

WHOI Position Statement on Marine Carbon Dioxide Removal Research

Woods Hole Oceanographic Institution (WHOI) is firmly committed to the independence of its scientific research and to advancing understanding of the ocean's integral role in Earth's climate system.

Consistent with a vast body of scientific research, WHOI recognizes that addressing climate change is imperative and dramatic reductions in carbon emissions must be the immediate priority.

Because the ocean is a highly active part of Earth's carbon cycle and its carbon content far exceeds that of the atmosphere and terrestrial ecosystems combined, marine carbon dioxide removal (mCDR) approaches have drawn interest from both researchers and profit-seeking companies. As society considers such mCDR strategies, it is critical that decisions about whether and how to implement these strategies be grounded in independent and transparent research and observation. The efficacy and safety of any such approach must be fully evaluated, and must include comprehensive community engagement, before being considered for deployment at scale.

Carefully designed field trials and test beds will be required to evaluate proposed mCDR techniques and to inform science-based legislation and regulations before any mCDR approaches are deployed at scale. Cosigned by 123 international ocean organizations, the "[COP28 Dubai Ocean Declaration](#)" recognizes the urgent need to establish large-scale, persistent ocean observation systems to improve national emissions reduction estimates for evaluating the long-term efficacy and safety of mCDR and other ocean-related climate change solutions.

WHOI mCDR Priorities

- **Independent research:** As society considers mCDR strategies, it is imperative that these be grounded in independent and transparent research and observation, and that the efficacy, safety, and potential environmental impacts are fully understood.
- **Improved observations:** Comprehensive monitoring, reporting, and verification (MRV) protocols of both carbon and environmental conditions must be established to track ocean health and assess mCDR effectiveness for durable, scalable carbon removal, with a focus on identifying impacts on marine ecosystems and society.
- **Collaboration:** An effective research program will require national, regional, and global collaboration among ocean science institutions, governments, NGOs, and philanthropic organizations, with active communication and consensus-building.
- **Ethical, inclusive science:** mCDR research must also be guided by an ethical and open data framework that ensures effective stewardship of our shared marine resources and cultivates trust and collaboration across society. Example frameworks are available^{1,2,3}.

WHOI does not endorse solution-scale mCDR deployment, which we believe is premature given the current lack of data and understanding of potential impacts. We are committed to high-integrity, transparent, inclusive, and ethical conduct of research, ensuring that data and findings are freely available and accessible and that these processes involve diverse partners and rights holders such as Indigenous communities, as well as other relevant groups.

As we navigate the complexities of our changing world and its implications for the future of the ocean, WHOI remains steadfast in its mission: Advancing basic and applied knowledge of the ocean and its connection with the Earth as a whole through a sustained commitment to excellence in science, engineering, and education, and the application of this knowledge towards solution to problems facing society.

July 1, 2024

1. Loomis R, Cooley SR, Collins JR, Engler S and Suatoni L (2022) A Code of Conduct Is Imperative for Ocean Carbon Dioxide Removal Research. *Front. Mar. Sci.* 9:872800. [doi: 10.3389/fmars.2022.872800](https://doi.org/10.3389/fmars.2022.872800)
2. Boettcher, Miranda & Conathan, Michael & Keller, David & Scobie, Michelle & Lezaun, Javier & Chai, Fei & Cooley, Sarah & Klinsky, Sonja & Renforth, Phil & Webb, Romany. (2023). A Code of Conduct for Marine Carbon Dioxide Removal Research. [doi:10.13140/RG.2.2.22528.40968](https://doi.org/10.13140/RG.2.2.22528.40968)
3. American Geophysical Union (2023). [Position Statement on Ethical Framework Principles for Climate Intervention Research](#).