

BOARD OF FORESTRY AND FIRE PROTECTION

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March 16, 2017

RE: Comments on the Forest Carbon Plan

Forest Climate Action Team:

The California Board of Forestry and Fire Protection (BOF) appreciates the opportunity to comment on the Forest Climate Action Team's (FCAT) Draft Forest Carbon Plan. The BOF represents the state's interest in federal matters pertaining to forestry, and the protection of the state's interests in forest resources on private lands, and shall determine, establish, and maintain adequate forest policy. (PRC § 740)

The Global Warming Solutions Act (AB 32; Chaptered 2006) requires California to reduce greenhouse gas emissions to 1990 levels by 2020. The 2008 Climate Change Scoping Plan, the initial framework for implementing AB 32, and the 2014 Scoping Plan Update emphasize the important role forests play in achieving the state's greenhouse gas reduction goals. The Forest Carbon Plan will be the detailed implementation plan for the forest carbon goals embodied in the 2014 Scoping Plan Update.

To meet the mandates of the Global Warming Solutions Act, AB 1504 (Chaptered 2010) requires the BOF to ensure that its rules and regulations governing 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 sufficient to meet or exceed the state's greenhouse gas reduction requirements for the Forestry Sector. The Forestry Sector, as identified in the 2008 Scoping Plan, includes more than 30 million acres of federal, state, other public and private forested lands within California.

Additionally, in 2008, the BOF developed "The 2008 Strategic Plan and Report to the California Air Resources Board on Meeting AB 32 Forestry Sector Targets" (2008 Strategic Plan). The 2008 Strategic Plan established a framework for action to meet the BOF's responsibility under the Global Warming Solutions Act. The plan recognized the following guiding principal related to the AB32 mandate:

"The Board of Forestry and Fire Protection is mandated to maintain a vigorous, resilient and healthy forest land base in California, which supports the ecological needs of the forest ecosystem and its human dependencies. The Board recognizes the importance of the sequestration potential for forests, and their benefits in achieving GHG emission reduction targets established by the Global Warming Solutions Act (AB32). At the same time the Board acknowledges that these needs must be considered in conjunction with many other ecological and human benefits that forests provide and for which the Board has responsibility."

The 2008 Strategic Plan recommended actions to meet the AB 32 Forestry Sector Targets, which include:

- Improvement of forest inventory and monitoring to ensure changes will be detected.
- Consideration of additional statutory and regulatory needs, including a review of the effects of existing regulations on carbon sequestration.
- Working with federal agencies to maintain and increase sequestration levels by: 1) preventing losses of inventory and growth rates; 2) continuing reforestation efforts; and 3) fuels management treatments on federal lands to reduce the risk of catastrophic wildfire.
- Reducing barriers and providing additional incentives to encourage voluntary action by private landowners to increase inventory and growth rates while decreasing risk of losses.
- Developing sound policies and regulations for CAL FIRE that will contribute to reduction of the risk of catastrophic wildfire.
- Encouraging research related to climate change impacts for the Forestry Sector.

The Board's mission is to lead California in developing policies and programs that serve the public interest in environmentally, economically, and socially sustainable management of forest and rangelands, and a fire protection system that protects and serves the people of the state.

- Working with other agencies and legislative authorities to ensure development of policies, infrastructure and funding to support fuels reduction and biomass utilization.

RECOMMENDATIONS FOR THE DRAFT FOREST CARBON PLAN (Draft Plan)

Considering the clear and significant role of the BOF in implementing regulations and policies promoting sustainable forest management under AB 32, AB 1504, and the Scoping Plan(s), the BOF provides the following recommendations to be addressed in the January 20, 2017 Draft Plan below.

