



October 14, 2009

SENT VIA EMAIL

Director and Review Team
CAL FIRE
Resource Management
santarosapubliccomment@fire.ca.gov

Re: Comments on Timber Harvesting Plan: Lagomarsino (1-08-063-SMO)

Dear CAL FIRE:

The Center for Biological Diversity (“Center”) submits the following comments for the Lagomarsino Timber Harvesting Plan (“THP”), 1-08-063-SMO. The Center is a non-profit, public interest, conservation organization dedicated to the protection of native species and their habitats through applying sound science, policy and environmental law. The Center has over 40,000 members, many of whom reside in California.

Legal Background

In addition to the Forest Practice Act and its implementing regulations (“FPRs”), THPs are subject to the California Environmental Quality Act (“CEQA”) which mandates that environmental impacts be considered and analyzed, and significant impacts then avoided and/or mitigated. *See Sierra Club v. State Bd. of Forestry* (1994) 7 Cal. 4th 1215, 1228 (“in approving timber harvesting plans, the [agency] must conform not only to the detailed and exhaustive provisions of the [Forest Practice] Act, but also to those provisions of CEQA from which it has not been specifically exempted”). THPs must also comply with the federal Endangered Species Act (“ESA”), as well as the California Endangered Species Act (“CESA”). *See* 14 CCR 896 (“The purpose [of the FPRs is to implement the FPA] in a manner consistent with other laws.”)

Under both CEQA and the FPRs, a cumulative impact analysis is a fundamental component of the THP review process. *See Joy Road Area Forest & Watershed Assn. v. California Dept. of Forestry & Fire Protection* (2006)142 Cal. App. 4th 656, 676; *Californians for Native Salmon etc. Assn. v. Department of Forestry* (1990) 221 Cal. App. 3d 1419, 1423. Cumulative impact analysis ensures that the significant impacts of many different projects over time are identified so as to “alert the public and its responsible officials to environmental changes before they have reached ecological points of no return.” *Sierra Club*, 7 Cal.4th at 1229; *see also* 14 CCR 897 (information in THPs shall be “sufficiently clear and detailed to permit adequate and effective review by responsible agencies and input by the public to assure that significant adverse . . . cumulative impacts are avoided or reduced to insignificance”). The FPRs adopt the CEQA Guidelines’ definition of cumulative impacts: “The change in the environment which results

from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.” 14 CCR 895.1; 14 CCR 15355.

If the information in a cumulative impacts assessment is not sufficiently clear and detailed to permit CDF, review team agencies, and members of the public to determine whether significant adverse cumulative impacts have been avoided or mitigated, the plan must be denied. 14 CCR 897, 898.2. CDF must disapprove a THP that is “misleading in a material way” or that fails to include sufficient information to evaluate the plan’s significant environmental impacts. 14 CCR 898.1. Furthermore, CDF must deny a plan that fails to “incorporate feasible silvicultural systems, operating methods, and procedures that will substantially lessen significant adverse impacts on the environment.” 14 CCR 898.1, 896; *see also Friends of the Old Trees v. Department of Forestry & Fire Protection* (1997) 52 Cal. App. 4th 1383, 1405 (“an alternative to a proposed project is just that—a description of *another* activity or project that responds to the major environmental issues identified during the planning process.”)

It should also be emphasized, as recently put by the Attorney General’s Office, that “the plain intent of the Legislature in enacting the [Forest Practice Act] was to require the Board to view the forests of the state as a complete working ecosystem, and not only as a producer of high quality timber, but also as forestlands valuable in their own right as a public resource.” *Advice Regarding Board of Forestry’s Regulatory Authority to Provide for the Restoration of Resources* at 4. “[T]he protection of California’s watersheds and soils has been an important goal of the FPA since its enactment in 1973,” *id.* at 5, and “the explicit language of the FPA requires that the Board balance timber production and protection and restoration of forest resources. However, the FPA does not require that this balance be affirmatively struck in favor of timber production [B]oth CEQA and CESA assure that forest resources . . . be protected during timber operations and thus balance the Board’s authority to weigh too heavily in favor of timber production.” *Id.* at 8 “The requirements of CEQA, CESA, and the functional equivalent certification of the THP review process all require that the Board consider and mitigate for adverse environmental impacts when making its decisions.” *Id.* at 9.

The Lagomarsino THP fails to meet the requirements of the FPA, CEQA, CESA, and ESA because it fails to adequately address the project’s impacts on late seral forest habitat and wildlife in the area. Namely, the Lagomarsino THP fails to adequately: 1) identify, discuss, and analyze the baseline condition in the area (e.g., lack of late-seral habitat); 2) discuss, analyze, and avoid impacts to endangered species; 3) identify, discuss and analyze significant impacts to late seral habitat as well as the non-listed species that use such habitat; 4) identify, discuss and analyze the THP’s carbon emissions, and 5) properly identify, discuss, analyze and implement appropriate alternatives and/or mitigation.

Factual Background

In California, redwood forest with late seral characteristics (also referred to as old-growth redwood) is extremely limited. “Most of the old-growth redwood (*Sequoia sempervirens*) in California has been cut; regenerating forests will probably never resemble those that were

harvested, and what old growth remains on private land occurs in small, isolated remnant patches.”¹ As stated in a recent discussion of the status of marbled murrelets, “In California, old-growth coastal redwood forests had been reduced by about 85 to 96 percent [as of 1997].”² Consequently, and as explained further below, California’s remaining remnant patches of redwood old-growth are of great significance in terms of their importance to California’s plant and wildlife communities, including, but not limited to, rare and endangered species.

The DFG reports for this THP provide a good background regarding the proposed harvest and the history of harvest in the area, and also provide a good discussion of the importance of late seral forest in general. As discussed in one of the DFG reports:

Although the ten-acre patch [in this THP] does not meet the FPR § 895.1 definition of Late Succession Forest (LSF) due to its size, it possesses all other characteristics of LSF including the presence of multiple canopy layers, large decadent trees, snags, and large down logs. Some trees within the LSF area possess multiple characteristics typical of old-growth conifers, including large and rotting basal hollow cavities, reiterated tops, and/or large spreading limbs are proposed for harvest. Large-diameter living trees provide important wildlife elements for species which utilize forested habitats. Much of the habitat value of these elements is provided by mast production, dominant canopy position and the presence of structural characteristics including cavities, reiterated crowns, basal fire scars, platforms, dead tops and particularly basal hollows (Mazurek and Zielinski 2004). The THP provides no mitigation for the loss of these late seral habitat elements and high quality wildlife trees.

For the purpose of DFG’s evaluation, old-growth characteristics included, but were not limited to, redwood trees equal to or greater than 48 inches diameter at breast height (dbh) DFG staff observed a total of 44 redwood trees with old-growth characteristics within the LSF area. Of these 44 trees, 14 were marked for harvest. The majority of the 14 redwoods with old-growth characteristics marked for harvest possessed a dbh of 60 inches or more. Additionally, at least one stand within the LSF area had screen trees marked on the edge of the stand such that the old-growth type trees left within the stand would no longer be protected from environmental threats such as wind throw.

The majority of trees within the Santa Cruz Mountains are second-growth and do not possess LSF characteristics. The dominance of second growth trees throughout the Santa Cruz mountains is due to the harvesting of old-growth trees in the late 1800s and early 1900s. This turn-of-the-century harvesting created a regional scarcity of LSF habitat, which is even more uncommon on managed timberlands. Additionally, there is little recruitment of LSF habitat within managed timberlands. For example, if harvesting occurred as proposed . . . , the LSF within the THP area would have 22 old-growth type

¹ Zielinski, William J. and Steven T. Gellman. 1999. Bat Use of Remnant Old-Growth Redwood Stands, *Conservation Biology*, Volume 13, No. 1: pages 160- 167

² U.S. Fish and Wildlife Service , Marbled Murrelet (*Brachyramphus marmoratus*) 5-Year Review (June 12, 2009)

trees remaining after harvesting. It is unlikely that within the timeframe of the next five harvest entries (a minimum of 50 years) that any remaining second-growth trees on-site would develop old-growth characteristics comparable to the trees already present. Old-growth characteristics take hundreds of years to develop and cannot be readily replaced or mitigated. Even if only 30% of the old-growth type trees were removed every 10 years (which is still less than allowed by the FPRs), within 50 years only 3 of these trees would remain. Loss of the habitat elements present within the LSF area on-site will further decrease the overall value and diversity of habitat provided for wildlife resources throughout the Santa Cruz Mountains. Given this documented alteration and likely eventual loss of LSF habitat within the THP area, the THP does not appear to comply with FPR § 897(b)(1)(B), which states that one objective of forest management is to maintain functional wildlife habitat in sufficient condition for continued use by the existing wildlife community within the planning watershed.

[T]he THP does not appear to comply with FPR § 897(b)(1)(C), which states that one goal of forest management is to retain or recruit late and diverse seral stage habitat components for wildlife concentrated in the watercourse and lake zones and as appropriate to provide for functional connectivity between habitats. The proposed harvest will further fragment habitat within the local region including the Open Space Preserves to the north and south and does not retain or allow for the recruitment or expansion of late and diverse seral stage habitat components.

At a minimum to protect LSF habitat on-site and comply with FPR §§ 913.8(a) and 897(b)(1), the THP should be revised to include language stating that no trees exhibiting old-growth characteristics shall be harvested, no large woody debris shall be harvested and no snags shall be harvested (Recommendation 5). If Recommendation 5 is not incorporated into the THP, the THP shall provide a thorough evaluation of LSF within and adjacent to the THP area including any LSF within the Kings Grove NTMP (1-96NTMP-005 SMO). This evaluation shall include a map showing the location and acreage of LSF stands within and adjacent to the THP area, the total trees in each size class retained and marked for harvest, and the number of trees marked as wildlife trees. Once this data and map have been compiled, the THP shall include adequate and feasible mitigation measures for the loss of LSF habitat elements. The preferred alternative would be the permanent retention of LSF habitat elements through a Conservation Easement (Recommendation 6).

Due to the failure of the THP to address its impacts to trees with late seral characteristics, DFG submitted an additional report which noted the following:

The purpose of this memo is to provide the California Department of Forestry and Fire Protection (CAL FIRE) with additional information regarding Timber Harvesting Plan (THP) 1-08-063 SMO and the Department of Fish and Game's (DFG) recommendation to retain all large old trees within the project area. DFG provided the basis for this recommendation in our Pre-harvest Inspection (PHI) Report dated July 21, 2009.

