An Ocean-Sized Climate Solution?

Can marine carbon dioxide removal (mCDR) offer a feasible, scalable, and sustainable climate response for Sāmoa?

Why does this matter?

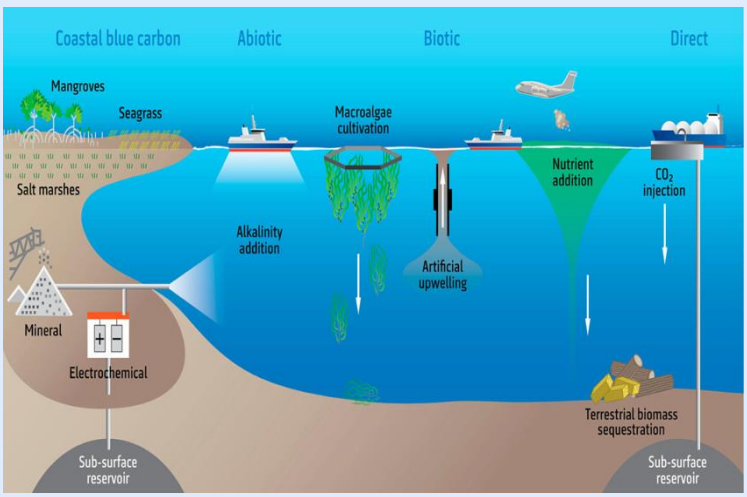
Pacific nations face the **heaviest climate impacts** despite contributing the least to global emissions.

Holding warming below 1.5°C now requires actively removing CO_2, not only reducing it.

Recent interest in mCDR research has shifted to the Pacific.

Marine CDR (mCDR) approaches remain untested for large-scale implementation with uncertainty in the ecological consequences and social support

It is crucial to ensure that pacific perspectives and local ecological contexts are considered and represented at any stage of mCDR conversations and implementation.



Law & McLeod, 2025

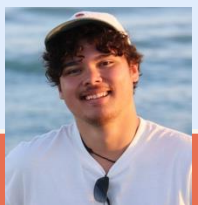
What is being assessed?

Four leading mCDR techniques are compared on efficiency, scalability, environmental risk and verifiability:

- Ocean alkalinity enhancement
- Macroalgae cultivation and sinking
- Enhanced marine weathering
- Electrochemical CO_2 removal

How is this being studied?

- Comparative review of the mCDR literature, weighing each technique on efficiency, scalability, environmental risk and verifiability.
- Assessment grounded in Sāmoa's geography, reef ecology, infrastructure and governance context, and social acceptability



University of Otago Department of Marine Science

Ryan Taei PGDipSci Candidate, 2026