



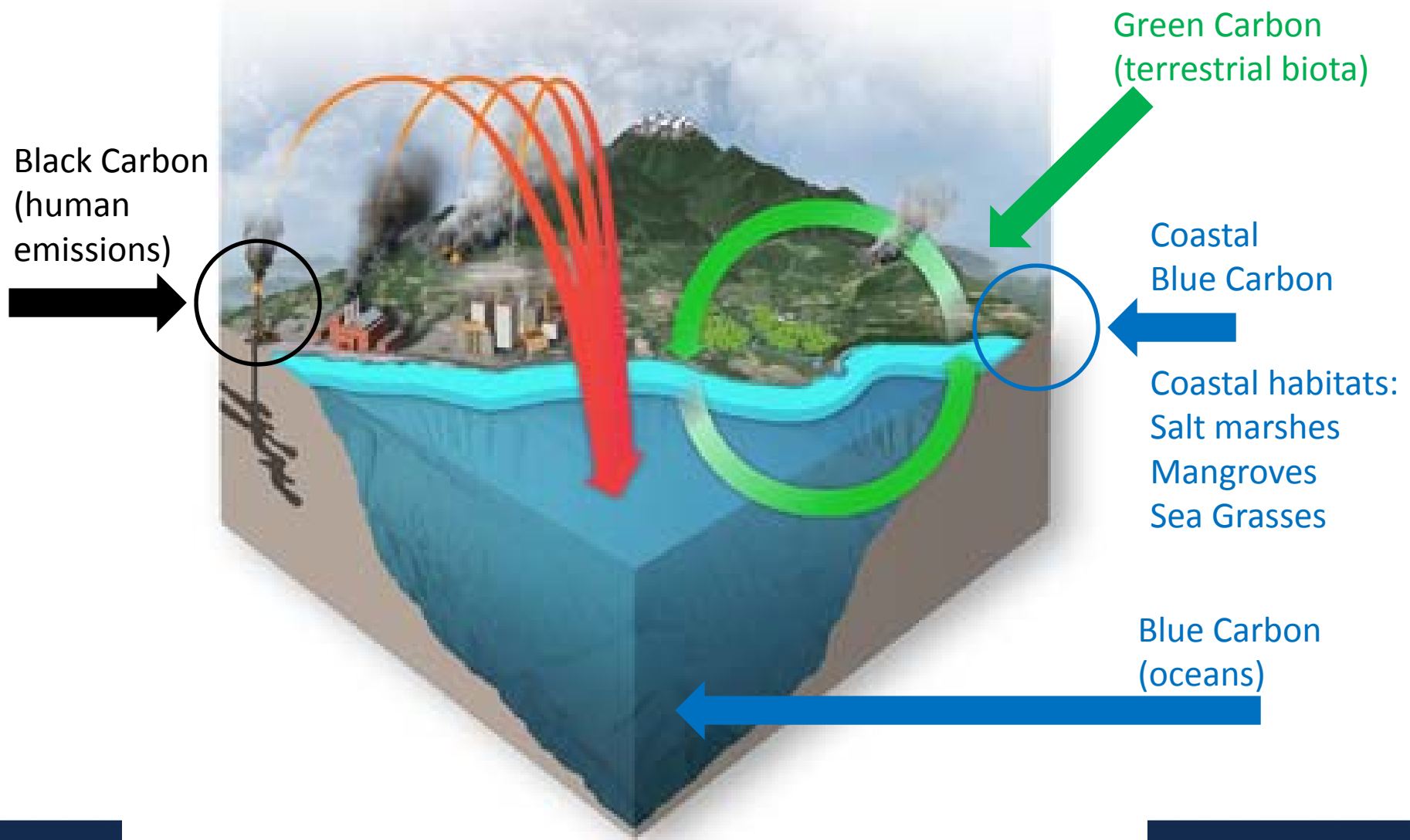
# Coastal Blue Carbon: What is it and why care?

