

BOARD OF FORESTRY AND FIRE PROTECTION

P.O. Box 944246
SACRAMENTO, CA 94244-2460
Website: www.bof.fire.ca.gov
(916) 653-8007



March 8, 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 that the BOF 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, which includes in excess of 30 million acres of federal, state, other public and private lands, as identified in the 2008 Scoping Plan adopted by the California Air Resources Board.

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.

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.

- Encouraging research related to climate change impacts for the Forestry Sector.
- 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

- It is apparent that multiple authors drafted the document. A thorough review to make the tone and narrative point of view consists 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,” “degraded forests,” “resilience,” “business-as-usual,” 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 Board questions whether it is included in the correct 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 within other portions of the Draft Plan. The BOF requests clarification on the “broader Forest Health Vision” definition and context of this term in relation to 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.

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 description of those, with respect to guiding the purpose and intent of this plan, and to provide a better explanation of linkages between this plan and other policy level climate change documents.
 - 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 the concept of putting forth goals for a broad set of “co-benefits.” It is not until the 2014 Scoping Plan Update where a major shift in emphasis occurs with describing the goal of maximizing “co-benefits.” The BOF recommends providing explanation regarding the shift in objectives toward “co-benefits” that occurred with the 2014 Scoping Plan.
 - A clear description of the authority underlying the Forest Carbon Plan (i.e. AB 32) would provide context for the authority of the California Air Resources Board to establish the policies and actions put forward in the Draft Plan. This clarification will provide a better understanding regarding which agency will be guiding and assuring its implementation, and monitoring results.
 - 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 Forest Carbon Plan’s stated goals, though there are descriptions of future action throughout the document where that is implied. The BOF requests clarification regarding what the authority and capacity to carry out the Forest Carbon Plan will be to FCAT or others.
- These questions of authority and implementation are of interest to the BOF, as its mandate and responsibilities overlap considerably with the objectives and implementation strategies in the Draft Plan. Among other responsibilities, the BOF is mandated to establish forest policy for the State of California in order to protect and

enhance its forest resources, and to establish rules for the conduct of timber harvesting. The BOF requests clarification on the following:

- Is it the intent of FCAT to promulgate forest policy, in its establishment of scattered large old trees as the definition of a healthy forest?
- Is it the intent of FCAT that the BOF respond to the Plan with specific regulatory or policy actions?
- The opening statement of Section 10 – *Existing State Legislation and Regulations* (p. 113) states that forest lands are considered “public trust” resources. The watershed values and wildlife associated with forests and forested landscapes are public trust resources, while forests themselves are not. With due respect to the authors of the cited publication, a more robust discussion of the basis for considering something a public trust resource needs to be made. One example is that wildlife resources have been declared to be in the public trust by the legislature in enacting the Fish and Game Code. The same is not true for the Forest Practices Act. This implies that there would be a “Trustee Agency” for forests, a role that does not apply to the FCAT, the BOF, or CAL FIRE.

FOREST CARBON STORAGE DYNAMICS

The BOF has concerns regarding tree size distribution, stand density and forest carbon storage dynamics. Additionally, some of these concerns might also fall into other themes as outlined in this letter. In order to ensure clarity and highlight the importance of these concerns, these issues have been solely addressed here.