EDITORIAL/TERMINOLOGY

- A thorough review to make the tone and narrative point of view consistent would be appropriate and reduce redundancy.
- Include a brief discussion and definitions of several concepts and terms that are used throughout the document. These concepts and terms include “restoration,” “treatments,” “forest health,” “healthy forests,” “degraded forests,” “resilience,” “business-as-usual,” “old growth”, “net positive ecosystem productivity”, “negative productivity” (p. 19), “quality” of the forest as a carbon sink (p.59), and “improved wildlife habitat.”
- The Draft Plan discusses the need for widespread thinning treatments within the “Science Snapshot” section (p. 15 - 16). While the information is important to include in the Plan, the BOF suggests it could better fit in the “Goals” section of the Plan.
- A broader “Forest Health Vision” is mentioned in the discussion on Goals for Wildland Forests (p. 24), but does not seem to be referenced further . The BOF requests clarification of this term in the context of the remaining portions of the Draft Plan.
- On p. 118, the California Forest Practice Rules are incorrectly referred to as the Timber Harvest Practice Rules.
- There are inconsistencies that should be resolved with spelling of common names for trees.

POLICY

- While the introductory description of AB 32 and the subsequent Scoping Plans provides context for the creation of the Forest Carbon Plan, the BOF encourages a broader discussion of the linkage between those policy documents and the purpose and intent of the Forest Carbon Plan.
 - Relevant documents include the 2009 California Climate Change Adaptation Strategy for Forests and the 2014 Scoping Plan Update. AB 32 and the 2008 Scoping Plan do not include goals for a broad set of “co-benefits.” It is not until the 2014 Scoping Plan Update that a shift in emphasis occurs with describing the goal of maximizing “co-benefits.” The BOF recommends that an explanation be included regarding this shift in objectives that occurred with the 2014 Scoping Plan.
 - The stated goals and objectives emphasize the attainment of a broad range of co-benefits that go beyond the carbon issue (p. 7, Vision Statement, p. 24, Section 3 - Goals for Wildland Forests). As noted in Section 8 (p.87), these goals generally intersect with or overlap the policies and regulatory mechanisms of other agencies charged with protecting these broader resource values. While the Draft Plan identifies the plans and standards of the State Wildlife Action Plan, the California Water Action Plan, the Fire and Resources Assessment Program Forest and Range Assessment, and Air Quality Attainment Standards as measures of the attainment of co-benefits, the role of other policy and regulatory mechanisms in meeting goals pertaining to co-benefits and the mandate of AB32 should be discussed. These include the Clean Water Act, Forest Practices Act and Rules, Fish and Game Code, Endangered Species Acts, and Federal statutes pertaining to National Forest management.
 - This discussion should include a clear description of the authority of state and federal agencies that regulate forest resources within the state.
 - It is not explicit that the FCAT will remain as the entity to perform, develop and implement plans, or guide or monitor progress towards the Draft Plan’s goals. Provide clarification regarding what the authority and capacity of the FCAT or other stakeholders may be to carry out these functions .

- Is it the intent of FCAT that the BOF respond to the Plan with specific regulatory or policy actions?
- Section 10 – *Existing State Legislation and Regulations* (p. 113) states that forest lands are considered “public trust” resources, which is a complicated legal term. While watershed values and wildlife associated with forests are public trust resources, forests themselves are not. The BOF recommends revising the Draft Plan accordingly.

FOREST CARBON STORAGE DYNAMICS

The BOF has concerns regarding the characterization of certain forest stand structures as they relate to forest carbon storage dynamics. While these concerns apply to other themes as outlined in this letter, they are addressed here to ensure clarity and highlight their importance.

