



July 14, 2025

Stacey Jensen
Director, Oceans, Wetlands, and Communities Division
Office of Wetlands, Oceans and Watersheds
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W., Washington, DC 20460

RE: Docket ID No. EPA-HQ-OW-2025-0198 – Carboniferous, Inc. Research Project (Orca Basin, Gulf of America)

Director Jensen:

Thank you for the opportunity to comment on the Environmental Protection Agency (EPA) decision regarding a research permit (Proposed Permit No. EPA-HQ-MPRSA-2025-001) pursuant to the Marine Protection, Research and Sanctuaries Act (MPRSA) to Carboniferous, Inc. for the transportation and disposition of materials into ocean waters as part of a research project on carbon removal. Ocean Visions agrees with the EPA's tentative determination that the proposed research project has sufficient scientific merit for field research on ocean carbon cycling and would not result in unacceptable adverse impacts.

Ocean Visions is a science-based ocean conservation organization focused on alleviating the unprecedented ocean warming and ocean acidification that are putting marine ecosystem health and reliant economic stability at risk. For the last five years, we have developed core programming to accelerate [research and development of marine carbon dioxide removal](#) (mCDR) pathways as necessary complements to the decarbonization required to address these ocean stressors and at scale. We develop [open knowledge products](#) and [convene and facilitate progress among key actors](#) to increase societal understanding and advance mCDR research, development, and demonstration (RD&D).

The Carboniferous research project would provide information that is important to better understand mCDR and this kind of information can only be gained through ocean-based field research.

Because the ocean occupies more than 70 percent of the surface area of our planet and is [the biggest part of the global carbon cycle](#), mCDR has the potential to perform the required scales of CDR needed to restore and maintain ocean ecosystems and ways of life. MCDR also has the

potential to create a new marine industry that does not always require arable land, fresh water, or nutrients, as compared to some other forms of CDR. Unfortunately, mCDR pathways remain underdeveloped. As a result, the knowledge base for assessing mCDR efficacy, environmental impacts, and economic potential is weaker than it is for the terrestrial portion of the CDR portfolio. In recognition of the outsized importance of and underdeveloped body of research to date on mCDR, over 450 scientists from around the world have [called](#) for more responsible mCDR research. This is why permitting field research projects, like the one proposed by Carboniferous, are essential to developing a sufficient body of research for carbon removal in the ocean.

Under the MPRSA, the EPA may permit the transportation and disposition of materials in the ocean as part of a research project when the EPA determines that the scientific merit of the proposed activities outweigh the potential adverse environmental or other impacts that may result from the activities (40 C.F.R. 220.3(e)). Well-designed controlled field trials, such as Proposed Permit No. EPA-HQ-MPRSA-2025-001 are our best way to gain real world information about the efficacy and impacts of mCDR approaches in ways that can never be replicated in laboratory, mesocosm, and/or modeling studies. This is the first planned field trial of Marine Anoxic Carbon Storage (MACS) in the United States and **the scientific merit would assist in positioning the United States as a leader in mCDR RD&D.**

The research project under the proposed permit has unique scientific value for advancing our collective understanding of mCDR and satisfies criteria for issuing a permit under the MPRSA, including:

- Characterizing the fate of terrestrial biomass in an anoxic, high-pressure setting. This field trial will allow the study on how sugarcane bagasse, a form of waste biomass on land, remains intact as biomass or is converted to dissolved carbon and the timescales involved with any transformations.
- Field testing the sensors and other oceanographic equipment included as part of a measurement package to evaluate performance in extreme conditions. Monitoring and reporting of mCDR activities will require high-performance sensors and other ocean observational equipment. This field trial will generate critical information to help optimize the use of oceanographic equipment for monitoring and reporting of mCDR activities in the deep ocean.

The Carboniferous research project, as designed, should result in minimal adverse impacts to the marine environment and human health.

