CCST EXPERT BRIEFING SERIES
A Carbon Neutral California

Blue Carbon Sequestration along California's Coast

Briefing held **DECEMBER 2020**

One Pager

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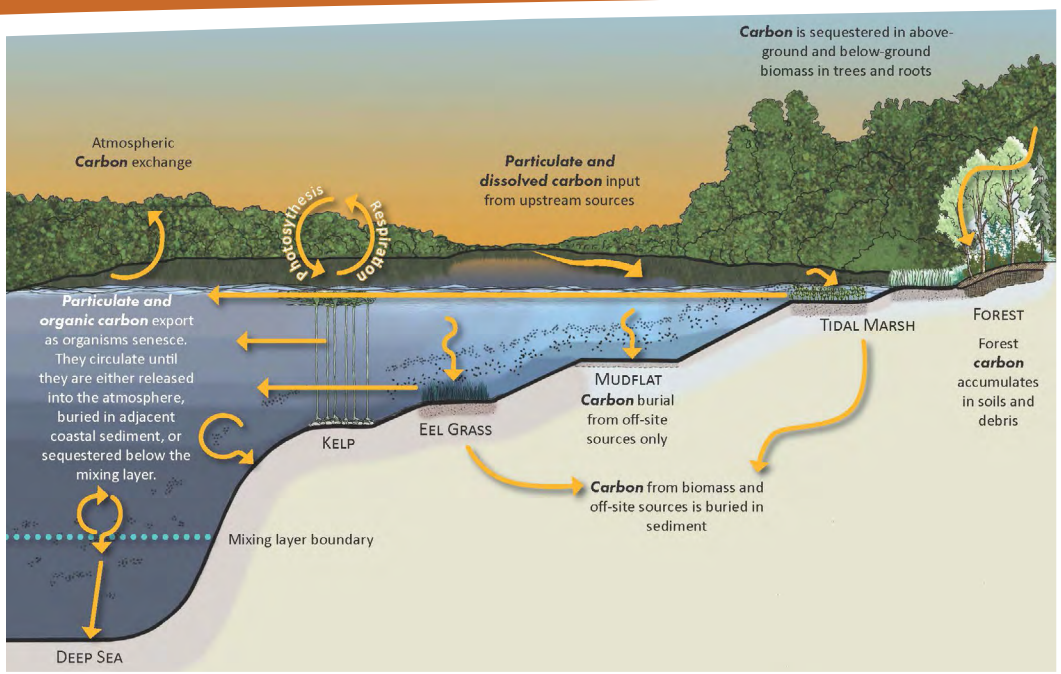

Figure: Carbon cycles in coastal (blue carbon) habitats **(The Watershed Company)**

BACKGROUND

- Anthropogenic **carbon emissions** are a leading cause of **climate change**.
- California has set an ambitious goal of being **carbon neutral** by 2045.
- A combined approach of reducing emissions and **sequestering carbon** – physically removing CO_2 from the atmosphere and storing it long-term – can help California reach its goals.
- **Blue Carbon** refers to carbon stored by coastal ecosystems including wetlands, salt marshes, seagrass meadows, and kelp forests.
- Restoring coastal habitats can **increase** blue carbon sequestration and contribute to state goals.
- Restored coastal habitats also provide many other **co-benefits**.

SEQUESTERING BLUE CARBON
in California's Coastal Ecosystems

Per unit area, coastal wetlands, marshes, and eelgrass meadows capture more carbon than terrestrial habitats such as forests. However, these blue carbon habitats are rapidly being lost worldwide, as well as in the U.S., which results in released carbon emissions to the atmosphere and reduced carbon sequestration.

If restored and protected, blue carbon habitats accomplish two goals with respect to greenhouse-gas emissions: **1)** avoiding added emissions to the atmosphere from the destruction of these habitats' large carbon reservoirs, and **2)** contributing to continued carbon trapping and sequestration in perpetuity and therefore further supporting the achievement of carbon neutrality goals in geographies such as California.

Benefits of Blue Carbon Habitats

1. **Reduced** atmospheric CO_2 levels
2. **Protect** captured CO_2 in the ground from being released to atmosphere
3. **Improved** water quality
4. **Improved** biodiversity and fish habitat
5. **Improved** sea level rise buffer
6. **Improved** resilience to climate change along the coast

Restoring and protecting California's coastal habitats would have a measurable contribution to California's negative carbon emission goals. Blue carbon habitats also provide additional co-benefits, including biodiversity, coastal protection from storm surge, essential fish habitat, and recreation and tourism value for people.

