

**DEPARTMENT OF FORESTRY AND FIRE PROTECTION**

NORTHERN REGION HEADQUARTERS REDDING

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**OFFICIAL RESPONSE OF THE DIRECTOR OF THE CALIFORNIA DEPARTMENT
OF FORESTRY AND FIRE PROTECTION
TO SIGNIFICANT ENVIRONMENTAL POINTS RAISED DURING THE
TIMBER HARVESTING PLAN EVALUATION PROCESS**

THP NUMBER: 2-22-00001-PLU

SUBMITTER: Plan C Holdings LLC

COUNTY: Plumas

END OF PUBLIC COMMENT PERIOD: May 23, 2022

DATE OF OFFICIAL RESPONSE/DATE OF APPROVAL: June 7, 2022

The California Department of Forestry and Fire Protection has prepared the following response to significant environmental points raised during the evaluation of the above-referenced plan. Comments made on like topics were grouped together and addressed in a single response. Where a comment raised a unique topic, a separate response is made. Remarks concerning the validity of the review process for timber operations, questions of law, or topics or concerns so remote or speculative that they could not be reasonably assessed or related to the outcome of a timber operation, have not been addressed.

Sincerely,

Jon Woessner, RPF #2571
Forester III
Cascade, Sierra & Southern Regions

cc:
Unit Chief
Danielle Bradfield, RPF
Dept. of Fish & Game, Reg. 2
Water Quality, Reg. 5
Jean Marquardt

COMMON FOREST PRACTICE ABBREVIATIONS

CAL FIRE	Department of Forestry & Fire Protection	FPR	Forest Practice Rules
CAA	Confidential Archaeological Addendum	LTO	Licensed Timber Operator
CESA	California Endangered Species Act	NMFS	National Marine Fisheries Service
CEQA	California Environmental Quality Act	PHI	Pre-Harvest Inspection
CIA	Cumulative Impacts Assessment	RPF	Registered Professional Forester
CGS	California Geological Survey	THP	Timber Harvest Plan
CSO	California Spotted Owl	USFS	United States Forest Service
DBH	Diameter at Breast Height	WLPZ	Watercourse/Lake Protection Zone
DFG	Department of Fish & Game	WQ	California Regional Water Quality Control Board
DPR	Department of Pesticide Regulation	PCA	Pest Control Advisor
NSO	Northern Spotted Owl	[SIC]	Word used verbatim as originally printed in another document. May indicate a misspelling or uncommon word usage.
CDFW/DFW	California Dept. of Fish & Wildlife		
AB 32	Assembly Bill 32	ARB	Air Resources Board
NPP	Net Primary Production	BOF	Board of Forestry
NEPA	National Environ. Policy Act	CAPCOA	Calif. Air Pollution Control Officers Assoc.
NEP	Net Ecosystem Production	CCR	Calif. Code of Regulations
NTMP	NonIndust. Timb. Manag. Plan	CESA	Calif. Endangered Species Act
OPR	Govrn's Office of Plan. & Res.		
Pg	Petagram = 10 ¹⁵ grams		
PNW	Pacific NorthWest	PRC	Public Resources Code
CO ₂	Carbon Dioxide	RPA	Resource Plan. and Assess.
CO ₂ e	Carbon Dioxide equivalent	RPF	Registered Professional Forester
DBH/dbh	Diameter Breast Height	SPI	Sierra Pacific Industries
DFG	Calif. Department of Fish and Game	SYP	Sustained Yield Plan
EPA	Environmental Protection Agency	tC	tonnes of carbon
FPA	Forest Practice Act	Tg	Teragram = 10 ¹² grams
FPR	Forest Practice Rules	THP	Timber Harvesting Plan
GHG	Greenhouse Gas	LBM	Live Tree Biomass
ha ⁻¹	per hectare	TPZ	Timber Production Zone
LTSY	Long Term Sustained Yield	USFWS	U.S. Fish & Wildlife Service
m ⁻²	per square meter	WAA	Watershed Assessment Area
MAI	Mean Annual Increment	WLPZ	Watercourse. & Lake Prot. Zone
MMBF	Million Board Feet	yr ⁻¹	per year
MMTCo ₂ E	Million Metric Tons CO ₂ equivalent		

NOTIFICATION PROCESS

In order to notify the public of the proposed timber harvesting, and to ascertain whether there are any concerns with the plan, the following actions are automatically taken on each THP submitted to CAL FIRE:

- Notice of the timber operation is sent to all adjacent landowners if the boundary is within 300 feet of the proposed harvesting, (As per 14 CCR § 1032.7(e))
- Notice of the Plan is submitted to the county clerk for posting with the other environmental notices. (14 CCR § 1032.8(a))
- Notice of the plan is posted at the Department's local office and in Cascade Area office in Redding. (14 CCR § 1032)
- Notice is posted with the Secretary for Resources in Sacramento. (14 CCR § 1032.8(c))
- Notice of the THP is sent to those organizations and individuals on the Department's current list for notification of the plans in the county. (14 CCR § 1032.9(b))
- A notice of the proposed timber operation is posted at a conspicuous location on the public road nearest the plan site. (14 CCR § 1032.7(g))

THP REVIEW PROCESS

The laws and regulations that govern the timber harvesting plan (THP) review process are found in Statute law in the form of the Forest Practice Act which is contained in the Public Resources Code (PRC), and Administrative law in the rules of the Board of Forestry (rules) which are contained in the California Code of Regulations (CCR).

The rules are lengthy in scope and detail and provide explicit instructions for permissible and prohibited actions that govern the conduct of timber operations in the field. The major categories covered by the rules include:

- *THP contents and the THP review process
- *Silvicultural methods
- *Harvesting practices and erosion control
- *Site preparation
- *Watercourse and Lake Protection
- *Hazard Reduction
- *Fire Protection
- *Forest insect and disease protection practices
- *Logging roads and landing

When a THP is submitted to the California Department of Forestry and Fire Protection (CAL FIRE) a multidisciplinary review team conducts the first review team meeting to assess the THP. The review team normally consists of, but is not necessarily limited to, representatives of CAL FIRE, the Department of Fish and Wildlife (DFW), and the Regional

Water Quality Control Board (WQ). The California Geological Survey (CGS) also reviews THP's for indications of potential slope instability. The purpose of the first review team meeting is to assess the logging plan and determine on a preliminary basis whether it conforms to the rules of the Board of Forestry. Additionally, questions are formulated which are to be answered by a field inspection team.

Next, a preharvest inspection (PHI) is normally conducted to examine the THP area and the logging plan. All review team members may attend, as well as other experts and agency personnel whom CAL FIRE may request. As a result of the PHI, additional recommendations may be formulated to provide greater environmental protection.

After a PHI, a second review team meeting is conducted to examine the field inspection reports and to finalize any additional recommendations or changes in the THP. The review team transmits these recommendations to the RPF, who must respond to each one. The director's representative considers public comment, the adequacy of the registered professional forester's (RPF's) response, and the recommendations of the review team chair before reaching a decision to approve or deny a THP. If a THP is approved, logging may commence. The THP is valid for up to five years, and may be extended under special circumstances for a maximum of 2 years more for a total of 7 years.

Before commencing operations, the plan submitter must notify CAL FIRE. During operations, CAL FIRE periodically inspects the logging area for THP and rule compliance. The number of the inspections will depend upon the plan size, duration, complexity, regeneration method, and the potential for impacts. The contents of the THP and the rules provide the criteria CAL FIRE inspectors use to determine compliance. While CAL FIRE cannot guarantee that a violation will not occur, it is CAL FIRE's policy to pursue vigorously the prompt and positive enforcement of the Forest Practice Act, the forest practice rules, related laws and regulations, and environmental protection measures applying to timber operations on the timberlands of the State. This enforcement policy is directed primarily at preventing and deterring forest practice violations, and secondarily at prompt and appropriate correction of violations when they occur.

The general means of enforcement of the Forest Practice Act, forest practice rules, and the other related regulations range from the use of violation notices which may require corrective actions, to criminal proceedings through the court system. Civil, administrative civil penalty, Timber operator licensing, and RPF licensing actions can also be taken.

THP review and assessment is based on the assumption that there will be no violations that will adversely affect water quality or watershed values significantly. Most forest practice violations are correctable and CAL FIRE's enforcement program seeks to assure correction. Where non-correctable violations occur, civil or criminal action may be taken against the offender. Depending on the outcome of the case and the court in which the case is heard, some sort of supplemental environmental corrective work may be required. This is intended to offset non-correctable adverse impacts. Once a THP is completed, a completion report must be submitted certifying that the area meets the requirements of the

rules. CAL FIRE inspects the completed area to verify that all the rules have been followed including erosion control work.

Depending on the silvicultural system used, the stocking standards of the rules must be met immediately or in certain cases within five years. A stocking report must be filed to certify that the requirements have been met. If the stocking standards have not been met, the area must be planted annually until it is restored. If the landowner fails to restock the land, CAL FIRE may hire a contractor to complete the work and seek recovery of the cost from the landowner.

General Discussions for the Introduction

Although more specific detail is provided in the responses below, the following summary is provided for some of the over-arching concerns expressed in public comment.

Evenage Management and Impacts to Fire Hazard

The historical variability of fire hazard is a function of many variables, one of which is forest management (both active and passive). Many areas within California are experiencing an increase in wildfire size and intensity resulting from a reduction of forest management without considering the role that fire and timber management has played in fuels reduction. Timber management activities create a mosaic of age, size and density of forest cover that alone can stop or direct wildfire by modifying the fuel component of the fire tetrahedron. Conversely, omission of fuel management or controlled fire in a forest setting will result in an increased fuel load and potential for catastrophic fire. An objective view of forest management effects on fire occurrence reveals a matrix of fire risk and fire hazard. Fire seasons in the last 5 years have demonstrated that when wind driven, plume dominated fires occur, all forest types are vulnerable and all forest types have suffered catastrophic fire impacts, from young plantations to old growth forested stands.

