climate-and-forest-scientists-urge-congress-protect-forests-to-mitigate-climate-crisis/):

> "Troublingly, to make thinning operations economically attractive to logging companies, commercial logging of larger, more fire-resistant trees often occurs across large areas. Importantly, mechanical thinning results in a substantial net loss of forest carbon storage, and a net increase in carbon emissions that can substantially exceed those of wildfire emissions (Hudiburg et al. 2013, Campbell et al. 2012). Reduced forest protections and increased logging tend to make wildland fires burn *more* intensely (Bradley et al. 2016). This can also occur with commercial thinning, where mature trees are removed (Cruz et al. 2008, Cruz et al. 2014). As an example, logging in U.S. forests emits 10 times more carbon than fire and native insects combined (Harris et al. 2016). And, unlike logging, fire cycles nutrients and helps increase new forest growth."

Moomaw et al. (2021) (letter from over 200 scientists: https://bit.ly/3BFtIAg):

> "[C]ommercial logging conducted under the guise of "thinning" and "fuel reduction" typically removes mature, fire-resistant trees that are needed for forest resilience. We have watched as one large wildfire after another has swept through tens of thousands of acres where commercial thinning had previously occurred due to extreme fire weather driven by climate change. Removing trees can alter a forest's microclimate, and can often increase fire intensity. In contrast, forests protected from logging, and those with high carbon biomass and carbon storage, more often burn at equal or lower intensities when fires do occur.

Bartowitz, K.J., et al. 2022. Forest Carbon Emission Sources Are Not Equal: Putting Fire, Harvest, and Fossil Fuel Emissions in Context. Front. For. Glob. Change 5: Article 867112.

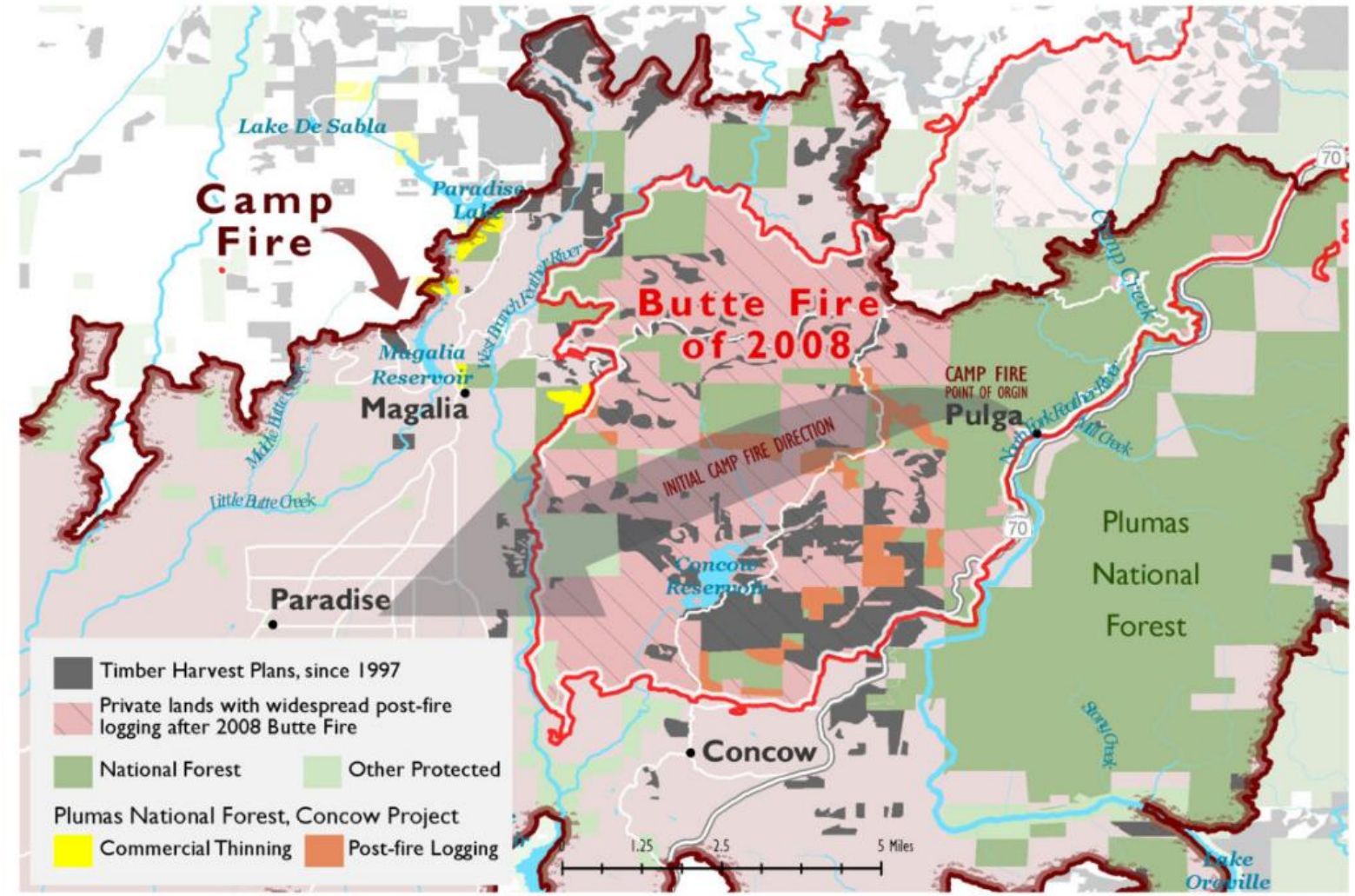
> The authors found that logging conducted as commercial thinning, which involves removal of some mature trees, substantially increases carbon emissions relative to wildfire alone, and commercial thinning "causes a higher rate of tree mortality than wildfire."

