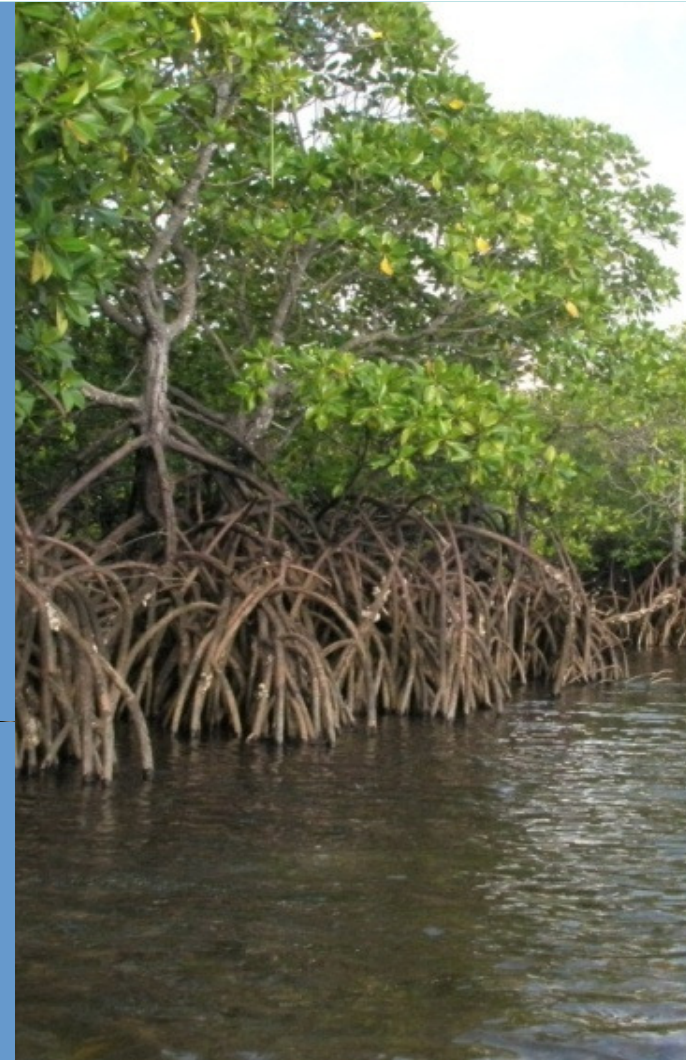


Carbon Storage and Emissions from Coastal Ecosystems

Stephen Crooks Ph.D.
ESA PWA

Managing Coastal Ecosystems for Climate Mitigation

Climate Change and Response Expo