- The Draft Plan emphasizes the concept of protecting forests as carbon sinks, while underestimating the value of active carbon sequestration through sustained, active forest management that promotes growth. The primary goal of the Draft Plan “to transfer carbon stocks from many small, fire-vulnerable trees into resilient large trees” (p. 19, *Fuels Reduction and Related Treatments*) relies heavily on restoration strategies on a landscape scale, such as those embodied in GTR-220 and GTR-237. These scenarios have value, but do not necessarily fit the whole range of ownerships and management objectives in the state.
 - The Draft Plan specifies a goal to secure forests as resilient net sinks of carbon (p. 24, Section 3 - *Goals for Wildland Forests*) and that “The carbon benefits from treatments that promote growth and retention of larger trees include increased sequestration rates, more carbon storage, and decreased risk from the growing threats of climate change” (p. 60, Section 6.3 – *Forest Carbon Storage Dynamics*). While this clearly mirrors the effects and benefits of actively managing forests, including wood production, it is unclear whether this implies that those large trees would never be harvested under any silvicultural regime. Does the goal include the contribution of carbon sequestered in long-lived wood products? If not, the Draft Plan limits the potential to achieve significantly greater levels of sequestration over time. The Draft Plan should place greater emphasis on the role of active management of young stands/coniferous species as the engine for carbon sequestration and where it may be appropriate to utilize these management techniques.
 - There is a general lack of discussion of timber harvesting and actively managed, working forests in the Draft Plan. As a means of treating fuels, and as a source of funding, timber harvesting on both private and public lands is an essential part of a successful strategy to maintain and improve California’s forests as reservoirs of resilient carbon storage. Because grant funds to implement treatments such as reforestation, restoration, prescribed fire, fuels reduction and thinning are substantially short of what is needed, the revenue generated from harvest can fund these treatments, and can provide revenue for additional treatments elsewhere. The Draft Plan does state that “commercial harvesting can play a beneficial role,” (p. 26, Section 3.2 – *Expand and Improve Forest Management to Ameliorate Forest Health and Resilience*), but in this way characterizes it as incidental, rather than an integral, strategy in utilizing the capacity of trees to actively sequester carbon. The Board recommends including discussion within the Plan on how the California Forest Practice Rules, and projects implemented under those rules, demonstrate net sequestration over time, and positively affect long term carbon sequestration within the state, in Section 3.2.2 – *Improve Health and Resilience on Nonfederal Forestland*.
 - In describing the goal of a “steady state” of large, old trees distributed across the forest landscape, the Draft Plan should elaborate on the time frame that’s envisioned, and the role of climate change and other ecological stressors in maintaining that forest condition. Larger trees are often older trees due to the high correlation of size with age. Older trees of many species are highly susceptible to pests, disease, mortality and fire. The most recent FIA data provide estimates of fire mortality on federal reserved lands that is an order of magnitude higher than on corporate timber lands.
 - The Draft Plan states, “Private timberland management practices can result in conditions different from the desired healthy forest conditions consisting of more large, widely spaced trees,” (p. 104, Section 9.1 – *Traditional Wood Products*). Private timberland management practices can result in greater carbon

sequestration over time than unmanaged reserve lands, and can result in more fire resilient forests, and in forests that maintain the full array of environmental benefits. The sentence should reflect the variety of scenarios and possible management strategies available.

- Figure 8 stresses the importance of protecting the remaining old-growth trees (p. 60, Section 6.3 – *Forest Carbon Storage Dynamics*). It is unclear how this figure was derived from the literature cited and does not adequately address the role of young trees in active carbon sequestration. This figure should be removed. Finally, it appears that the use of the term old-growth is synonymous with large trees, which can be misleading. Clarification regarding what constitutes a “large” tree should be provided.
- The statement that “carbon can quickly be recovered to pre-treatment levels if large, fire-tolerant overstory trees are not removed in large quantities,” (p. 61, Section 6.3 – *Forest Carbon Storage Dynamics*) ignores that forests of any size, if occupying the site and capturing its inherent growing capacity, maintain the ability to recover carbon.

