



June 15, 2023

Dr. Elizabeth Kim, Director  
Office of Ocean and Polar Affairs  
Department of State  
RE: Comment on proposed scope of the United States Ocean Acidification Action Plan

Dear Director Kim:

The Carbon Business Council is a nonprofit trade association of more than 90 innovative carbon management companies with over \$1.5 billion in combined assets working across six continents, and we appreciate this opportunity to comment on the proposed scope of the upcoming United States Ocean Acidification Plan (OA-AP).

The recent IPCC AR6 Synthesis Report clearly states that carbon dioxide removal (CDR) – alongside a strong global prioritization on emissions reduction of carbon dioxide (CO<sub>2</sub>) and other greenhouse gasses – is “unavoidable,” and in fact will be required at gigatonne (Gt) scale by mid-century for us to reach net zero and have a chance to limit warming to 1.5 or even 2°C.<sup>1</sup> Covering 71% of the planet’s surface and serving as (by far) the largest global sink for anthropogenic CO<sub>2</sub>,<sup>2</sup> the world’s oceans have an outsized role to play in scaling carbon removal to the level we will need in the coming decades.<sup>3 4</sup>

Because so much excess anthropogenic CO<sub>2</sub> has been absorbed by the ocean, ocean acidification has increased to unprecedented levels, endangering critical marine ecosystems, commercial fisheries, and the aquaculture industry. We applaud the U.S. government’s focus on this critical issue and would like to take the opportunity of this comment to suggest how the scaling and advancement of certain marine carbon dioxide removal (mCDR) approaches can contribute to the mitigation of the ocean’s current extreme levels of acidification.

The ocean is too vast for anthropogenic carbon removal to meaningfully reduce ocean acidification at a global level in the near term: This will require CDR at massive scale over decades and will be our work for the second half of the century and beyond. However we would like to highlight how certain mCDR approaches can increase alkalinity, and reduce acidification, on a sustained basis *locally* – thereby contributing to the protection and potential restoration of critical near-shore marine ecosystems and fisheries, as well as to enhanced productivity of commercial aquaculture. In fact, local alkalinity enhancement has already been demonstrated to enhance net

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<sup>1</sup> [IPCC AR6 Synthesis Report](#) p 50, 2023.

<sup>2</sup> Friedlingstein et al., [Global Carbon Budget 2022](#). *Earth Systems Science Data*, 2022.

<sup>3</sup> [Research Strategy for Ocean Carbon Dioxide Removal and Sequestration](#), NASEM, 2022.

<sup>4</sup> [Strategy for NOAA Carbon Dioxide Removal and Research](#), NOAA PMEL, 2023



coral reef calcification in the natural environment on a small scale.<sup>5</sup> Further, alkalinity is frequently added to shellfish hatcheries to increase yield.

mCDR approaches that can reduce ocean acidification locally include:

- Cultivation of aquatic plants, including [macroalgae](#)<sup>6</sup> and [microalgae](#) (for sinking to the deep ocean, or harvested for incorporation into long-lived products);
- Restoration of seagrass, mangroves, and other coastal marine ecosystems (coastal “[blue carbon](#)”)<sup>7</sup>;
- [Ocean alkalinity enhancement](#) via the deployment of electrochemical systems or physical application of clean alkaline minerals to coastlines, coastal watersheds, through existing and permitted ocean outfalls (e.g. wastewater treatment plants), or the open ocean; and
- [Direct ocean removal of CO<sub>2</sub>](#) via electrochemical systems, which can reduce acidification without addition of material to the ocean.

Given these significant synergies, we strongly recommend that the U.S. Department of State, NOAA, and the OA Alliance meaningfully include the opportunities for increased investment in mCDR research; development of science-based systems for mCDR monitoring, reporting, and verification; and advancing and scaling mCDR project deployment in the scope of the OA-AP. Additionally [creating a permitting regime for mCDR](#) that ensures field trials within U.S. waters under existing and new legal frameworks can help advance mCDR to contribute to the restoration of ocean health.

We would be pleased to discuss this further with you and other relevant stakeholders, and connect you with Carbon Business Council members working to advance mCDR. We very much appreciate the important work that you do, and the opportunity to submit this input for your consideration.

Sincerely,

*Benjamin Rubin*

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*Isabella Corpora*

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Associate Director, Carbon Business Council

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<sup>5</sup> Albright et. al., “[Reversal of Ocean Acidification Enhances Net Coral Reef Calcification](#),” *Nature* (2016).

<sup>6</sup> “[SBU Study Shows Kelp Can Reduce Ocean Acidification and Protect Bivalves](#),” June 2022.

<sup>7</sup> Fakhraee, M., Planavsky, N.J. & Reinhard, C.T. [Ocean alkalinity enhancement through restoration of blue carbon ecosystems](#). *Nat Sustain* (2023).