COP 17, Durban, Dec 7th 2011



Ecosystems in focus for climate change mitigation

Forest



Peatland



Mangroves



Tidal Marshes



Seagrass

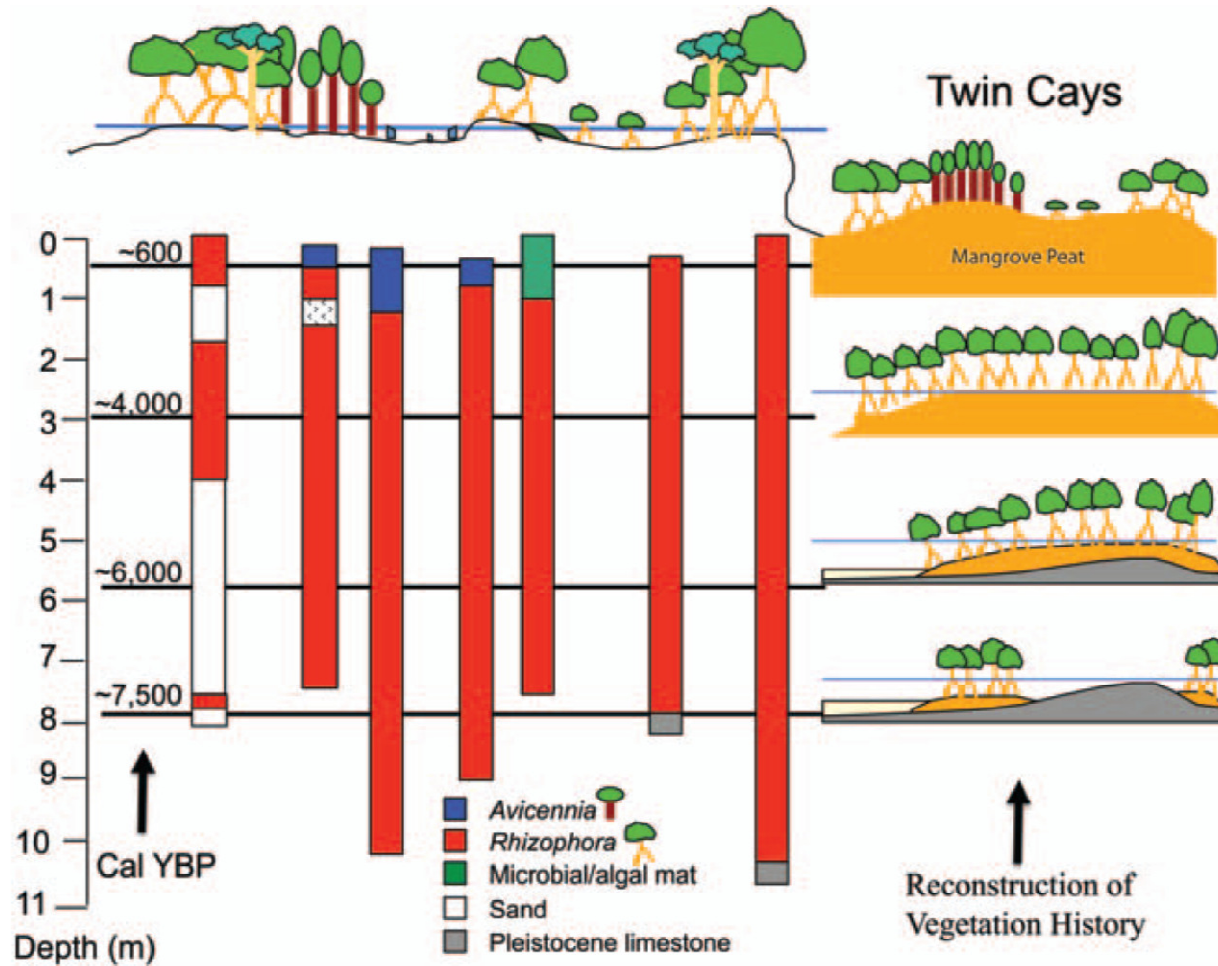


Long-term carbon sequestration and storage