- The Draft Plan places great emphasis on the concept of forests being carbon sinks and protecting that status. The overarching vision of the Draft Plan underestimates the value of active carbon sequestration through sustained, active forest management. 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*) is a one-dimensional, static strategy that does not recognize the application of silviculture.
 - The Draft Plan specifies a goal to secure forests as resilient net sinks of carbon, with “resilient” presumably meaning scattered, large trees (p. 24, Section 3 - *Goals for Wildland Forests*). This is limiting in several ways. First, it indicates an abandonment and downplaying of the concept of actively sequestering carbon through forest growth and long-term sequestration of carbon in wood products. Ignoring this concepts limits the potential of the Draft Plan to achieve significantly greater levels of sequestration over time. There is also the reality that on a temporal and spatial scale, the attainment of this goal will be limited given landowner goals and the inability to control or halt forest disturbance. The arrival of a “steady state,” as seemingly contemplated in the Draft Plan, in California’s forests is not possible in the face of climate change and other ecological stressors.
 - The document follows GTR-220 and GTR-237 (Malcom North), an assessment strategy for standing carbon that does fit the whole range of ownerships and management objectives in the state. For example, if the case of one 300-year old pine versus 175 30-year old white firs (p. 59) is viewed in dynamic terms, active forest management can move the 175 30-year old white fir forest from carbon weak to carbon strong. While the single 300-year old pine stores large amounts of carbon, its growth rate is slower when compared to a thrifty, well stocked stand. The instance of a single large tree represents a “snapshot,” frozen at one point in time, presenting an idyllic representation of California’s forests as museums, static in time and space. The theme misrepresents the dynamics of carbon; 175 white firs spaced over a few acres over time will sequester far more carbon than widely scattered large sugar pine, which will eventually die and become a carbon emitter. The referenced white firs would, in time, be harvested and provide for long term carbon storage benefit as forest products. This completes the picture of a far more dynamic, effective plan to sequester carbon. The Draft Plan should address the forest condition where some mature, individual slower growing trees that are beyond the culmination of mean annual increment are replaced with younger and efficient regeneration as a benefit to rates of sequestration.

- More emphasis is needed 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.
- The Draft Plan states that “commercial harvesting can play a beneficial role,” (p. 26, Section 3.2 – *Expand and Improve Forest Management to Ameliorate Forest Health and Resilience*). In this way, the Plan considers commercial harvest as incidental, rather than an integral, strategy in utilizing the capacity of trees to actively sequester carbon. The BOF requests that more emphasis be provided on the role of commercial harvest as a strategy to meet the Plan’s goals.
- The Draft Plan’s stated goal to “Ensure that timber operations conducted under the Forest Practice Act and Rules contribute to the achievement of healthy and resilient forests that are net sinks of carbon” (p. 30, Section 3.2.2 – *Improve Health and Resilience on Nonfederal Forestland*) is inconsistent with forestry policy in California, if it means that private forests are to be managed in a manner consistent with GTR 220.
- The Draft Plan discusses “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*). This is a fundamental premise of forestry, which includes both even-aged and uneven-aged regeneration as described in the Forest Practice Rules. Trees are grown and thinned to maintain and transfer growth to more vigorous residual stems, and then subsequently harvested, greatly contributing to long-term carbon storage as durable wood products, while the sequestration cycle continues through regeneration. The implication in the Draft Plan, however, is that those trees would never be harvested under either even-aged or uneven aged silvicultural regeneration methods.
- The discussion on *Forest Carbon Storage Dynamics* (p. 59, Section 6.3) introduces the concept of the quality of the forest as a carbon sink. Please clarify what is meant by “quality” (i.e. resilience? Amount of carbon in live versus dead pools? etc.).
- Figure 8 stresses the importance of protecting the remaining old-growth trees (p. 60, Section 6.3 – *Forest Carbon Storage Dynamics*). This comment and does not adequately address the role of young trees in active carbon sequestration, nor does it fairly represent the current degree of protection for old-growth, which is not defined. It appears that the use of the term old-growth is synonymous with large trees, which is also misleading. Finally, it is not clear what constitutes a “large” tree (i.e. trees > 24” dbh, 30” dbh?).
- 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 the fact that forests maintain the ability to recover carbon after tree removal remains, whether large or small trees are retained.

