Coastal Blue Carbon – A New Opportunity for Wetlands Conservation

Restore America's Estuaries
September 2012

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Outline

1. Carbon stocks, sequestration, and emissions
2. Carbon markets and credits
3. Making the connection

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Why Coastal Blue Carbon?

- Estuary Restoration
- Coastal Wetland Conservation
- Adaptation to Sea Level Rise
- Climate Mitigation

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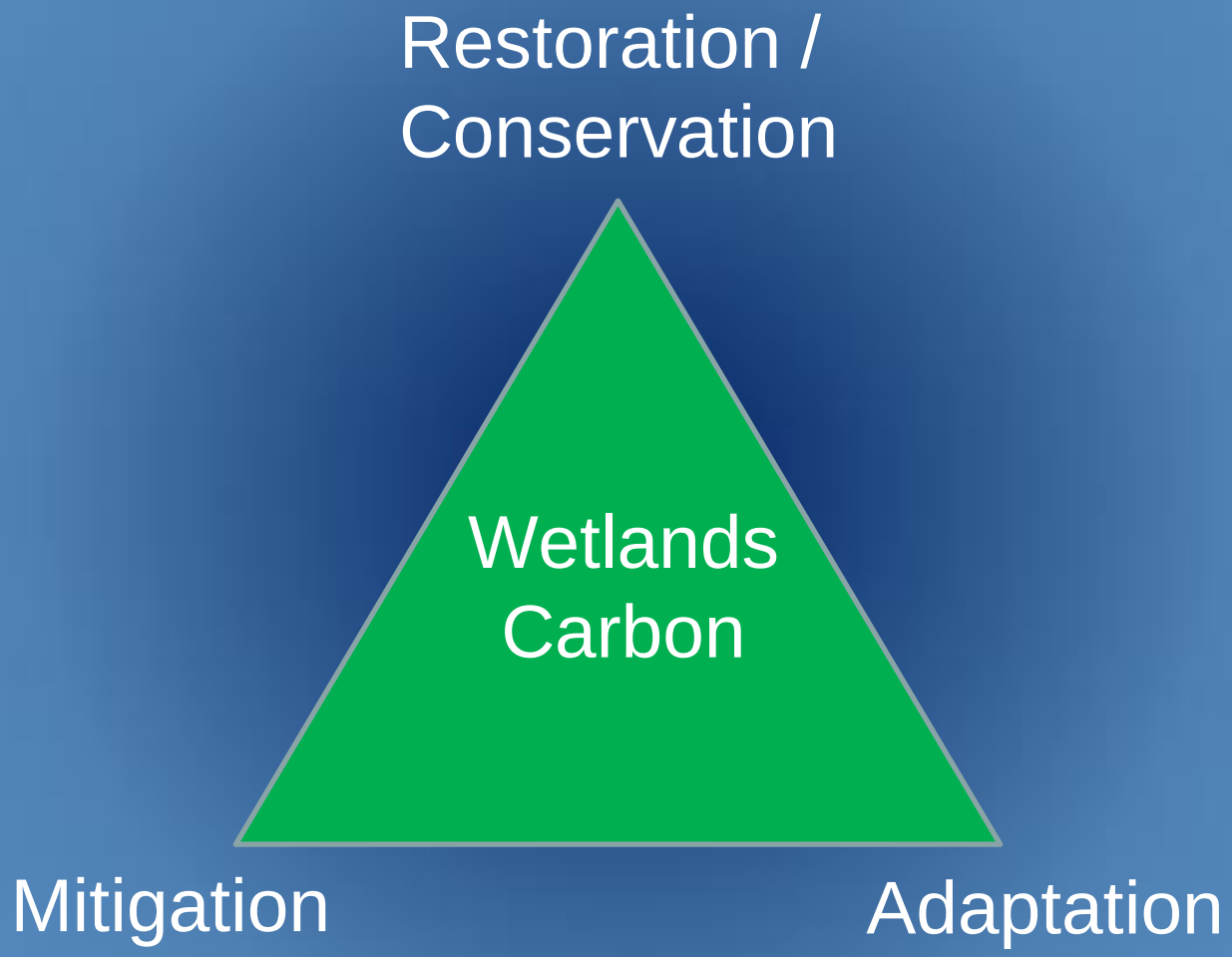
Wetlands Carbon at the Nexus



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Carbon Stocks, Sequestration, and Emissions