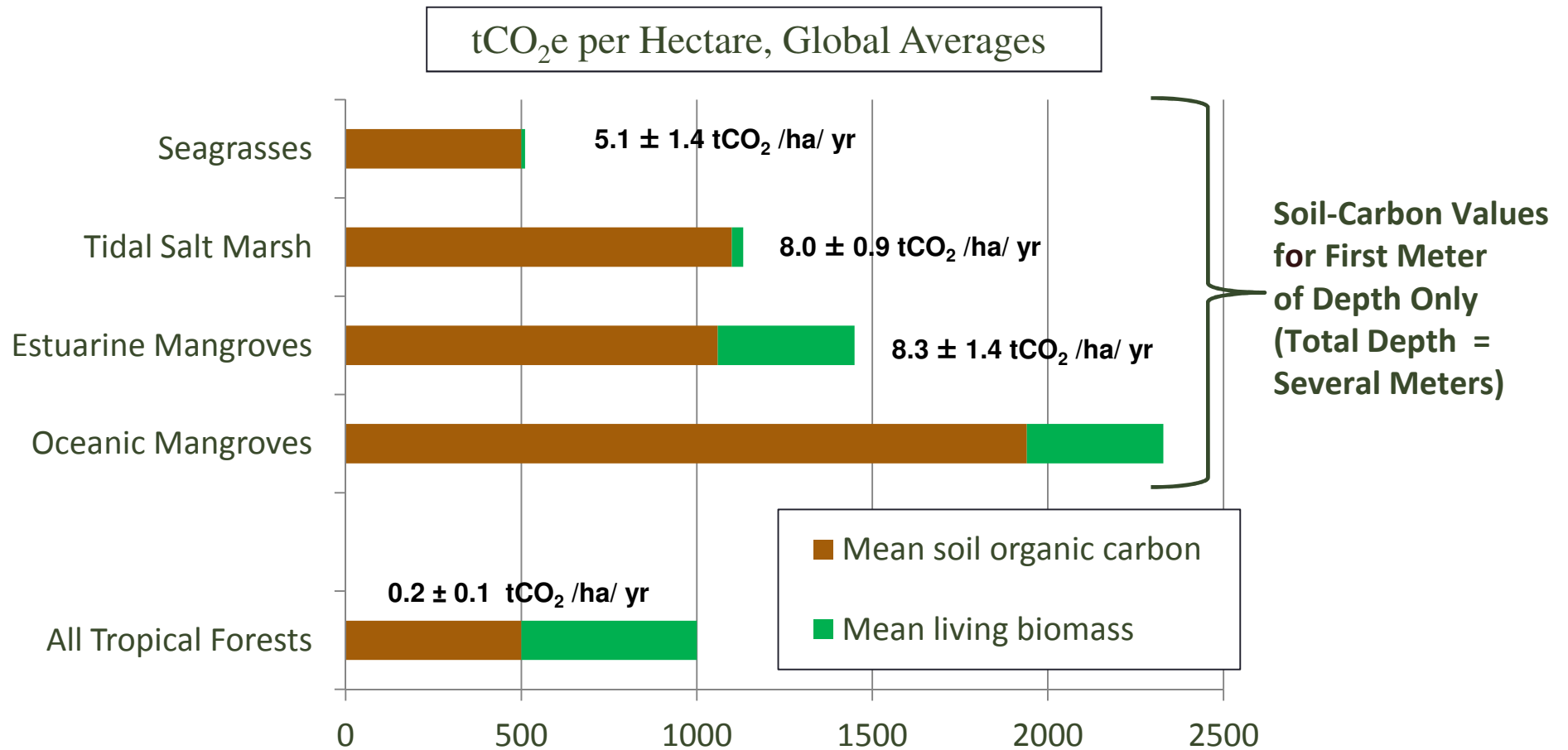


Carbon from plants gather in soil and builds up over thousands of years

Peat Accumulation: Belize Example

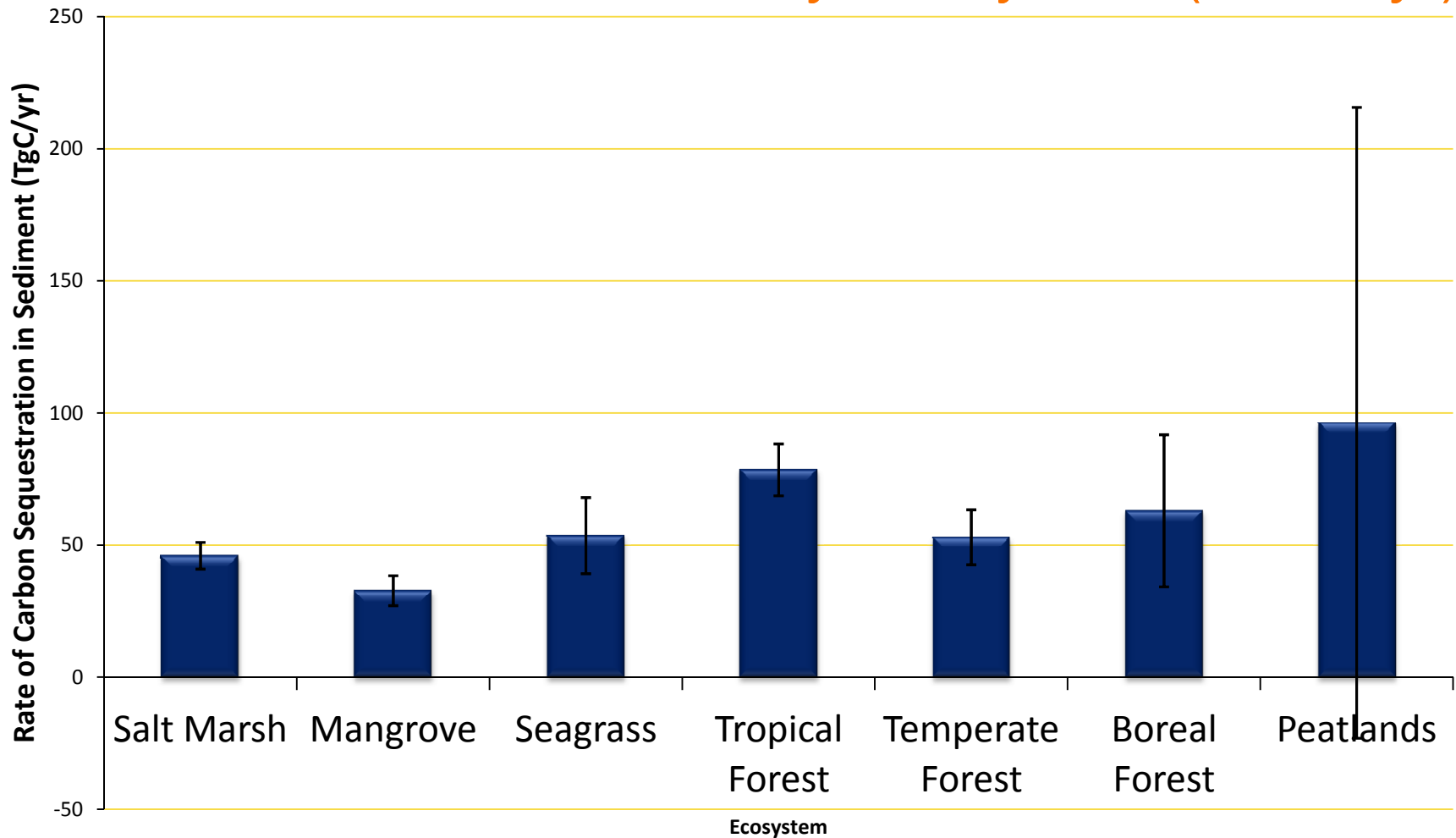


Distribution of carbon in coastal ecosystems