GOALS/PROPOSED ACTIONS/TREATMENTS

- Throughout the document goals for proposed treatments are referenced in terms of acres. It can be difficult to determine magnitude and effectiveness of management action by acres alone. Goals should be reported by “weight” or “volume” rather than by acres where possible.
- In general, most of the proposed actions/goals will be difficult to achieve, and there is no clear description of the means for achieving these goals in the Draft Plan. While the Draft Plan mentions that implementation actions will be determined and carried out regionally, the BOF requests that the Forest Carbon Plan describes a practical path or plan outlined for achieving the goals to make them more attainable. The FCAT should consider separating and identifying what goals are aspirational versus achievable.
- 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?

- What are the circumstances where landowners are not reforesting? Is it due to fires and insect mortality, where restocking is not required? In general, how does this goal relate to the stocking and demonstration of Maximum Sustain Production requirements of the Forest Practice Rules?
- The Draft Plan states CAL FIRE estimates 500,000 acres of non-federal forests need treatment annually to achieve the forest health and resiliency goals of the Forest Carbon Plan (pg. 3, *Proposed Actions*). The BOF requests the following clarifications regarding this estimate:
 - 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, if possible.
 - Describe what is presumed achieved by this rate of treatment.
 - The Forest Carbon Plan needs to describe why this recommendation is not also appropriate for federal timberlands and forestlands within 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 BOF requests that the Forest Carbon Plan clarify that this goal needs to be evaluated by looking at the overall effect of the action with respect to either sequestering carbon or reducing the risk of greater emissions by reducing wildfire emissions.
- How “Exemptions and Emergencies” as treatments are expressed and reflected in the Draft Plan does not reflect that harvesting under exemptions or emergency notifications can be beneficial for long term rates of sequestration. The BOF also recommends the addition of a table that shows the extent of these treatments, as well as existing Timber Harvest Plans, Non-Industrial Timber Management as defined in 14 CCR § 895.1.
- The terms “logging” or “timber operations” are conspicuously missing from the document. The BOF recommends using more direct language to describe forest management, such as “logging” or “timber harvesting,” rather than masking activities with language such as “treatments”.
- The BOF recommends providing estimates within the Forest Carbon Plan on how much funding would be required to achieve each of the stated goals.
- There is little specificity provided 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 different applicable management scenarios for these different ownerships can be modeled to determine optimal net sequestration and storage options.
- The Draft Plan discusses fuels management and thinning treatments, specifically thinning from below (p. 26, Section 3.2 – *Expand and Improve Forest Management to Ameliorate Forest Health and Resilience*). These examples reflect Forest Service silvicultural methodology that are not consistent in comparison with the Forest Practices Act and Rules. The BOF suggests adding examples that reflect the various silvicultural prescriptions that may be appropriate for different ownership classes.
- Preventing forest land conversions is already a BOF responsibility and relates to local land use planning jurisdictions. The BOF requests clarification regarding how FCAT intends to further this goal.
- The Draft Plan states the goal of increasing the acreage of forestland protected by conservation easements by 10% (p. 25, Section 3 – *Increase Protection of Forested Lands and Reduce Conversion to Non-Forest Uses*). The BOF requests that the Forest Carbon Plan includes evidence to demonstrate that using conservation easements is an effective strategy in increasing carbon storage over the long term, particularly when contrasted to active management, harvesting and manufacturing of durable wood products or where the threat of conversion of such lands is low.
- The proposed action to ensure timber operations conducted under the Forest Practice Act and Rules contribute to the achievement of healthy and resilient forests that are net sinks of carbon differs from the direction provided to the BOF by AB 1504, which requires that the BOF assures that its rules and regulations, where applicable, meet the sequestration goal of 5 million metric tons (MMT) of carbon annually from the forestry sector.
- The Draft Plan states a 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). The BOF requests clarification regarding how this goal will be achieved (i.e. how acres of a certain forest type will be increased), and how this relates to the goals of the State Wildlife Action Plan.