“Successfully managing fuel conditions across landscapes will increase fire risk because of changes in microclimate and increases in fine fuels (Deeming and others 1977; Weatherspoon 1996; Agee and others 2000). Thinning of stands for fuel treatment and creating openings to encourage regeneration of ponderosa pine does allow more sun to reach the forest floor, contributing to faster drying of surface vegetation and more air/wind movement, and the open crowns encourage more fine fuels – herbaceous plants and fresh needle litter. However, when all the effects of these treatments are considered together (e.g., reducing stand density, reducing surface fuels, providing for long-term regeneration of ponderosa pine) fire hazard across the landscape is dramatically reduced, while the prospects of achieving multi-aged, multi-story, resilient forested landscapes are greatly improved. Additionally, fire suppression is generally made more efficient since the reduction of fire hazard more than offsets the increase in fire risk (Martin and Brackebusch 1974; Rothermel 1983; Agee 1996; van Wagtendonk 1996; Agee and others 2000).”¹

¹ United States District Court for the Eastern District of California, 2005, Declaration of Carl N. Skinner, Case No. S-04-CV-2023 LKK/PAN.

Fire behavior is influenced by three primary factors: Fuels, Weather and Topography. Of the three factors, fuels are the only factor that can reasonably be modified by human interaction. It is important to remember that the primary characteristics of fuels are modified over time in the absence of any human interaction; the natural environment is ever changing; as are the vegetative conditions and the relative fire threat that exists at any one time.

Even though topography cannot be changed readily by human interactions, it is also important to view the proposed project from the perspective of topography to understand how the vegetation that has been modified from harvesting operations would influence fire behavior. The National Wildfire Coordinating Group (NWCG) provides a variety of courses to teach and train wildland firefighters in understanding how wildland fires burn and the strategy and tactics that can be applied to safely extinguish them. There is a series of courses devoted exclusively to fire behavior (S-190, S-290, S-390, S-490 and S-590). These courses lay the foundation upon which a fire manager can predict the spread and direction of wildland fires across the landscape. S-190 and S-290 are standard courses which many CAL FIRE foresters take as part of their career development. Others go on to complete the full course and are eventually certified as Fire Behavior Analysts (FBAN). The experience that a forester brings from the natural resources side complements the course materials well.

One of the principles introduced in S-290 and expanded upon in S-390 is how to predict fire spread potential based upon the point of ignition for a fire. In addition to the fuels and weather at the fire location, the point where the fire originates also plays a large role in how it will behave and determine its potential to spread and become a large fire. Since the composition and distribution of fuels have the most influence on smaller fires, this is an important consideration when evaluating the fire danger that could potentially be created as a result of timber harvesting. Larger fires that have reached a plume, wind or terrain-dominated stage tend to be much less restricted by small-scale changes in vegetation, like that which would be seen resulting from timber management. It is the small-scale fires that deserve the most consideration in these instances.

A small ignition, occurring within an area that receives intensive forest management, is more likely to be extinguished during the incipient phases, due in large part to the access that is granted by the timberland owners road system. These smaller fires can be more easily extinguished during the phases where they are burning within the ground and surface fuels. The specific behavior of any fire is difficult to predict even under theoretical circumstances, let alone one burning in the open environment. There is no direct "cause and effect" relationship that can be drawn between evenage plantations and fire danger, because each fire start is different and each fire burns under different conditions. The assumption that a plantation has, at certain times in its development, higher fire dangers than others, is insufficient grounds to deny the use of evenage silviculture. In either event, the THP as proposed does not adversely add to the potential fire danger present within the plan area.

Aside from direct vegetation management, fire danger can also be reduced through the modification of practices that either reduce the potential for fire starts, or reduce the chance that a fire start will escape into the wildland and beyond the control of initial attack resources.

Catastrophic wildfire is the greatest threat to a timber resource based industry such as Sierra Pacific. As a result, one of the land manager's primary objectives is to protect that resource and the multitude of other values associated with it from destruction. It is important to differentiate between fire risk and fire hazard. While evenage units will experience a short period in their life span where they have greater risk of ignition (fire risk), as they develop they become more and more resistant to fire and thus have a much lower fire hazard over the longer term. Thus, the only way to effectively manage against catastrophic wildfire is at the landscape level. The activities that have led to increasing risks for catastrophic fire and the landowner's strategy to mitigate these are described in the THP. Maintaining a mosaic of forest stands at different ages that are managed to control forest density and thus fuel loads is an effective landscape level approach to containing large fires.

At the very least, the regeneration units afford an area of fire control in the event of an unplanned wildfire event. The units would represent areas of easier control of fires when the seedlings or saplings of conifers are shorter than the surrounding forest area. Unbroken areas of standing timber with ladder fuels can lead to large crown fires that are difficult to suppress because there is no natural barrier to fire, other than ridge tops, watercourses or wide roads and fuelbreaks. An occasional area of shorter timber with no ladder fuels can afford an area where fire control becomes feasible.

The Department has concluded that the wildfire assessment meets the intent of the Forest Practice Rules.

About Agency "Activism"

Another theme is the idea that CAL FIRE should take a somewhat activist role in steering plan submitters towards, or in this case away from, certain actions that the comment writer deems deleterious to the natural environment. To do so would be contrary to our purpose and entirely outside of our jurisdictional authority. The plan submitter is responsible for proposing plans consistent with their objectives and CAL FIRE is responsible for determining whether or not the operations as proposed would cause a significant adverse effect on the environment.

Greenhouse Gas Sequestration

Forest Practice Regulatory Background

The Z'berg-Nejedley Forest Practice Act (Division 4, Chapter 8, PRC) establishes the necessity for Timber Harvesting Plans to conduct commercial timber operations and establishes the Board of Forestry and Fire Protection as the regulatory authority for promulgation of regulations to, among other things:

...encourage prudent and responsible forest resource management calculated to serve the public's need for timber and other forest products, while giving consideration to the public's need for watershed protection, fisheries and wildlife, sequestration of carbon dioxide, and recreational opportunities alike in this and future generations.

The FPA was initially adopted in 1973. Since that time, the BOF has enacted numerous regulations to support Act intent related to sustained yield and has adopted conservation standards for post-harvest stocking that meet or exceed the minimum resource conservation standards specified in PRC 4561 of the Act. The Board has established rules related to demonstration of Timberland Productivity, Sustained Forestry Planning (14 CCR §933.10), demonstration of Maximum Sustained Productivity (14 CCR §933.11), and has defined sustained yield and Long Term Sustained Yield (14 CCR §895.1). Under these various rule provisions, landowners with more than 50,000 acres of timberland are required to demonstrate long-term sustained yield under the management regime they have selected for the ownership. Under this provision, the Department has received and approved long term sustained yield documents covering approximately 3.2 million acres of timberland. For smaller industrial and nonindustrial landowners, they must comply with minimum retention standards specified in the Rules as established by the BOF, although they may choose a higher standard.

More recently, amendments were made to the FPA to clarify and refine other mandates related to the assessment of Greenhouse Gas (GHG) impacts:

4512.5. Sequestration of carbon dioxide; legislative findings and declarations.

The Legislature finds and declares all of the following:

- (a) State forests play a critical and unique role in the state's carbon balance by sequestering carbon dioxide from the atmosphere and storing it long term as carbon.*
- (b) According to the scoping plan adopted by the State Air Resources Board pursuant to the California Global Warming Solutions Act of 2006 (Division 25.5 (commencing with Section 38500) of the Health and Safety Code), the state's forests currently are an annual net sequesterer of five million metric tons of carbon dioxide (5MMTCO₂). In fact, the forest sector is the only sector included in the scoping plan that provides a net sequestration of Greenhouse Gas emissions.*
- (c) The scoping plan proposes to maintain the current 5MMTCO₂ annual sequestration rate through 2020 by implementing "sustainable management practices," which include potential changes to existing forest practices and land use regulations.*
- (d) There is increasing evidence that climate change has and will continue to stress forest ecosystems, which underscores the importance of proactively managing forests so that they can adapt to these stressors and remain a net sequesterer of carbon dioxide.*
- (e) The Board, the Department, and the State Air Resources Board should strive to go beyond the status quo sequestration rate and ensure that their policies and regulations reflect the unique role forests play in combating climate change.*

4551. *Adoption of district forest practice Rules and regulations; factors considered in Rules and regulations governing harvesting of commercial tree species; funding.*

(a) ...

(b) (1) *The Board shall ensure that its Rules and regulations that govern the harvesting of commercial tree species, where applicable, consider the capacity of forest resources, including above ground and below ground biomass and soil, to sequester carbon dioxide emissions sufficient to meet or exceed the state's Greenhouse Gas reduction requirements for the forestry sector, consistent with the scoping plan adopted by the State Air Resources Board pursuant to the California Global Warming Solutions Act of 2006 (Division 25.5 (commencing with Section 38500) of the Health and Safety Code).*

(2) ...

Technical Rule Addendum #2, Item G:

G. GREENHOUSE GAS (GHG) IMPACTS

Forest management activities may affect GHG sequestration and emission rates of forests through changes to forest inventory, growth, yield, and mortality. Timber Operations and subsequent production of wood products, and in some instances energy, can result in the emission, storage, and offset of GHGs. One or more of the following options can be used to assess the potential for significant adverse cumulative GHG Effects:

1. *Incorporation by reference, or tiering from, a programmatic assessment that was certified by the Board, CAL FIRE, or other State Agency, which analyzes the net Effects of GHG associated with forest management activities.*
2. *Application of a model or methodology quantifying an estimate of GHG emissions resulting from the Project. The model or methodology should at a minimum consider the following:*
 - a. *Inventory, growth, and harvest over a specified planning horizon*
 - b. *Projected forest carbon sequestration over the planning horizon*
 - c. *Timber Operation related emissions originating from logging equipment and transportation of logs to manufacturing facility*
 - d. *GHG emissions and storage associated with the production and life cycle of manufactured wood products.*
3. *A qualitative assessment describing the extent to which the Project in combination with Past Projects and Reasonably Foreseeable Probable Future Projects may increase or reduce GHG emissions compared to the existing environmental setting. Such assessment should disclose if a known 'threshold of significance' (14 CCR § 15064.7) for the Project type has been identified by the Board, CAL FIRE or other State Agency and if so whether or not the Project's emissions in combination with other forestry Projects are anticipated to exceed this threshold.*

Over the years, various efforts by the California Legislature and the Governor to quantify greenhouse gas emissions and develop strategies for avoiding potential negative impacts have occurred. A summary relevant to this THP is provided below:

1. Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006, was signed into law by Governor Schwarzenegger and represents a comprehensive approach to address climate change. AB32 establishes a statewide goal to reduce greenhouse gas emissions to 1990 levels by 2020. The California Resources Air Board (ARB) is the lead agency for implementing AB32.