Presentation to the Marine Fisheries Advisory Committee  
October 25, 2011

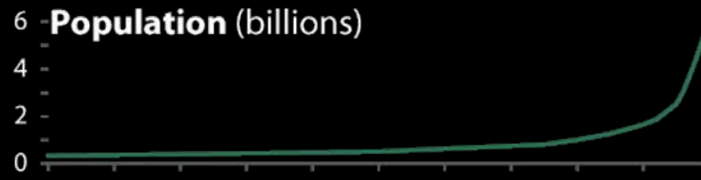
Roger Griffis, NOAA Fisheries Service



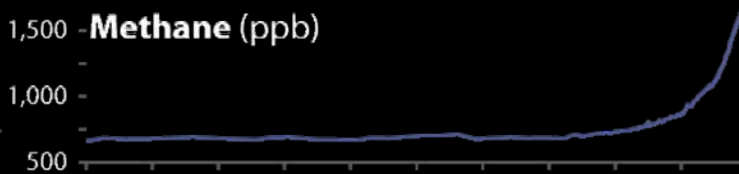
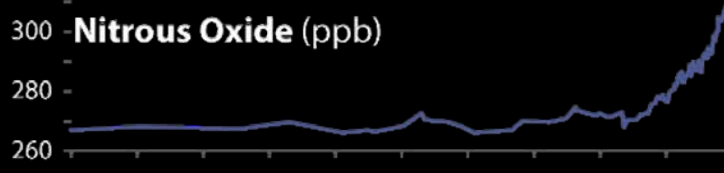
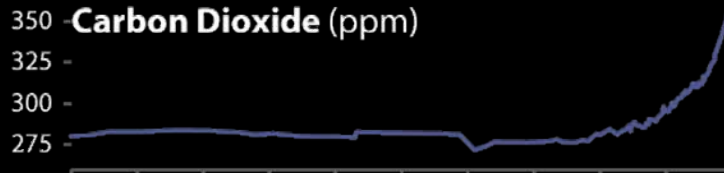
# Our Changing Carbon Cycle.....



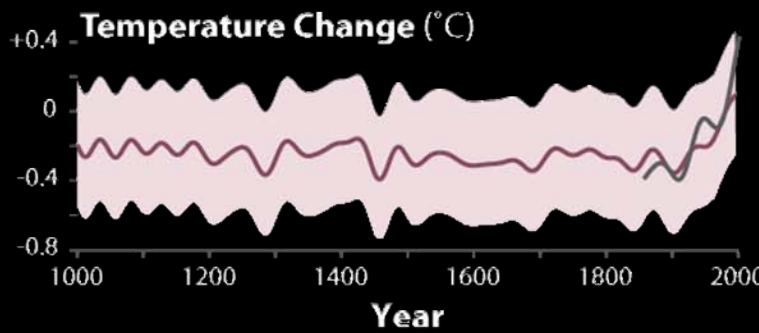
# Changes in Carbon Impact Our Climate System



Human population doubled & then doubled again over the last century—from 1.65 billion to more than 6 billion inhabitants.



Rise in the three most abundant human-emitted greenhouse gases, mirroring the growth in human population. Isotopic analysis and carbon cycle models established that the increase in carbon dioxide was due to fossil fuel consumption.