- In regards to the “Fountain Fire Box” (p. 27, Section 3.2 – *Expand and Improve Forest Management to Ameliorate Forest Health and Resilience*), there is no direct relationship between the attainment of revenues from timber harvesting and the replanting of the Fountain Fire area, as is assumed here. The areas managed by large timberland owners have always been reforested after fires, regardless of the revenue gained from the forest harvest. It is the belief of foresters and timber companies that restoring forest cover is their responsibility. This commitment to sustainable forestry by private landowners and timber companies should be explicitly highlighted.

IMPLEMENTATION

- When using the terms “manage” and “management” throughout the document, it’s stated that “California will manage...for this range of values” - this use of the active voice highlights a recurring depiction of California as a singular entity that’s capable of guiding the management of lands, thus introducing an element of confusion into the Draft Plan. The BOF recommends more clearly stating that the management of forested lands is the responsibility of the private owner or the agency responsible for management of public lands.
- One of the stated goals within the Draft Plan is to engage in large landscape planning. This responsibility lies with various federal, state, regional, and local entities. The BOF seeks clarification regarding how the Forest Carbon Plan envisions active involvement or interaction with the planning agencies to facilitate this.
- The BOF agrees with emphasizing a regional implementation approach where feasible. However, the regional approach should coordinate with all stakeholders and take into consideration the current management regime of forest lands within the targeted region. Although managing by region to achieve Forest Carbon Plan goals may be appropriate, setting individual carbon goals for specific regions may not be appropriate.
- The factors that should guide regional prioritization don’t correspond to any distinguishable areas on the landscape. How will these factors be used in identifying priority areas?

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

- The Draft Plan identifies entities that will implement the Forest Carbon Plan. There is a need to include state boards, commissions, and agencies in the list of relevant entities. 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. 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 highlight the level of attention that needs to be applied to National Forest lands. The Board recommends that the Forest Carbon Plan more explicitly highlight the importance of the Forest Service in achieving the goals outlined in the Forest Carbon Plan.
- In order to successfully implement fuels treatments as recommended in the Draft Plan, the Forest Carbon Plan needs to support the development of an effective programmatic vegetation treatment EIR (e.g. VTP PEIR).
- The Draft Plan does not mention the continued use and fine-tuning of exemptions for specific forest management activities.
- The Draft Plan recommends streamline permitting for certain restoration activities, but does not specifically identify streamlining needs or which agencies or Boards would be play a role in the effort.
- The Draft Plan discusses an expected reduction of 3.2 MMT CO₂e 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?

- How was it determined that GHG would be reduced by implementing these projects by the identified amount, given that 3.2 MMT CO₂e seems quite elevated.

FEDERAL LANDS

- The Draft Plan states that the U.S. Forest Service contains the largest “forest carbon sink.” Based on the status of forests within USFS reserves, as well as the level of mortality seen within the National Forests, the BOF recommends confirming that reported statistics on this subject matter are accurate and consistent.
- At the BOF meeting on January 25th, 2017, USFS Region 5 Deputy Regional Forester Ms. Wade-Evans reported a reforestation backlog of 250,00 acres. This reforestation backlog on the USFS R5 forested landscaped is a carbon liability and should be addressed in the Forest Carbon 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 CO₂e MMT targets?
- The Draft Plan describes the USFS needing only to plant 400,000 acres after fire (p. 154, *Stand Conditions – Impacts on Forests*). The BOF requests that this number be checked for consistency with previously stated acreages.
- The discussion of federal lands (p. 28, Section 3.2.1 – *Improve Health and Resilience on Federal Forest Lands*) is unclear regarding the expectations of federal lands contributions to achieving the goals of the Draft Plan. Specifics regarding the federal commitment to assist in meeting the states goals within the Forest Carbon Plan should be provided.

PRIVATE LANDS

- Landowners face unique challenges when attempting to engage in projects within the forested landscape. The BOF recommends articulating these challenges and addressing how these challenges may prevent landowners from being able to achieve Forest Carbon Plan goals.
- Many landowners have been participating in voluntary and compliance carbon markets. The BOF recommends providing the total acres that have been successful in marketing carbon credits to date (i.e. State Responsibility Areas Grants, Greenhouse Gas Reduction Funds Grants, etc.)