Evers, C., et al. 2022. Extreme Winds Alter Influence of Fuels and Topography on Megafire Burn Severity in Seasonal Temperate Rainforests under Record Fuel Aridity. Fire 5: Article 41.

> The authors found that dense, mature/old forests with high biomass and canopy cover tended to have lower fire severity, while more open forests with lower canopy cover and less biomass burned more severely.

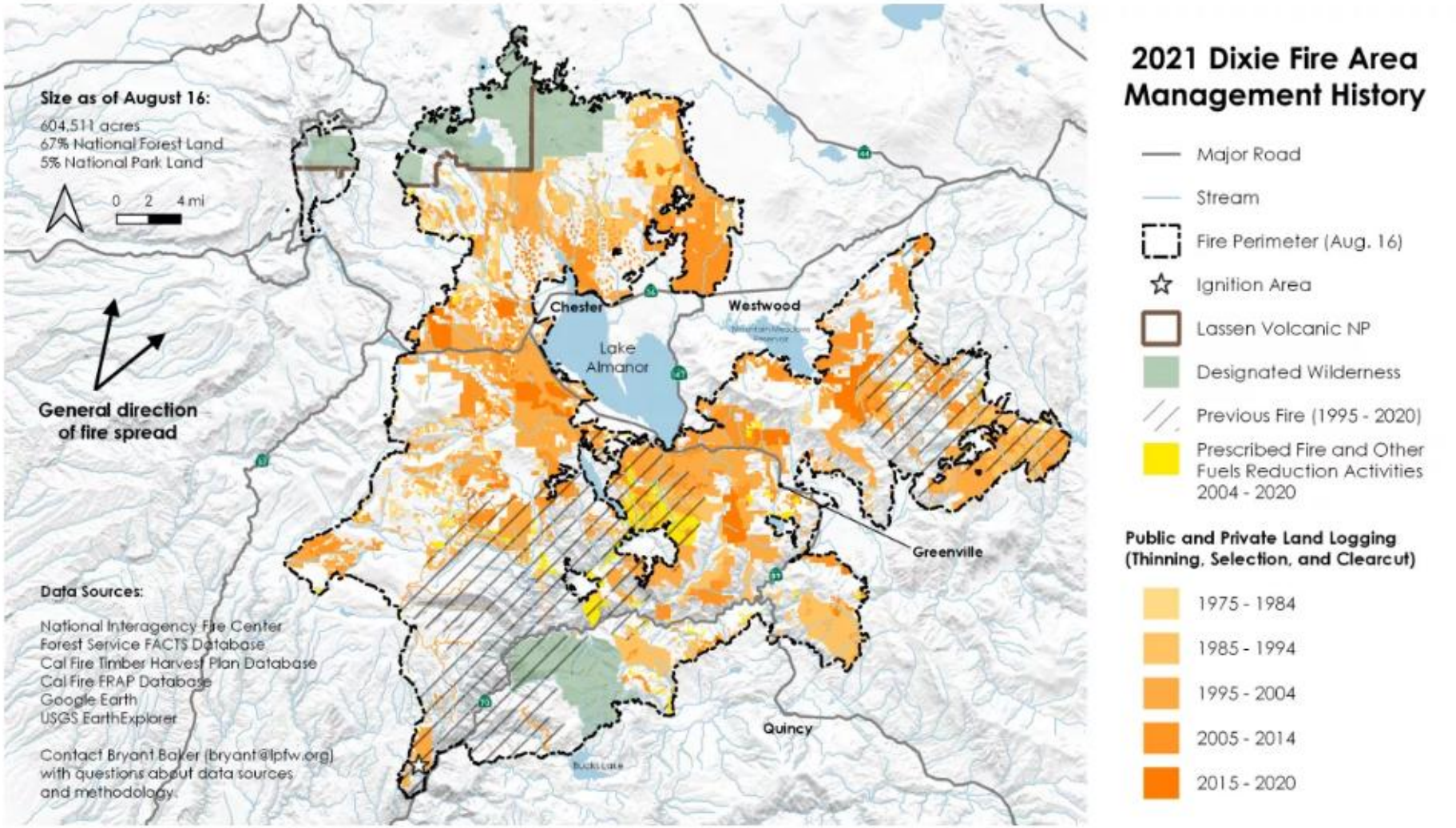
Baker, W.L., C.T. Hanson, M.A. Williams, and D.A. DellaSala. 2023. Countering Omitted Evidence of Variable Historical Forests and Fire Regime in Western USA Dry Forests: The Low-Severity-Fire Model Rejected. Fire 6: Article 146.

> A pattern of omissions of peer-reviewed, published reply articles, which refuted and discredited U.S. Forest Service response articles, created a "falsification" of the scientific record regarding historical forest density and fire regimes. The corrected record shows that historical forests were much denser on average than assumed by the Forest Service and were shaped by mixed-severity fire, not merely low-severity fire.



Map showing the boundary of the Camp Fire, the direction the fire burned and the extensive amount of logging and habitat removal that occurred between the fire's origin and the towns of Paradise, Magalia and Concow which did not stop the fire.

John Muir Project map of logging and habitat removal history in the area which burned in the Camp Fire (2018).



A map of the Dixie fire's management history — including logging, fuel reduction and prescribed fire — is overlaid with recent or ongoing fire areas. (Bryant Baker)

Bryant Baker of Los Padres Forest Watch's map of the logging and habitat removal history in the area which burned in the 2021 Dixie Fire.