The scoping plan adopted by the ARB in December of 2008 establishes a general roadmap that California will take to achieve the 2020 goals. Targets for the Forestry Sector were established under the "Sustainable Forests" section of the Scoping Plan. The "Sustainable Forest" element was recognized as a carbon sink based on the current carbon inventory for the Forest Sector and sequestration benefits attributable to forest. Specific recommendations for the sector included:

- Maintaining the current 5 MMTCO₂E reduction target through 2020 by ensuring that current carbon stock is not diminished over time.
- Monitoring of carbon sequestered
- Improving greenhouse gas inventories.
- Determining actions needed to meet the 2020 targets.
- Adaptation
- Focusing on sustainable land-use activities.

Wildfire threat and loss to conversions were recognized as potential threats to the Forest Sector in relation to achieving sector goals.

2. AB 1504 (Chapter 534, Statutes of 2010, Skinner): Requires the Board of Forestry and Fire Protection to ensure that its rules and regulations that govern timber harvesting consider the capacity of forest resources to sequester carbon dioxide emissions sufficient to meet or exceed the state's GHG reduction target for the forestry sector, consistent with the AB 32 Climate Change Scoping Plan goal of 5 million metric tons CO₂ equivalent sequestered per year. Currently, these reports are principally prepared by Glenn A. Christensen.
3. SB 1122 (Chapter 612, Statutes of 2012, Rubio): This bill requires production of 50 megawatts of biomass energy using byproducts of sustainable forest management from fire threat treatment areas as determined by CAL FIRE.
4. AB 417 (Chapter 182, Statutes of 2015, Dahle): This bill provides the Board of Forestry and Fire Protection with additional flexibility in setting post timber harvest tree stocking standards in order to, in part, contribute to specific forest health and ecological goals as defined by the Board. The 2020 Forest Practice Rules include the Board's revisions to the "Resource Conservation Standards" under 14 CCR §932.7.

5. In 2015, the Governor issued [Executive Order B-30-15](#) establishing a GHG reduction target for California of 40 percent below 1990 levels by 2030 and 80 percent by 2050 to help limit global warming to 2 degrees Celsius or less as identified by the IPCC to avoid potentially catastrophic climate change impacts. In 2016, the California Legislature passed Senate Bill 32 (Chapter 249, Statutes of 2016), which codifies the Governor's Executive Order. CARB updated the AB 32 Scoping Plan in 2017 to reflect the 2030 target.
6. SB 859 (Chapter 368, Statutes of 2016, Committee on Budget and Fiscal Review): Among other things, calls for CARB, in consultation with CNRA and CAL FIRE, to complete a standardized GHG emissions inventory for natural and working lands, including forests by December 31, 2018 (CARB 2018 - An Inventory of Ecosystem Carbon in California's Natural & Working Lands – 2018 Edition).
7. SB 1386 (Chapter 545 Statutes of 2016, Wolk): Declares the policy of the state that the protection and management of natural and working lands, including forests, is an important strategy in meeting the state's greenhouse gas reduction goals, and requires all state agencies, departments, boards, and commissions to consider this policy when revising, adopting, or establishing policies, regulations, expenditures, or grant criteria relating to the protection and management of natural and working lands.
8. (2018) Accompanying release of the Forest Carbon Plan, Governor Brown's Executive Order B-52-18 on forest management emphasizes the importance of implementing the Forest Carbon Plan. Executive Order B-55-18 also calls for California to achieve carbon neutrality no later than 2045, with carbon sequestration targets to be set in the Natural and Working Lands to help achieve this goal.

These Laws, Regulations and Executive Orders form the background under which CAL FIRE reviews plans for impacts to GHG emissions and sequestration.

National and State-Level GHG Assessments

A variety of assessments have been conducted to calculate the GHG emissions and rates of sequestration related to management of natural and working lands. Due to the rapidly evolving science, accounting methods and policy directions from the executive and legislative branches, specific accounting that conforms from study to study has yet to be achieved. The overall trends, however, do provide meaningful insight within which to make assumptions about how an individual THP fits into the overall objectives of assessing and mitigating potential negative impacts from GHG emissions.

USEPA Inventory of U.S. Greenhouse Gas Emissions and Sinks (2019):

Summary: Forest management falls under the “Land Use, Land Use Change, and Forestry” (abbreviated LULUCF) for consistent reporting with other international efforts. Sequestrations at the national level offset approximately 11.3% of total US GHG Emissions annually and this carbon pool remains relatively stable over time.

- *In 2017, total gross U.S. greenhouse gas emissions were 6,456.7 MMT, or million metric tons, of carbon dioxide (CO₂) Eq. Total U.S. emissions have increased by 1.3 percent from 1990 to 2017, and emissions decreased from 2016 to 2017 by 0.5 percent (35.5 MMT CO₂ Eq.). The decrease in total greenhouse gas emissions between 2016 and 2017 was driven in part by a decrease in CO₂ emissions from fossil fuel combustion. The decrease in CO₂ emissions from fossil fuel combustion was a result of multiple factors, including a continued shift from coal to natural gas and increased use of renewable energy in the electric power sector, and milder weather that contributed to less overall electricity use.*
- *Conversely, U.S. greenhouse gas emissions were partly offset by carbon (C) sequestration in forests, trees in urban areas, agricultural soils, landfilled yard trimmings and food scraps, and coastal wetlands, which, in aggregate, offset 11.3 percent of total emissions in 2017. The following sections contribution to total U.S. greenhouse gas emissions in more detail.*
- *Within the United States, fossil fuel combustion accounted for 93.2 percent of CO₂ emissions in 2017. There are 25 additional sources of CO₂ emissions included in the Inventory (see Figure ES-5). Although not illustrated in the Figure ES-5, changes in land use and forestry practices can also lead to net CO₂ emissions (e.g., through conversion of forest land to agricultural or urban use) or to a net sink for CO₂ (e.g., through net additions to forest biomass).*

Land Use, Land-Use Change, and Forestry (LULUCF)

Overall, the Inventory results show that managed land is a net sink for CO₂ (C sequestration) in the United States. The primary drivers of fluxes on managed lands include forest management practices, tree planting in urban areas, the management of agricultural soils, landfilling of yard trimmings and food scraps, and activities that cause changes in C stocks in coastal wetlands. The main drivers for forest C sequestration include forest growth and increasing forest area, as well as a net accumulation of C stocks in harvested wood pools.

The LULUCF sector in 2017 resulted in a net increase in C stocks (i.e., net CO₂ removals) of 729.6 MMT CO₂ Eq. (Table ES-5).²³ This represents an offset of 11.3 percent of total (i.e., gross) greenhouse gas emissions in 2017.

Forest fires were the largest source of CH₄ emissions from LULUCF in 2017, totaling 4.9 MMT CO₂ Eq

- *Forest fires were also the largest source of N₂O emissions from LULUCF in 2017, totaling 3.2 MMT CO₂ Eq.*
- *In addition to forest regeneration and management, forest harvests and natural disturbance have also affected net C fluxes. Because most of the timber harvested from U.S. forest land is used in wood products, and many discarded wood*

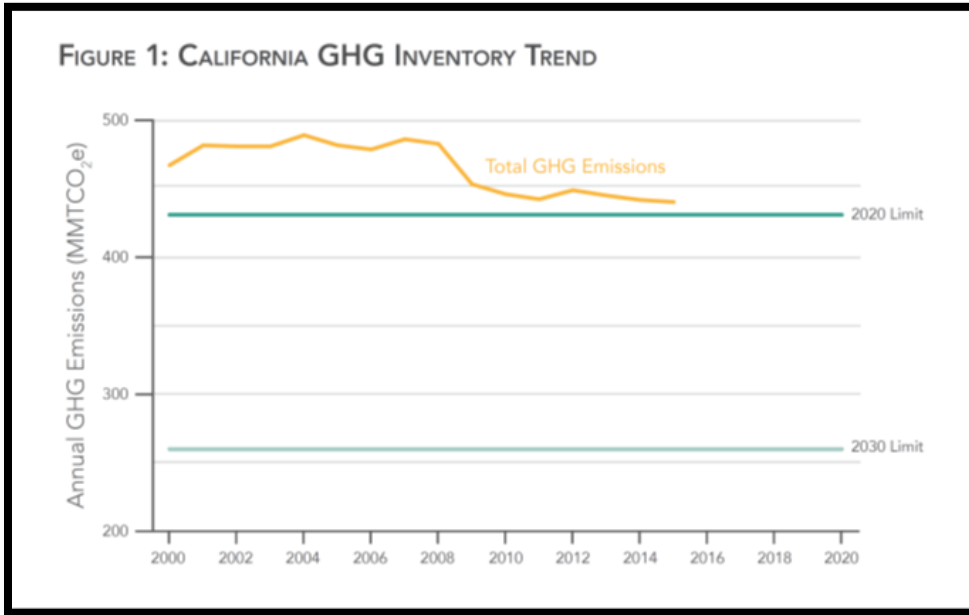
products are disposed of in SWDS rather than by incineration, significant quantities of C in harvested wood are transferred to these long-term storage pools rather than being released rapidly to the atmosphere (Skog 2008). Maintaining current harvesting practices and regeneration activities on these forested lands, along with continued input of harvested products into the HWP pool, C stocks in the Forest Land Remaining Forest Land category are likely to continue to increase in the near term, though possibly at a lower rate.