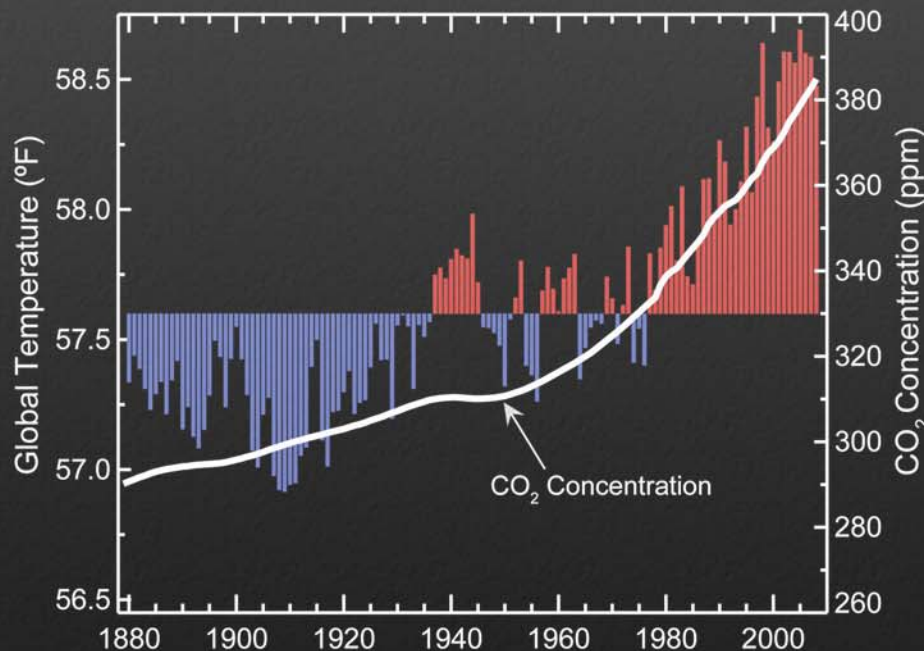


With the rise in those greenhouse gases, Earth experienced an unusually rapid rise in its average temperature—increasing 0.7°C since 1880.

Greenhouse Gases

# The Climate Is Already Changing

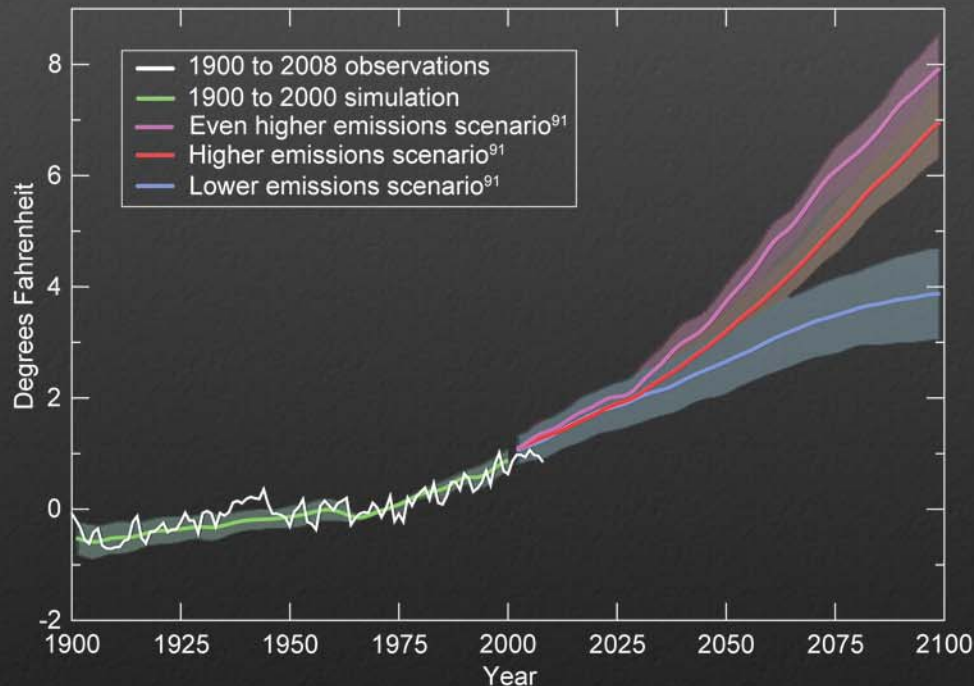
*Scientific consensus shows that the Earth's climate is changing due to increased concentrations of greenhouse gases in the atmosphere*



- Global average temperature and carbon dioxide concentrations have risen substantially since 1880
- Most of the warming in the past 50 years has been over land and in the Northern Hemisphere
- Year-round average temperatures in the U.S. have already risen 2°F over the past 50 years

# Future Climate Change

*The future depends largely on choices people make now*



- Year-round average temperatures in the U.S. have already risen 2°F over the past 50 years
- Actions to reduce greenhouse gas emissions will help limit future warming
- Even with strong emissions reductions, people will continue to feel the effects of climate change
- Adaptation and mitigation are inextricably linked

# Coastal Habitats Store Carbon

## Carbon Sequestration

- ❖ Coastal habitats sequester 2-4x the amount of carbon of tropical forests.