During the PHI, DFG staff observed a total of 44 redwood trees with old-growth characteristics within a 10-acre patch of large old trees. Many of these trees are likely over 200 years old. Although this 10-acre patch does not meet the Forest Practice Rule (FPR) § 895.1 definition of Late Succession Forest (LSF) due to its size, it possesses all other characteristics of LSF including the presence of multiple canopy layers, large decadent trees, snags, and large down logs. Some trees within the 10-acre patch possess multiple wildlife tree characteristics, including large and rotting basal hollow cavities, reiterated tops, and/or large spreading limbs.

Late-seral forest habitats provide unique and ecologically significant habitat features. Late-seral forest habitats are characterized by the presence of specific features or “habitat elements.” The principal structural components of old-growth forests are individual large old trees, snags, and logs (Bingham and Sawyer 1991; Franklin and others 1981; Franklin and Spies 1991; Maser and others 1988). The importance of these elements is reflected in the FPR definition of “Late Succession Forest Stands.” Mature forest stands with late-seral habitat elements have greater structural diversity and thus provide greater habitat value than stands without such elements. Other beneficial characteristics of late-seral forest habitats include multi-layered canopies, broad range in tree ages and sizes, and abundant shade tolerant species (Noss 1999).

Large-diameter living trees are important wildlife elements for species which utilize forested habitats. Much of the habitat value of these elements is provided by dominant canopy position and the presence of structural characteristics including cavities, reiterated crowns, platforms, dead tops, and basal hollows (Mazurek and Zielinski 2004). According to Mazurek and Zielinski (2004), individual legacy trees support a greater number and diversity of wildlife species than non-legacy trees of merchantable size. They also found that legacy trees were used more often for nesting, roosting, resting, and foraging than non-legacy trees.

Due to increased light availability resulting from pre-dominant or dominant canopy position and crown injuries attendant to age, older conifers may develop multiple resprouted trunks arising from other trunks and branches. In comparison to older trees, young second-growth conifers tend to have relatively simple architecture: a single main bole with a crown comprised of small diameter horizontal lateral branches. Due to their long-life and resistance to wood-decay fungi, redwoods most often manifest benefits to wildlife as upright, mostly living trees. Their complex crowns promote biological diversity by providing a substrate for organic material accumulation, humic development, and crevice cover (furrowed bark) for nesting and bole-foraging birds. Thus, elevated soils form and create habitat for vegetation and terrestrial fauna, as well as food sources for birds (Sillett and Pelt 2000).

In the redwood region, large-old Douglas-fir have particular value as habitat elements due to their susceptibility to cavity decay and their tendency to develop large limbs, accumulate moss, and thus yield complex crown structure at a younger age than redwood. Large diameter branches and furrowed or loose bark are also important features of individual habitat elements (Franklin 2002). Timberlands devoid of large living trees will

not generate any large snags or downed wood. Existing large snags and downed wood fill a distinct ecological role simply because of their size but will decay over time and eventually disappear from timberlands in the absence of large living trees (Franklin 2002). The value of snags and downed wood is discussed in more detail below. Large old decadent trees that were once abundant as wildlife habitat prior to the extensive historic logging of late-seral redwood forests are now relatively rare and often scattered on commercial and non-commercial timberlands (Thornburgh and others 2000). These forest elements are considered irreplaceable features for wildlife habitat. Mazurek and Zielinski (2004) found that cumulative effects of the retention and recruitment of legacy and residual trees in commercial forest lands will yield important benefits to vertebrate wildlife and other species of plants and animals that are associated with biological legacies. Considering the habitat values that large old trees provide to a broad range of species harvesting such trees may be incompatible with FPR § 897(b)(1)(B).

Important characteristics of snags (standing dead or mostly dead trees) include density, diameter, height, and state of decay. Snags are important forest habitat features which provide for nesting, foraging, and roosting by a variety of bird species and denning for many mammal species (Bull 2002, Bull and others 1997). Many locally occurring forest species depend on or utilize snags, including arboreal salamanders, turkey vultures, birds-of-prey, band-tailed pigeons, owls, white-throated swifts, woodpeckers, olive-sided flycatchers, western wood-peewees, violet-green swallows, nuthatches, brown creepers, winter wrens, bats, raccoons, long-tailed weasels, skunks, and bobcats (CDFG and California Interagency Wildlife Task Group 2005).

Trees with cavities are essential for reproduction for wood ducks, kestrels, western screech and saw whet owls, and Lewis' and acorn woodpeckers. Locally occurring species which depend on or utilize trees with cavities include arboreal salamanders, turkey vultures, northern pygmy owls, white-throated swifts, pileated woodpeckers, northern flickers, purple martins, red-breasted nuthatches, bats, long-tailed weasels, and skunks (CDFG and California Interagency Wildlife Task Group 2005). Pileated woodpeckers excavate cavities of trees, creating habitat for a number of other species. As strong excavators, pileated woodpeckers are capable of excavating in sound dead wood (Schroeder 1982) and they play a critical role in creating habitat for secondary cavity users. For this role, they have been described as keystone habitat modifiers (Aubrey and Raley 2002). Species of the area which use pileated woodpecker cavities include Vaux's swift, various ducks, American kestrel, various small owls, hairy woodpeckers, northern flicker, brown creeper, bats, squirrels, woodrats, and ringtail. Pileated woodpeckers annually excavate new nest cavities (Bull and Jackson 1995), thus requiring a greater availability of snags than is used in a single season (Schroeder 1982). Nest trees are usually dead and within a mature or old stand of coniferous or deciduous trees, but may be in relict dead trees in younger forests (Bull and Jackson 1995). Nest sites are rarely reused (Bull and Jackson 1995). Pileated woodpeckers require large tall snags for nesting (Schroeder 1982). A U.S. Fish and Wildlife Service Habitat Suitability Index model (Schroeder 1982) for pileated woodpeckers models habitat suitability on the basis of canopy cover, density of large trees, density of large stumps, density of large snags, and average diameter of snags.

Birds and mammals select the largest snags available (Richter 1993). Large snags provide all functions of small snags, but small snags do not provide all functions of large snags. For example, small snags typically are not of sufficient size to provide suitable sized cavities for many primary excavators. Additionally, large snags have longer persistence and provide habitat for a longer period (Richter 1993). Most researchers have recommended minimum diameters greater than or equal to 20 inches dbh to achieve adequate habitat value (Richter 1993). Classification schemes exist for describing state of decay (Cline and others 1980). Snags in advanced stages of decay, often called “soft snags,” provide foraging substrate and nesting sites for weak excavators. Soft snags are unlikely to remain standing between harvest cycles and persistence is difficult to project. Snags in early stages of decay or “hard snags” tend to last longer (Richter 1993). Primary cavity nesters (e.g., pileated woodpeckers) prefer hard snags for nest sites (Richter 1993). Douglas-fir may take approximately 35 years to develop from dead trees to soft snags (Cline and others 1980).

According to the “Department of Fish and Game Snag Resource Evaluation” (Richter 1993), a mean value of three snags per acre should be retained across the landscape. Likewise, Hunter (1990) suggests that two to four large snags per acre may be adequate to maintain most wildlife populations. Richter (1993) and Hunter (1990) also highlight the importance of retaining mature green trees to replace snags as they decay and fall. For example, Hunter (1990) recommends retaining patches of old forest distributed among younger stands. Protecting the old and large diameter conifers in patches of old forest will ensure large snags are continuously recruited.

Large downed logs provide breeding, feeding, and cover functions for many species of wildlife, particularly small mammals, reptiles, and amphibians. Size of logs is positively correlated with the range of wildlife species using them, types of uses provided, and the duration or habitat value derived from the log. Therefore, recruitment for large downed logs in the form of green trees should focus on the largest trees available so that habitat will be provided to the highest diversity of species as possible. Downed logs also provide humid and thermally stable microhabitats for amphibians and reptiles. Hollow logs are derived from hollow trees and only originate from live trees infected with heart-rot fungi (Bull and others 1997). Hollow trees take many years to develop and are therefore usually developed in large diameter trees.

Locally occurring species which depend on or utilize downed logs include newts and salamanders, western toads, California ground squirrels, western gray squirrels, deer mice, dusky-footed woodrats, coyotes, gray fox, raccoons, long-tailed weasels, skunks, and bobcats (CDFG and California Interagency Wildlife Task Group 2005).

The THP provides no supporting evidence that habitat elements lost from harvesting 14 large old trees will be created in other trees by the next harvest cycle. Based on site conditions, DFG believes creation of old-growth characteristics within existing second-growth trees is impossible in a 10- to 15-year time frame. Replacing the structural conditions and functional wildlife values of any harvested existing legacy trees with

current second-growth redwood would likely require 200 years or longer (Noss 1999). Planned harvest rotations on most commercial forestlands do not permit trees to mature to their age of maximum value to wildlife (Mazurek and Zielinski 2004). Selection silviculture does not automatically provide adequate wildlife tree retention and recruitment. While selection forestry maintains a cover of standing green trees, without measures that ensure long-term retention of individual trees, trees are usually harvested before they develop beneficial habitat characteristics. Recruitment may be interrupted through thinning or felling of stems in the upper size classes. In one case study, Kenefic and Nyland (2000) found reductions in snag and cavity tree density occurred following selection treatments.

Gellman and Zielinski (1996), Hunter and Mazurek (2003), and Hunter and Bond (2001) found that fire-derived basal hollows provide particularly high wildlife habitat value. In another study of the habitat value provided by legacy trees, Mazurek and Zielinski (2004) found the presence of a basal hollow to add the greatest habitat value to legacy trees. The presence of legacy redwoods with basal hollows is rare in private timberlands and the formation of new basal hollows is even rarer given that most fires on private lands are suppressed (Finney 1996). Trees with basal hollows are of extremely high value and are an irreplaceable habitat feature. Therefore, trees with high wildlife value providing late-seral habitat elements within the THP area that are lost during this harvest and that were lost during the previous harvests will likely never be replaced, particularly if the trees being harvested are in excess of 200 years old and possess basal hollows.

Only three to five percent of original old-growth forest remains, which is mostly found within a patchy mosaic of second- and third-growth forests (Thornburgh and others 2000). The majority of forest stands within the Santa Cruz Mountains are second-growth and do not possess old-growth characteristics. The dominance of second-growth trees throughout the Santa Cruz Mountains is due to the harvesting of old-growth trees in the late 1800s and early 1900s. This turn-of-the-century harvesting created a regional scarcity of late-seral forest habitat and large old trees, which are even more uncommon on managed timberlands. Loss of the large old trees and their late-seral habitat elements within the 10-acre patch of large old trees on-site will further decrease the overall value and diversity of habitat provided for wildlife resources throughout the Santa Cruz Mountains.