- *Overall, estimates of average C density in forest ecosystems (including all pools) remained stable at approximately 205 MT C ha⁻¹ from 1990 to 2017.*

CARB AB32 Scoping Plan (2017):

Summary: At the state level, all sectors are cumulatively on track to meet the 2020 targets for GHG reductions and sequestration. The Natural and Working Lands in the state represent a key sector for the long term storage of carbon in vegetation and soils. During the period of 2001-2010, disturbances (primarily in the form of wildfire) caused significant losses to the total stored carbon. Meeting state goals will require multi-owner and jurisdictional cooperation as well as trade-offs between competing interests.

- *California's natural and working landscapes, like forests and farms, are home to the most diverse sources of food, fiber, and renewable energy in the country. They underpin the state's water supply and support clean air, wildlife habitat, and local and regional economies. They are also the frontiers of climate change. They are often the first to experience the impacts of climate change, and they hold the ultimate solution to addressing climate change and its impacts. In order to stabilize the climate, natural and working lands must play a key role.*
- *Work to better quantify the carbon stored in natural and working lands is continuing, but given the long timelines to change landscapes, action must begin now to restore and conserve these lands. We should aim to manage our natural and working lands in California to reduce GHG emissions from business-as-usual by at least 15-20 million metric tons in 2030, to compliment the measures described in this Plan.*
- *California's forests should be healthy carbon sinks that minimize black carbon emissions where appropriate, supply new markets for woody waste and non-merchantable timber, and provide multiple ecosystem benefits.*
- *AB 32 directs CARB to develop and track GHG emissions and progress toward the 2020 statewide GHG target. California is on track to achieve the target while also reducing criteria pollutants and toxic air contaminants and supporting economic growth. As shown in Figure 1, in 2015, total GHG emissions decreased by 1.5 MMTCO₂e compared to 2014, representing an overall decrease of 10 percent since peak levels in 2004. The 2015 GHG Emission Inventory and a description of the methodology updates can be accessed at: www.arb.ca.gov/cc/inventory/inventory .*



Carbon dioxide is the primary GHG emitted in California, accounting for 84 percent of total GHG emissions in 2015, as shown in Figure 2 below. Figure 3 illustrates that transportation, primarily on-road travel, is the single largest source of CO₂ emissions in the State.. When these emissions sources are attributed to the transportation sector, the emissions from that sector amount to approximately half of statewide GHG emissions. In addition to transportation, electricity production, and industrial and residential sources also are important contributors to CO₂

Increasing Carbon Sequestration in Natural and Working Lands

- California’s natural and working lands make the State a global leader in agriculture, a U.S. leader in forest products, and a global biodiversity hotspot. These lands support clean air, wildlife and pollinator habitat, rural economies, and are critical components of California’s water infrastructure. Keeping these lands and waters intact and at high levels of ecological function (including resilient carbon sequestration) is necessary for the well-being and security of Californians in 2030, 2050, and beyond. Forests, rangelands, farms, wetlands, riparian areas, deserts, coastal areas, and the ocean store substantial carbon in biomass and soils.
- Natural and working lands are a key sector in the State’s climate change strategy. Storing carbon in trees, other vegetation, soils, and aquatic sediment is an effective way to remove carbon dioxide from the atmosphere. ...We must consider important trade-offs in developing the State’s climate strategy by understanding the near and long-term impacts of various policy scenarios and actions on our State and local communities.
- Recent trends indicate that significant pools of carbon from these landscapes

risk reversal: over the period 2001–2010 disturbance caused an estimated 150 MMT C loss, with the majority— approximately 120 MMT C— lost through wildland fire.

- *California’s climate objective for natural and working lands is to maintain them as a carbon sink (i.e., net zero or negative GHG emissions) and, where appropriate, minimize the net GHG and black carbon emissions associated with management, biomass utilization, and wildfire events.*
- *Decades of fire exclusion, coupled with an extended drought and the impacts of climate change, have increased the size and intensity of wildfires and bark beetle infestations; exposed millions of urban and rural residents to unhealthy smoke-laden air from wildfires; and threatened progress toward meeting the state’s long-term climate goals. Managing forests in California to be healthy, resilient net sinks of carbon is a vital part of California’s climate change policy.*
- *Federally managed lands play an important role in the achievement of the California climate goals established in AB 32 and subsequent related legislation and plans. Over half of the forestland in California is managed by the federal government, primarily by the USDA Forest Service Pacific Southwest Region, and these lands comprise the largest potential forest carbon sink under one ownership in the state... The State of California must continue to work closely and in parallel to the federal government’s efforts to resolve these obstacles and achieve forest health and resilience on the lands that federal agencies manage.*

California Forest Carbon Plan (May 2018)

Summary: Current estimated sequestration for the entire forest sector is 32.8 MMT CO₂e/year, which is 4.7 times more than the current target of 5 MMT per year. Regional, landscape or watershed level assessments are appropriate scales for examining rates of GHG emissions and sequestration. Wildfire remains the single largest source of carbon loss and remains the largest source of black carbon emissions. Although there are trade-offs with in-forest carbon stores, sustainably managed working forests can further provide climate mitigation benefits.

- *When all forest pools are considered, California’s forests are sequestering 34.4 MMT CO₂e/year, and when land-use changes and non-CO₂ emissions from wildfires are accounted for, the total net sequestration is 32.8 MMT CO₂e/year.*

Table 16. Statewide Average Annual Growth, Removals, Mortality, and Net Change for the Above Ground Live Tree Pool by Disturbance, Owner, and Land Status on Plots Initially Measured between 2001-2005 and Re-Measured between 2011-2015 (thousand metric tons carbon dioxide equivalent per year).

	UNRESERVED FORESTLAND			RESERVED FORESTLAND	ALL FORESTLAND ²
	Private, Corporate	Private, Non-Corporate	USDA Forest Service	USDA Forest Service	Total
	<i>thousand metric tons CO2 equivalent per year</i>				
Gross tree growth	18,554	13,772	25,983	7,188	73,253
Removal - harvest	-10,664	-1,476	-1,467	-22	-13,645
Mortality – fire killed	-278	-449	-6,077	-4,689	-12,566
Mortality – cut and fire ¹	-466	-49	-326	0	-842
Mortality – insects and disease	-488	-435	-3,162	-1,039	-5,728
Mortality – natural/other	-2,525	-2,988	-6,743	-2,203	-16,543
Net live tree	4,133	8,375	8,208	-765	23,929
	95% confidence interval				4,575

¹Mortality – Cut and fire: plots where tree mortality has occurred due to both harvest and fire.

²Includes other public forestland.

Source: USDA Forest Service FIA.²⁶⁷

- *The key findings of the [Forest Carbon Plan] include:*
 - *California’s forested landscapes provide a broad range of public and private benefits, including carbon sequestration.*
 - *The long-term impacts of excluding fire in fire-adapted forest ecosystems are being manifested in rapidly deteriorating forest health, including loss of forest cover in some cases.*
 - *Extreme fires and fire suppression costs are increasing significantly, and these fires are a growing threat to public health and safety, to homes, to water supply and water quality, and to a wide range of other forest benefits, including ecosystem services.*
 - *Reducing carbon losses from forests, particularly the extensive carbon losses that occur during and after extreme wildfires in forests and through uncharacteristic tree mortality, is essential to meeting the state’s long-term climate goals.*
 - *Fuel reduction in forests, whether through mechanical thinning, use of ecologically beneficial fire, or sustainable commercial timber harvest to achieve forest health goals, involves some immediate loss of forest carbon, but these treatments can increase the stability of the remaining and future stored carbon.*
 - *Current rates of fuel reduction, thinning of overly dense forests, and use of prescribed and managed fire are far below levels needed to restore forest health, prevent extreme fires, and meet the state’s long-term climate goals.*
 - *Where forest stands are excessively dense, forest managers may have to conduct a heavy thinning to restore resilient, healthy conditions, which, among other benefits, will subsequently facilitate the reintroduction of prescribed fire as an ecological management tool.*
 - *Sustainable timber harvesting on working forests can substantially improve the economic feasibility of these treatments to achieve forest health goals at the*

scale necessary to make an ecologically meaningful difference.

- *Where forestlands have been diminished due to fires, drought, insects, or disease, they should be reforested with ecologically appropriate tree species from appropriate seed sources.*
 - *The scale and combination of needed treatments and their arrangement across the landscape is likely to be highly variable and dependent on the local setting.*
 - *The state must work closely with Federal and private landowners to manage forests for forest health, multiple benefits, and resiliency efficiently at a meaningful scale.*
- *The watershed level has proven to be an appropriate organizing unit for analysis and for the coordination and integrated management of the numerous physical, chemical, and biological processes that make up a watershed ecosystem. Similarly, a watershed can serve as an appropriate reference unit for the policies, actions, and processes that affect the biophysical system, and providing a basis for greater integration and collaboration. Forests and related climate mitigation and adaptation issues operate across these same biophysical, institutional, and social gradients.*

Because of these factors, the Forest Carbon Plan proposes working regionally at the landscape or watershed scale. The appropriate scale of a landscape or watershed to work at will vary greatly depending upon the specific biophysical conditions, land ownership or management patterns, and other social or institutional conditions.

- *Forests are shaped by disturbance and background levels of tree mortality. However, elevated tree mortality from overly dense stand conditions, fire exclusion, lack of or poor forest management practices, and impacts related to drought and climate change can have a substantial effect on the forest carbon balance. Wildfire is the single largest source of carbon storage loss and GHG emissions from forested lands: of the estimated 150 million metric tons of carbon lost from forests from 2001-2010, approximately 120 million metric tons of carbon was lost through wildland fire. Wildfire also is the single biggest source of black carbon emissions. Reducing the intensity and extent of wildland fires through tools such as fuels reduction, prescribed or managed fire, thinning, and sustainable timber management practices is therefore a top priority.*
- *In addition to fuels reduction and prescribed and managed fire treatments, sustainable commercial timber harvesting on private and public lands, where consistent with the goals of owners or with management designations and done to maximize forest health goals, can play a beneficial role, both in thinning dense forests and financing additional treatments. Although there are trade-offs with in-forest carbon stores, sustainably managed working forests can further provide climate mitigation benefits. Commercial timber harvest within a sustainable management regime to maximizing forest health goals also creates revenue opportunities to fund additional forest treatments and should be seen as a tool in the maintenance of our forests as healthy, resilient net sinks of carbon.*
- *In order to support the goals of this Forest Carbon Plan, wood and biomass material*

generated by timber harvesting, forest health, restoration and hazardous fuels treatments must be either utilized productively or disposed of in a manner that minimizes net GHG and black carbon emissions. Timber and other biomass harvest volumes are expected to increase as a result of the forest management activities outlined above. These volumes will include green and dead trees suitable for timber production, smaller-diameter green and dead trees with little traditional timber value, and tops and limbs.

