December 10, 2018

Shelby Livingston
Air Resources Board
1001 I Street
Sacramento, CA 95814

Dear Ms. Livingston:

Thank you for the opportunity to comment on the workshop presentation for the Natural and Working Lands (NWL) Climate Change Implementation Plan. We look forward to the opportunity to comment on the Plan itself and version 3 of the CALAND model. The Center for Biological Diversity and Sierra Club California appreciate California state agencies' recognition of the global climate crisis and their efforts in combating the crisis.

If improperly administered, NWL interventions can simultaneously fuel climate change and harm carbon stocks. Thus, whatever steps the state takes towards combating climate change via natural carbon sequestration and storage must be judicious and well informed. As the state finalizes and implements the NWL Climate Change Implementation Plan, agencies must:

- Consider short-term carbon losses alongside resilience
- Prioritize effective, accurate, and transparent landscape carbon models
- Prioritize effective, accurate, and transparent landscape carbon monitoring tools
- Urge long-term funding for programs that sequester and store carbon on working lands
- Take extreme caution in utilizing forest interventions that substantially reduce current carbon stocks

Consider Short-Term Carbon Losses Along Side Long-Term Resilience

In the Final Plan, mitigation must clearly be defined as increasing carbon sequestration and reducing greenhouse gas emissions in both the short term and long term. Climate change is an immediate and existential threat requiring deep reductions in carbon emissions over the next decade (and ongoing) to meet California's climate goals and avoid the worst damages from climate change, as made clear by the IPCC report on meeting the 1.5°C target. Thus, the Final Plan cannot ignore the initial, large emissions associated with the Plan's forest interventions.

During the November 2nd public workshop, agency staff presented CALAND carbon projections for two scenarios. The projections showed significant carbon losses during the next few decades estimated at 31 and 67 MMT CO_2e in 2030 compared with the baseline, and did not predict carbon benefits for between 20 and 40 years (i.e., cumulative net emissions do not become negative until ~2037 under alternative A and ~2054 under alternative B). As illustrated by the

isolated activity results, forest fuels reduction treatments – particularly thinning – are the primary driver of these carbon losses, while "less intensive forest management" provides significant immediate carbon reduction benefits. The agencies did not present a scenario without fuel reduction treatments, but presumably, a scenario without thinning/logging and forest bioenergy would show steady carbon benefits with natural regrowth and sequestration.

Enhancing the resilience of landscapes is an important goal. To that goal, the Final Plan must incorporate the scientific research indicating that restoring natural disturbance processes such as wildland fire – and reducing thinning/logging – best supports biodiverse forests with heterogeneous, uneven-aged stands that are more resilient to fire and climate change and capable of storing more carbon.[1]

Prioritize effective, accurate, and transparent landscape carbon models

The NWL Implementation Plan relies heavily on modeling results from the CALAND model. However, throughout the Implementation Plan development process, CARB and LBNL have not made the CALAND model, model documentation, and results publicly available for review and comment in a timely manner. The November 2 Final Plan Workshop presented limited results from version 3 of the CALAND model which has undergone substantial revision since version 2 was released a year and a half ago. Although the NWL Concept Paper stated that version 3 would be completed in July 2018, technical documentation for CALAND version 3 has still not been publicly released, and as a result, the public has not been able to evaluate the model assumptions, inputs, or results beyond the limited results presented at the Workshop. CALAND version 3, with full technical documentation, specifying the model inputs, data sources, definitions, assumptions, sensitivities of parameters, and full results, should be immediately released for public review and subsequent revision. CARB should not use the model for decision-making until stakeholders have reviewed the model and until it has been updated to address concerns.

Based on the Workshop presentation and as detailed in our prior comments, the CALAND model does not appear to be capable of providing robust carbon modeling for estimating the GHG emissions associated with management measures, although model outputs will be used to justify funding and pursuing those strategies. To provide just one example, we are concerned about the way that wildfire is being modeled. Based on the Workshop, it appears that CALAND assumes that fuels reduction treatment on a given amount of forest area will affect fire behavior on an equivalent amount of forest area, ignoring the fact that subsequent fire must occur in the area where that fuels reduction occurred in order for the treatment to have an effect. Therefore, it appears that the model vastly overestimates the effects of fuels reduction treatments on fire behavior.

[1] For example, Law et al. (2018) found that reducing logging -- lengthened harvest cycles on private lands and restricting harvest on public lands -- were the most effective management measures for increasing net ecosystem carbon balance, followed by reforestation and afforestation. In contrast, using forest harvest residue for bioenergy production increased cumulative net emissions compared to leaving residues in the forest to slowly decompose. Law, B.E. et al., Land use strategies to mitigate climate change in carbon dense temperate forests, 115 PNAS 3663-3668 (2018).

