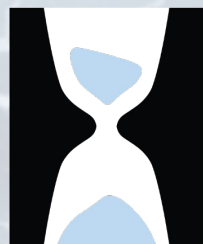


Ocean Alkalinity Enhancement (OAE): Science, Engagement, and the Path to Responsible Scaling

California Climate Policy Summit
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HOURGLASS

C L I M A T E

HOURGLASS CLIMATE

Hourglass is a **501(c)3 nonprofit** research organization.

Our **mission** is to strategically research the safety and efficacy of **Ocean Alkalinity Enhancement** (OAE) for responsible carbon removal and climate impact at scale, and to disseminate our work for the public benefit.

TOOLS

Modeling tools that facilitate responsible project **planning**, **permitting**, and impact **quantification**.



FIELD TRIALS

Field trials that ground-truth the **efficacy** and **safety** of mCDR, with transparent **data sharing** as a tenet of the work.



OAE

Ocean Alkalinity Enhancement

The addition of alkalinity to seawater via the dissolution of ground alkaline minerals or through electrochemical processes, ultimately drives atmospheric CO₂ ingassing into the surface ocean for long-term storage.

Mineral based OAE Field Trial, North Carolina



Hourglass
monitoring team

ENGAGEMENT AT HOURGLASS

Disseminating our work for the public benefit is part of our mission

Data Transparency

- Peer-review publication of results
- Frequent/early communication of findings
- Open source data access

Open Source toolkits for MRV

- Democratize access to CDR and environmental impact quantification tools
- Transparent assessments

Engagement at Hourglass

Field Trial Community Engagement: *A participatory governance framework*



1. Stakeholder Mapping

Consider technical, industry, NGO, academic, community, indigenous, and regulatory stakeholders

Identify leaders, potential advocates & opposition

Build engagement plan based on stakeholder needs & preferences

Engagement at Hourglass

Field Trial Community Engagement: *A participatory governance framework*



**2. 2-way
Information
Sharing**

Engagement communication toolbox

**Focus Groups
Interviews
Town Halls
Education Sessions
Clear expectations
LISTENING**

Engagement at Hourglass

Field Trial Community Engagement: *A participatory governance framework*



3. Project Co-design

Integrate local knowledge

Incorporate stakeholder priorities into research plan

Build local monitoring & research collaborations

Engagement at Hourglass

Field Trial Community Engagement: *A participatory governance framework*



4. Post-project implementation

Update, update, update! Stakeholders are invested in the outcomes of your project

Demonstrate appreciation & give back

SAFETY & EFFICACY

Part of our mission: *Research the safety and efficacy of OAE for responsible CDR and climate impact at scale*

**Simulate
interventions in
the lab**

&

**Conduct &
monitor
real-world field
trials**

&

**Develop &
validate
mechanistic
models**

SAFETY & EFFICACY – MARINER Lab



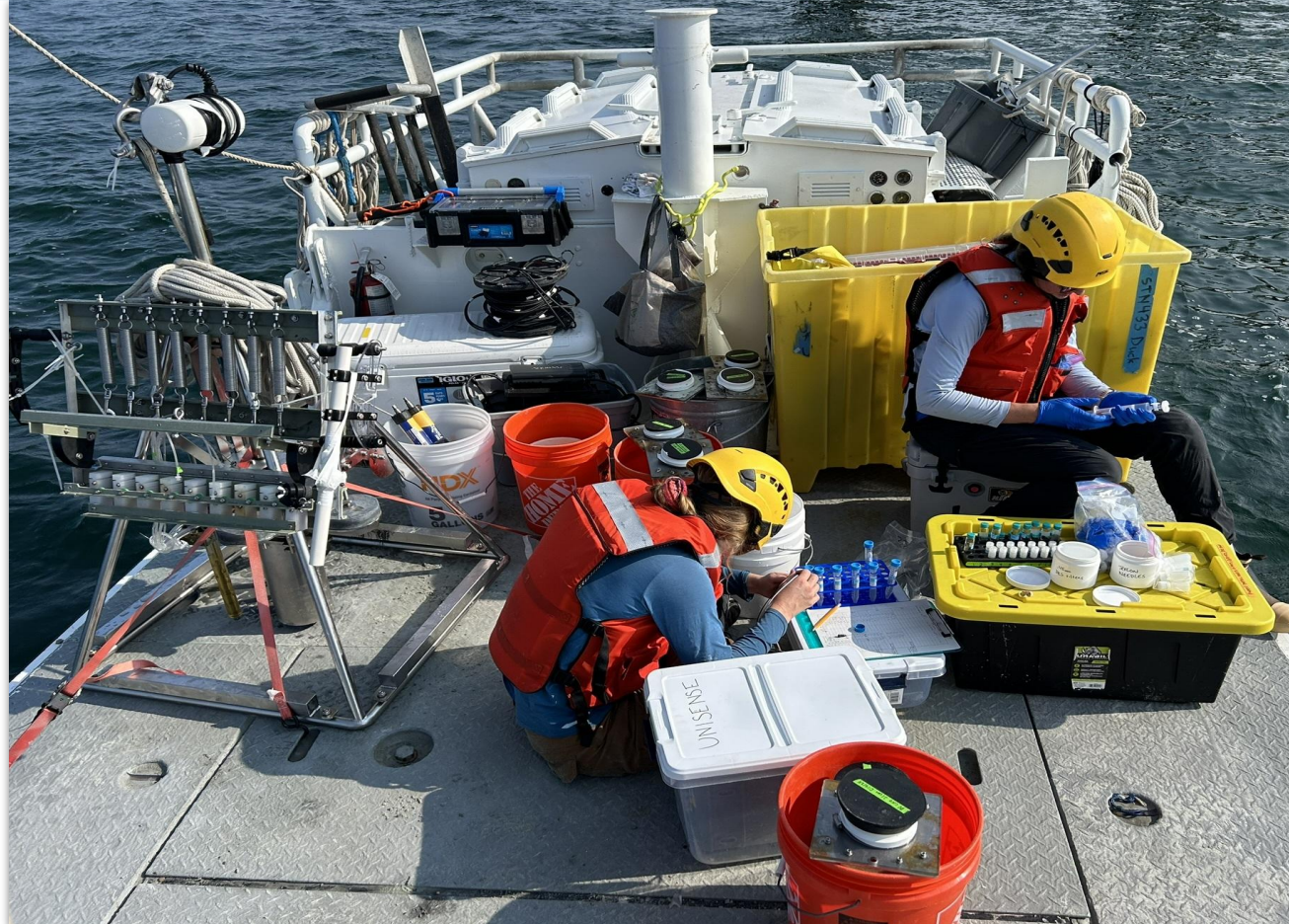
LA-based reactor facility

- Simulates real world conditions (temperature, water residence time, sediment columns)
- Helps de-risk OAE by testing feedstocks for safety and efficacy in controlled lab settings before field deployment