- *Specific Rates of Sequestration/Emission by landowner category:*
 - *Private Corporate Forestland: Private corporate forestland includes both timberland and other forestland. On private corporate forestland growth is high and exceeds removal and mortality, reflecting the practice of sustained yield as required by California's Forest Practice Act and Rules. These forests are managed to create relatively little annual mortality and the harvested volume is less than forest growth. Rates of removals from harvest and thinning are highest on these lands, but the rate of fire-related mortality is lowest. These forests experience a net gain in carbon at a rate of 0.75 metric tons of CO₂e per acre per year, or 4.1 MMT of CO₂e per year. In 2012, these lands contributed 70 percent of the total harvest (Figure 16) and are therefore an important contributor to the carbon stored long-term in harvested wood products and reduced emissions from burning wood instead of fossil fuels for energy.*
 - *Private Non-Corporate Forestland: This category represents private ownerships for which timber production may or may not be a primary management objective. The rate of gross growth is high on these lands, while the rate of natural, non-fire related mortality is low. The rate of fire-related mortality is also quite low, although it is higher than on private corporate forestland. As these lands exhibit high growth rates, lower harvest per acre than corporate forestland, and have relatively low levels of mortality, these forest lands see the highest net sequestration rates on the order of 1.33 metric tons of CO₂e per acre per year, or 8.4 million metric tons of CO₂e per year.*

Private non-corporate forestland has the highest rate of sequestration per acre (Figure 17), and despite making up 10 percent less of the forestland base than USDA Forest Service unreserved forestland, these forests sequester the greatest total amount (Table 16). A net 33 percent increase in carbon stock from private non-corporate forestland came from only 24 percent of the California forestland base (Figure 18, Figure 9). A net 13 percent increase in carbon stock from private corporate forestland came from 15 percent of the forestland base. ... Private non-corporate forestlands provided slightly less of a net increase in carbon stocks than all USDA FS forestlands, despite being just half the size.

- *Forest carbon is stored in both forest ecosystems and, to a lesser extent, in harvested wood products. The degree to which California forests operate as a sink or source is influenced by land management, weather, and a range of forest health issues (e.g., growth, tree mortality from drought, pest and disease outbreaks, wildfire severity). In*

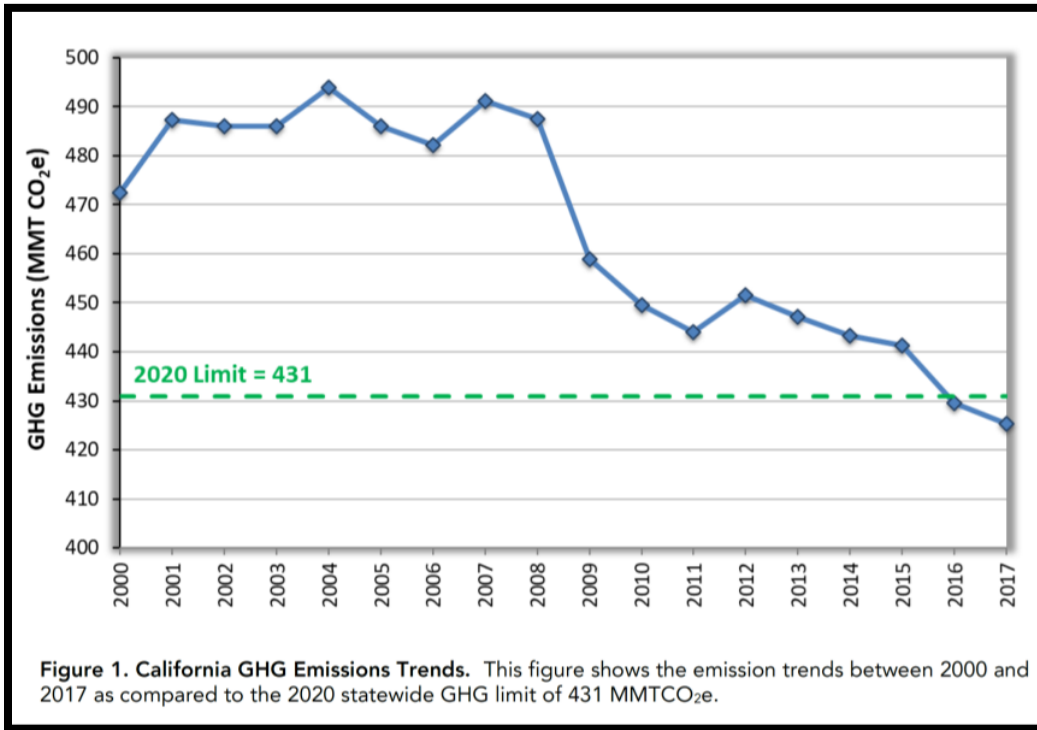
recent years, prolonged drought conditions have resulted in elevated tree mortality that is widespread across the southern Sierra. The combination of drought impacts and extensive wildfires has made forests lose significant capacity for storing carbon. For all forestlands, improving forest health and managing to reduce losses from mortality can greatly increase the carbon balance on forestlands. On commercial and other actively managed forestlands in California, efficient uses of long lasting wood products and residues for energy can yield GHG benefits. Key inventory findings include:

- Based on FIA Program data from 2006-2015, all California forests combined on all ownerships were performing as a net sink and are sequestering carbon at an average rate of 0.79 metric tons of CO₂e per acre per year, or 0.22 metric tons of carbon per acre per year.
- *Based on FIA Program data from 2006 – 2015, California forests have substantial carbon storage; 1,303 MMT above ground and 734 MMT below ground, for a total of 2,037 MMT.*
- *Based on remeasurements taken between 2011 and 2015, carbon sequestration in the live tree pool (in-forest) was estimated at 7.4 MMT of CO₂e per year on National Forest System unreserved and reserved forestlands, 4.1 MMT on private corporate forestland, 8.4 MMT on private noncorporate timberlands, and 4.0 MMT on other public lands. The net change in the live tree pool across all forestlands is estimated at 23.9 MMT of CO₂e per year.*
- *When other forest pools, soils, non-GHG emissions from wildfire, and changes from land-use are accounted for, the net change is 32.8 MMT CO₂e per year, meeting the AB 1504 goal of sequestering 5 MMT CO₂e per year, assuming the contribution of flux associated with wood products does not drastically lower rates.*
- *On a per-acre basis, conifer forest types have enormous carbon capture and storage potential.*
- *FIA Program data suggest that on private forestland growth is outpacing losses from harvest and mortality (excluding wood product storage), and exceeds that of National Forest System lands.*
- *FIA Program data show that non-corporate forestland has the greatest net growth (i.e., growth minus mortality and harvest excluding wood product storage).*
- *Based on FIA Program data, tree mortality from forest health-related causes results in substantial declines in forest carbon. These data indicate that tree mortality rates are highest on federal forest lands in reserve (e.g., wilderness), where mortality is slightly outpacing growth.*

CARB California Greenhouse Gas Emissions for 2000 to 2017 (2019)

Summary: This inventory is specific to anthropogenic sources so most of the agriculture category relates to commercial agriculture. Emissions related to logging from trucks and equipment would fall under the transportation sector. The Natural and Working Lands Emission Inventory contains more specific emission and sequestration numbers for Forestry.

- *For the first time since California started to track GHG emissions, in-state and total electricity generation from zero-GHG sources (for purposes of the GHG inventory, these include solar, hydro, wind, and nuclear) exceeded generation from GHG-emitting sources.*
- *The transportation sector remains the largest source of GHG emissions in the state, but saw a 1 percent increase in emissions in 2017, the lowest growth rate over the past 4 years.*
- *Emissions from all other sectors have remained relatively constant in recent years, although emissions from high Global Warming Potential (GWP) gases have continued to increase as they replace Ozone Depleting Substances (ODS) banned under the 1987 Montreal Protocol.*



- *In 2017, emissions from statewide emitting activities were 424 million metric tons of CO₂ equivalent (MMT CO₂e), which is 5 MMT CO₂e lower than 2016 levels. 2017 emissions have decreased by 14 percent since peak levels in 2004 and are 7 MMT CO₂e below the 1990 emissions level and the State's 2020 GHG limit. Per capita GHG emissions in California have dropped from a 2001 peak of 14.1 tonnes per person to 10.7 tonnes per*

person in 2017, a 24 percent decrease.^{4,19} Overall trends in the inventory also demonstrate that the carbon intensity of California's economy (the amount of carbon pollution per million dollars of gross domestic product (GDP)) is declining. From 2000 to 2017, the carbon intensity of California's economy has decreased by 41 percent from 2001 peak emissions while simultaneously increasing GDP by 52 percent. In 2017, GDP grew 3.6 percent while the emissions per GDP declined by 4.5 percent compared to 2016.²² Figures 2(a)-(c) on the next page show California's growth alongside GHG reductions.