## Carbon Storage

- ❖ Coastal habitats store 3-5x tropical forests by area.

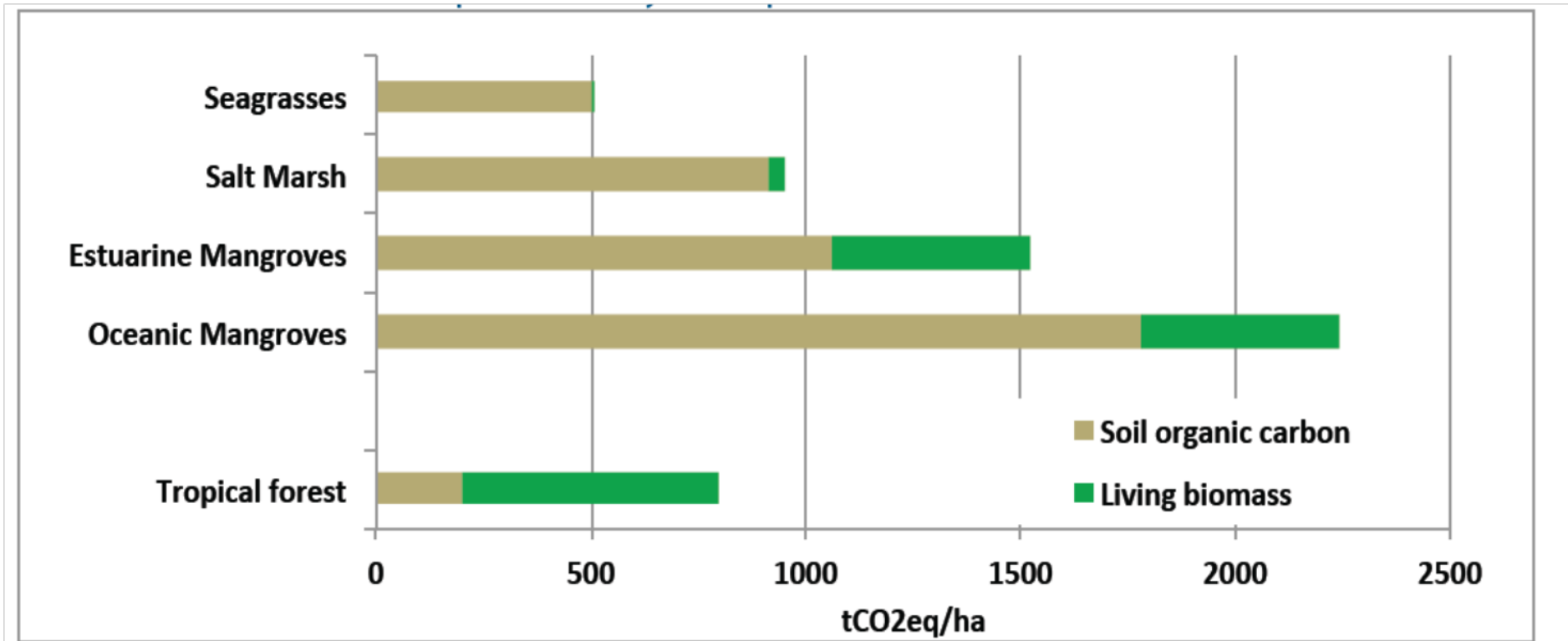
**Goal: Value carbon services to help conserve coastal habitats**