Data summarized in Crooks *et al.*, 2011; Murray *et al.*, 2011

Global Carbon Burial by Ecosystem (Mt C / yr)



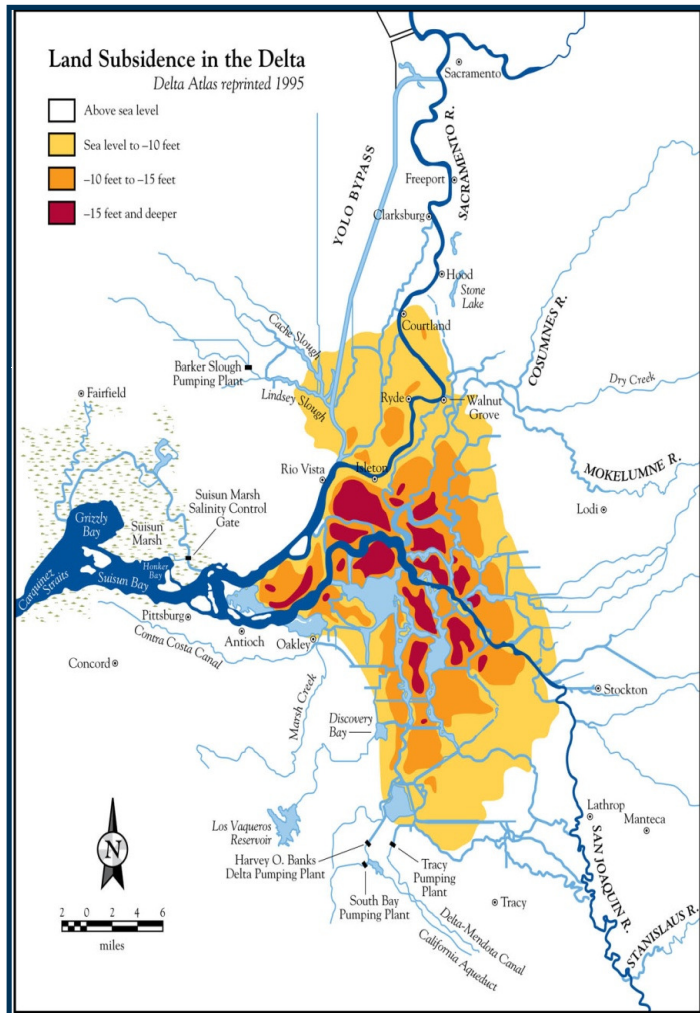
Total Area (km²): Coastal 640, Forests 43,700, Peatlands, 3,850⁶