GOALS/PROPOSED ACTIONS/TREATMENTS

- Goals for proposed treatments are often referenced in terms of acres. It is difficult to determine magnitude and effectiveness of management action by acres alone. Where appropriate, goals should be reported by “weight” or “volume” rather than by acres.
- Most of the proposed actions/goals will be difficult to achieve, and there is no clear description of the means or time horizons for achieving these goals. While the Draft Plan mentions that implementation actions will be determined and carried out regionally, discussion that describes a practical path and timeline for achieving the goals is required. The FCAT should separate and identify the goals that are aspirational versus achievable within a reasonable planning horizon.
- The Draft Plan provides a goal of increasing reforestation on private lands by 25% over the current level (pg. 3, Proposed Actions). The Board requests the following clarifications:
 - Where is the data that indicates that the level of reforestation on private lands is currently a problem?
 - How does this goal relate to the stocking and demonstration of Maximum Sustain Production requirements of the Forest Practice Rules?
 - How does this relate to the goal of eliminating the USDA Forest Service Reforestation Need on a quantitative basis?
- The Draft Plan states CAL FIRE estimates 500,000 acres of non-federal forests require treatment annually to achieve the identified forest health and resiliency needs (pg. 3, *Proposed Actions*). The following clarifications regarding this estimate are needed:
 - Describe what this estimate is based on: reduction in black carbon emission, maximizing net sequestration, processing plant infrastructural growth, other?
 - Provide a citation for this estimate.
 - Describe what is presumed achieved by this rate of treatment.
 - Describe how this relates to vegetation treatment goals needs on federal forestlands in California.
- The Draft Plan states a second goal to minimize GHG and black carbon emissions from management practices and wildfire events (p. 24, Section 3 - *Goals for Wildland Forests*). The Draft Plan should clarify that this goal needs to be evaluated by looking at the overall effect of the action or treatment with respect to either sequestering carbon or reducing the risk of greater emissions in the event of wildfire.
- How “Exemptions and Emergencies” as treatments are expressed in the Draft Plan does not reflect that harvesting under Exemptions or Emergency notifications can benefit long term rates of sequestration.
- Consider using a more precise descriptor of the activity if known, such as “timber operations” or “timber harvesting” where appropriate to describe forest management, rather than vague language such as “treatments”.
- There is little specificity in the Draft Plan relative to the importance of modeling different forest ownership classes (private non-industrial, industrial, public timber zoned, and reserves) separately so that applicable management scenarios can be assessed for optimizing net sequestration and storage options.

- The Draft Plan discusses fuels management and thinning treatments, specifically thinning from above (p. 26, Section 3.2 – *Expand and Improve Forest Management to Ameliorate Forest Health and Resilience*). These examples reflect Forest Service silvicultural methods that are not consistent with the Forest Practices Act and Rules. Adding examples that reflect the various silvicultural prescriptions from the Forest Practice Rules that apply to different ownership classes is appropriate.
- Explain that regulating forest land conversions is a BOF responsibility and relates to local land use planning jurisdictions (p. 24 3.1 *Increase Protection of Forested Lands and Reduce Conversion to Non-Forest Uses*). How will the Draft Plan achieve the goal of expanding acres of high priority forest habitat by 5% over 2015 levels by 2025 (p. 3, Executive Summary – *Proposed Actions*, p. 25, Section 3 – *Increase Protection of Forested Lands and Reduce Conversion to Non-Forest Uses*)?

IMPLEMENTATION

- The management of forests in the state relies on a wide range of policy tools that are applied to different spatial scales and diverse sets of stakeholders. Although the BOF agrees with the Draft Plan’s emphasis on large-scale and regional approaches where feasible, it lacks the specificity needed to parse out responsible parties. For example, when using the terms “manage” and “management”, i. e. “California will manage...for this range of values,” the Draft Plan implies forests are managed by a single entity.
- The BOF appreciates that forest management on private lands requires a combination of policy tools which may rely on bottom-up implementation efforts. For example, to promote carbon sequestration, the Draft Plan should emphasize the role of incentives and the need to develop incentive-based approaches for private landowners.
- With a combination of public (federal, state, regional/municipal) and private (industrial and non-industrial) forests, the Draft Plan does not provide enough detail to align the management authority with implementation mechanisms. For example, in the case of privately held forests, the state relies on the Board’s Forest Practice Rules to maintain forest ecosystem services, broadly defined. The BOF suggests that the Draft Plan develop strategies to align (local, county, and regional) land use planning to the BOF’s regulatory role in the state, via Forest Practice Rules, Safety Element for State Responsibility Areas, etc.