DFG believes that harvesting and mitigation as proposed in this THP in conjunction with the last entry and foreseeable future entries will further contribute to the cumulative significant adverse permanent loss of late-seral habitat elements and high quality wildlife trees on this property. Under the current plan, it is possible that almost all of the large old trees within the 10-acre patch of large old trees could be harvested before the existing second-growth on-site develops into similar type large old trees. This eventual loss of the majority of large old trees on-site will also curtail any recruitment for snags and large woody debris and ultimately eliminate much of the late-seral habitat elements currently present on-site. Given this loss of existing large old trees coupled with the lack of recruitment of late-seral habitat elements within the THP area, the THP does not appear to comply with FPR § 897(b)(1)(B and C). To comply with the FPRs and avoid

significant adverse impacts, all trees exhibiting old-growth characteristics, all large woody debris, and all snags should be retained.

Furthermore, DFG has previously pointed out similar information regarding the importance and significance of late-seral forest:³

The FPRs contain regulations intended to identify (Title 14, CCR, Section 895.1) and avoid significant adverse effects (Title 14, CCR, Section 919.16) to late succession forest stands. While codified in the FPRs, the late succession forest issue is largely a wildlife habitat issue and thus within the specific expertise of DFG.

Late seral habitats can be viewed from several ecological perspectives, for example, biological growth, disturbance, forest and community structure, species, and ecological processes (Franklin et al. 1981). Central to all of these perspectives are the changes in forest ecosystems and communities during long periods of time that are free from large, high severity disturbance such as high intensity fires, windthrow and repeated timber harvests which remove large diameter trees faster than can be recruited to the stand. The characteristics of structure, composition and processes that develop as the dominant trees grow older and die constitute some of the most definitive features of late seral habitats. Late seral habitats thus emerge over time from the general process of accumulation of growth, small disturbances, natural tree mortality, and colonizing species (Spies et al., 1994). Together these processes produce structural complexity that shapes the terrestrial habitat and also affects the dynamics of watershed products such as temperature, water, nutrients, LWO and sediment. Therefore, the THP should protect the existing late seral stand structure by retaining the larger diameter conifers in the late seral habitat.

DFG has determined the incremental loss of large decadent trees from the late seral stands would contribute to significant adverse cumulative impacts to this resource and the associated wildlife community ... One component of the FPR LSF definition, at least 20 acres in size, is intended to capture two functions of area of late seral habitat important to wildlife. First, area is a correlate of internal (core) habitat, where edge effects are minimal. Second, the forest processes inherent in late successional forest (e.g., growth, recruitment, decline, death, and decay of large trees) cannot be sustainable if the area is too small. The FPR's definition does not address stand shape, intervening or internal gaps, or the landscape context of the stand. All of these factors affect the ecological function of the late succession stand. THP page 216 acknowledges that portions of the late seral habitat are fragmented and likely limited in functional value as old-growth habitat for vertebrates (CDF 1999). Rather than justifying additional degradation of the late seral stands through operation of the THP, DFG suggests the CDF 1999 findings are evidence of the already existing impacts to the late seral habitat. Such cumulative impacts must be mitigated to a level that renders additional impacts insignificant. DFG assesses late seral habitat conditions with both the FPR definition and a more ecological, albeit not well differentiated, designation of late seral forests. The assessed conditions include:

~ Dominant and predominant tree sizes are large relative to site conditions.

³ See DFG PHI Report for THP 1-08-116-MEN

- ~ Evidence of decline, decadence, and other signs of “over-maturity” in the predominant and dominant trees in the stand.
- ~ Incidence of time-associated habitat features among the predominant and dominant trees. These include basal hollows, bark character (such as extensive charring, deep furrows and exfoliation), and mechanical damage or deformity (such as broken or reiterated tops).
- ~ Presence of mortality (snags and downed logs) consistent with the stand forest type and position.
- ~ Area is adequately large and contiguous, or is embedded in a mature forested landscape such that the area under review provides sustainable, interior late seral habitat conditions. Relative to continuity, the size of breaks that are significant are species-specific. But for the late seral community as a whole, significant breaks probably are best approximated by forest structure effects on microclimate. A reasonable rule of thumb is one tree height.

The importance of late seral habitats are extensively documented in the available literature. Some species such as the marbled murrelet (*Brachyramphus marmoratus*), Pacific fisher (*Maries pennantl*) and the American marten (*Maries americana*) are strongly associated with late successional forest for part of their life cycle such as denning and nesting. Harris (1984) lists 118 vertebrate species out of 153 in Western Oregon that use late seral forests as a primary habitat. ... Of the late seral-associated vertebrates, 47 use it as their primary habitat and, without this forest type, would not meet their habitat needs for essential behaviors such as reproduction.

[M]any of the species associated with the larger tree habitats are listed as endangered or threatened or are otherwise considered sensitive, whereas most of the early- and midseral species are not. For example, among the listed and sensitive species using size class 5 and 6 stands for reproduction, foraging, or cover are the marbled murrelet (*Brachyramphus marmoratus*), Pacific fisher (*Maries pennantl*), American marten (*Maries americana*), Sonoma tree vole (*Arborimus pomo*), northern spotted owl (*Strix occidentalis caurina*), Vaux’s swift (*Chaetura vaux/*), purple martin (*Progne subis*), peregrine falcon (*Falco peregrinus*), pallid bat (*Antrozous pal/idus*), long-eared myotis (*Myotis evotis*) and Townsend's big-eared bat (*Corynorhinus townsendi*). These declining or sensitive species associated with late seral Douglas fir forests rely upon the presence of adequate area of large tree stands with sufficient late seral habitat elements such as snags, decadent live trees, and coarse woody debris for cover, foraging, and reproduction.

Large old trees, large snags, and large downed wood may all be considered “critical habitat elements” in late seral habitats because they are required components for a variety of late seral-associated wildlife species, they occur at low densities in managed forests, and they take a long time to develop (often longer than the typical harvest rotation period). The following wildlife species are strongly associated with these critical habitat elements.

- ~ Northern spotted owl - large trees with cavities and structural deformities.
- ~ Marbled murrelet - large trees with large limbs and structural deformities.

- ~ Fisher and American marten - large trees with cavities, internal hollows and mistletoe brooms, and downed hollow logs.
- ~ Several bat species (e.g., Townsend's big-eared bat) -large trees with basal hollows and loose bark.
- ~ Pileated woodpecker - large live trees and snags with heart rot.
- ~ Sonoma tree vole - medium to large trees with structural deformities.
- ~ Bald eagle -large trees above the surrounding canopy with large lateral limbs or structural deformities.
- ~ Peregrine falcon - large green trees or snags with broken tops or fire scar-formed depressions or platforms.
- ~ Vaux's swift - large fire scarred trees or snags with internal hollows.
- ~ Purple martin - large trees or snags with cavities that are located in open areas.
- ~ Osprey - large trees or snags above the surrounding canopy with broken tops or large lateral branches.

Trees in all size classes up to the maximum management diameter are normally retained in selection silviculture. Through successive harvest entries, trees specified for retention during prior harvests may be harvested in subsequent harvests. This approach does not ensure that retained trees and trees in the larger diameter classes will be allowed to eventually develop into snags or green wildlife trees. This allows depletion of late seral habitat elements over time as existing snags and senescing trees deteriorate or are lost to windthrow (Chen et al., 1995, Reid and Hilton 1988). Without measures to mitigate the loss of large decadent trees, the cumulative harvest of this late seral habitat attribute at rates that exceed their recruitment will reduce their numbers on the landscape. Unevenaged silviculture should be mitigated in late seral habitats to prevent harvests that reduce the number and density of individual large, old trees and their benefits to a multitude of species and forest processes.

The pre-project deficiency of large trees in the late seral habitat is indicative of several timber entries and evidence of an already present cumulative adverse impact. DFG finds that while the proposed selection silviculture may not be individually significant, any additional reduction in the large tree component of the late seral habitat would add to past and reasonably foreseeable future impacts and is therefore cumulatively significant. DFG finds the THP's proposed silviculture method would not avoid or mitigate long-term impacts to late seral forest habitats. In summary, the proposed selection silviculture in the late seral habitat is not likely to eliminate late seral habitat value during this entry; however, DFG is concerned that: 1) habitat values will be diminished in this entry, and 2) future harvest entries would eliminate the late seral functionality of the stands unless they occur at substantially longer return intervals than is commonly used in THPs. Special emphasis should be placed on environmental resources that are rare or unique to that region and would be affected by the project. Existing late seral forests should be managed to ensure stand structure continues to provide habitat for late seral associated wildlife such as the marbled murrelet and Pacific fisher.

In DFG's opinion, the proposed THP can adequately address specific cumulative impacts to biological resources by including measures that will retain late seral tree structure and

more appropriately represent a ‘light-touch’ selection harvest. DFG recommends the THP implement selection harvest that focuses more on the smaller trees Selection conducted to maintain or enhance late seral attributes would essentially be a thin or selection from below. The intent would be to promote growth into the larger size classes more quickly than what the proposed mark currently reflects. Based on the stand information provided compared with a fully functioning old-growth stand such as Montgomery Woods State Reserve, it appears that a light thinning from below as opposed to the current selection harvest in the late seral habitat would be most appropriate for avoiding cumulative impacts to the stands and the existing wildlife communities that depend on them. DFG finds this recommendation is justified with the available literature and feasible to implement. Furthermore, the THP should not be approved without this mitigation designed to substantially lessen significant adverse effects on the environment.

Large old decadent trees that were once abundant as wildlife habitat prior to the extensive historic logging of late seral redwood forests are now relatively rare and often scattered on commercial and non-commercial timberlands. These forest elements are considered irreplaceable features for wildlife habitat. Considering the habitat values that large old trees provide to a broad range of species (Franklin et al., 2000; Mazurek and Zielinski, 2004) harvesting any of these uncommon or rare habitat elements may be incompatible with the overall intent of the FPR (Title 14, CCR, Section 897(b)(1)(8), Shintaku 2005).