FOREST CARBON ACCOUNTING/INVENTORY

- The Draft Plan references several inventory systems using various data sets and reporting standards (i.e. Forest Inventory and Analysis data, remote sensing, etc.). 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 reports. As such, the Draft Plan does not present a consistent a repeatable method to measure whether forests are sinks versus sources. To clarify these issues, the BOF recommends the following:
 - Reference examples/case studies on how forest carbon is measured elsewhere in the world and what the associated strengths and weaknesses of these methods are. The BOF recommends reviewing and including Intergovernmental Policy on Climate Change (IPCC) accepted methods for carbon stock accounting.
 - Discuss the strengths and weaknesses of the different inventory methods used in the ARB Scoping Plan and FCP analysis. Be explicit about the limitations of FIA data when used alone, as well as remotely sensed imagery as it relates to forest inventory.
 - While the use of remote sensing presents the opportunity to simplify data collection, ultimately, the ARB/LBEL results should support the results determined by FIA field measurements. Differences and inconsistencies should be addressed.

- The BOF also emphasizes the need for a single inventory system for a more consistent foundation for analytics.
- The Draft Plan specifies that the measures of success are not to be reported until 2018. The BOF recommends clarifying the reason for the delay on the monitoring of the implementation of recommended management actions.
- Reference to 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.
- Chapter 5 of the Draft Plan discusses California forest carbon monitoring and accounting and notes these activities must align with federal and international standards. However, no direct reference is made to the IPCC-compliant full forest carbon accounting models.
- The Draft Plan does not specify that accounting and reporting of actual forest performance by ownership and forest sector (federal, state, industrial private, non-industrial private, etc.) will occur. This is important in identifying and refining priorities.
- More recent data is available from the Forest Inventory and Analysis program in which 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 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 in journal, should be included in the Forest Carbon Plan.

FOREST INVENTORY AND ANALYSIS DATA

- While the recommendations above address discussing strengths and weaknesses in FIA data, the Draft Plan also identifies a research need to increase plot density and frequency of FIA data collection. The BOF agrees with the identification of this research need to improve the FIA program, but the Forest Carbon Plan should also address the challenges to expanding the FIA program plot density, frequency, and statistical rigor with regards to proprietary FIA data, especially on private timberland assets.
 - The BOF recommends reinforcing the idea of increasing plot density and frequency of data collection by bringing it 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 BOF requests that the details defining large, medium, small, and non-stocked size classes in Table 7 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*). The BOF requests the following clarifications:
 - 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

- The role of forest management is not just about restoration, but also generating wood products. The BOF is pleased with the inclusion of harvested wood products within the Draft Plan when considering forest carbon as a whole. However, the BOF recommends emphasizing the importance of harvested wood products in carbon sequestration earlier in the plan, particularly in the Executive Summary.
- 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 reviewing the information provided in this section to see whether it accurately reflects the amount of carbon stored in harvested wood products. Any shortcomings or discrepancies in these numbers should be explicitly discussed.