Photo: EPA

# Coastal habitats Store Carbon

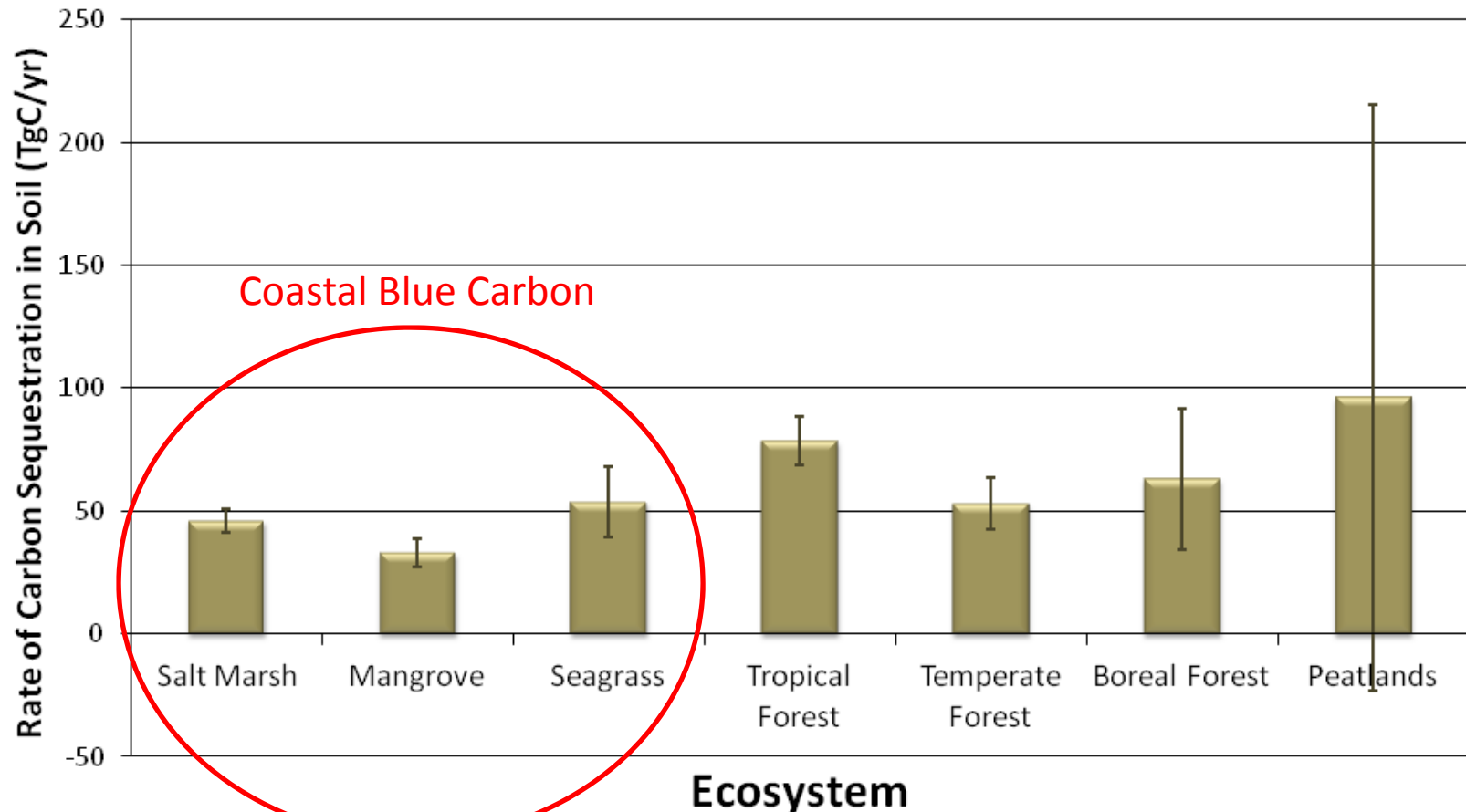
In coastal habitats, most carbon is stored in sediments and less in biomass.



Source: Murray, Brian, Linwood Pendleton, W. Aaron Jenkins, and Samantha Sifleet. 2011. Green Payments for Blue Carbon: Economic Incentives for Protecting Threatened Coastal Habitats. Nicholas Institute Report. NI R 11-04.

# Coastal Habitats Store Carbon

Rates of carbon sequestration similar to terrestrial forests  
(small area but high sequestration rates)





# We're loosing Coastal Carbon Services

- ❖ Coastal habitats are some of the most threatened on the planet with continued losses every year.