While the DFG reports cite to various literature, one study in particular does an excellent job of explaining the importance of old-growth forest, as well as explaining the significance of individual old-growth redwood trees that persist in areas where old-growth has been largely depleted. As discussed in Mazurek 2004:⁴

In coast redwood (*Sequoia sempervirens*) forests, only 3–5% of the original old-growth redwood forest remains, largely as fragments scattered throughout a matrix of second and third-growth forests (Fox, 1996; Thornburgh et al., 2000). The remnants vary in size from large, contiguous forest patches protected in state and federal parks to patches of only a few hectares in size, to individual legacy trees in managed stands. Individual old-growth trees that have, for one reason or another been spared during harvest, or have survived stand-replacing natural disturbances, are referred to as ‘legacy’ trees (Franklin, 1990). We define legacy trees as having achieved near-maximum size and age, which is significantly larger and older than the average trees on the landscape. This distinguishes them from other ‘residual’ trees, which may also have been spared from harvest but are not always larger and older than the average trees in the landscape.

The rarity of old-growth forests in managed landscapes combined with the rising economic value of old-growth redwood increases the likelihood that legacy stands and individual legacy trees will be harvested. At this time, there is no specific requirement for the retention of legacy trees during timber harvests on private or public lands in

⁴ Mazurek, M. J. and W. J. Zielinski. 2004. Individual legacy trees influence vertebrate wildlife diversity in commercial forests. *Forest Ecology and Management* 193: 321-334.

California. Exceptions occur on lands owned by companies that are certified as sustainable forest managers (Viana et al., 1996; Smart- Wood Program, 2000) and as such, are required to maintain and manage legacy old-growth trees. A number of studies have demonstrated the importance of legacy and residual trees to wildlife.

As measured by species richness, species diversity, and use by a number of different taxa, legacy trees appear to add important foraging and breeding habitat value to redwood forests managed for timber. The use of legacy trees by wildlife was demonstrated by evidence of their nesting, roosting and resting; behaviors which were not observed at control trees. This difference is probably related to the structural complexity offered by redwood legacy trees (Bull et al., 1997; Laudenslayer, 2002). Control trees were smooth-barked with very few large horizontal limbs, few cavities, and no basal hollows. Legacy trees possess these structural features, which probably account for their greater attractiveness to a variety of wildlife species.

The presence of a basal hollow, which only occur in legacy trees, was the feature that appeared to add the greatest habitat value to legacy trees and, as a result, to commercial forest stands. However, we did not sample specifically for wildlife that may benefit from the presence of large horizontal branches (e.g. platform nesting wildlife). Basal hollows were used by every taxa sampled, but appear to be particularly important to bats and birds. In addition to the fact that guano was collected at every hollow we sampled, individual bats were observed in hollows, and reproduction was documented. Use of basal hollows by bats has been observed in other redwood regions (Gellman and Zielinski, 1996; Zielinski and Gellman, 1999; Purdy, 2002) and there are several previous reports of basal hollows used by bats for reproduction (Rainey et al., 1992; Mazurek, in press). Hollows also appear to be important nest sites for some bird species, in particular Vaux's swifts (Hunter and Mazurek, in press). Because roost and nest availability can limit the populations of birds and bats (Humphrey, 1975; Kunz, 1982; Brawn and Balda, 1988; Christy and West, 1993; Raphael and White, 1984), basal hollows may play a critical role in the redwood region if they provide roost and nest sites in forests that are otherwise deficient. The increased use of legacy trees by insectivorous birds and bats may also be because the rugosity of the bark may harbor a greater diversity and abundance of insects (Ozanne et al., 2000; Willett, 2001; Summerville and Crist, 2002). Bark gleaners, such as brown creepers (*Certhia americana*), have been correlated with the abundance of spiders and other soft-bodied arthropods that are significantly associated with bark furrow depth (Mariani and Manuwal, 1990); this may also explain the disproportionate use of legacy trees by nuthatches and woodpeckers. Finally, basal hollows not only benefit the wildlife that use them but the trees in which they are found. The feces of animals that are attracted to hollows can be an important source of nutrients for trees that may be on nutrient-poor sites (Kunz, 1982; Rainey et al., 1992). ... Our conclusions about the value of legacy trees to wildlife in the redwood region are supported by the results of studies on individual species of wildlife elsewhere. ... Our work was directed at assessing the value of individual legacy trees in stands, but there is a considerable body of research on the related question of what value residual trees and patches have in maintaining wildlife diversity in forests. Residual structures may not be as old as the

legacy structures we studied, but they can add important structural diversity to which many species of wildlife respond.

Our traditional view of conservation reserves is of large protected areas. However, few landscapes provide us with the opportunity to preserve large tracts of land and we must consider conserving biodiversity within the matrix of multiple use lands (Lindenmayer and Franklin, 1997). Given the fragmented nature of mature forests in the redwood region, remnant patches of old-growth and individual legacy trees may function as ‘mini-reserves’ that promote species conservation and ecosystem function. Legacy structures increase structural complexity in harvested stands and, as a result, can provide the ‘lifeboats’ for species to re-establish in regenerating stands (Franklin et al., 2000). Although the lifeboat function may not be entirely fulfilled for vertebrates with large area needs, these habitat elements may make it possible for some species to: (1) breed in forest types where they may otherwise be unable, and (2) secure a greater number of important refuges from climatic extremes and predators. In addition, these functions may allow legacy trees to provide some measure of habitat connectivity (‘stepping stones’) to larger more contiguous tracts of old-growth forests (Tittler and Hannon, 2000; Noss et al., 2000). Because of their rarity in commercial forests, the first step in the management of legacy trees is to determine their locations and protect them from logging or from physical degradation of the site. Because legacy redwoods with basal hollows are even more rare, locating and protecting these should be the highest priority. In addition, the circumstances that lead to their genesis will be difficult to recreate, especially on commercial timberland. Hollows form by repeated exposure of the base of trees to fire (Finney, 1996), and because most fires on private land are suppressed, prescribed fire would need to be repeatedly applied to trees that would be designated as ‘future legacies’ and which would be excluded from harvest in perpetuity. We hasten to add, however, that legacy trees without basal hollows appear to have significant benefits to wildlife. Even without management to encourage basal hollows we suggest that managers plan for the recruitment of trees that are destined to become legacies. This will require their protection over multiple cutting cycles. We expect that new silvicultural methods will be required to prescribe the process of identifying, culturing, and protecting residual legacy trees. Although we do not believe that any one tree will protect a species, we do believe that the cumulative effects of the retention, and recruitment, of legacy and residual trees in commercial forest lands will yield important benefits to vertebrate wildlife and other species of plants and animals that are associated with biological legacies. The results of our study beg us to consider habitat at a spatial scale that is smaller than that of habitat patches or remnant stands; we conclude that individual trees can have very important values to wildlife.

Legal Violations

The Forest Practice Rules explicitly acknowledge the importance of late seral habitat and trees:

Determination of the presence or absence of mature and over-mature forest stands and their structural characteristics provides a basis from which to begin an assessment of the influence of management on associated wildlife. These characteristics include large trees

as part of a multilayered canopy and the presence of large numbers of snags and downed logs that contribute to an increased level of stand decadence The area should include a multi-layered canopy, two or more tree species with several large coniferous trees per acre..., large conifer snags, and an abundance of large woody debris. Previously harvested forests are in many possible stages of succession and may include remnant patches of late seral stage forest which generally conform to the definition of unharvested forests but do not meet the acreage criteria.

The fragmentation and resultant isolation of late seral habitat types is one of the most significant factors influencing the sustainability of wildlife populations not adapted to edge environments.

The loss of a key habitat element may have a profound effect on a species even though the habitat is otherwise suitable. Each species may have several key limiting factors to consider. For example, a special need for some large raptors is large decadent trees/snags with broken tops or other features. Deer may have habitat with adequate food and cover to support a healthy population size and composition but dependent on a few critical meadows suitable for fawning success. These and other key elements may need special protection.

14 CCR 952.9.

In order to provide adequate protection for late seral trees, the Forest Practice Rules specifically require an assessment of cumulative impacts to “Late Seral (Mature) Forest Characteristics.” *See* 14 CCR 952.9, 14 CCR 897. 14 CCR 952.9 further states that “[s]ignificant cumulative effects may be expected where there is a substantial reduction in required habitat or the project will result in substantial interference with the movement of resident or migratory species.” “Significant factors” to consider include impacts to “Snags/den trees; Downed, large woody debris; Multistory canopy; Road density; Hardwood cover; Late seral (mature) forest characteristics; and Late seral habitat continuity.” *Id.* Moreover, under 14 CCR 897, “[i]ndividual THPs shall be considered in the context of the larger forest and planning watershed in which they are located, so that biological diversity and watershed integrity are maintained within larger planning units and adverse cumulative impacts . . . are reduced.”

This THP is largely deficient in providing the information and analysis necessary for informed decisionmaking and for avoiding and mitigating significant impacts. While the THP notes that:

The timber harvest area was clearcut around the turn of the century where most of the mature Redwoods and Douglas-fir trees were harvested. A few highly defective residual old growth were retained. The property was entered for single-tree selection harvest around 1992;

and that:

The Tunitas Creek watershed has a long history of timber harvesting. Clear cutting began in the late 1800’s and continued into the 1940s. After World War II, selective harvesting

has continued; currently a large portion of the old-growth timber has been harvested as well as significant volumes of second-growth redwood;

the THP then goes on to improperly conclude that:

The proposed timber harvest is typical of harvests conducted in the Santa Cruz Mountains. There are no unique environmental problems associated with the proposed operation. The State Forest Practice Rules are designed to mitigate significant adverse impacts from normal and routine harvest operations. Thus, the application of these rules will mitigate potential significant adverse impacts on the proposed operation.

Such a conclusory statement misses the point of the Rules.⁵ The FPRs, in conjunction with CEQA, require avoiding and mitigating significant impacts. And that can only be accomplished if a) enough information is provided to properly identify and analyze significant impacts, and then b) an adequate analysis is performed. Moreover, there is nothing routine or normal about the loss of old-growth redwood. In fact, as explained further below, despite the THP's answers to the contrary, the "proposed project, as presented, in combination with the impacts of past and future projects" will likely "have a reasonable potential to cause or add to significant cumulative impacts to biological resources within the biological resources assessment area." The project will likely "adversely affect a threatened or endangered species" due to its impacts to murrelet habitat. The project "will likely "interfere significantly with the movement of ... wildlife." And the project will likely "significantly diminish habitat for fish, wildlife, or plants."