- *California's agricultural sector contributed approximately 8 percent of statewide GHG emissions in 2017, mainly from methane (CH₄) and nitrous oxide (N₂O) sources.*

An Inventory of Ecosystem Carbon in California's Natural & Working Lands (NWL) (2018)

This inventory tracks carbon within California ecosystems and how it moves between various "pools". This is a snapshot view that provides for valuable long-term comparisons. These inventories are constantly being improved and some tracking categories have higher levels of certainty than others. Soil is the largest estimated pool of carbon and also has the highest error associated with those estimates. The assessment estimates that a majority of soil carbon loss is associated with the Sacramento-San Joaquin Delta region. Forest and shrublands show a 6% decrease, due to loss from wildfire. During the early iterations of these inventories, it appears prudent to only focus on gross trends.

- *The NWL Inventory tracks how much carbon exists in California's ecosystems, where that carbon is located, and estimates how much carbon is moving in and out of the various land types and carbon pools. It provides stored carbon "snapshots" and gives insight into the location and magnitude of NWL carbon stocks at discrete moments in time. NWL plays an important role in the State's climate strategy by contributing to carbon sequestration and GHG reduction, and the NWL Inventory is a key tool for tracking the impacts of these strategies.*
- *The NWL inventory includes:*
 - *Forest and other natural lands (woodland, shrubland, grassland, and other lands with sparse vegetation): live and dead plant materials and their roots*
 - *Urban land: trees in urban area*
 - *Cropland: woody biomass in orchards and vineyards*
 - *Soil Carbon: organic carbon in soils for all land types*
 - *Wetlands: CO₂ and CH₄ emissions from wetland ecosystem*

Current NWL Inventory

- *There are approximately 5,340 million metric tons (MMT)² of ecosystem carbon in the carbon pools that CARB has quantified.³ (To put it into context, 5,340 MMT of carbon in land is equivalent to 19,600 MMT of atmospheric CO₂ currently existing as carbon in the biosphere and pedosphere as carbon cycles through the Earth's carbon cycle.) Forest and shrubland contain the vast*

majority of California's carbon stock because they cover the majority of California's landscape and have the highest carbon density of any land cover type. All other land categories combined comprise over 35% of California's total acreage, but only 15% of carbon stocks. Roughly half of the 5,340 MMT of carbon resides in soils and half resides in plant biomass. Figure E-1 shows carbon distribution by land category (inner ring of the pie chart) and by carbon pool (outer ring of the pie chart). Table E-1 summarizes carbon stocks by land category and the fractions of total State land area in each land category.

- *Soil is the largest carbon reservoir. Using the IPCC default assumptions, most of the estimated net change in soil carbon was due to microbial oxidation of organic soil on the Sacramento-San Joaquin Delta. Disturbance caused by tillage and other agricultural management practices, land conversion, and land degradation also contributed to the soil carbon loss. Forest and shrubland carbon stocks in 2010 was 6% lower than in 2001 due to a number of large wildfires that occurred during the 2001-2010 period. (Future inventory editions will capture the impacts of large fire events seen in recent years.) Woody crops and urban forest both gained carbon, as these trees are generally well maintained due to their economic and aesthetic values. Part of the carbon gain seen in urban forests came from expansion of the urban footprint over this period of time. Movement of carbon among land types and carbon pools is a dynamic process. Carbon gain in one land type may be a result of carbon loss in another land type, and vice versa.*

Although carbon that leaves the land base is counted as a carbon stock loss in the NWL Inventory, not all carbon stock loss becomes emissions released into the atmosphere. Some of the carbon leaving the land base continue to retain carbon as durable wood products (e.g., furniture and building materials).

Disturbances in Forest and Other Natural Lands

Geospatially explicit carbon stock change information can be related to the different types of disturbance on land. During the 2001–2014 period, wildfire accounted for 74% and prescribed fire accounted for 3% of the areas that experienced disturbance. The impact of wildfire can be seen throughout the State, in both rural areas and urbanized areas near shrublands and forest. Harvest and clearcut accounted for 11%, and fuel reduction activities (thinning, mechanical, and mastication) accounted for 14% of the disturbed area.

Uncertainty of the Inventory Estimates The science, method, and technique for accounting of ecosystem carbon are relatively new and still rapidly advancing. Although significant progress has been made in the inventory development, more work still needs to be done. The parts of the NWL Inventory that have been in development for more years generally have a reasonably constrained uncertainty (between 15% and 40%), but other parts of the inventory that CARB started to develop more recently contain significant uncertainties.

AB 1504 California Forest Ecosystem and Harvested Wood Product Carbon Inventory (2019)

Summary: California forests vastly exceed the 5MMT CO₂e target, by a factor of over 5 times, even when taking into account losses from fire, drought and timberland conversion. Forests remain a net sink of carbon, even accounting for losses from wildfire and drought.

- *As of the 2017 reporting period, California continues to exceed the 5 MMT CO₂e target rate of annual sequestration established by AB 1504. Using recent FIA plot measurements, the 2017 statewide rate of carbon sequestration from all forest ecosystem pools across all ownerships is 29.2 ± 4.9 MMT CO₂e per year, excluding net CO₂e contributions from other sources such as harvested wood products, land moving to and from a forested condition, and non-CO₂ greenhouse gas emissions from wildfire (Table 4.1, 4.3)...Accounting for the additional net sequestration associated with HWP pools of 0.9 MMT CO₂e per year (Table 6.6), the 2017 statewide rate of carbon sequestration for all forest land across all ownerships is 27.9 ± 5.0 MMT CO₂e per year (excludes confidence interval for HWP C flux; Table 7.1).*
- *The available data on mean carbon storage in recent years in California, and on National Forests in particular, indicates that the forests are still a net sink of carbon from the atmosphere. It is possible that during specific years of severe drought, growth rates are so reduced and mortality so high that decay exceeds new storage.*
- *As of the 2017 reporting period, California's forests remain net sinks, sequestering 27.8MMT CO₂e per year. This value includes changes in forest ecosystem pools (29.2 MMT CO₂e per year), harvested wood product pools (0.9 MMT CO₂e per year), non-CO₂ emissions from wildfires (-0.5 MMT CO₂e per year), and forest land conversions (-1.7 MMT CO₂e per year).*
- *In many forest types current stocking levels reflect over a century of fire suppression and may not represent stand densities that are resilient to disturbances common to California forests such as fire or pest outbreaks. Additionally, as the forests age in unharvested stands, growth rates slow. Older forests tend to store more carbon, but they might not accumulate new carbon as quickly as younger, fast-growing stands. Consequently, the stocks and flux represented in this report may not be sustainable in the future without forest management.*
- *The data are beginning to show changes in the forest carbon flux, but it is unclear whether these will remain long-term trends. The statewide rate of annual carbon sequestration on all forest land remaining as forest land declined by 2.2 MMT CO₂e since 2016 (Christensen et al. 2018). This reduction in carbon sequestration is the result of several factors including improvements in inventory methodology but is also being driven by two complementary factors; an increased rate of tree mortality and decreased gross growth rate on live trees during the most recent measurement years. Tree mortality regardless of cause, accounted for an additional 2.5 MMT of CO₂e converted to dead wood annually. Gross growth on trees measured 10-years earlier declined 4.3 MMT CO₂e annually further reducing the net rate of sequestration.*

THP-Specific Assessment

CEQA requires that individual projects estimate the associated GHG emissions from a proposed project and make a determination of significance. The plan submitter provided a site-specific analysis on pages 96-97 with calculations provided on pages 105-112.

The Department has reviewed the estimates of emissions evaluated as part of the project specific analysis and has determined that the calculations have reasonably accounted for emissions from biologic and production elements of the project and that the sequestration estimates incorporate approaches for estimating carbon sequestration that are consistent with current science.

When this THP is considered within its own context, taking into account the state and national assessments discussed previously, CAL FIRE believes that it meets the requirements of CEQA and is consistent with the broader goals established by AB32 in providing for long-term carbon sequestration while providing for the market needs for forest products.

Public Comment

Public comment for this plan came in the form of a single letter, included for reference at the end of this document. The brackets around the snapshot below show that this is considered specific Concern #1, of which a corresponding Response #1 is provided.

#1

My main objection to this clear cut is that it is in an extreme fire area. The Beckwith Complex fire in this vicinity was about 100 acres that burned quickly in July to October 2021. This THP lies in the eastern edge of the Sierra Nevada range where summer temperatures are frequently over 100 degrees and there is a serious lack of rainfall. The THP is in the Wildfire Risk and Hazard Assessment area and in the Portola/Beckwith Wildland Urban Interface Zone. Within this area lies several residential communities and if (or when)there is an evacuation order the vehicular traffic for escape will impact State Route 70 which is the major road for evacuation. THP states 3 logging truckloads each day and if there is any accident or an overturned logging truck there will be major build up of traffic either with or without a fire in the area.

The following issues/concerns were raised during the public comment period and are addressed as follows:

Concern #1:

#1

My main objection to this clear cut is that it is in an extreme fire area. The Beckwith Complex fire in this vicinity was about 100 acres that burned quickly in July to October 2021. This THP lies in the eastern edge of the Sierra Nevada range where summer temperatures are frequently over 100 degrees and there is a serious lack of rainfall. The THP is in the Wildfire Risk and Hazard Assessment area and in the Portola/Beckwith Wildland Urban Interface Zone. Within this area lies several residential communities and if (or when)there is an evacuation order the vehicular traffic for escape will impact State Route 70 which is the major road for evacuation. THP states 3 logging truckloads each day and if there is any accident or an overturned logging truck there will be major build up of traffic either with or without a fire in the area.

Response #1:

Please refer to the “Evenage Management and Impacts to Fire Hazard” section within the introduction. The plan provided Wildfire Risk and Hazard Impact Assessment on page 98 addresses expected fuel conditions and impacts, CAL FIRE and the other multi-agency review team concurs with the assessment.