Habitat	Estimated Global Area (km <sup>2</sup> )	Annual Loss	Total Loss
Seagrass	300,000	2%	29%
Salt Marsh	400,000	2%	50% +
Mangrove	152,000	1.8%	35%

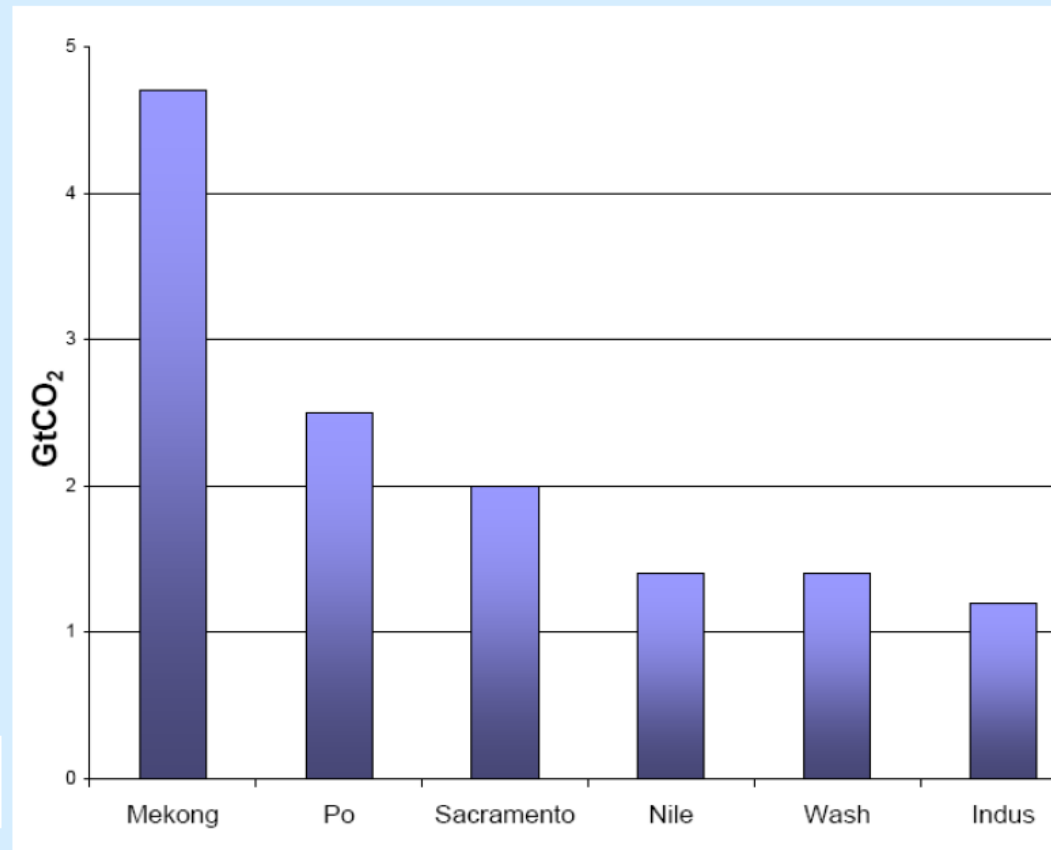
# Habitat Degradation Can Release Carbon