⁵ The following are additional examples of the THP's incorrect and/or conclusory assertions (and are addressed in these comments):

Biological impacts from timber harvesting will not likely occur outside of the watershed. Terrestrial plants and animals further away from the harvest area will be less affected by the disturbance than those within the plan area and downstream within the watershed. Special status resources are assessed for an area greater than the watershed and a 5-mile radius;

Past timber operations in the Santa Cruz Mountains, like the harvesting project proposed here, have shown that the application of the Forest Practice Rules does not cause a significant cumulative adverse impact to watershed resources;

habitat conditions will be the same pre and post project;

Late Seral Habitat Continuity is Not Applicable;

Stands that meet the criteria of "late succession forest stands" as defined in 14 CCR 895.1, or late seral forest as defined in CDF Technical Rule Addendum #2, do not exist within the assessment area.

the project will not adversely affect a threatened or endangered species of animal or plant, or the habitat of the species

The project is not likely to produce significant adverse cumulative effects to the biological resources within the biological resources assessment area;

The habitat is typical of second growth conifer timberlands in the Santa Cruz Mountains;

Habitat will still be viable for [a] bat post harvest.

The THP Ignores the Current Baseline Regarding Late Seral Forest and Consequently Fails to Adequately Address Cumulative Impacts

The THP fails to adequately consider the present existing baseline condition – in which the vast majority of old-growth redwoods have already been logged⁶ – as a factor contributing to significant cumulative impacts, and consequently, the THP improperly concludes that its impacts will be cumulatively insignificant. In *Environmental Protection and Information Center v. California Department of Forestry*, the California Supreme Court noted the importance of assessing cumulative impacts in their proper context:

We agree . . . that the statutory injunction to assess ‘the incremental effects of an individual project . . . in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects . . . signifies an obligation to consider the present project in the context of a realistic historical account of relevant prior activities that have had significant environmental impacts This historical information also may help to identify previous activities that have caused intensive environmental impacts in a given area, the full effects of which may not yet be manifested, thereby disclosing potential environmental vulnerabilities that would not be revealed merely by cataloging current conditions.

(2008) 44 Cal. 4th 459, 524-25. In short, until the past is fully accounted for, decisionmakers and the public are denied a proper context for the THP’s impacts. Thus, the THP’s failure to appropriately acknowledge and account for, and then analyze, the substantial impacts of historical logging (and the consequent fact that an entire habitat type is now almost gone), prevents any real assessment of the harm that will likely occur by removing what are now the very last vestiges of available old-growth.

Furthermore, CEQA case law confirms that where the environmental baseline demonstrates existing significant impacts, this heightens, rather than reduces, the scrutiny that must be applied in the resulting cumulative impact assessment. Here, the historical loss of old-growth trees, the consequent present condition of such habitat (i.e., the lack thereof), and the importance of such habitat to wildlife (as already described in the factual background section and elsewhere in these comments), has made that which remains exceedingly valuable, and its further loss is therefore a cumulatively significant impact. *See e.g., Los Angeles Unified School Dist. v. City of Los Angeles* (1997) 58 Cal. App. 4th 1019, 1026 (additional increase in noise level of another 2.8 to 3.3 dBA was significant given that the existing noise level of 72 dBA already exceeded recommended maximum of 70 dBA.); *Communities for a Better Environment* (2002) 103 Cal. App. 4th 98, 117 (Cal. App. 3d Dist. 2002) (CEQA regulation that “compares the incremental effect of the proposed project against the collective cumulative impact of all relevant projects” is contrary to CEQA); *id.* at 114 (“[E]nvironmental damage often occurs incrementally from a variety of small sources. These sources appear insignificant when considered individually, but assume threatening dimensions when considered collectively with other sources with which they

⁶ E.g., Mazurek 2004, “In coast redwood (*Sequoia sempervirens*) forests, only 3–5% of the original old-growth redwood forest remains, largely as fragments scattered throughout a matrix of second and third-growth forests (Fox, 1996; Thornburgh et al., 2000).”

interact.”); *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal. App. 3d 692, 720 (“[p]erhaps the best example of [a cumulative impact] is air pollution, where thousands of relatively small sources of pollution cause a serious environmental health problem”); *id.* at 718 (relevant question is “whether any additional amount of precursor emissions should be considered significant in light of the serious nature of the ozone problems in this air basin.”). Until the THP both acknowledges and accounts for the baseline situation, it will fail CEQA’s mandate to avoid significant cumulative impacts.

Similarly, the FPRS specifically require *continuity* of late seral forest habitat to be addressed as part of the THP’s cumulative impact analysis. See 14 CCR 952.9. CEQA cases recognize the importance of considering habitat fragmentation in assessing potential cumulative impacts. See *e.g.*, *Sierra Club*, 7 Cal. 4th at p. 1221 (“The amount of old-growth habitat has diminished and the distribution of that habitat has been fragmented considerably in the past few years.”). Here, however, the THP does not analyze the fact that it will cause further loss and fragmentation of already depleted old-growth redwood. This failure also violates 14 CCR 897. (THP must “[r]etain or recruit late and diverse seral stage habitat components for wildlife.”).

In sum, a cumulative impact analysis “must be substantively meaningful.” *Joy Road*, 142 Cal. App. 4th at 676. Here, the record shows that there will be great loss of old growth should the THP be approved (14 of 44 trees), and that it will occur in an area already severely depleted of old-growth. The THP does not, however, disclose or analyze why, in light of this evidence, the cumulative impacts of the project are not significant: “A cumulative impact analysis which understates information concerning the severity and significance of cumulative impacts impedes meaningful public discussion and skews the decisionmaker's perspective concerning the environmental consequences of the project [and], the necessity for mitigation measures.” *Joy Road, supra*, 142 Cal. App. 4th at 676. Put another way, the THP violates CEQA’s “fundamental goal of fostering informed decision making.” *Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 402-403.

The THP review process substitutes for the CEQA review process “intended to demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action” and to permit public “accountability and informed self-government.” See *Joy Road*, 142 Cal. App.4th at 670. As explained further below, the THP’s failure to conduct a meaningful and proper impacts analysis is also prejudicial because it has resulted in a false conclusion that no significant cumulative impacts to important habitat and wildlife will occur, which in turn precluded any consideration whether there are feasible mitigation measures that could avoid or substantially lessen such impacts.

The THP Would Likely Cause Significant Impacts to Critically Endangered Marbled Murrelets and Would Violate the Federal and State Endangered Species Acts

The DFG reports for this THP explain the background regarding the marbled murrelet:

The THP area contains mainly second-growth redwood and mixed evergreen hardwood forest. However, there is a stand of large old redwoods in the northern portion of the plan area.

The marbled murrelet is listed as State endangered pursuant to Fish and Game Code § 2050 *et seq.*, federally threatened pursuant to Title 16, United States Code 1531 *et seq.*, and is a sensitive species as defined by FPR § 895.1.

DFG staff conducted an assessment of potential marbled murrelet habitat within the THP area in late Fall 2005. The THP area was found to contain an area approximately 10 acres in size, occupied by trees with old-growth characteristics located in the northern portion of the 35-acre plan area. DFG determined that potential marbled murrelet habitat was present within this area. As such, protocol-level marbled murrelet surveys were completed and spanned over two breeding seasons (2006 – 2007). No marbled murrelets were detected during either year of surveys. A DFG Consultation Letter and Review of Marbled Murrelet Survey Results issued on March 12, 2009 states that the surveys were adequately conducted to conclude that marbled murrelets are absent from the suitable habitat identified within the THP area.

Following the DFG marbled murrelet pre-consultation, the DFG biologist reported the habitat within the THP area as some of the highest quality potential marbled murrelet nesting habitat in that region of San Mateo County. Additional potentially suitable marbled murrelet habitat is present both north and south of the THP area (see Table 2) as documented in the DFG-maintained database BIOS and a habitat assessment conducted by H.T. Harvey and Associates (2007). Because the THP proposes to harvest potential nest trees found within the LSF area, the THP does not appear to comply with FPR § 897(b)(1)(C), which states that one goal of forest management is to retain or recruit late and diverse seral stage habitat components for wildlife concentrated in the watercourse and lake zones and as appropriate to provide for functional connectivity between habitats. The proposed harvest will further fragment habitat within the local region including the Open Space Preserves to the north and south and does not retain or allow for the recruitment or expansion of late and diverse seral stage habitat components.

While surveys were conducted and no murrelets found,⁷ the fact remains, as DFG likewise points out,⁸ that trees currently slated for harvest represent important habitat for the murrelet.⁹

⁷ One likely reason that none were found is because so few still exist. That means all remaining old-growth that persists where murrelets could live (i.e., unoccupied murrelet habitat) should be retained in order to allow this population to return from the brink of extinction.

⁸ A March 2009 DFG report states that: “Although marbled murrelets were found not to currently occupy the THP area, DFG recommends that late-seral conifers with special habitat elements observed within the THP area be retained as wildlife trees. Trees marked as no-cut should include the approximately 25 residual redwoods and Douglas-firs which were examined by DFG during the site inspections as having characteristics favorable for nesting murrelets. DFG also recommends that screen or replacement trees be retained for the purposes of recruitment of special habitat elements. Screen trees protect wildlife trees by reducing windthrow, providing shade to potential nest sites, and reducing exposure to nest predators. Wildlife and screen trees should be marked as no-cut prior to harvesting operations. Nearby harvested trees should be directionally felled to avoid damage to legacy trees.”

⁹ It is noted that: “A remnant stand of old growth trees occurs on approximately 10 acres in the northern half of the plan area. Most of the old growth trees are in a contiguous stand, but outlying individuals occur northwest of the

Moreover, as recently discussed in a U.S. Fish and Wildlife Service publication,¹⁰ the central California murrelet population is at extreme risk of extinction:

[T]he 2008 population estimate [currently estimated at 91-256] represented a decline of about 55 percent since 2007, and a 75 percent decline since 2003 (Peery et al. 2008), for an average decline of about 15 percent per year between 2003 and 2008. The 2007 and 2008 population estimates are the lowest estimate since surveys began in 1999 The authors concluded that the murrelet population in central California underwent a significant and rapid decline between 2003 and 2008 (Peery et al. 2008).

The species decline has been largely caused by extensive removal of late-successional and old growth coastal forest which serve as nesting habitat for murrelets.

