



April 4, 2022

Matthew Botill, Branch Chief
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: Overlooking Inorganic Carbon Jeopardizes Modeling Accuracy

Dear Mr. Matthew Botill:

We thank the team at the California Air Resources Board (CARB) for presenting the 2022 Scoping Plan Update, Initial Modeling Results for Natural and Working Lands on Tuesday, March 15, 2022 and for providing space for public comments both during the workshop and in writing. Our signatories represent community members and non-profits working throughout the state on issues of desert conservation, access, and equity. This letter builds on the document provided to CARB on August 3, 2021.

We are pleased that CARB has designed a stand-alone scenario for desert carbon sequestration that does not include other landscapes. This is a step closer to providing the deserts with an appropriate designation. CARB's March 15 presentation, "Scenario 1 and Desert Carbon Stocks" slide 18, indicates that when left undisturbed, the desert ecosystem sequesters carbon at the highest level. We strongly support Scenario 1 as the preferred management scenario.

The Case for Better Analysis of Desert Organic and Inorganic Carbon

We remain concerned that the Natural and Working Lands initial modeling results do not accurately reflect the potential for carbon sequestration in terrestrial soils and inorganic carbon in the California desert. This will lead to incomplete modeling results and land management practices that allow for vegetation removal and soil disturbance in intact desert lands resulting in the loss of natural lands, carbon sequestration capabilities and the release of carbon into our atmosphere.

Both inorganic and organic carbon have similar effects on our atmosphere once they are exposed or weatherized (Swanson 2017; Allen et al. 2013). Therefore, it would be prudent to not overlook inorganic carbon – especially if it’s being dismissed simply because of a deficiency in understanding the desert ecosystem and for lack of resources to generate proper studies below ground.

It is our understanding that currently, CARB is only looking at the top 30 centimeters of topsoil to generate terrestrial carbon studies. Dismissing the deeper depths (between 30 to 100 cm) where desert carbon sequestration takes place is part of the problem. The Center for Conservation Biology notes that (see [Appendix A](#) for full document):

Globally, soils store more carbon (C) than the aboveground biosphere or the atmosphere (1,500GT versus 500GT and 720GT, respectively). Of that, 1,500GT of soil C, more than a third (500GT) of C is sequestered as inorganic calcium carbonate (CaCO₃; 500GT of C), more than is stored in all forests globally. Within that stored fraction, three pools that are ignored by CARB’s modeling are crucial for sequestering and managing C, including total soil carbon (see Carbon Cycle Institute 2022), desert soil organic C, (usually 20 to 100cm deep, the most commonly measured form of desert soil C), and inorganic carbonate C¹.

Omitting inorganic carbon from modeling leads to an underestimation of carbon stocks in the desert. We know that California deserts have been collecting inorganic carbon for millennia (Schlesinger 1985; Li et al. 2015) and that California’s hot deserts contain a large pool of inorganic carbon in the form of calcium carbonate (caliche), derived from biological processes.

Furthermore, according to a science brief from Defenders of Wildlife, Dr. Lindsay Rosa ([Appendix B](#)), California deserts hold 10% of the state’s carbon sequestration capabilities.

We urge CNRA scientists to work with desert carbon sequestration experts, academics and scientists to help address this gaping hole left by the lack of desert carbon sequestration understanding.

Funding for Desert Carbon Sequestration Research

Even though there are enough scientific grounds for creating inputs for desert carbon sequestration modeling, there is still additional research yet to be initiated that could further illuminate our understanding of the complexities of carbon sequestration in below-ground soils. In collaboration with your offices, we would be happy to advocate for desert carbon sequestration research and/or investments in current or additional CNRA staff or consultants that could bring a holistic approach to understanding desert carbon sequestration.

Follow-up Questions for Clarification

We invite you to provide your thoughts or create space for a conversation with our group around the following:

1. Why are Deserts placed in a sub-category within “Sparsely Vegetated Lands”? Why not have “Deserts” be their own category – especially since there appear to be no other sub-categories within “Sparsely Vegetated Lands”?

¹ Notes on Carbon Dynamics in the California Deserts by Michael F. Allen, Ph.D., updated 2022

2. Did CARB decision makers take into account Dr. Allen's white paper entitled "Notes on Models of Carbon Dynamics for the California Deserts", provided to you in our letter dated August 3, 2021, and if so, were any of those recommendations for modeling pathways entertained? Are there any questions based on that reading?
3. In Slide #31 of your March 15, 2022 presentation, would deserts be considered under the "Non modeled landscapes" lands that provide additional opportunities for carbon sequestration? If so, can you specifically add deserts to the sample list?
4. Because the desert ecosystem sequesters carbon at the highest level when left completely undisturbed, Scenario 1, as your analysis indicates, is the preferred management scenario. This likely varies from other ecosystems presented. We weren't clear if the goal was to choose a single management scenario across all ecosystem types, or to shape management practices based on the highest carbon sequestration. Can you expand?

It is our hope to shed light on the incomplete data input in the current modeling process and to highlight the sequestration processes that work together to capture and store carbon deep in hot desert soils.

We appreciate your review of our material and welcome further conversations with you and your colleagues at CARB. The health of our planet and our communities deserve to have our carbon sinks in the desert working as they have for millennia. We thank you in advance for your consideration and all the work that this type of endeavor requires.

Best regards,

Signatories:

Andrea Williams, Director of Biodiversity Initiatives
California Native Plant Society

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