## Coastal Habitats as Carbon Emitters:

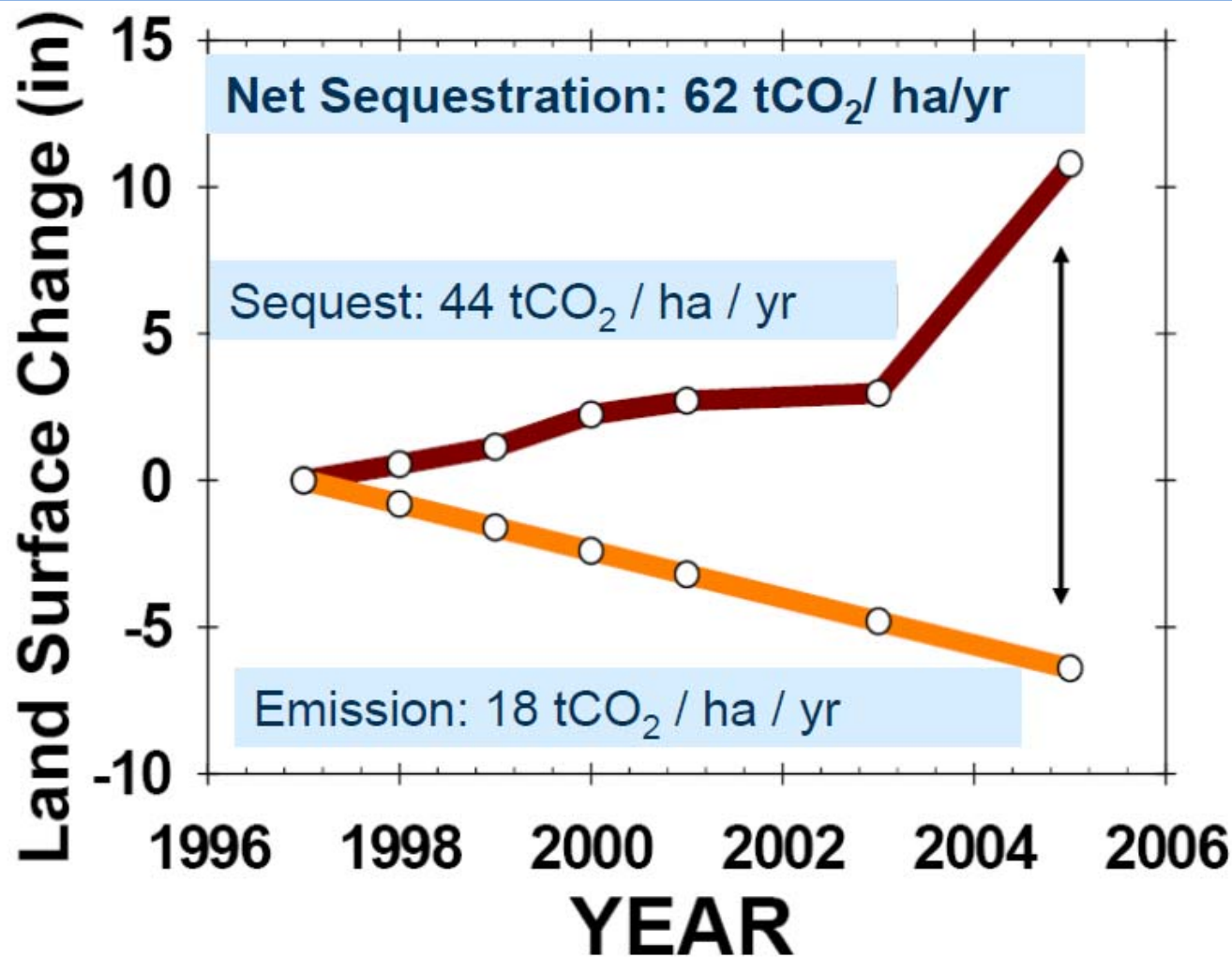
- ❖ Coastal habitats release carbon when damaged.



## CO<sub>2</sub> Emissions from Drained Wetlands (Preliminary Estimates)



# Restored Habitats Can Sequester Carbon and Reverse Subsidence



# Implications for Fisheries



## ❖ Loss of coastal habitats

- Loss of essential nursery and juvenile habitat for many important fisheries.
- Reduction in near-shore productivity.
- Increases in pollution to coastal waters degrading variety of fish habitats.

## ❖ Protection and restoration of habitats

- Provide essential habitats for fisheries.
- Provide range of ecosystem services
  - ◆ Improve water quality
  - ◆ Reduce storm damage
  - ◆ Reduce atmospheric carbon and climate change



# Two pathways to use carbon services to advance conservation

## NOAA Policy Needs:

- Identification of federal policies that should consider coastal carbon
- Procedures for how to incorporate C services into activities

## Science Needs:

- Estimates of net C storage and sequestration
- Areal extent of habitats and rates of loss
- Carbon dynamics of habitat disturbance and restoration

## Market Policy Needs:

- Protocols for GHG accounting
- Carbon market protocols

Improve ability to incorporate carbon services in programs and policies (e.g. mitigation projects, NEPA)