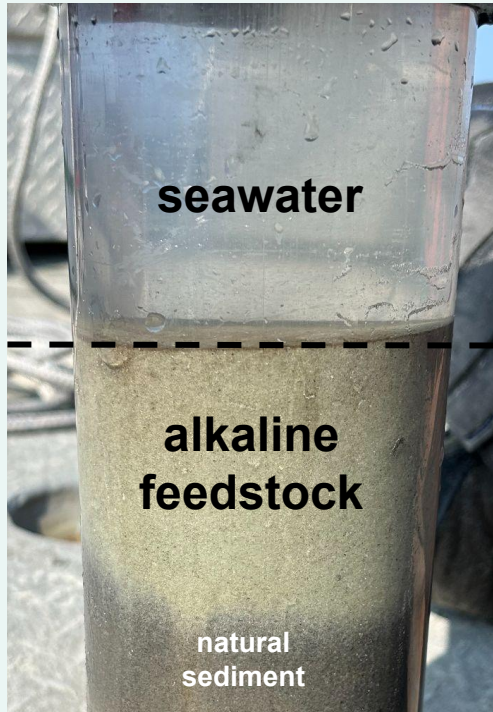
SAFETY & EFFICACY – FIELD TRIAL

Monitoring an OAE Field Trial

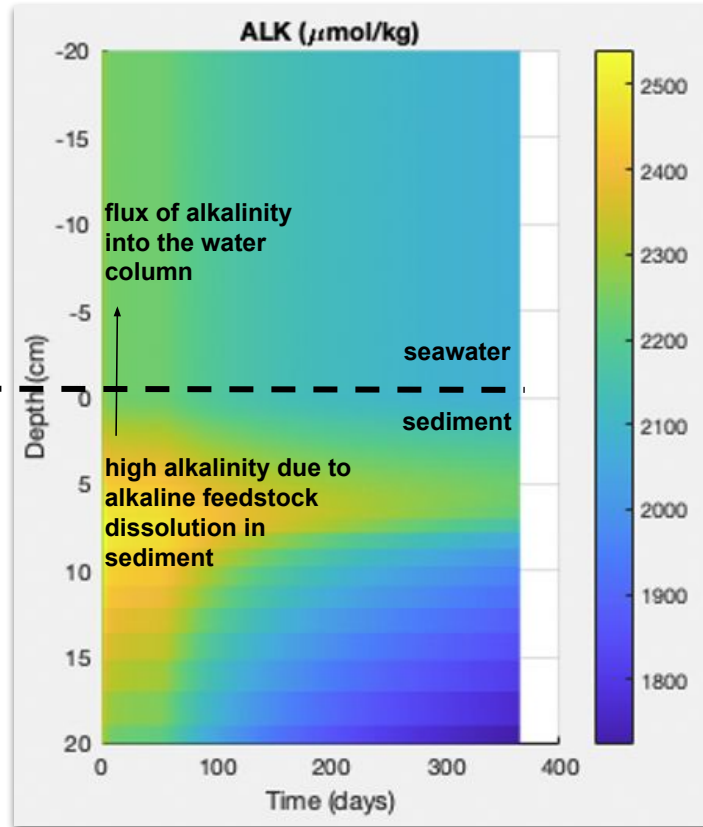
- Tracking ecological impacts from microbes to fish
- Deploying custom equipment to measure CDR and advance MRV approaches



SAFETY & EFFICACY – RADIO



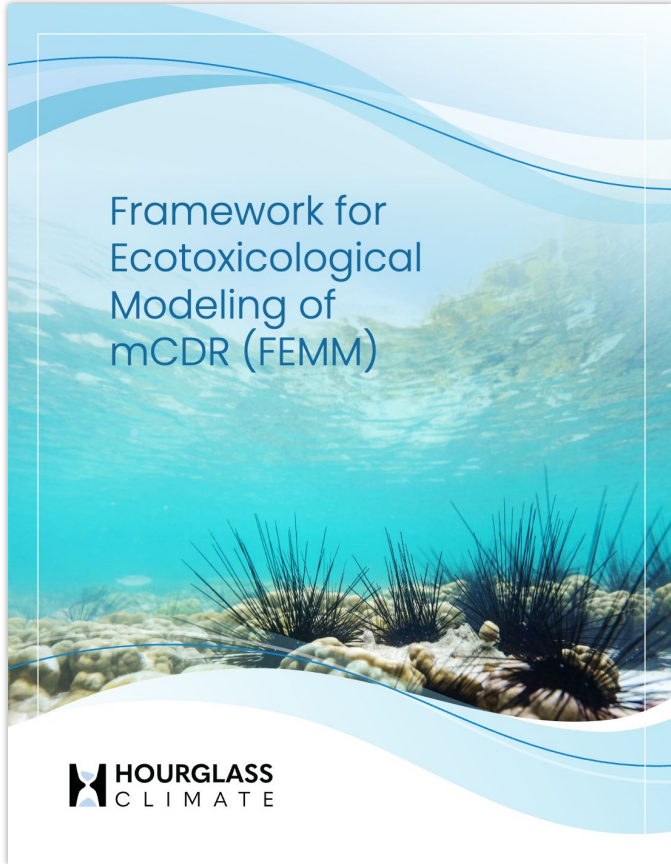
sediment core pulled from seafloor



Sediment Reaction Transport Model (RADIO)

- Quantify alkalinity flux from sediment to water
- Disentangle alkalinity sources
- Extend predictions beyond what can be directly measured in the field

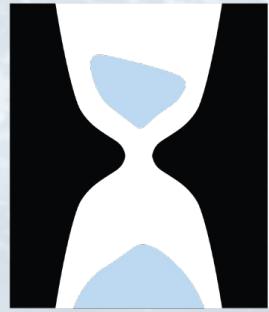
SAFETY & EFFICACY – FEMM



FEMM is a guidance document on how to quantify the ecotoxicological risk from mCDR projects.

- Suitable for OAE, direct ocean carbon capture (DOCC), and more
- Integrates EIA approaches with widespread regulatory precedent
- Moves from screening-level assessment to advanced assessment only as needed
- Intended for project developers, regulatory bodies and standard setting organizations





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