Another recent publication addressing the murrelet in central California makes similar findings and concludes that immediate and strong conservation is necessary:¹¹

[O]ur results indicate that current conservation projects in the Santa Cruz Mountains are insufficient to prevent the extirpation of Marbled Murrelets in central California when the current cohort of adults dies. Given the predicted and observed population decline, the genetic uniqueness of the population (Friesen et al. 2005, Piatt et al. 2007), and high probability of local extirpation, there is a clear need for immediate and stronger conservation actions in the region, and for annual monitoring of the success of these conservation efforts.

CAL FIRE is required to disapprove a plan if implementation of the plan would result in take, jeopardy, or adverse modification of habitat, in violation of the federal or California Endangered Species Acts.¹² Here, the habitat at stake in this THP is of incalculable importance to the future

stand as a cluster of three trees and a single tree. The old growth stand includes approximately 25 'potential murrelet nest trees' trees (22 coast redwood, 3 Douglas-fir) with one or more platform structures that appear suitable for use by nesting Marbled Murrelets. Several of these trees have complex structure with multiple suitable platforms."

¹⁰ U.S. Fish and Wildlife Service , Marbled Murrelet (*Brachyramphus marmoratus*) 5-Year Review (June 12, 2009)

¹¹ Peery, M. Zachariah Abundance And Productivity Of Marbled Murrelets Off Central California During the 2008 Breeding Season, Final Report (September 2008)

¹² CA Fish and Game Code, sections 2052, 2053, and 2055 state that:

The Legislature further finds and declares that it is the policy of the state to conserve, protect, restore, and enhance any endangered species or any threatened species and its habitat

The Legislature further finds and declares that it is the policy of the state that state agencies should not approve projects as proposed which would jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available consistent with conserving the species or its habitat which would prevent jeopardy.

well-being of one of the most endangered populations on earth;¹³ in fact, the murrelet's endangered status is partly due to the fact that so little old-growth, upon which the species depends, is left in the area. In short, the situation could not be more stark. The current baseline, as discussed above, tells us that the central California population of the marbled murrelet could not be in worse condition (absent extinction). Therefore, any further negative contribution to the current baseline will indeed jeopardize the continued existence of the bird¹⁴ and adversely modify habitat essential to its continued existence in violation of CESA. The THP does not even address that fact and no adequate explanation is provided in the THP regarding how the loss of trees important to the murrelet would be avoided or mitigated; this is especially problematic given that it takes many, many years for redwood trees to achieve old-growth status. Thus, not only would this THP cause significant, unavoided/unmitigated impacts to the murrelet (and hence be in violation of CEQA¹⁵ and the FPRs¹⁶), it would also violate CESA's mandate that a)

The Legislature further finds and declares that it is the policy of this state that all state agencies, boards, and commissions shall seek to conserve endangered species and threatened species and shall utilize their authority in furtherance of the purposes of this chapter.

¹³ Moreover, the murrelet population of central California is likely genetically distinct and therefore its conservation is even more paramount. As noted in Piatt, J.F., Kuletz, K.J., Burger, A.E., Hatch, S.A., Friesen, V.L., Birt, T.P., Arimitsu, M.L., Drew, G.S., Harding, A.M.A., and K.S. Bixler, 2007, Status review of the Marbled Murrelet (*Brachyramphus marmoratus*) in Alaska and British Columbia: U.S. Geological Survey Open-File Report 2006-1387, 258 p.:

[S]everal lines of evidence indicate that murrelets in the central and western Aleutian Islands (Near and Andreanof islands) and central California differ significantly from those in central parts of the species' range.

Marbled Murrelets appear to comprise three genetic units: (1) western and central Aleutian Islands; (2) eastern Aleutian Islands to northern California; and (3) central California. These units were first identified by Congdon and others (2000) and Friesen and others (2005), and have been upheld by analyses of additional samples and loci. They are supported by both traditional (e.g., Wright's *FST*) and state-of-the-art analyses (e.g., coalescent theory), and three types of molecular markers (mtDNA, introns, and microsatellites). Loss of any of these populations would result in loss of a portion of the species' genetic resources and/or local adaptations, and may compromise its long-term viability. Due to their generally small size, relative isolation, and often marginal habitat, peripheral populations are expected to be more vulnerable to extinction (reviewed in Lessica and Allendorf, 1995; Vucetich and Waite, 2003). Our analyses confirm that murrelets in the western and central Aleutian Islands, and central California are genetically distinct, peripheral populations.

¹⁴ Due to the murrelet's critically endangered status in the area, its continued existence is already in jeopardy; therefore, when addressing impacts to the murrelet or its habitat, the question now is not whether the impacts will cause jeopardy – that is established – the question should only be how to avoid the impact.

¹⁵ The THP also therefore violates CEQA's mandate to provide the information necessary for the public and decisionmakers to make an informed decision. *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal. 4th 412, 442. (finding that information must "be presented in a manner calculated to adequately inform the public and decision makers, who may not be previously familiar with the details of the project.")

¹⁶ E.g., Cal Fire must disapprove a plan that could jeopardize the continued existence of any endangered species (14 CCR 898.2) and must make "mandatory Findings of Significance [when the] project has the potential to substantially degrade the quality of the environment; substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal

endangered species be “conserve[d], protect[d], restore[d], and enhance[d]”, b) jeopardy be avoided, and c) habitat essential to the continued existence of endangered species be protected. *See also Nat’l Wildlife Fed’n v. NMFS*, 524 F.3d 917, 933 (9th Cir. 2008) (“[Allowing a species to be] gradually destroyed, so long as each step on the path to destruction is sufficiently modest . . . is one of the very ills the ESA seeks to prevent.”). As such, this THP must be rejected.

The THP would also cause illegal habitat fragmentation. In other words, not only will important murrelet habitat be destroyed, but habitat outside the THP will also lose ecological value due to the fact that old-growth habitat in the region will be further fragmented by this THP. This is especially so from a cumulative impact perspective. In short, overall habitat in the area would be diminished, remaining habitat would be further isolated, and connectivity amongst habitat would be reduced. This reduction in size and connectivity of habitat will likely increase the influence of adverse environmental and demographic stochastic events on the murrelet thus pushing it closer to extinction on the central coast. Again, we are dealing with a baseline situation that shows the central coast murrelet population to be critically endangered; therefore, any additional loss of habitat, and any further harm to habitat connectivity, should be considered significant and should be considered to jeopardize the continued existence of the murrelet population that calls this THP’s watershed home. Moreover, to avoid extinction on the central coast, movement of murrelet individuals among habitat must be sufficient to repopulate unoccupied areas; of course, the more fragmented the area, the more difficult it becomes to repopulate unoccupied habitat. Thus, this THP must be rejected due to its impacts to murrelet habitat. As discussed in the USFWS 5-year Review, in order to adequately protect murrelets, necessary actions include “implementing short-term actions to stabilize and increase the population that include maintaining potential suitable habitat in large contiguous blocks and buffer areas, maintaining habitat distribution and quality, . . . implementing long-term actions to stop population decline and increase population growth by increasing the amount, quality and distribution of suitable nesting habitat, decreasing fragmentation, protecting “recruitment” habitat, [and] providing replacement habitat through silvicultural techniques” As things stand, the THP as proposed would do just the opposite and would further negatively contribute to an already bad situation.

THP 1-08-063-SMO contemplates the harvest of old-growth redwood trees in an area where extremely few still exist and in an area where the marbled murrelet depends upon them. Consequently, it is imperative that all old-growth in this THP be retained. Moreover, it is important that trees adjacent to old-growth be protected as well in order to buffer the old-growth and help ensure that the old-growth can be fully functional (for instance, for marbled murrelets to be able to use the trees with late seral characteristics adequately, it is necessary that adjacent trees be protected in order to provide security from predation, as well as to provide shade and protect the trees from windthrow).¹⁷ As explained in *Sierra Club v. State Bd. of Forestry*, 7 Cal. 4th at 1234:

community; substantially reduce the number or restrict the range of an endangered, rare or threatened species; or eliminate important examples of the major periods of California history or prehistory.” 14 CCR 15065.

¹⁷ Predation and wind throw are currently serious problems for murrelets. *See, e.g.*, USFWS 5-year Review (“The following actions were identified as necessary [:] . . . decreasing risk of . . . windthrow, . . . reducing nest predation”); *See also* Chen et al. 1999. Microclimate in Forest Ecosystem and Landscape Ecology: Variations in local

[The] express goals of CEQA . . . include preventing the elimination of fish or wildlife species due to man's activities, ensuring that fish or wildlife populations do not drop below self-perpetuating levels, and preserving for future generations representations of all plant and animal communities and examples of the major periods of California history. The possible destruction of both old-growth-dependent species and their habitat from the harvesting of old-growth timber can therefore be fairly described as significant and adverse.

Here, the record shows that marbled murrelets are on the cusp of extinction in the area due in part to logging activities. Yet the THP contains no discussion of how the absence of this species in the THP area is correlated with the loss of adequate high quality habitat in the planning area. THPs must consider their impacts “in the context of the larger forest and planning watershed in which they are located, so that biological diversity and watershed integrity are maintained and adverse cumulative impacts are reduced.” 14 CCR 897. The THP, on the other hand, essentially proposes to penalize murrelets for being critically endangered — instead of acknowledging the information which shows there to be high quality nesting trees in the THP (and thus retaining those trees), the THP proposes to cut old growth trees simply because surveys demonstrated that murrelets were not present. Such an analysis misses the point that all remaining old growth habitat in the area is crucial for the murrelet to be able to avoid extinction. Thus, while the marbled murrelet may not be present in the THP area at this time, the unoccupied habitat is nonetheless critical for this species to have any chance of surviving into the future and should be retained. Regardless, until the THP adequately addresses the baseline situation, properly discusses the cumulative impact to murrelets of loss of old growth habitat and loss of habitat connectivity, and then addresses appropriate alternatives or mitigation, it violates CEQA and the FPA.

The THP Fails to Adequately Address the Importance of Trees With Late Successional Characteristics

As stated in a CAL FIRE memorandum, “disclosure of potential significant adverse impacts pertaining to large old trees is required, even in those situations involving a single tree or small stand of trees less than 20 acres in size (i.e. does not meet the minimum stand acreage for Late Succession Forest Stands per 14 CCR § 895.1).”¹⁸ The situation here demands a proper analysis and mitigation for impacts to large old trees not only due to the impacts to murrelet habitat but also due to the importance of old-growth to wildlife, plants, and the environment in general. As explained below, the THP’s failure to adequately discuss the importance of large old trees to wildlife is prejudicial to informed decision-making and precludes necessary mitigation. *See San Joaquin Raptor/Wildlife Rescue Ctr. v. County of Stanislaus* (1994) 27 Cal. App. 4th 713, 723 (“Knowledge of the regional setting is critical to the assessment of environmental impacts.

climate can be used to monitor and compare the effects of different management regimes. *BioScience*, Vol. 49 No. 4; 288-97 (“strong winds near abrupt edges can be the primary cause of tree mortality, through windthrow . . .”)