We are also concerned that the CALAND model results for 2030 do not seem consistent with the results presented for 2050 or 2100. The isolated activity results (i.e., net cumulative effects of individual restoration practices under Alternatives A and B through 2030) show that forest management practices related to fuels treatment lead to significant carbon losses. The only forest management practice that leads to carbon gains relative to the baseline is "less intensive forest management." Overall, through 2030, the proposed land management measures result in carbon losses of 31 MMT CO_2e under alternative A and 67 MMT CO_2e under the more intensive alternative B, with the losses largely driven by thinning. The full CALAND results shown through 2100, however, are not consistent with the isolated activity results presented through 2030. Although fuels reduction treatments remain ongoing through 2100, there is no explanation for the steep reductions in net cumulative emissions that begin in 2050 and which increase nearly exponentially through 2100, producing enormous projected decreases in net emissions of ~ -660 MMT under both scenarios by 2100. CARB should show the isolated activity results through 2100, rather than just 2030, so the public can discern what is driving the dramatic and incongruous pivot beginning around 2050 toward enormous carbon gains, despite continuation of highly carbon-emitting fuels reduction practices.

We also disagree with CARB that net cumulative emissions at 2030 should be expressed as the "32-year annual average by 2030" rather than the actual model results at 2030, which comes across as an attempt to hide the fact that CALAND projects significant carbon emissions in 2030. As the CALAND model results clearly show, net cumulative emissions at 2030 are 31 MMT under alternative A and 67 MMT under alternative B, indicting significant carbon losses in 2030. Carbon gains don't occur in the model until ~2037 under alternative A and ~2054 under alternative B. Averaging the emissions over the 2018-2050 period to present a "32-year annual average by 2030" is misleading and inaccurate.

Prioritize Effective and Transparent Monitoring Tools

Effective monitoring tools are integral to measuring the Plan's success. The State must use monitoring tools that can accurately determine the carbon outcomes of specific interventions. The current CARB NWL inventory is a start, but it is prone to inaccuracies and omissions. For example, soil carbon is currently not included in the inventory.

CARB's NWL carbon inventory also utilizes satellite imagery to estimate forest carbon and thus forest carbon stocks are measured largely based on canopy cover. As a result, thinning operations that remove large volumes of understory vegetation are not adequately measured as they have little effect on forest canopy. Conversely, carbon losses in forest fires can be overestimated as the satellite detects losses in canopy, but does not consider the bulk of the tree and its carbon remain intact.

For the NWL Final Plan to be effective in the long-term, state agencies must use accurate and effective monitoring tools. If the policy outcomes are not based on systems that accurately track the true impacts of its interventions, the resulting programs could reduce rather than augment its carbon stocks.

Working Lands

The Plan should include the importance of long-term dedicated funding for carbon sequestration on working lands through programs like the Healthy Soils Program, which assists farmers' and ranchers' transition to regenerative agricultural practices.

Biodiversity protection should be a guiding principle for working land ecosystems. It is crucial on working lands because greater biodiversity is associated with healthier crops, less pests, and less reliance on toxic inputs that compromise the accumulation of soil carbon.

Forests

The Concept Paper and the Final Plan Workshop included a number of troubling forest practices that would be counterproductive in reducing carbon emissions and would damage vital ecosystems. The Concept Paper and Final Plan Workshop:

- Aim interventions at fuel reduction in wildland, which increases emissions in the near term and does not guarantee emission reductions or increased carbon stocks
- Prioritize forest thinning, which has variable effectiveness as a fuel-management tool depending on where it is done, how it is done, what activities precede or follow it
- Neglect managed fire as a forest management tool
- Suggest biomass incineration as a biomass utilization method, which will increase emissions in the near term and leads to significant human health impacts

The NWL Final Plan must expand uneven-age management, the scattering of debris, and the lengthening of harvest rotation periods. These activities will result in healthier forest ecosystems that include more large trees and healthy soil, which will sequester and store more carbon. Forest and habitat conservation preserve current carbon stocks and persistent growth will continue to sequester carbon into the future. The Final Plan should prioritize forest preservation and aim for a natural fire regime in wildlands.

The Plan must not rely on biomass incineration as a means for facilitating biomass disposal or electricity generation. Biomass incineration as a means of producing electricity is extremely climate damaging and expensive, producing 1.5 times more CO_2 per megawatt hour than coal. Incinerating forest biomass is not carbon neutral, and should not be designated as such in the Plan or CALAND Model. Instead, the Plan should recommend leaving forest residues in the forest whenever possible.

When trees must be removed, the Final Plan should encourage biomass utilization methods that are appropriately sized and sited and that do not emit carbon. Biomass can be mulched and utilized by the state alongside roads and around state-owned buildings; it can also be sold to farmers as soil amendment and animal bedding or to individuals as material for water-smart landscaping. If there is more biomass than can be mulched, a multitude of state processes are already aimed at encouraging new biomass utilization methods. The NWL Final Plan should push for sustainable, emission-free biomass utilization, not for pile burning or biomass incineration.

Again, Sierra Club California and the Center for Biological Diversity thank you and the State for recognizing the importance of carbon sequestration and storage in our statewide and global climate mitigation goals, but we caution that the NWL Climate Change Implementation Plan must be thoughtfully constructed and administered, as recommended above, so that it results in actual net carbon storage in our ecosystems in the short and long term, providing true benefits in fighting climate change and protecting California ecosystem health.

Sincerely,

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