In regards to *Recommendations for Implementation* on page 5, the BOF has the following comments:

- The Draft Plan does not identify a robust range of relevant entities that will implement the Forest Carbon Plan. We suggest that the Draft Plan list state and county boards, commissions, and agencies as relevant partners. CAL FIRE, for example, plays a significant role in accomplishing the proposed actions on page 3 relative to fuels treatment. Similarly, the Wildlife Conservation Board and the Department of Fish and Wildlife play important roles in expanding areas of high priority habitat, and the BOF ensures that timber operations under the Forest Practice Rules contribute to healthy and resilient forests. In addition, county land use plans and zoning ordinances can have dramatic cumulative effects in forested regions. A clear description of authority and implementing agencies or entities needs to be developed.
- The Draft Plan envisions collaborators on a regional level implementing fuel reduction projects, but does not emphasize the role of federal land management agencies in completing this work within their jurisdiction. The BOF recommends that this section of the Forest Carbon Plan should more explicitly highlight the importance of the Forest Service achieving the goals outlined in the Forest Carbon Plan.
- The Draft Plan recommends streamlining permitting for certain restoration activities, but does not specifically identify streamlining needs or which agencies or boards would play a role in the effort.
- The Draft Plan discusses an expected reduction of 3.2 MMT CO₂e (i.e. 861,087 metric tons C) due to 66 Greenhouse Gas reduction projects (p. 29, Section 3.2.2 – *Improve Health and Resilience on Nonfederal Forestland*). The BOF requests the following clarifications:
 - What is the implementation period and what methods were utilized to determine that GHG emissions would be reduced by implementing these projects by the identified amount? The reported number seems large; for example, it is larger than the reported 624,825 metric tons of carbon sequestered by

finished lumber produced in 2012 (p. 70, Section 6.3.4 – *Carbon Storage in Wood Products and Other Uses*).

FEDERAL LANDS

- At the BOF meeting on January 25th, 2017, USFS Region 5 Deputy Regional Forester Ms. Jeanne Wade-Evans reported a reforestation near-term backlog of 250,000 acres. This may represent a carbon liability and should be addressed in the Draft Plan. The BOF recommends the Draft Plan address the following questions:
 - If the USFS continues with business-as-usual with regards to reforestation, will it be possible to meet the goals of the Forest Carbon Plan?
 - Should the State of California assume the responsibility for the USFS reforestation backlog if it is an identified problem in terms of meeting sequestration targets?
- The Draft Plan describes the USFS needing only to plant 400,000 acres (p. 154, *Stand Conditions – Impacts on Forests*). The BOF requests that this number be checked for consistency with previously stated acreages.

PRIVATE LANDS

- Landowners face unique challenges when attempting to engage in forest management projects. The BOF recommends including a discussion of these challenges and addressing how they may prevent this category of ownership from achieving Forest Carbon Plan goals.
- Many landowners have been participating in voluntary and compliance carbon markets. The BOF recommends describing these markets, the acres and carbon credits that have been successfully marketed to date.