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SELECT EXPERTS

The following experts can advise on Blue Carbon pathways:

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Expertise: salt marsh ecology, coastal ecosystem conservation and resilience

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Expertise: wetland and marsh ecology, carbon cycling, and sea level rise

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Expertise: carbon storage in seagrass, marsh, and kelp ecosystems

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BLUE CARBON SEQUESTRATION
in Coastal Habitats

1

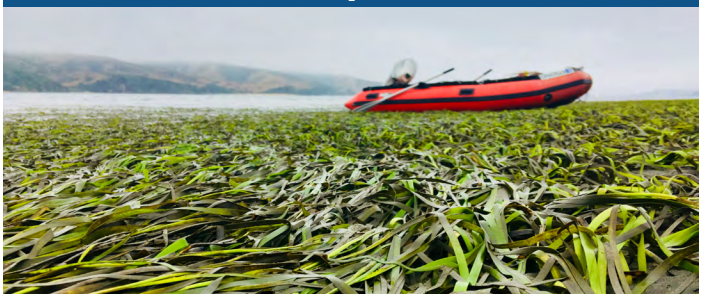

Photo: Tomales Bay at low tide **(Melissa Ward)**

BLUE CARBON CYCLES

Coastal habitats remove carbon from the atmosphere through photosynthesis as plants grow and build biomass and soil. Carbon can be stored in above-ground biomass for decades and in sediments for thousands of years.

Measuring carbon stocks that have already been captured by coastal habitats – and the rate at which more carbon is sequestered – is the first step in understanding their blue carbon potential in California. Researchers use a combination of field measurements and modeling methods to quantify carbon stocks and sequestration rates.

2

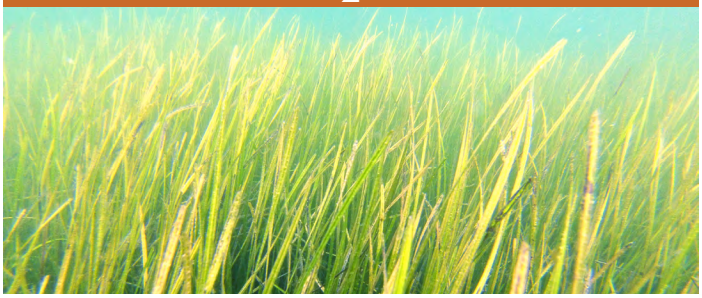

Photo: Subtidal eelgrass in Mission Bay, San Diego **(Melissa Ward)**

SEAGRASS MEADOWS

A comprehensive carbon stock accounting for the state that includes seagrass habitats has not been done. Work is currently underway to quantify sediment carbon stocks in seagrass meadows in several sites in California.

Acres of habitat in California:
14,800 ACRES (60 KM²) of seagrass habitat (CDFW)

Annual Sequestration rate:
1.58 - 14.2 G C/M²/YR (Poppe & Rybczyk 2018)

Estimated total annual sequestration potential in CA*:
Equivalent to removing **~ 500** cars from the road

3

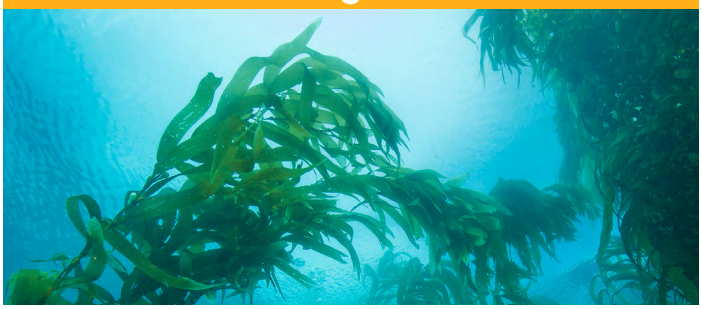

Photo: Kelp Forest, Channel Islands National Park **(NPS)**

KELP FORESTS

There is scientific uncertainty as to whether kelp can play a significant role in blue carbon sequestration. Kelp attach to rocky substrates and do not contribute to soil-building processes. The extent to which kelp settles to the deep ocean bottom where it would be sequestered for millennia is an active area of research.

Acres of habitat in California:
17,800 ACRES (72 KM²) of kelp forest (source CDFW)

Sequestration rate:
Currently uncertain, active area of research.

4

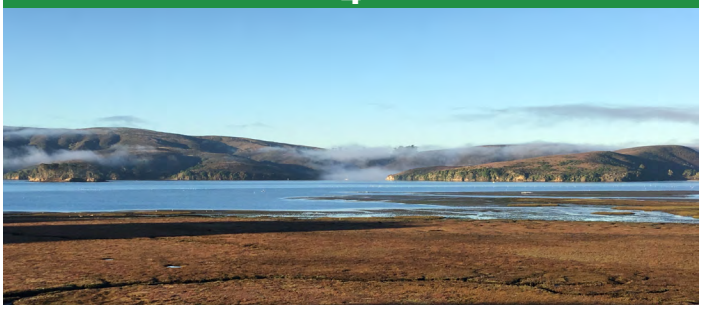

Photo: Tidal marsh **(Melissa Ward)**

WETLANDS AND MARSHES

Statewide, there is relatively good carbon and net GHG accounting in salt marsh habitats across the state based on a series of field studies, including projects from the CDFW Wetlands and Watersheds GGRF program.

Acres of habitat in California:
296,500 ACRES (1,200 KM²) of tidal marsh (source CDFW)

Annual Sequestration rate:
200 G C/M²/YR (Wedding et al, in press)

Estimated total annual sequestration potential in CA*:
Equivalent to removing **~133,800** cars from the road

* Based on an average annual emissions of ~ 4.6 metric tons of CO_2 per car

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