PACIFIC FOREST TRUST
Private Forests. Public Treasures.

August 3, 2021

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Thank you for the opportunity to learn more about how ARB is intending to develop scenarios that will shape its recommendations for an ambitious natural and working lands sequestration target.

We appreciated hearing some of the known attributes and limitations of the chosen modeling approaches. While understanding the desire to use "wall-to wall" publicly available data sets and open source modeling, it will be critical to complement the admittedly constrained results from these models and large-scale data sets with targeted, strategically identified case studies that are more fine grained and with more recent data in order to better calibrate the scale of opportunity and feasibility. Following here are some of our suggestions for improving the overall outcome of this effort:

1. The differences between the business-as-usual (BAU) scenario and alternative scenarios were not clear. To remedy this, assumptions for all scenarios should be made available in text. Some of these were generally described during the workshop, but the slides had no such information. it would increase transparency and clarity–and our ability to understand and endorse the outcomes–if the assumptions, in full detail, were accessible in writing.

2. It is essential to complement the RHESSys model given some critical limitations described. While it was stated that the model does not capture vegetation conversion due to climate change, it is nonetheless being used to predict future sequestration, even where certain of California's vegetation types are not predicted to survive. It would be useful to calibrate the RHESSys outcomes against predictive vegetation change models such as Dr. J. Thorne's, which has been used in the state's Climate Change Assessments.

3. The 12 chosen ecological units are necessarily modeled at a scale that does not capture substantial within-ecological region variability. To compensate for this, regional-scale models that do reflect this variability at finer grain, as well as capture the impacts of climate change on vegetation type, can be used. For example, our model of the 10-million acre Sacramento River

Headwaters Region, developed in cooperation with UC Davis and Duke University, would provide key data using both the RCP 4.5 and 8.5 pathways.

4. There was a lack of clarity as to how emissions from fire would be estimated, whether based on acreage and fire limits or fire intensity within those fires or some combination. The methods chosen will have a major impact of predicted emissions from fire. How are carbon emissions from different fire types being measured and projected? The LANDFIRE disturbance data appears to only show the impacts of fire in terms of acres burned. The difference in intensity, and therefore emissions, of different fire types should be considered. Case studies on the difference in fire intensity within large scale fires should be undertaken to better calibrate this for future predictions.

5. While incorporating growth of carbon stocks over time, the modeling does not consider avoided emissions resulting from preventing conversion or reduced emissions from changes to prescribed/TEK fire. How can CARB accurately evaluate the benefit of conserving forests relative to a business-as-usual (BAU) scenario if avoided emissions are not incorporated? Using case studies of other work, such as what is included in the Forest Carbon Plan, would assist in better calibrating benefits of avoided or reduced emissions.

6. While the modeling incorporates all ownership types, it does not account for potential future changes in ownership, nor does it account for potential changes in management practices under each ownership type.
    a. For example, a case study scenario which evaluates the change in intensive management to natural forest management would both increase resilience and amount of carbon stocks. Natural forests are far more effective than plantations at both sequestering carbon and maintaining it over the long term.[1] Encouraging more natural forest management across ownerships would increase resilience and enable significantly more carbon to be sequestered. This is a critical incentive-based pathway to assess, especially given the limitations of the RHESSys model with silviculture.

7. Given that 85% of the carbon stored in California's lands is in forests, illustrating how we can increase the amount and resilience of forest carbon stocks (as well as preventing loss) seems critical. This could be accomplished through the inclusion of case studies on key forest types.
    a. For example, oaks are slow-growing but very carbon-dense. The loss of oak forests therefore represents a significant loss of carbon that

[1] Anand M Osuri et al. 2020. Greater stability of carbon capture in species-rich natural forests compared to species-poor plantations. *Environ. Res. Lett*. 15 034011. iopscience.iop.org/article/10.1088/1748-9326/ab5f75

requires a long time to recapture. Honing in on an evaluation of the benefits of preventing carbon loss (as well as other ecological and economic benefits of these systems) in these forests is key.

b. High-productivity conifer forests, on the other hand, can provide a significant <u>near-term</u> carbon and adaptation benefit if they are conserved and harvest is focused on restoring more natural resilience and carbon stocking. A case study comparing the 10-30 year carbon and other climate benefits of intensive and natural forest management would provide a calibration for assessing this.

Sincerely,

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