¹⁸ *See* March 2, 2005, Department of Forestry and Fire Protection Memorandum Re Disclosure, evaluation and protection of large old trees.

Special emphasis should be placed on environmental resources that are rare or unique to that region and would be affected by the project.”); *Cadiz Land Co. v. Rail Cycle* (2000) 83 Cal. App. 4th 74, 94 (“Because the EIR must be certified or rejected by public officials, it is a document of accountability. If CEQA is scrupulously followed, the public will know the basis on which its responsible officials either approve or reject environmentally significant action, and the public, being duly informed, can respond accordingly to action with which it disagrees.”); 14 CCR 897 (“The information in [THPs] shall also be sufficiently clear and detailed to permit adequate and effective review by responsible agencies and input by the public to assure that; significant adverse individual and cumulative impacts are avoided or reduced to insignificance.”)

While the DFG reports make plain that the THP cannot be approved as is, additional scientific publications beyond those cited by DFG likewise highlight the significant impacts. For instance, a 2001 journal article notes the importance of old-growth to often overlooked arthropods and demonstrates that the THP is deficient in both its discussion of significant impacts and its failure to address alternatives or to provide for adequate mitigation:¹⁹

Extensive logging has reduced old-growth redwood forests from 800,000 hectares in 1850 to about 30,000 hectares by the early 1990s (Snyder 1992; Barbour et al. 1993).

Spiders and other arthropods have been found to react to habitat differences, individually through behavior, and collectively through the assembly of communities (Uetz 1979; Robinson 1981; Gunnarsson 1990; Uetz 1990; Sundberg & Gunnarsson 1994; Pettersson et al. 1995; Halaj et al. 1998). Diversity and abundance declined with decreased structural complexity, which could be a reflection of reduced habitat or resources.

A consistent finding of this project was the negative association between the number of logging events and the abundance and diversity of spiders and other arthropods. This finding occurred even though the tree farm uses selective harvesting techniques that are considered a model for sustainable redwood forestry (D. Herrman, personal communication). While the tree farm may be sustainable with respect to redwood biomass and financial integrity for the near future, findings from this study and from Hoekstra et al. (1995) show that these forestry techniques do not result in a diversity or abundance of forest floor arthropods comparable to those found in old growth. Because these arthropods are important in decomposition and nutrient cycling (Ausmus 1977; Crossley 1977; Reichle 1977; van der Drift & Jansen 1977; Peterson & Luxton 1982; Wallwork 1983; Verhoef & de Goede 1985; Visser 1985), events that disrupt these communities could be expected to disrupt these cycles that are needed for the sustenance of the primary production that forms the basis of the forest. It appears that tracts of undisturbed land are needed to preserve species diversity, maintain the integrity of communities, and serve as a control for our management experiments (Harris 1984; Barbour et al. 1993). Forest management, especially for timber production, could benefit from expanding the set of parameters examined when making decisions. The monitoring of redwood forests can and should include arthropods.

¹⁹ Willett, Terrence R.. 2001. Spiders and Other Arthropods as Indicators in Old-Growth Versus Logged Redwood Stands, *Restoration Ecology*, Vol. 9 No. 4, pp. 410–420

Another journal publication made similar findings regarding the importance of old-growth to bats. The article, *Bat Use of Remnant Old-Growth Redwood Stands*, notes that:

[O]lder forests favor abundant and diverse communities of forest bats (Thomas 1988; Fenton et al. 1992; Huff et al. 1993; Krusic et al. 1996; Parker et al. 1996).

[W]e sought to understand how bats use old trees in small remnant patches of old growth versus old trees in contiguous, unfragmented forest. This information may help managers assign value to the increasingly rare patches of old (>500 years) redwood forest within the extensive matrix of younger stands (5–80 years old) in the north coast of California.

Basal hollows in redwood trees are important roost sites for bats in coastal northern California. Hollows form as the result of periodic fires and subsequent wood decay (Fritz 1932; Finney 1996) and can become very large and persist for centuries before the tree falls. Forest-dwelling bats use the fire-scar cavities in redwood as maternity, day, and night roosts and occupy hollows during every month of the year (Rainey et al. 1992; Gellman & Zielinski 1996). Trees with the largest hollow volumes and those nearest to available surface water appear to receive the greatest use by roosting bats (Gellman & Zielinski 1996).

We conducted a study to compare the use by bats of hollow, old-growth redwood trees in contiguous forest and in remnant stands to determine the importance of these increasingly rare landscape features to the community of forest bats in the northern coastal region of California.

The guano data demonstrate a significantly greater use of old-growth trees in residual stands than within the contiguous forest. This suggests that either more bats use each of these trees or individual bats return to use these trees more frequently than they do trees within the unfragmented forest in the park. Although the ultrasound data were not statistically different, the isolated stands also had a higher index of bat activity (passes per night). It is clear that bats are making significant use of old-growth remnants, which make up a small proportion of the landscape.

Our data demonstrate that small remnants of original or old-growth forest continue to function as important habitat for forest bats. This conclusion agrees with the work of Crampton and Barclay (1996), who found that *Myotis* activity levels did not change substantially following forest fragmentation, and of Fenton et al. (1992), who found that bat captures generally remained high as long as some original forest remained. Erickson and West (1996) found that *Myotis* activity was greater in mature stands, but there was no difference for a number of other species. We do not believe, however, that there is anything inherently attractive about the remnants that resulted in the increased use of basal hollows in trees that occur there. Neither is there reason to suspect that a landscape dominated by young, developing forest with a few remnants would provide better habitat for forest bats than an intact, continuous forest; substantial evidence exists to the contrary (Thomas 1988; Fenton et al. 1992; Huff et al. 1993; Krusic et al. 1996; Parker et al. 1996). The lower availability of basal hollows in the remnants and their fortuitous

proximity to water probably explain why individual hollows in remnants received greater use by bats compared to those in hollows in the parkland reserve. The Wilson Creek watershed is an example of how an extremely modified landscape can continue to provide habitat for bats when most but not all of the large-cavity roosting structure has been eliminated. Our data provide an indication of the value of remnants to forest bats. The practice of harvesting the remnants to “clean up” all the miscellaneous fragments of old growth in a landscape and to bring all the stands into rotation for efficient management will probably affect bats and other wildlife. Marbled Murrelets and Northern Spotted Owls have also been reported to either nest or occur in small remnant stands of old-growth redwood (Miller & Ralph 1995; L. Diller, personal communication).

Remnants are the only old growth that occur in many watersheds. They should be viewed as the nuclei for the restoration of habitat, or at least as stepping stones in a management scheme to link larger units of forest managed for late-seral structure and function. A similar value has been recognized for small, isolated fragments of tropical forest, despite the fact that they may not be able to support all species (Turner & Corlett 1996). Remnants that are close to protected parkland, like those considered here, may actually expand the effective size of the park for species that can move easily between areas. It is apparent from the number of species associated with late-seral forest and whose habitat has been reduced by timber harvest (U.S. Forest Service & U.S. Bureau of Land Management 1994) that many species in addition to bats would benefit from protecting and linking the best of the remaining fragments of original forest.

In addition to arthropods and bats, the THP ignores impacts to species like the Vaux’s swift, a California Bird Species of Special Concern whose range includes the redwood forests of San Mateo county.²⁰ The Vaux’s swift is associated with trees that “grow large enough, persist long enough, and have decay, fire, or primary excavators such as Pileated Woodpeckers (*Drycopus pileatus*), or otherwise develop large and accessible cavities. ... While published details are limited, most California nests have been in burned-out and hollow Redwood snags or stumps.” *Id.* The California Bird Species of Special Concern account goes on to state the following:

Numerous studies have shown a strong positive association between the presence of Vaux’s Swifts and old-growth forests (Bull and Collins 1993), presumably reflecting the swifts’ requirement of large cavities for nesting. In California, the highest densities of swifts are found in the Redwood zone, the lowest in the Douglas-fir (*Pseudotsuga menziesii*) and other forest types found further inland (Sterling and Paton 1996). The relationship between swifts and Redwood forests may be explained by characteristics of these trees that favor the formation of large and long-lasting cavities. Redwoods can live

²⁰ See Shuford, W. D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento (“The range of the Vaux’s Swift in coastal California generally follows the distribution of Redwoods, but probably is patchy because of forest fragmentation. Although lacking prior to 1945, confirmed breeding records now exist for Del Norte, Mendocino, Sonoma, Marin, San Mateo, and Santa Clara counties...”)

over 2000 years and reach >7 m dbh (Sawyer et al. 2000). They are also resistant to fire and decay and will remain standing for very long periods while declining or completely dead. The presence of swifts in second-growth Redwood forests may be explained by the presence of remnant or residual old-growth trees (Sterling and Paton 1996). These scattered residual trees—formerly left during initial harvest(s) due to the presence of “cull” wood, deformity, or other defect—are often excellent potential nest and roost sites.

Id. A THP that fails to include adequate information regarding sensitive species necessarily contains insufficient information for evaluation of the plan’s potentially significant impacts. As explained in *Sierra Club*, 7 Cal. 4th at 1237:

The absence of any information regarding the presence of the four old-growth-dependent species on the site frustrated the purpose of the public comment provisions of the Forest Practice Act. It also made any meaningful assessment of the potentially significant environment impacts of timber harvesting and the development of site-specific mitigation measures impossible. In these circumstances prejudice is presumed.

Moreover, “the burden is not on the objectors to show that a project will cause a significant effect on the environment. The burden is on the EIR to consider and decide if a project will cause a significant effect.” *Napa Citizens for Honest Gov’t v. Napa County Bd. of Supervisors* (2001) 91 Cal. App. 4th 342, 384-385. Therefore, until the THP considers and accounts for its impacts to all wildlife, and then properly avoids or mitigates significant impacts, it is deficient, especially given that published literature has time and again explained the great significance of old growth for wildlife like the Vaux’s swift, arthropods, and bats.²¹ “The ultimate decision of whether to approve a project, be that decision right or wrong, is a nullity if based upon an EIR that does not provide the decision-makers, and the public, with the information about the project that is required by CEQA.” *San Joaquin Raptor/Wildlife Rescue Ctr.*, 27 Cal. App. 4th at 721-22. Moreover, in light of the baseline condition which shows late-seral trees to be extremely limited in the area, it should be plain that in order to adequately safeguard species in the watershed that use trees with late seral characteristics, it is necessary to protect and buffer all such trees.