FOREST CARBON ACCOUNTING/INVENTORY

- The Draft Plan references several inventory systems using various data sets, models and reporting standards. The Draft Plan also mentions different inventory accounting efforts being undertaken by the California Air Resources Board/Lawrence-Berkeley Energy Labs (LBEL) for the 2014 Scoping Plan, the California Natural Resources Agency/CAL FIRE for the Forest Carbon Plan, and the BOF/CAL FIRE for the AB 1504 report. The Draft Plan does not present a consistent or repeatable method to measure whether forests are sinks versus sources. The BOF recommends the following:
 - Reviewing and including Intergovernmental Policy on Climate Change (IPCC) accepted methods for carbon stock accounting. The IPCC methodology should be referenced in Chapter 5.
 - Discuss the strengths and weaknesses of the different inventory methods used in the ARB Scoping Plan and Forest Carbon Plan analysis. Be explicit about the limitations of Field Inventory and Analysis (FIA) data, as well as limitations of remotely sensed data/imagery as it relates to forest inventory.
 - The ARB/LBEL results should support the results determined by FIA field measurements. The differences and inconsistencies should be addressed.
 - The need for a single inventory system for a more consistent foundation for analytics.
- The use of different units (i.e. metric tons of carbon vs. carbon dioxide equivalents) throughout the document is confusing. All metrics should be reported in CO₂e for clarity and/or a conversion factor between C and CO₂e should be provided.
- The Draft Plan does not specify that accounting and reporting of actual forest performance by ownership within the forest sector will occur. This is important in identifying and refining priorities.
- More recent data is available from the FIA program where growth, removals, and mortality have been analyzed on three annual panels of forest inventory plots that were first visited between 2001-2003 and were subsequently remeasured between 2011-2013. These data provide more detailed information on above-ground carbon changes among different ownership classes and due to varying mortality agents. These data indicate a substantial difference in the degree of change compared to the numbers reported in the Draft Plan (p. 73, Section 6.3 – *Carbon Stock-Change Rates*, tables 12 and 13). Please refer to the letter provided in Appendix A. Units reported in the Draft Plan are in metric tons of carbon per year and differ from the units reported in

Appendix A, which are in megagrams (a.k.a. metric tons) of carbon dioxide equivalent per acre. These newer data, which are soon to be published, should be included in the Draft Plan.

FOREST INVENTORY AND ANALYSIS DATA

- The Draft Plan identifies a research need to increase plot density and frequency of FIA data collection. The BOF agrees with this research need, but the Draft Plan should also address the challenges to expanding the FIA program plot density, frequency, and statistical rigor with regards to proprietary FIA data across ownership classes. This recommendation should be brought to the forefront in the Executive Summary as a recommendation for implementation.
- The FIA data presented in Table 7 (p. 60, Section 6.3 – *Forest Carbon Storage Dynamics*) is difficult to interpret without a better breakdown. The details defining large, medium, small, and non-stocked size classes in Table 7 need to be provided.
- Table 2 pertaining to understocked forests includes 1 million acres of mixed conifer and 2 million acres of western oak (p. 155, Stand Conditions – *Understocked Forest*) requires clarification.
 - How are the FIA data analyzed to result in these numbers?
 - What is considered fully stocked for these forest types?
 - Can these numbers be provided by public versus private ownership? Combining the data reduces the meaning and effectiveness of the data.

HARVESTED WOOD PRODUCTS

- One of the roles of forest management is generating wood products. The inclusion of harvested wood products when considering forest carbon sequestration is appropriate, however emphasizing the importance of harvested wood products in carbon sequestration earlier in the plan, particularly in the Executive Summary is needed.
- The discussion about Smith et al. 2006 and Stewart and Nakamura 2012 on p. 103 (Section 9.2 – *Traditional Wood Products*) dismisses the entire concept of long-term storage in harvested wood products as a key component of a carbon sequestration strategy. The BOF recommends including a full life-cycle analysis of forest management, including durable wood products, as it relates to long term carbon sequestration.
- There are several potential discrepancies with the Mclver et al. 2015 study data presented in Table 10 (p. 70, Section 6.3.4 – *Carbon Storage in Wood Products and Other Uses*). The BOF recommends working with the authors to accurately report the finding in relation to the following concerns:
 - Reported biomass products and mill overrun seem disproportionately high for California.
 - Volume was removed for shrinkage of lumber. No carbon is lost by lumber shrinkage.
 - The total metric tons of sequestration from the Mclver study only reported out ½ of finished lumber products (i.e. 624,824) when compared to what the primary producer of lumber within the state alone produces annually from milling facilities (i.e. 1,180,624 metric tons of C). There could potentially be a problem with the cubic meters conversion. If this difference is corrected, finish lumber would then comprise 50 - 60% of the output rather than 26%.
 - The Mclver data reported that residues combusted for energy were 18% of the total delivered, not 54%, whereas 7% went into pulp and fiberboard products, not 4%. These discrepancies need to be addressed.
 - A discussion of the Mclver data (p. 103, Section 9.1 – *Traditional Wood Products*) does not differentiate between public versus private timber harvest between 2000-2012, or pre-recession versus post-recession harvesting. These clarifications must be made to fully understand the context of these numbers.
- The Draft Plan identifies the expansion of wood products manufacturing as a goal (p. 4, Section D of *Proposed Actions*) but does not identify and address costly and often redundant permitting impediments to active forest management. The BOF makes the following recommendations to address these issues:
 - There is a need to eliminate duplicative regulatory procedures to not only lessen private landowner burden, but also reduce state agency regulatory costs, resulting in more public funding available for forest resiliency projects. State law often provides for duplicative regulatory programs where legislative