Rates of Wetland Loss

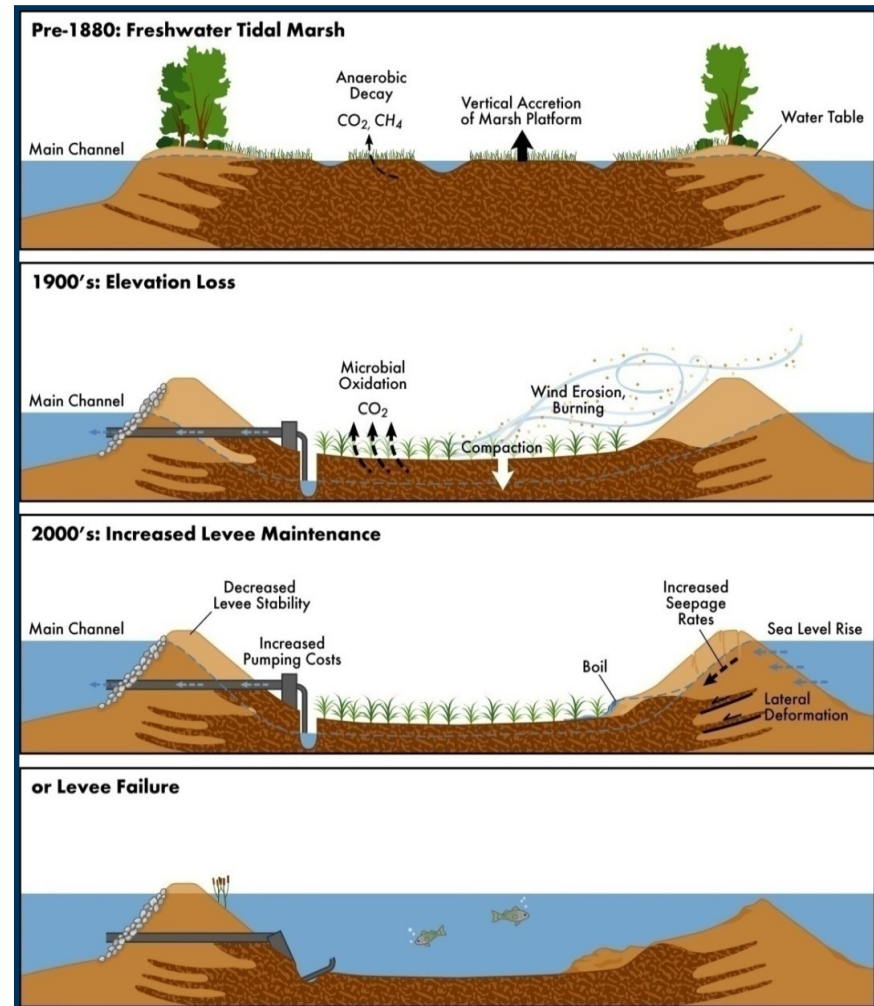
Ecosystem	Global Extent (km ²)	Annual Rate Of Loss (%)
Tidal Marsh	400,000	1 - 2
Mangrove	160,000	1 - 2
Seagrass	300-600,000	1 - 2