- The McIver et al. 2015 study data presented in Table 10 (p. 70, Section 6.3.4 – *Carbon Storage in Wood Products and Other Uses*) is troubling, in that the overall lumber recovery seems to be very low, and correspondingly, the recovery of biomass products disproportionately high. The overrun also seems very high. The BOF recommends addressing the following possibilities:
 - In reviewing the McIver study, a possible anomaly was noted in the product flow chart presented there, as a certain volume was pulled out for shrinkage of lumber. As there's no carbon lost by lumber shrinkage, it's unclear that this was appropriately accounted for.
 - The total metric tons of sequestration from the McIver 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 some 60% of the output rather than 26%.
 - Additionally, the amount reported for carbon sequestered in finished lumber seems low when considering the 861,087 metric tons of carbon saved in 66 GGRF Projects (p. 29, Section 3.2.2 – *Improved Health and Resilience on Nonfederal Forestland*, 3.2 MMT CO₂e). The reported number indicates that these GGRF projects would save more carbon than is sequestered in the 624,825 metric tons of carbon in finished lumber produced in 2012. These numbers need to be scrutinized more closely.
 - The McIver data reported are that residues combusted for energy were 18% of the total delivered, not 54%, and 7% went into pulp and fiberboard products, not 4%. These discrepancies need to be addressed.
 - A discussion of the McIver 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 resilience projects. State law, or interpretation of state law, often plays into existing 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 legislative 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 Forest Carbon Plan must cite the need for long terms supply agreements from federal lands to support investment in manufacturing infrastructure.
- On p. 103 (Section 9.1 – *Traditional Wood Products*), it is unclear what leakage refers to. The BOF requests this be clarification on this matter.
- 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.
- The benefits of wood storage in landfills is always qualified by mentioning the methane that is eventually produced (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.

- In the discussion regarding biochar (p. 105, Section 9.2 – *Woody Biomass*), the BOF requests the following clarifications within the Forest Carbon Plan:
 - Who is currently making 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 lower value dimension lumber may increase in its marketability, slightly increasing the lumber sales average of the stream of products coming out of a sawmill 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. It is the impression of the BOF that biomass use within California is 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*).
- The Draft Plan discusses the SB1122 BioMAT program as legislative support to aid new bioenergy facilities (p. 107, Section 9.3.2 – *Legislative Support for Forest Biomass*). This discussion should include a status update on the successes or failures of this program. It is not clear that this program is having the intended affect.
- In the discussion regarding biomass feedstock and facilities, the BOF requests the following clarifications:
 - It is not clear 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*). Most biomass plants in the state derive their feedstock from urban and agricultural wastes.
 - What is the current and planned use of forest biomass for fuel, as described here? The description of California’s Low Carbon Fuel Standard is fine, but how relevant is it to forest carbon use?
- Regarding the extended discussion of the California Energy Commission’s funding of research and development (p. 108, Section 9.3.3 – *Forest Biomass Research and Development*), it would be appropriate to provide some perspective on these actions, rather than a wholly optimistic listing of what may occur, along with the potential timeline might be for any of these technologies being described coming to come to fruition and contribute to the reduction of GHGs. Each of these technologies should be identified as a net reducer of GHG impacts.
- 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 Draft Plan stated goals and objectives also provides a broad range of ecosystem values that go beyond the carbon issue (p. 7, Vision Statement, p. 24, Section 3 - *Goals for Wildland Forests*). AB 32 is mute on the topic of broader ecological values, as is the 2008 Scoping Plan, although the 2014 Scoping Plan Update emphasizes maximizing “co-benefits.” This goal overlaps the BOF’s mandate considerably, as well as other agencies charged with protecting forest resources, and their existing policy and regulatory mechanisms in place to address these broader resource values. The existing regulatory and policy framework that addresses the protection and enhancement of these resources are not mentioned until much later (p. 87, Section 8). The Forest Carbon Plan is

not stepping in to fill a void with regards to the protection of forest resources. The BOF requests clarification regarding how it is within the purview of the Air Resources Board to establish these types of goals. Also, while the document later identifies 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 in Section 8, there is no acknowledgment of the Clean Water Act, Forest Practice Act, Fish and Game Code, Endangered Species Acts, or Federal statutes pertaining to National Forest management. The Forest Carbon Plan should either eliminate the redundancy of attempting to achieve further forest protection, or make mention and discuss all aspects of state and federal law that pertains to this matter.