Wildfire Risk and Hazard

The California Forest Practice Rules, page 47, state that “Cumulative increase in wildfire risk and hazard can occur when the effects of two or more activities from one or more projects combine to produce a significant increase in forest fuel loading in the vicinity of residential dwellings and communities”. The THP area is within the “Wildland Urban Interface Zone” (WUI) of Portola/Beckwith according to the Plumas County Communities Wildfire Protection Plan. A WUI is a zone of transition between wildland and human development. Communities in the WUI are known to be at risk of catastrophic wildfire and their presence disrupts the ecology of the area. The Plumas County Communities Wildfire Protection Plan (CWPP) states explains that the WUI is generally 1.5 miles around a Community At Risk boundary. The CWPP mentions that “... Community At Risk boundary to the outer edge of the WUI is the area where collaborative community based hazardous fuel reduction efforts should occur so that fires approaching or leaving a community will be less intense, generate fewer embers for spot fires, and provide for defensible actions by suppression resources. These fuel reduction projects would focus on reductions in surface, ladder, and canopy fuels on public and private lands.” The intent of treatment of the fuels in the defense zone is to reduce the fire behavior under extreme weather conditions so that suppression resources can adequately engage the fire before it reaches the homes and other important community infrastructure. This means that the fire behavior should be such that the flame lengths are less than 4 feet and the rates of spread are slow enough for ground resources to suppress the fire.

From the assessments within the CWPP, continuity of flammable forest fuels is identified as a key contributing factor to wildfire risk and hazard in the area. The CWPP Fire History Map also reveals that there have been no significant wildfire events within a reasonable vicinity of the THP area since the 1930’s, also likely supporting dangerous fuel accumulations over time. From these cumulative factors, it can be inferred that on the landscape level, the area surrounding the THP area contains a high degree of vertical and horizontal fuel continuity, which is known to support increased wildfire flame lengths, rate of spread, duration, and intensity. The CWPP also indicates there are no known existing public or private fuel breaks within the THP area or vicinity.

The THP area is being converted to a non-timber producing use. All vegetative material removed from the site will be removed in the form of sawlogs, firewood, or tree chips to facilitate the Spring Valley Ranch construction. Resulting slash will be removed as chips.

As designed, the proposed timber operations will not provide for an increase in fuel loading, density, or arrangement. The anticipated outcome of the proposed harvest will not be inconsistent with the desired outcomes and conditions listed in the Plumas County CWPP, and can reasonably be expected to positively modify fire behavior such that the proposed project does not contribute to a significant increase in forest fuel loading in the vicinity of residential dwellings and communities.

In addition, during the Pre-Harvest Inspection, the CAL FIRE Inspector made the following observations and comments in response to the submitted Letter of Concern. This information is included within the PHI Report (Item 78 page 9).

78. Response to any Public Comment received prior to the conclusion of the PHI, if any: **One public comment letter was received, which seems to be related to three topics: 1) clearcutting, 2) fire activity, and 3) carbon sequestration.**
1) This project is not a clearcut; it is timberland conversion.
2) While the Dixie Fire and Beckwourth Complex fires of 2021 occurred in Plumas County, they did not burn within the resource assessment area. It is clear that there are elevated fuel loads in the project area, though, which is why there was discussion during the PHI regarding additional actions that could be taken. These include subsequent timber harvest to reduce overstocking as well as prescribed fire (once the area has had fuel load reductions to safely receive fire to meet objectives). These additional activities will meet not only the fire hazard concerns, but also improve forest health (i.e., insects and pathogens).
3) The RPF did not assert that there will be no loss of carbon or additional carbon sequestration in the plan. Rather, the RPF stated that the majority of this property will not be harvested in this plan, which will continue to sequester carbon. The remainder will be converted.

In addition to any specific practices specified in the Plan, the following rules pertaining to fire danger apply and are enforced on all Timber Harvesting Activities. These rules are not required to be reiterated into the timber harvest plan, but must be followed for every timber harvest plan. Fire tools and clearance are regularly enforced by CAL FIRE Inspectors.

Per Article 8 of the FPR.

Article 8 Fire Protection

918, 938, 958 Fire Protection [Coast, Northern, Southern]

When burning permits are required pursuant to PRC § 4423, Timber Operators shall:

- (a) Observe the fire prevention and control Rules within this article.
- (b) Provide and maintain fire suppression related tools and devices as required by PRC §§ 4427, 4428, 4429, 4431, and 4442.
- (c) Submit each year, either before April 1st or before the start of Timber Operations, a fire suppression resources inventory to the Department as required by the Rules.

918.1, 938.1, 958.1 Fire Suppression Resource Inventory [All Districts]
 The Fire Suppression Resource Inventory shall include, as a minimum, the following information:
 (a) Name, address and 24-hour telephone number of an individual and an alternate who has authority to respond to Department requests for resources to suppress fires.
 (b) Number of individuals available for firefighting duty and their skills.
 (c) Equipment available for firefighting. The Fire Suppression Resource Inventory shall be submitted to the ranger unit headquarters office of the Department having jurisdiction for the timber operation.

918.3, 938.3, 958.3 Repealed [All Districts]

918.4, 938.4, 958.4 Smoking and Matches [All Districts]
 Subject to any law or ordinance prohibiting or otherwise regulating smoking, smoking by persons engaged in Timber Operations shall be limited to occasions where they are not moving about and are confined to cleared Landings and areas of bare soil at least three feet (.914 m) in diameter. Burning material shall be extinguished in such areas of bare soil before discarding. The Timber Operator shall specify procedures to guide actions of his employees or other persons in his employment consistent with this subsection.

918.5, 938.5, 958.5 Lunch and Warming Fires [All Districts]
 Subject to any law or ordinance regulating or prohibiting fires, warming fires or other fires used for the comfort or convenience of employees or other persons engaged in Timber Operations shall be limited to the following condition:
 1. There shall be a clearance of 10 feet (3.05 m) or more from the perimeter of such fires and flammable vegetation or other substances conducive to the spread of fire.
 2. Warming fire shall be built in a depression in the soil to hold the ash created by such fires.
 3. The Timber Operator shall establish procedures to guide actions of his employees or other persons in their employment regarding the setting, maintenance, or use of such fires that are consistent with (a) and (b) of this subsection.

938.8 Inspection for Fire [Northern]
 (a) The Timber Operator or his/her agent shall conduct a diligent aerial or ground inspection within the first two hours after cessation of felling, Yarding, or loading operations each day during the dry period when fire is likely to spread. The person conducting the inspection shall have adequate communication available for prompt reporting of any fire that may be detected.

918.10, 938.10, 958.10 Cable Blocks [All Districts]
 During the period when burning permits are required, all tail and side blocks on a cable setting shall be located in the center of an area that is either cleared to mineral soil or covered with a fireproof blanket that is at least 15 ft. in diameter. A shovel and an operational full five-gallon back pump or a fire extinguisher bearing a label showing at least a 4A rating must be located within 25 feet of each such block before Yarding.

Per 14 CCR 943.6(d) Use of Logging Roads and Landings

(d) When burning permits are required pursuant to PRC § 4423, Logging Roads and Landings that are in use shall be kept in passable condition for fire trucks.

Below are pertinent excerpts from the Public Resources Code, Division 4, Chapter 6.

4428. Use of hydrocarbon powered engines near forest, brush or grass covered lands without maintaining firefighting tools.

No person, except any member of an emergency crew or except the driver or owner of any service vehicle owned or operated by or for, or operated under contract with, a publicly or privately owned utility, which is used in the construction, operation, removal, or repair of the property or facilities of such utility when engaged in emergency operations, shall use or operate any vehicle, machine, tool or equipment powered by an internal combustion engine operated on hydrocarbon fuels, in any industrial operation located on or near any forest, brush, or grass-covered land between April 1 and December 1 of any year, or at any other time when ground litter and vegetation will sustain combustion permitting the spread of fire, without providing and maintaining, for firefighting purposes only, suitable and serviceable tools in the amounts, manner and location prescribed in this section.

(a) On any such operation a sealed box of tools shall be located, within the operating area, at a point accessible in the event of fire. This fire toolbox shall contain: one backpack pump-type fire extinguisher filled with water, two axes, two McLeod fire tools, and a sufficient number of shovels so that each employee at the operation can be equipped to fight fire.

(b) One or more serviceable chainsaws of three and one-half or more horsepower with a cutting bar 20 inches in length or longer shall be immediately available within the operating area, or, in the alternative, a full set of timber-felling tools shall be located in the fire toolbox, including one crosscut falling saw six feet in length, one double-bit ax with a 36-inch handle, one sledge hammer or maul with a head weight of six, or more, pounds and handle length of 32 inches, or more, and not less than two falling wedges.

(c) Each rail speeder and passenger vehicle, used on such operation shall be equipped with one shovel and one ax, and any other vehicle used on the operation shall be equipped with one shovel. Each tractor used in such operation shall be equipped with one shovel.

(d) As used in this section:

(1) "Vehicle" means a device by which any person or property may be propelled, moved, or drawn over any land surface, excepting a device moved by human power or used exclusively upon stationary rails or tracks.

(2) "Passenger vehicle" means a vehicle which is self-propelled and which is designed for carrying not more than 10 persons including the driver, and which is used or maintained for the transportation of persons, but does not include any motor truck or truck tractor.

4429. Camps or local headquarters, firefighting equipment.

During any time of the year when burning permits are required in an area pursuant to this article, at any camp maintained in such area for the residence of employees, or at any local headquarters in such area of any industrial, agricultural, or other operations on or near any forest-covered land or brush-covered land, there shall be provided and maintained at all times, in a specific location, for firefighting purposes only, a sufficient supply of serviceable tools to equip 50 percent of the able-bodied, personnel, resident of such camp, or working out of such headquarters, for fighting fires. Among these tools shall be included shovels, axes, saws, backpack pumps, and scraping tools. With such tools there shall also be one serviceable headlight adaptable for attachment to at least one-half of the tractor-bulldozers used on the operation, and a sufficient number of canteens and flashlights to equip a third of the able-bodied personnel.

4431. Gasoline powered saws, etc.; firefighting equipment.
 During any time of the year when burning permits are required in an area pursuant to this article, no person shall use or operate or cause to be operated in the area any portable saw, auger, drill, tamper, or other portable tool powered by a gasoline-fueled internal combustion engine on or near any forest-covered land, brush-covered land, or grass-covered land, within 25 feet of any flammable material, without providing and maintaining at the immediate locations of use or operation of the saw or tool, for firefighting purposes one serviceable round point shovel, with an overall length of not less than 46 inches, or one serviceable fire extinguisher. The Director of Forestry and Fire Protection shall by administrative regulation specify the type and size of fire extinguisher necessary to provide at least minimum assurance of controlling fire caused by use of portable power tools under various climatic and fuel conditions.
 The required fire tools shall at no time be farther from the point of operation of the power saw or tool than 25 feet with unrestricted access for the operator from the point of operation.

4442. Spark arresters or fire prevention measures; requirement; exemptions.
 (a) Except as otherwise provided in this section, no person shall use, operate, or allow to be used or operated, any internal combustion engine which uses hydrocarbon fuels on any forest-covered land, brush-covered land, or grass-covered land unless the engine is equipped with a spark arrester, as defined in subdivision (c), maintained in effective working order or the engine is constructed, equipped, and maintained for the prevention of fire pursuant to Section 4443.
 (b) Spark arresters affixed to the exhaust system of engines or vehicles subject to this section shall not be placed or mounted in such a manner as to allow flames or heat from the exhaust system to ignite any flammable material.
 (c) A spark arrester is a device constructed of nonflammable materials specifically for the purpose of removing and retaining carbon and other flammable particles over 0.0232 of an inch in size from the exhaust flow of an internal combustion engine that uses hydrocarbon fuels or which is qualified and rated by the United States Forest Service.
 (d) Engines used to provide motive power for trucks, truck tractors, buses, and passenger vehicles, except motorcycles, are not subject to this section if the exhaust system is equipped with a muffler as defined in the Vehicle Code.
 (e) Turbocharged engines are not subject to this section if all exhausted gases pass through the rotating turbine wheel, there is no exhaust bypass to the atmosphere, and the turbocharger is in effective mechanical condition.

Concern #2:

#2 The THP also states that there has been “no significant fire activity since the 1930s . The Dixie Fire of 2021 is a significant fire activity of many many more acres that contradicts this THP that states that there is no significant fire activity.

Response #2:

This specific concern is addressed in the CAL FIRE PHI Inspector’s Report (Item 78 page 9).

78. Response to any Public Comment received prior to the conclusion of the PHI, if any: One public comment letter was received, which seems to be related to three topics: 1) clearcutting, 2) fire activity, and 3) carbon sequestration.

1) This project is not a clearcut; it is timberland conversion.

2) While the Dixie Fire and Beckwourth Complex fires of 2021 occurred in Plumas County, they did not burn within the resource assessment area. It is clear that there are elevated fuel loads in the project area, though, which is why there was discussion during the PHI regarding additional actions that could be taken. These include subsequent timber harvest to reduce overstocking as well as prescribed fire (once the area has had fuel load reductions to safely receive fire to meet objectives). These additional activities will meet not only the fire hazard concerns, but also improve forest health (i.e., insects and pathogens).

3) The RPF did not assert that there will be no loss of carbon or additional carbon sequestration in the plan. Rather, the RPF stated that the majority of this property will not be harvested in this plan, which will continue to sequester carbon. The remainder will be converted.

Concern #3:

#3 The THP analysis on carbon sequestration is in serious need of clarification and consists of faulty rationalization. For 15 acres of forest clear cut there will be serious loss of carbon sequestration. No trees, no sequestration.

Response #3:

This specific concern is addressed in the CAL FIRE PHI Inspector’s Report (Item 78 page 9).

78. Response to any Public Comment received prior to the conclusion of the PHI, if any: One public comment letter was received, which seems to be related to three topics: 1) clearcutting, 2) fire activity, and 3) carbon sequestration.

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3) The RPF did not assert that there will be no loss of carbon or additional carbon sequestration in the plan. Rather, the RPF stated that the majority of this property will not be harvested in this plan, which will continue to sequester carbon. The remainder will be converted.

Additionally, please refer to the “Greenhouse Gas Sequestration” portion of the introduction. The assessment as provided has been found to be in conformance with the Z’eborg-Nejedly Forest Practice Act and the requirements of the Forest Practice Rules. The Department does not have the legal authority to deny approval of a THP that is in conformance with the rules and regulations of the Board. Furthermore, the Department does not have the legal authority to establish laws or revise those laws which regulate timber harvesting. The California Legislature and the California Board of Forestry and Fire Protection are responsible for rules and regulation making, while CAL FIRE enforce those rules and regulations.

Concern #4:

#4

There are basically too many clear-cutting projects in the Sierra Nevada mountain range. Last year the Dixie Fire destroyed two THP areas: The Roll and the Rim THPs. The forest was “substantially damaged” by the Dixie Fire as written by SPI and the THPs were withdrawn. These THPs were planned to clear cut almost 2,000 acres of forest. If by fire or by clear cutting our forests are being decimated at an alarming rate.

Response #4:

Please refer to the “About Agency Activism” section in the introduction above. The THP as proposed has been found to be in conformance with the Z’eborg-Nejedly Forest Practice Act and the requirements of the Forest Practice Rules. The Department does not have the legal authority to deny approval of a THP that is in conformance with the rules and regulations of the Board. Furthermore, the Department does not have the legal authority to establish laws or revise those laws which regulate timber harvesting.

SUMMARY AND CONCLUSIONS

The Department recognizes its responsibility under the Forest Practice Act (FPA) and CEQA to determine whether environmental impacts will be significant and adverse. In the case of the management regime which is part of the THP, significant adverse impacts associated with the proposed application are not anticipated.

CAL FIRE has reviewed the potential impacts from the harvest and reviewed concerns from the public and finds that there will be no expected significant adverse environmental impacts from timber harvesting as described in the Official Response above. Mitigation measures contained in the plan and in the Forest Practice Rules adequately address potential significant adverse environmental effects.

CAL FIRE has considered all pertinent evidence and has determined that no significant adverse cumulative impacts are likely to result from implementing this THP. Pertinent evidence includes, but is not limited to the assessment done by the plan submitter in the watershed and biological assessment area and the knowledge that CAL FIRE has regarding activities that have occurred in the assessment area and surrounding areas where activities could potentially combine to create a significant cumulative impact. This determination is based on the framework provided by the FPA, CCR’s, and additional mitigation measures specific to this THP.

CAL FIRE has supplemented the information contained in this THP in conformance with Title 14 CCR § 898, by considering and making known the data and reports which have been submitted from other agencies that reviewed the plan; by considering pertinent information from other timber harvesting documents including THP’s, emergency notices, exemption notices, management plans, etc. and including project review documents from other non-CAL FIRE state, local and federal agencies where appropriate; by considering information from aerial photos and GIS databases and by considering information from the

CAL FIRE maintained timber harvesting database; by technical knowledge of unit foresters who have reviewed numerous other timber harvesting operations; by reviewing technical publications and participating in research gathering efforts, and participating in training related to the effects of timber harvesting on forest values; by considering and making available to the RPF who prepares THP's, information submitted by the public.

CAL FIRE further finds that all pertinent issues and substantial questions raised by the public and submitted in writing are addressed in this Official Response. Copies of this response are mailed to those who submitted comments in writing with a return address.

ALL CONCERNS RAISED WERE REVIEWED AND ADDRESSED. ALONG WITH THE FRAMEWORK PROVIDED BY THE FOREST PRACTICE ACT AND THE RULES OF THE BOARD OF FORESTRY, AND THE ADDITION OF THE MITIGATION MEASURES SPECIFIC TO THIS THP, THE DEPARTMENT HAS DETERMINED THAT THERE WILL BE NO SIGNIFICANT ADVERSE IMPACTS RESULTING FROM THE IMPLEMENTATION OF THIS THP.

22 PC - 000000028

RECEIVED

JAN 26 2022

REDDING FOREST PRACTICE

TO: Cal Fire Redding
RE: Spring Valley THP, 2-22-00001-PLU
DATE: January 24, 2022
FROM: Jean Marquardt

PC #1

Reviewed by:	<i>[Signature]</i>
Dist. By:	<i>[Signature]</i>
Dist. Date:	12/26/22
PLU:	PS
FD:	TC
WJ:	TLD
ARCh:	LTD
MS:	BMG
MSP:	ROE
Other:	
FPS:	
Status:	LOC

LM

Pargal

I am writing to object to this THP which is stated as a "timberline conversion" which will basically be a clear cut of 15 acres. The project is described to build an addition to the Spring Valley Ranch for B & B guest houses and other recreational uses as a resort. As a timberline conversion the THP states that "all the trees in the conversion boundary will be removed ". It will be converted to a non-timber use.

#1

My main objection to this clear cut is that it is in an extreme fire area. The Beckwith Complex fire in this vicinity was about 100 acres that burned quickly in July to October 2021. This THP lies in the eastern edge of the Sierra Nevada range where summer temperatures are frequently over 100 degrees and there is a serious lack of rainfall. The THP is in the Wildfire Risk and Hazard Assessment area and in the Portola/Beckwith Wildland Urban Interface Zone. Within this area lies several residential communities and if (or when)there is an evacuation order the vehicular traffic for escape will impact State Route 70 which is the major road for evacuation. THP states 3 logging truckloads each day and if there is any accident or an overturned logging truck there will be major build up of traffic either with or without a fire in the area.

#2

The THP also states that there has been "no significant fire activity since the 1930s . The Dixie Fire of 2021 is a significant fire activity of many many more acres that contradicts this THP that states that there is no significant fire activity.

#3

The THP analysis on carbon sequestration is in serious need of clarification and consists of faulty rationalization. For 15 acres of forest clear cut there will be serious loss of carbon sequestration. No trees, no sequestration.

#4

There are basically too many clear-cutting projects in the Sierra Nevada mountain range. Last year the Dixie Fire destroyed two THP areas: The Roll and the Rim THPs. The forest was "substantially damaged" by the Dixie Fire as written by SPI and the THPs were withdrawn. These THPs were planned to clear cut almost 2,000 acres of forest. If by fire or by clear cutting our forests are being decimated at an alarming rate.

Please consider the cumulative impacts of these BIG fires and of carbon sequestration on our environment.

Sincerely,
Jean Marquardt
Chico, CA.