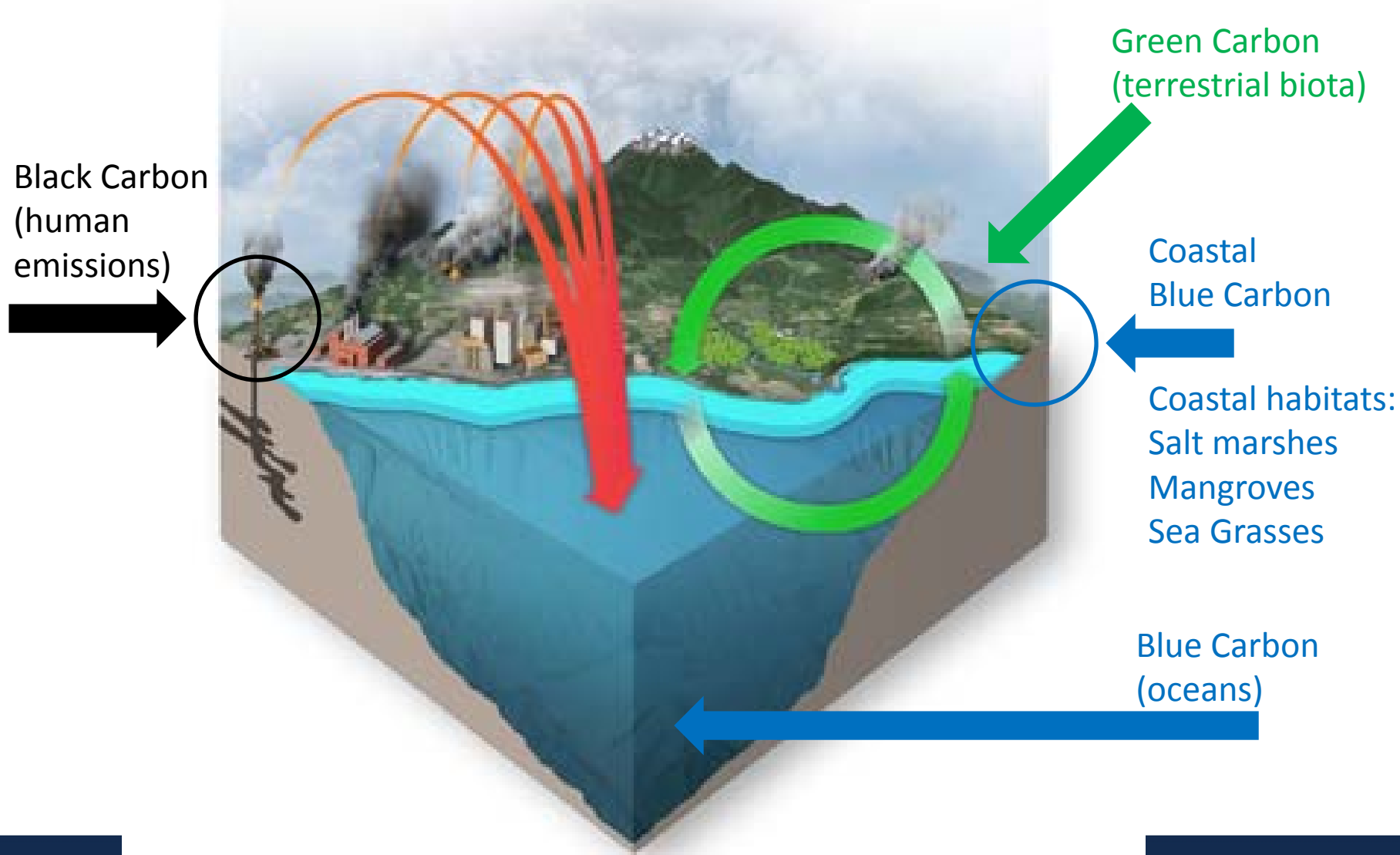
Top half in blue is NOT dependent on carbon markets.

**GOAL:**  
Enhanced Conservation of Coastal Habitats (salt marsh, sea grass, and mangroves)

Additional resources through carbon markets for protection and restoration

Bottom half in white is dependent on carbon markets.

# Our Changing Carbon Cycle.....



# Questions?