- 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*). This implies that FCAT thinks there are no considerations made for habitat values on private forests, that the Forest Practices Act and Rules and the Federal and State Endangered Species Acts, are irrelevant, or that the federal lands do a better job of protecting endangered species than private lands do. If this is not the case, the Forest Carbon Plan needs to more clearly articulate their concerns on the issue.
- 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, (i.e. people who are equipped to handle wood products in large quantities). Additionally, there needs to be an expectation of long-term raw material flow from federal lands to allow for investment in infrastructure.

“HEALTHY” FORESTS

- The term “healthy” is used to describe forests and ecosystems within the Draft Plan (i.e. page 63). “Healthy” is an undefined and unclear term in the ecological community – it anthropomorphizes natural processes and creates “good and bad” dichotomies. The BOF recommends using the term “resilient,” which is better understood within the ecological community.
- The Draft Plan’s statement that, “Private timberland management practices can result in conditions different from the desired healthy forest conditions described in the Plan of more large, widely spaced trees,” (p. 104, Section 9.1 – *Traditional Wood Products*) is suspect. This is a poor assumption within the Draft Plan, where a final pronouncement of what the ideal healthy forest is. This assumption is inimical to the Forest Practice Act and the Rules. Forest Service conceptual forest structure studies do not establish the ideal forest in California, nor should it be championed as forest policy for the state. This statement needs to be deleted from the Draft Plan.

SUPPORTING SCIENCE

- The Draft Plan states that “Large trees store and sequester more carbon than small trees,” and that “large trees also contribute to the greatest amount of carbon sequestration on an annual basis in California, while smaller trees are a net negative” (p. 59, Section 6.3 – *Forest Carbon Storage Dynamics*). Clarify within the Forest Carbon Plan how this is determined.
- The Draft Plan states that climate change will diminish carbon sequestration rates. The BOF requests the following clarifications:
 - Is the science clear that the rate of carbon sequestration in forests will be diminished, i.e. trees will grow more slowly? If so, please provide a citation.
 - With some models predicting warmer and wetter conditions, would that have the stated net effect of decreasing the quantity, quality, and stability of carbon stocks?

- If the implication is that forests are at greater risk of emitting carbon due to fire or insects, rather than actual decreased growth, that should be made clear.
- The “Science Snapshot” mentions the need for thinning and reintroduction of managed fire. The BOF requests clarification regarding whether thinning is specific to commercial thinning and if so, why? The BOF also recognizes that reintroducing managed fires is already a primary goal of the Forest Service, and requests clarification regarding how the Forest Carbon Plan will further that intention.
- 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*). The BOF requests clarification regarding to whom is this directed? Are the questions of ownership and/or differing management objectives factored into such a statement?
- In the discussion regarding the Weichmann et al. 2015 ten-year study described, “net positive ecosystem productivity” versus “negative productivity” is undefined (p. 19, *Fuel Reduction and Related Treatments*). The BOF requests clarification regarding these terms and how they are used as metrics of measure in compliance or non-compliance with Plan goals and objectives.
- 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 the National Forests, but not otherwise. The BOF requests more detailed discussion regarding what may be applicable and appropriate for different ownership classes.
- Figure 4 (p. 21, *Fuel Reduction and Related Treatments*) does to reflect that only 20% of the Sierra can be mechanically thinned. The BOF requests clarification regarding how this figure was determined and that any remaining gaps regarding the figure be addressed.
- 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*). The BOF requests clarification regarding whether this is anecdotal or if citations can be provided.
- The Draft Plan calls out the wildland urban interface as development that degrades and fragments wildlife habitat (p. 76, Section 6.6.1 – *Wildland-Urban Interface*). A citation should be provided 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 regarding this letter, please contact CAL FIRE’s Senior Environmental Scientist, Nadia Tase at nadia.tase@fire.ca.gov or 530-573-2320, or the BOF’s Executive Officer, Matt Dias at matt.dias@BOF.ca.gov or 916-653-8007.

Sincerely,

J. KEITH GILLESS
Chair
California Board of Forestry and Fire Protection

cc: