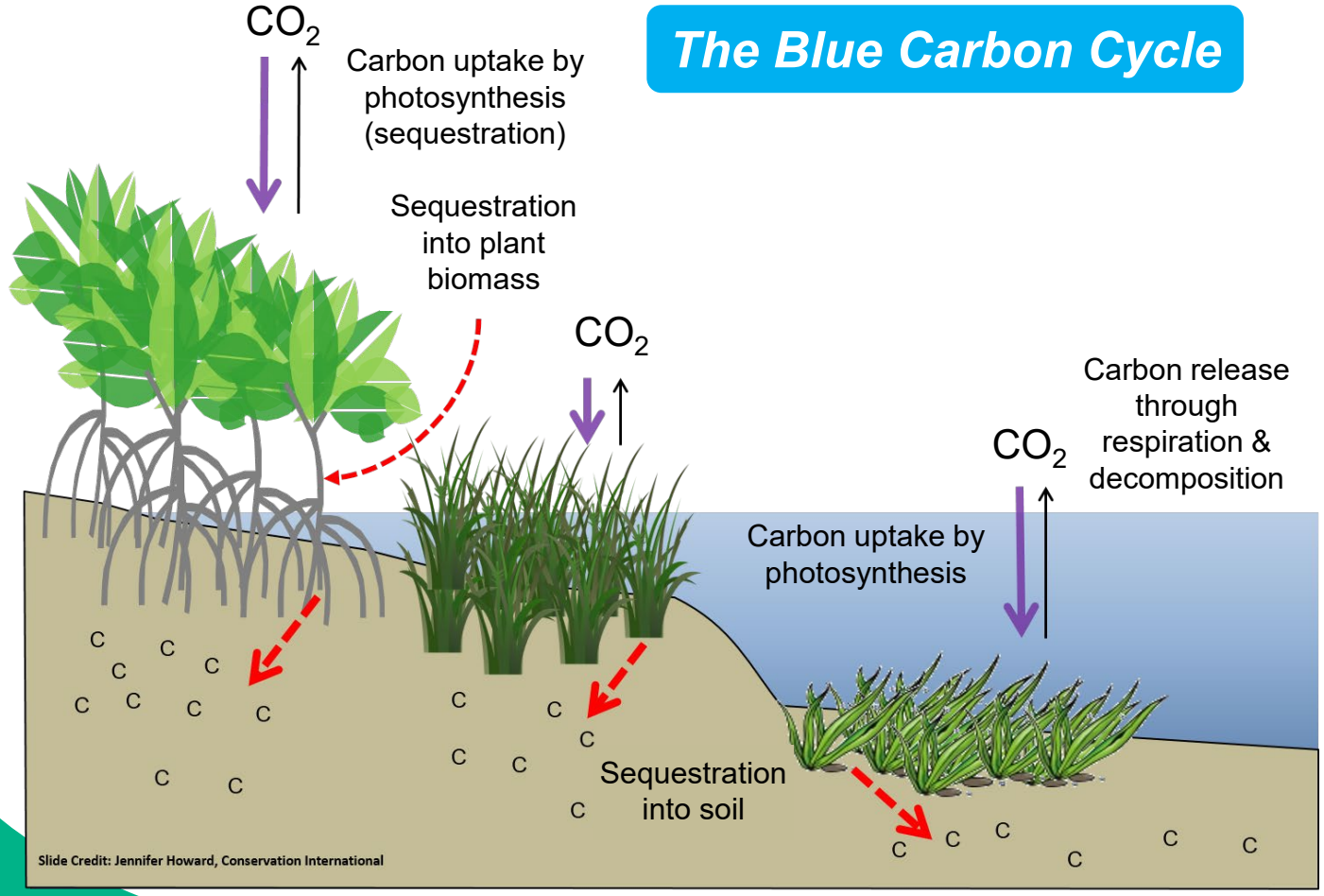
ASSESSING BLUE CARBON STOCK IN SAN DIEGO BAY'S EELGRASS BEDS

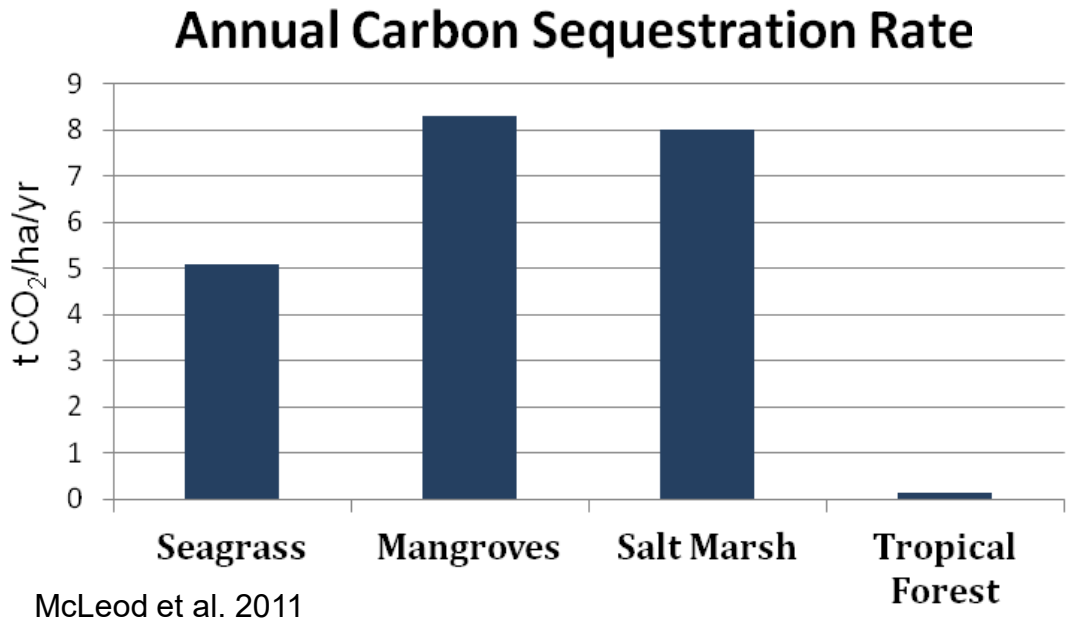
PORT of SAN DIEGO
Environment

Heather Carroll
Director of Environmental Conservation

What is Blue Carbon?

Carbon captured by the world's oceans & coastal ecosystems





McLeod et al. 2011

Salt marsh, eelgrass, & mangrove ecosystems are highly effective at capturing carbon

Blue Carbon and the Port

Blue Carbon Integrates Across Port Initiatives

- Environmental Conservation
- Aquaculture & Blue Technology
- Emissions Reduction
- Climate Resiliency
- Policy & Legislature

Building a Portfolio of Nature-Based Solutions

San Diego Bay Aquaculture

Seaweed & Shellfish Aquaculture Planning

San Diego Bay

Sunken Seaweed

Bay-wide Eelgrass Blue Carbon Study

Pond 20 Wetland Mitigation Bank

ECOncrete

Native Oyster Living Shoreline Project

Pacific Ocean

San Diego Bay's Eelgrass Habitats

Blue Carbon in the Bay

Building on Bay-wide Eelgrass Studies

- The Port & Navy jointly map eelgrass ~3 years.
- As of 2023, San Diego Bay has 2,600 acres of eelgrass, which represents:
  - 50% of all eelgrass in Southern California.
  - 17% of all eelgrass in the state.

San Diego Bay Eelgrass Blue Carbon Study

Funded by MARAD's Maritime Environmental & Technical Assistance Program

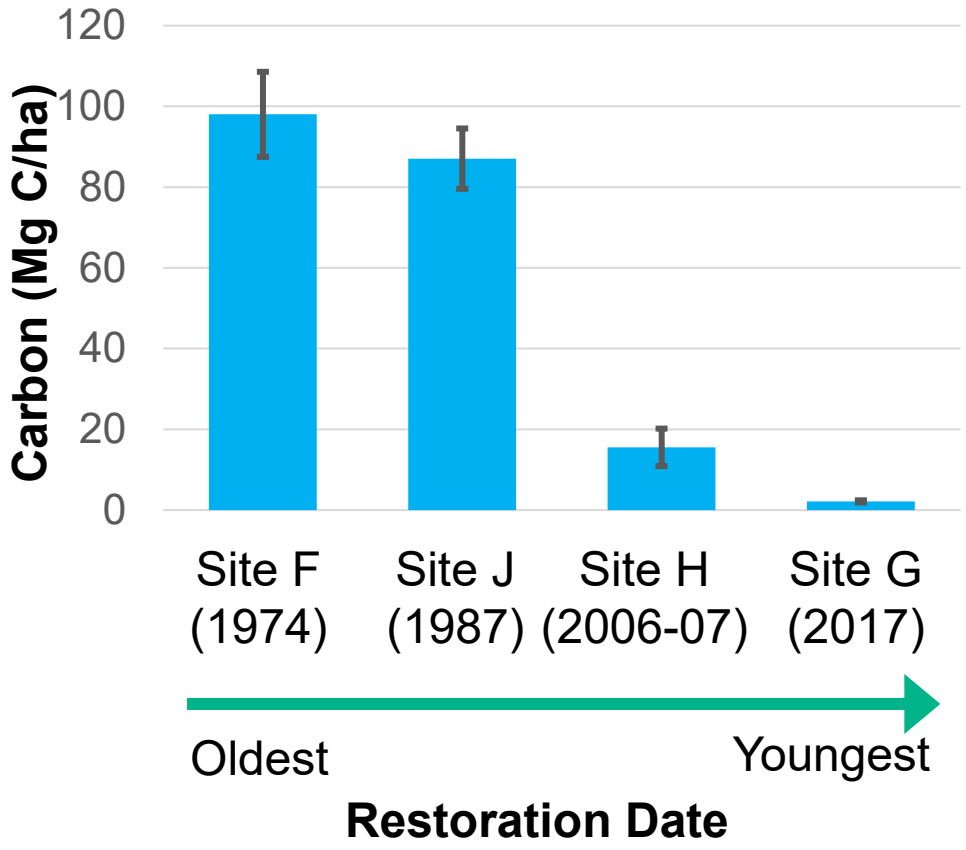
Year 1: Assessing Carbon Storage in the Bay

Study Goals:

1) Collect baseline data on above ground (eelgrass) and below ground (sediment) carbon.
2) Locate carbon storage hot spots.
3) Evaluate carbon storage within historic (old) & restored (new) eelgrass beds.
4) Model changes in carbon storage due to sea level rise.

Eelgrass Blue Carbon Study Year 1 Results

Funded by MARAD's Maritime Environmental & Technical Assistance Program



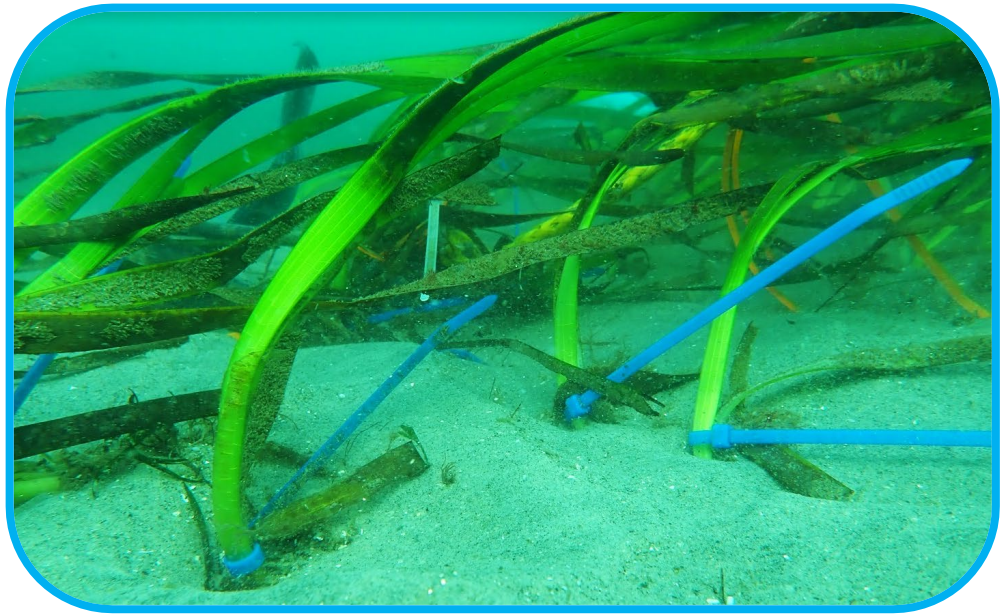
Year 1: Assessing Carbon Storage in the Bay

Study Results:

- The bay's eelgrass beds contain **170,900 Mt of CO^2 equivalent** in the top 1 meter of sediment but could contain as much as 245,000 Mt CO^2e.
- Older eelgrass beds contain more carbon than new eelgrass beds, meaning **eelgrass restoration has potential to store a lot of carbon**, especially within the first few decades of restoration.

Eelgrass Blue Carbon Study Year 2

Funded by MARAD's Maritime Environmental & Technical Assistance Program



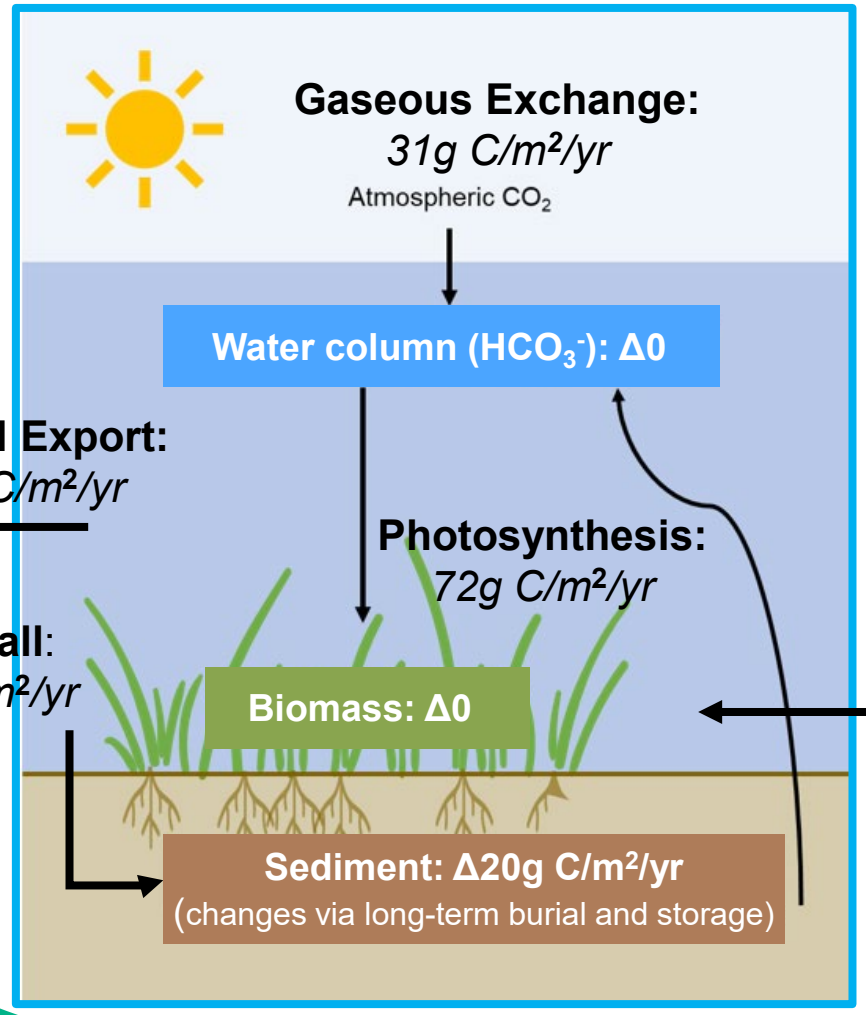
Year 2: Build a Carbon Budget

Study Goals:

1) Assess carbon sequestration rates, or how much carbon eelgrass beds store over time.
2) Expand previous analysis of carbon storage variation associated with differences in local conditions. *Collaborative effort with the Navy.*
3) Quantify sequestration through the Bicarbonate Pathway.

Eelgrass Blue Carbon Study Year 2 Results

Funded by MARAD's Maritime Environmental & Technical Assistance Program



Year 2: Build a Carbon Budget

Study Results:

1) San Diego Bay is sequestering approximately **1,195 Mt of CO^2 equivalent** annually.

eDNA and Eelgrass & Shellfish Mutualism Study

Funded by The Builder's Initiative

Year 3: Eelgrass & Shellfish Mutualism

- SDSU graduate student thesis.
- Study supports permitting of aquaculture leases near eelgrass beds.
- Results indicate **Pacific Oysters aid eelgrass growth** and provide beneficial sulfur oxidizing and denitrifying bacteria.

Year 3: eDNA Pilot Project

- Metabarcoding and eDNA study to understand where organic carbon in eelgrass beds originate.
- Results suggest **eDNA and stable isotope measurements complement each other in identifying contributors of organic matter to the eelgrass beds**.
- Opportunity to inform future crediting schemes.

Lessons We've Learned So Far

Collaboration is Key

- Opportunities for blue carbon are diverse.
- Need for more research. Data sharing is important.
- Build frameworks to approve, permit, and implement blue carbon restoration and offset/credit projects.
- Need for funding – restoration is expensive.

HEATHER CARROLL
hcarroll@portofsandiego.org

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Waterfront of Opportunity

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