solutions may be required to provide solutions. The Draft Plan should address this need and provide a discussion on potential solutions.

- Greater collaboration between California Natural Resource and California Environmental Protection Agencies should be included as a proposed action or implementation strategy, if both private commercial and non-commercial forest management is to be encouraged.
- For investment in additional milling or manufacturing technology, there must be a consistent supply chain of forest products. The Draft Plan must highlight the need for long term supply agreements from federal lands to support investment in manufacturing infrastructure.
- On p. 103 (Section 9.1 – *Traditional Wood Products*), the BOF requests clarification on what leakage refers to.
- It should be clarified that “woody biomass” of Section 9.2 (p. 104) is intended to mean those products that are not turned into energy.
- In regards to p. 105, Section 9.2 – *Woody Biomass*, the BOF requests clarification on the actual quantity of methane that is produced by long-term storage of wood in landfills and the rate of its release.
- Please clarify the following in the discussion regarding biochar (p. 105, Section 9.2 – *Woody Biomass*):
 - Who is currently manufacturing or generating and using biochar?
 - What is the carbon footprint of its production and use (i.e. energy to produce, transport, etc.)?
 - What is the feasibility of significantly expanding the practice of spreading biochar into forested lands as soil amendment?
- Discussion of cross-laminated timber (CLT) under the Woody Biomass section (p. 105, Section 9.2) is misleading. The BOF recommends that research be conducted on the actual size of material that is cost-effective in transporting for the manufacture of CLT. What may be found is that the marketability of lower value dimension lumber may increase, slightly increasing the lumber sales average of the stream of products coming from sawmills, rather than small diameter logs or forest materials being harvested to supply CLT manufacturing. The findings of the research should be included in the Forest Carbon Plan.
- The BOF requests that more information be provided regarding the statement cited from Morris 1999 that “the value of the environmental services provided by biomass energy production is estimated to be in excess of ten cents per kilowatt hour” (p. 106, Section 9.3 – *Biomass Energy*).
- The statement that “biomass utilization has played an increased role in forestry over time” (p. 106, Section 9.3.1 – *Challenges for Bioenergy and Biofuel Development*) may not be accurate. Biomass use within California is seemingly declining due to a variety of reasons. Additional research and verification of this statement in the Draft Plan should be conducted and the findings should be included in the Forest Carbon Plan.
- It should be clarified that market forces tend to favor log grade over small diameter trees (p. 106, Section 9.3.1 – *Challenges for Bioenergy and Biofuel Development*).
- Provide a status update on the successes and failures of the SB1122 BioMAT program to support new bioenergy facilities (p. 107, Section 9.3.2 – *Legislative Support for Forest Biomass*).
- The discussion regarding biomass feedstock and facilities should clarify how much of the 944 MW nameplate capacity of 40 biomass facilities is sourced from forests (p. 108, Section 9.3.2 – *Legislative Support for Forest Biomass*) versus other sources, what is the current and planned use of forest biomass for fuel, and what the relevancy of California’s Low Carbon Fuel Standard to forest carbon use.
- It would be appropriate to provide perspective on the positive and negative outcomes and implementation timelines regarding the California Energy Commission’s funding of research and development (p. 108, Section 9.3.3 – *Forest Biomass Research and Development*). The Draft Plan states, “California’s Forest Practice Act and Rules and inclusion of sustainable harvest requirements in bioenergy production through SB 1122 can inform accounting for the carbon and GHG outcomes for bioenergy under the federal Clean Power Plan” (p. 154, *Improving Carbon Quantification at the Landscape and Project Levels Going Forward*). Please provide more information regarding how this results in alignment between state and federal programs.