The THP Fails to Adequately Address Its Carbon Emissions

If the Lagomarsino THP is to meet its CEQA obligations, it must also assess the significant contribution of logging to carbon emissions. The THP’s failure to calculate and analyze the emissions associated with it are especially problematic given that redwood trees

are famous for their enormous stocks of standing biomass and represent perhaps the most massive forests, per unit area, on earth. Measurements of old-growth (>200 years) redwood stands have yielded standing carbon stocks ranging from 1,650 to 1,784 t C equivalent per ha (Hallin, 1934, Westman and Whittaker, 1975, and Fujimori, 1977). Equally impressive is the rate at which carbon is sequestered in growing redwood stands.

²¹ The species discussed (Vaux’s swift, etc.) are not the only ones who benefit from late seral forest. They simply illustrate the broader problem – that this THP is failing to address the importance of trees with late successional characteristics.

A 100 year old redwood stand measured by Olson et al (1990) yielded 3,600 cubic meters per ha, equivalent to 648 t C per ha (at specific gravity 0.36 g oven dry biomass/cm³ for second-growth redwood (Markwardt and Wilson, 1935)), or a mean annual carbon increment of 6.48 t C per ha per year.²²

Some industry advocates like to argue that old-growth forests are “carbon neutral” – that is, they no longer remove carbon from the atmosphere at significant rates. However, older forests can continue to remove carbon from the atmosphere at considerable rates. Luyssaert et al (2008) state: “Our results demonstrate that old-growth forests can continue to accumulate carbon, contrary to the long-standing view that they are carbon neutral.”

Regardless, older forests *store* the most amount of carbon and therefore their loss is significant. Old growth forests have an especially vast amount of live vegetation including huge trees, large downed logs, a healthy understory and a rich ground layer. Each of these elements stores considerable amounts of carbon and so it follows that ancient forests and trees are the “banks” holding the most carbon. A report from the IPCC has echoed this sentiment pointing out that the best way to preserve the carbon stored in a forest is to preserve the forest itself: “The theoretical maximum carbon storage (saturation) in a forested landscape is attained when all stands are in old-growth state (Nabuurs et al. 2007).” In short, regardless of what rate old-growth forests sequester additional carbon, the fact remains that old-growth trees have a vast amount of stored carbon and therefore their loss is undoubtedly significant. The following chart helps illustrate the carbon storage within the components of a young forest and old forest:

	60-year-old forest	Old-growth forest
Foliage	5.5	6.2-7.0
Branches	7.0	26.3
Boles (wood and bark)	145	323
Roots (fine)	5.6	5.6
Woody debris and forest floor	10.9-26.1	123
Total	203-218	555-556

Figure 3: Above-ground (non-soil) carbon stores in old-growth forest vs. 60-year-old forest. Numbers in MG of carbon per hectare. Source: Harmon et al. 1990.²³

²² Winrock International. *Measuring and Monitoring Plans for Baseline Development and Estimation of Carbon Benefits for Change in Forest Management in Two Regions, March 2004*. Accessed at <http://www.energy.ca.gov/reports/CEC-500-2004-070/CEC-500-2004-070F.PDF> on July 25, 2009. See also Figures 34, 40, 41 and Tables 24, 25, 29 in Christensen, Glenn A.; Campbell, Sally J.; Fried, Jeremy S., tech. eds. 2008. California’s forest resources, 2001–2005: five-year Forest Inventory and Analysis report. Gen. Tech. Rep. PNW-GTR-763. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 183 p., accessed at <http://www.fs.fed.us/pnw/publications/gtr763/> on July 25, 2009. Christensen (2008) also makes clear that Douglas fir has high carbon storage/sequestration and therefore, its loss is significant as well.

²³ Harmon, Mark E., William K. Ferrell, and Jerry F. Franklin. 1990. Effects on Carbon Storage of Conversion of Old-Growth Forests to Young Forests. *Science* 247:699-702

The chart shows that it is not only older trees that hold large amounts of carbon; forest floors in older forests contain significantly more carbon than forest floors of cutover forests (Lecomte et al. 2006; Fredeen et al. 2005; Harmon et al. 1990). Luyssaert et al (2008) reported similar findings:

In our model we find that old-growth forests accumulate $0.4 \pm 0.1 \text{ tC ha}^{-1} \text{ yr}^{-1}$ in their stem biomass and $0.7 \pm 0.2 \text{ tC ha}^{-1} \text{ yr}^{-1}$ in coarse woody debris, which implies that about $1.3 \pm 0.8 \text{ tC ha}^{-1} \text{ yr}^{-1}$ of the sequestered carbon is contained in roots and soil organic matter.

In sum, because old-growth forests steadily accumulate carbon for centuries, they contain vast quantities of it. The impacts to that carbon from this THP must be accounted for and avoided or mitigated. The Lagomarsino THP has not adequately attempted to “calculate, model, or estimate the amount of CO₂ and other GHG emissions from the project, including the emissions associated with [logging trucks, logging equipment, energy consumption, or the many other operations associated with logging.]” OPR Technical Advisory (2008). Nor has the THP addressed the cumulative significance of its carbon impact. Until that occurs, the THP cannot come into compliance with CEQA and FPA obligations.

The THP Must Analyze and Adopt All Feasible Mitigation Measures And Alternatives

A THP is required to consider mitigation or alternatives²⁴ to the proposed action that could avoid or substantially lessen the significant impacts of eliminating wildlife habitat. Pub. Res. Code 21002; 21080.5(d)(2)(A); 14 CCR 896, 898. The discussion must focus on alternatives capable of avoiding any significant adverse environmental effects or reducing them to a level of insignificance, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly. Here, as discussed above, the THP assumes that it will not have significant impacts on late-seral trees or on wildlife. Based on that erroneous and unsubstantiated assumption, the THP never considers viable alternatives or enforceable mitigation measures that would avoid or substantially lessen the impacts. The failure to consider alternatives or mitigation that would avoid significant impacts is contrary to CEQA and the FPA.

A rigorous analysis of alternatives to the project is absolutely necessary. “Without meaningful analysis of alternatives in the EIR, neither courts nor the public can fulfill their proper roles in the CEQA process.” *Laurel Heights Improvement Ass’n*, 47 Cal.3d at 404. Moreover, “[a] potential alternative should not be excluded from consideration merely because it would impede to some degree the attainment of the project objectives, or would be more costly.” *Save Round Valley Alliance v. County of Inyo* (2007) 157 Cal. App. 4th 1437, 1456-57 (quotations omitted).

Here, potential alternatives include different silvicultural techniques, and/or avoided/reduced cutting. All of these alternatives, and any others, must be considered and fully discussed and analyzed, as they would “avoid or reduce” the cumulatively significant effect of the THP. Thus far, the THP’s alternatives section contains only a conclusory discussion of the spectrum of

²⁴ Although the THP states that “As of this time, there has been no interest in purchase of the property by either a public or private entity,” that is not the case. One potential buyer has expressed interest.

alternatives, makes no real effort to analyze alternatives that would avoid cutting old-growth areas, and provides no discussion of how each alternative would differ based in terms of impacts to late seral trees and wildlife.

Moreover, feasible alternatives must be considered regardless of the project proponent's position on the alternatives. For instance, in *Preservation Action Council v City of San Jose* (2006) 141 Cal .App. 4th 1355, the defendant relied heavily on the real parties' project objectives in order to reject an alternative. The court found that "the project objectives in the DEIR appear unnecessarily restrictive and inflexible." *Id.* at 1360. Put another way, "the willingness of the applicant to accept a feasible alternative . . . is no more relevant than the financial ability of the applicant to complete the alternative. To define feasible [in such fashion] would render CEQA meaningless." *Uphold Our Heritage v. Town of Woodside* (2007) 147 Cal. App. 4th 587, 601. This same principle was reiterated in *Save Round Valley Alliance v. County of Inyo*, 157 Cal. App. 4th at 1460, where the court found that "the willingness or unwillingness of a project proponent to accept an otherwise feasible alternative is not a relevant consideration." This was so despite the project proponent's explicit unwillingness to accept a proposed alternative. *Id.* The Court found that the alternative should have been analyzed regardless, and noted that an "applicant's feeling about an alternative cannot substitute for the required facts and independent reasoning." *Id.* at 1458, quoting *Preservation Action Council*, 141Cal. App. 4th at 1356. Thus, while the project proponent may desire to cut old-growth and the trees needed to protect the old-growth, CAL FIRE nonetheless has an independent obligation to assess alternatives that would avoid that impact. This is also necessary in order to allow for informed decision-making. In short, CAL FIRE can not simply acquiesce to the THP's desires; in the words of the *Save Round Valley* Court, "the agency preparing the EIR may not simply accept the proponent's assertions about an alternative." *Id.* at 1460. Consequently, thus far, the THP's analysis of alternatives is deficient as it provides no meaningful discussion of alternatives that would avoid or mitigate the impacts to old-growth and the wildlife that could use that old-growth

In addition to thoroughly evaluating project alternatives, "the [THP] must propose and describe mitigation measures that will minimize the significant environmental effects that the EIR has identified." *Napa Citizens for Honest Gov't*, 91 Cal.App.4th at 360. Mitigation of a project's significant impacts is one of the "most important" functions of CEQA. *Sierra Club v. Gilroy City Council* (1990) 222 Cal.App.3d 30, 41. Therefore, it is the "policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures which will avoid or substantially lessen the significant environmental effects of such projects." Pub. Res. Code § 21002. Importantly, mitigation measures must be "fully enforceable through permit conditions, agreements, or other measures" so "that feasible mitigation measures will actually be implemented as a condition of development." *Federation of Hillside & Canyon Ass'ns v. City of Los Angeles* (2000) 83 Cal.App.4th 1252, 1261. Thus far, not only does the THP fail to adequately address its significant impacts, it fails to discuss appropriate mitigation for those impacts.

CONCLUSION

The Lagomarsino THP must be revised in light of its informational and other deficiencies. Until all issues are adequately addressed and the THP re-circulated for comments, the proposed harvest is unlawful.

Thank you for your consideration of these comments. Please contact us if you have any questions.

Sincerely,



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