Long-term release of carbon from organic soils



Sacramento - San Joaquin Delta



Emissions from One Drained Wetland



Area under agriculture **180,000 ha**

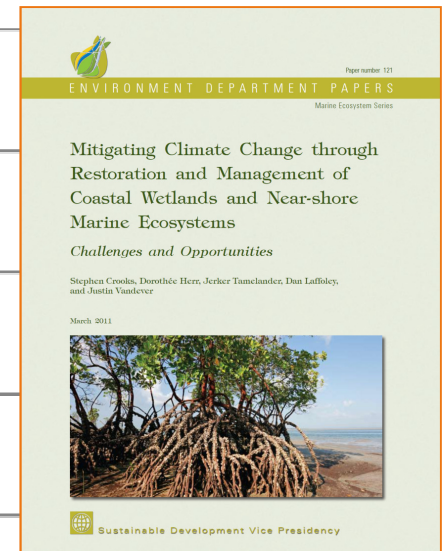
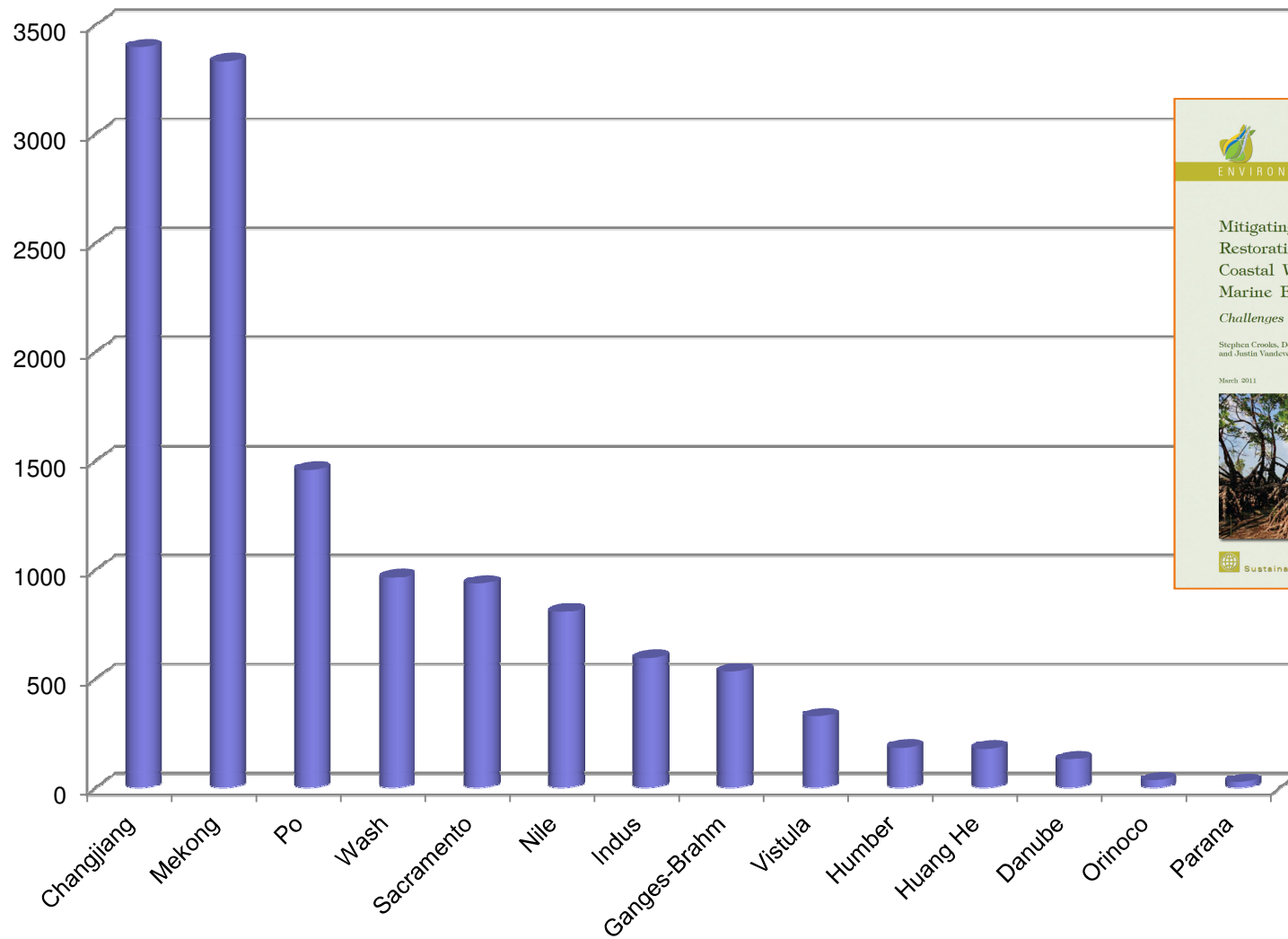
Rate of subsidence (in) **1 inch**

**5 to 7.5 million tCO₂/yr
released from Delta**

**1 GtCO₂ release in c.100 years
4000 years of carbon emitted**

Equiv. carbon held in 25% of
California's forests

CO₂ Emissions from Drained Wetlands (million tons)



How Big is Blue Carbon?