CO-BENEFITS

- The issue of co-benefits needs to be better articulated in terms of potentially competing objectives (i.e. fire-resilient forests may not be considered ecologically appropriate for black backed woodpeckers).
- The Draft Plan states “competing regulatory objectives (habitat values for example) likely mean that carbon storage will rarely be the primary focus of landowners” (p. 104, Section 9.1 – *Traditional Wood Products*). Clarification on the intent of this statement is required.
- The Draft Plan states that “there were nearly 60,000 urban forestry related jobs in CA...with revenues directly associated with urban forestry in California in 2009 over \$3 billion.” The BOF requests a citation for these statistics.
- In *Sustainable Rural Economies* (p. 87, Section 8.1), there should be greater emphasis pointing to the maintenance of a forest products industry infrastructure and a clear expectation of long-term raw material flow from federal lands to allow for investment in infrastructure.

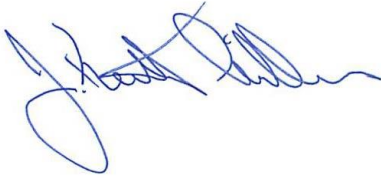
SUPPORTING SCIENCE

- p. 9 (Section 2.1 - *Historic and Current Forest Conditions*) discusses historic anthropogenic fire, but does not mention the role of lightning fires. Also, the reference to Kimmerer and Lake 2001 may not accurately portray their findings. Please review and revise if necessary.
- The Draft Plan states that climate change affects carbon sequestration rates. The BOF requests the following citation and clarifications:
 - That the rate of carbon sequestration in forests will be diminished, and that predicted warmer and wetter conditions will decrease the quantity, quality, and stability of carbon stocks.
 - That forests are at risk of emitting carbon due to fire, insects, or from decreased rates of growth.
- The “Science Snapshot” discusses the need for thinning and reintroduction of managed fire. The Forest Carbon Plan needs to specify how it intends to increase managed fire within the state’s forests and if thinning is referring to pre-commercial and commercial thinning.
- The Draft Plan offers a warning about going down the path of “status quo” with respect to forest management and resulting increase in wildfire emissions (p. 18, *Emissions*). Addition discussion on the intent of this statement needs to be provided.
- The “Fuel Reduction and Related Treatments” discussion (p.18–21) depend heavily on the Malcolm North studies. This discussion of managing by natural disturbance regime may be practical on National Forests, but not otherwise. The BOF requests more detailed discussion regarding what may be applicable and appropriate for different ownerships classes.
- Figure 4 (p. 21, *Fuel Reduction and Related Treatments*) reflects that only 20% of the Sierra can be mechanically thinned. Please provide a citation for this statement.
- The Draft Plan states that stands treated prior to the drought are faring better than untreated stands in the vicinity (p. 60, Section 6.3 – *Forest Carbon Storage Dynamics*). Please provide a citation for this statement.

Again, thank you for the opportunity to comment on the Draft Forest Carbon Plan. The BOF appreciates and supports efforts to ensure the resiliency of the state’s forest carbon sink. The BOF recognizes the need to develop an implementation plan that traverses all ownership and forestry sectors to be successful in achieving the state’s greenhouse gas reduction goals.

If you have any questions or comments, please contact CAL FIRE’s Senior Environmental Scientist, Nadia Tase at nadia.tase@fire.ca.gov or 530-573-2320, or Executive Officer, Matt Dias at matt.dias@BOF.ca.gov or 916-653-8007.

Sincerely,

A handwritten signature in blue ink, appearing to read "J. Keith Gilles". The signature is fluid and cursive, with a large initial "J" and a long, sweeping underline.

J. KEITH GILLES

Chair

California Board of Forestry and Fire Protection