The proposed research will take place in the Orca Basin, which reduces multiple variables that are typically present in an open-ocean study that could result in adverse impacts to the environment or humans. For example, the anoxic and hypersaline conditions make the Orca Basin inhospitable to

any life except microbes. Similarly, the nearest marine protected area is about 90 miles away and there are no coral present or near the proposed study area, suggesting no adverse impacts to critical amenities or protected habitats. Also, the water column is not a frequent fishing ground nor is it subject to major shipping or navigation routing. These characteristics for the study area significantly decrease potential risks posed by the experiment as designed.

The total experiment proposed by the Carboniferous research project is designed to have an incredibly small footprint. In numbers, the experimental footprint is approximately 180 square meters within the 158,000,000 square meters of the Orca Basin. To further the limited impact to the Orca Basin, the environmental signals are not detectable more than a meter from any of the benthic landers.

We are impressed by the level of analysis given to the possible pesticides that could leach from the sugarcane bagasse briquettes as well as the manila rope and burlap that would be placed in the study area. Agricultural products may contain pesticides, even trace amounts that can harm sensitive marine ecosystems. From the EPA's analysis of the proposal, we see that only diuron was detected at a low level and in only one of the two tests for pesticides on the sugarcane bagasse briquettes that will be used in the experiment. Because the EPA's assessment that pesticide residual levels are below detection limits—to the extent that even diuron was not detected in both testings — this gives us confidence that the potential environmental impacts will not outweigh the scientific merit of the research project.

Additionally, the research project will provide new information about under-researched ocean ecosystems. The project is designed to place biomass packages over multiple months and retrieve brine and biomass subsamples at multiple timepoints to evaluate the water chemistry and microbial community composition over the time frame of the experiment. Relative to ocean systems with charismatic megafauna, corals, and fishery stocks, for example, we know little about microbial communities like those within the Orca Basin. Through the Carboniferous research project, we can gain insights into microbial community dynamics in a unique ecosystem through the small sample size of the project relative to the Orca Basin.

The Carboniferous research project could provide insights into innovative co-benefits of mCDR.

The research project proposes to use sugarcane bagasse, a plant material residue from processing sugarcane, as the organic material for placement in the deep ocean. Management of sugarcane bagasse has already resulted in innovative ways to repurpose the material such as to generate electricity and as a building material, but the fact remains that [large bagasse piles are known to combust spontaneously and be a source of air and water environmental pollution](#), including through the release of methane due the conditions of their terrestrial storage. By investigating the

placement of sugarcane bagasse in an environment that is already inhospitable to humans and other creatures, the experiment could reveal innovative co-benefits of CDR such as new pathways for safer biomass management.

Conclusion

Carboniferous was selected for [Ocean Visions' Launchpad](#) program, which supports mCDR innovators with expert scientific and engineering advice to help them optimize their technologies and fully measure, understand, and minimize negative environmental effects. Selection for the Ocean Visions Launchpad program is highly competitive, with only a small number of responsible innovators selected through a rigorous review process based on scientific merit, innovation potential, and readiness for scaled impact.

During its involvement in the Launchpad program, Carboniferous received expert advice on the microbiology of Orca Basin and gained access to data obtained by research cruises from 2022 and 2023. This has helped Carboniferous develop insights into the microbial metabolic processes in the Orca Basin and how those processes could influence the potential for Marine Anoxic Carbon Storage (MACS).

We commend the EPA for the extensive review so far performed on Proposed Permit No. EPA-HQ-MPRSA-2025-001. We believe that Carboniferous is well positioned to perform the research project it has proposed and will advance efforts that fill knowledge gaps about removing carbon through the marine environment. Such gaps must be addressed to continue to advance mCDR pathways so that they are known to be safe for the environment and humans while effectively removing carbon. Accordingly, please accept our comments into consideration. We look forward to your further evaluation of the Proposed Permit and to continuing to work with you in advancing mCDR research projects that have scientific merit.



David Koweek
Chief Scientist, Ocean Visions



Ruth Driscoll-Lovejoy
MCDR Program Director, Ocean Visions