Globally:
~10-20% as big as REDD

Nationally:
Potentially more in
coastal tropical countries

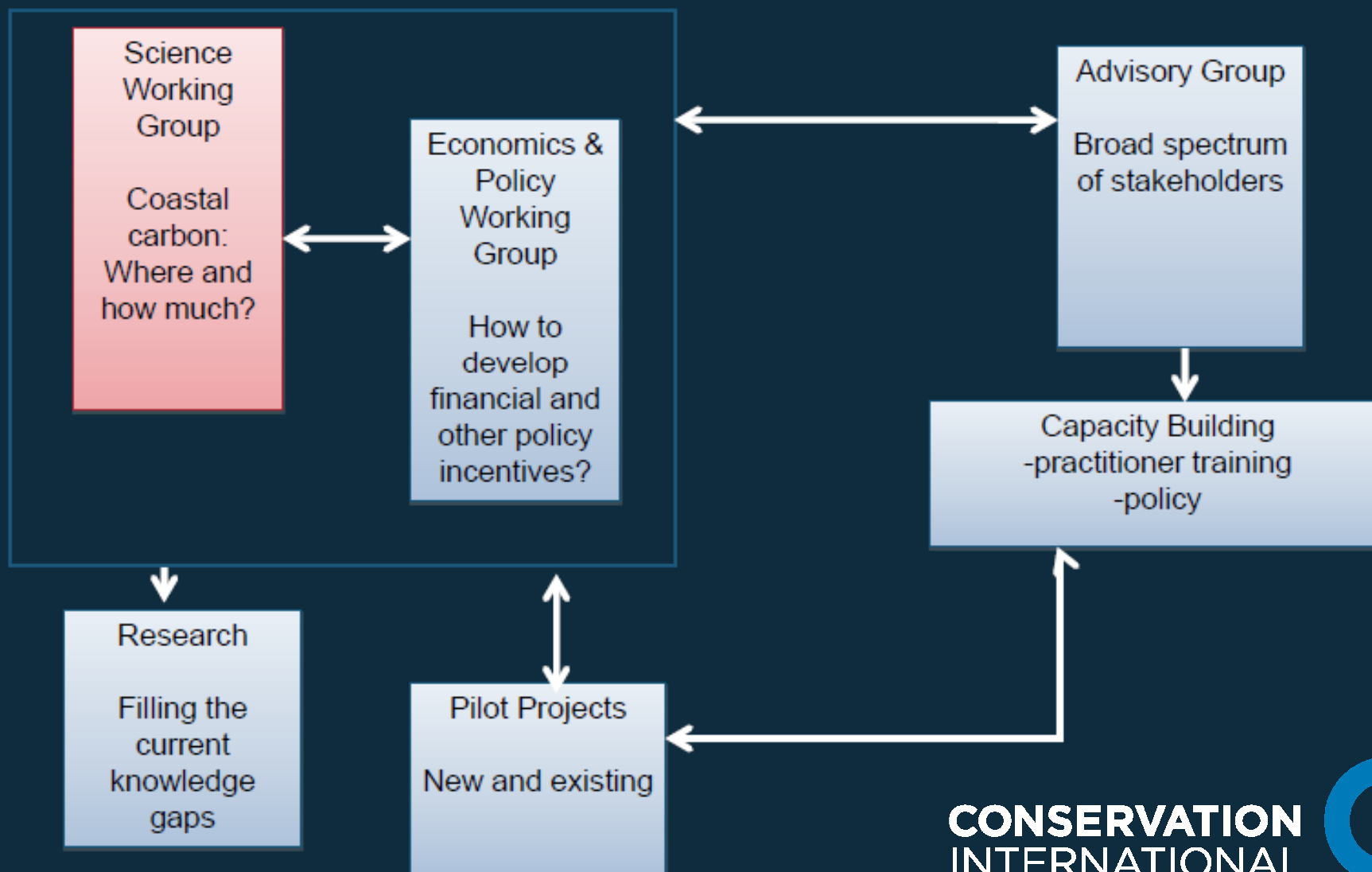
CO₂ Emissions
(Mt/year)

REDD	~4,000
Peat	~2,000
Blue Carbon	~300-900



Coastal wetlands are very rich
in Blue Carbon

Blue Carbon Initiative



International Blue Carbon Scientific Working Group

Near term

- Support of IPCC
 - Wetlands GHG national accounting
- Global Coastal Carbon Data Archive
 - Development of emissions factors
- Guidance documents
 - Field data collection
 - National assessment
- Inform developing policy

Long term

- Scientific guidance
- Global network development
- Demonstration and publication



- Coastal are an important component of the global carbon cycle
 - Sequester carbon
 - Hold dense carbon stocks in soil pool
 - Emit carbon when disturbed.
- Emissions or significant
 - Wetlands emit large quantities of CO₂ directly to the atmosphere when drained. (insufficiently studied – priority focus for future research)
 - Emissions from drained wetlands highest in first few year
 - Organic rich soils may release centuries to millennia of carbon within a few decades.
- Climate change mitigation
 - Conservation most effective activity for preventing release of carbon
 - Restore coastal ecosystems to reestablish long term sequestration
 - Embed coastal ecosystem CC mitigation within adaptation planning





Thank you!

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