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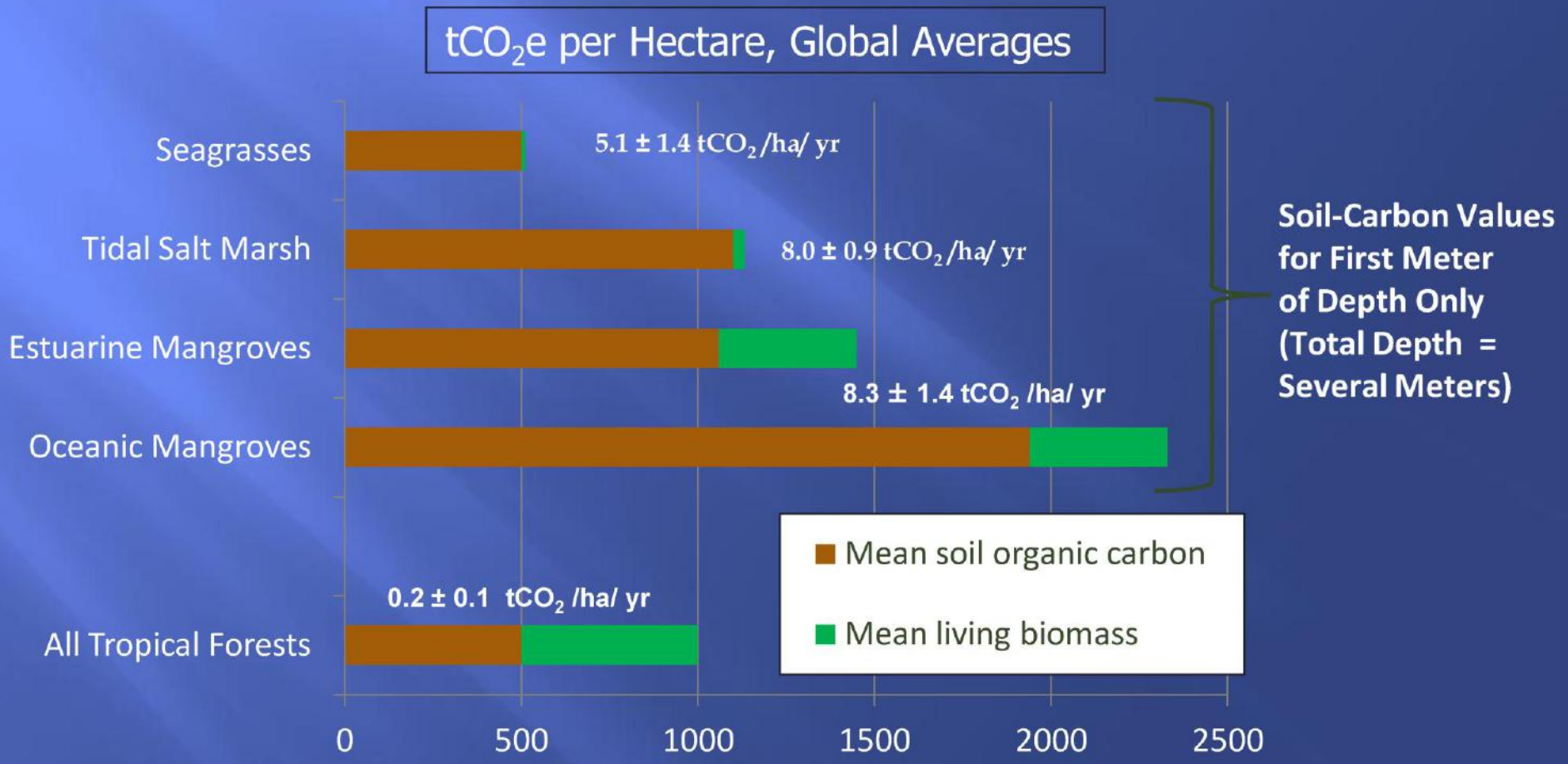
Distribution of carbon in coastal ecosystems



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

Carbon Storage

- Seagrasses: 66 - 1,467 tCO_2e/ha
- Salt marsh: 330 - 1,980 tCO_2e/ha
- Mangroves: 1,060 - 2,020 tCO_2e/ha

Carbon Sequestration

- Seagrasses: 4.4 ± 0.95 $tCO_2e/ha/yr$
- Salt marsh: 8.0 ± 8.5 $tCO_2e/ha/yr$
- Mangroves: 6.3 ± 4.8 $tCO_2e/ha/yr$

Carbon Emissions – 0.15 to 1.02 billion tCO_2/yr

Sources:
Pendleton L, Donato DC, Murray BC, Crooks S, Jenkins WA, et al. (2012) Estimating Global "Blue Carbon" Emissions from Conversion and Degradation of Vegetated Coastal Ecosystems. PLoS ONE 7(9): e43542..

Murray BC, Pendleton L, Jenkins WA, Sifleet S. Green Payments for Blue Carbon: Economic Incentives for Protecting Threatened Coastal Habitats. Nicholas Institute for Environmental Policy Solutions, NI R 11-04. March 2011.

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For Comparison

Hummer	15,000 miles	11 tons CO_2e
Prius	15,000 miles	3.7 tons CO_2e
Salt Marsh	1 hectare	8 tons CO_2e/year

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Activities with Potential Net GHG Benefits

- Restoration of tidal wetlands via enhancing, creating and/or managing hydrological conditions, sediment supply, salinity characteristics, water quality and/or native plant communities.

- Creation of tidal wetlands.

- Conservation/avoided loss of existing tidal wetlands, including adaptation.

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Carbon Markets and Credits

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Carbon Markets

1. Compliance Markets, e.g. Cap and Trade
   - $175 billion in 2011
   - UNFCC, Europe, Regional Greenhouse Gas Initiative, California
2. Voluntary Markets
   - $576 Million in 2011 ($178 million in N. America)
   - Average price $6.20/ton (2011)
   - Anticipated market growth of 400% by 2020
3. Standards
   - Climate Action Reserve (CAR) - 12% market share
   - American Carbon Registry (ACR) - 6%
   - Verified Carbon Standard (VCS) - 58%
   - VCS is “most sought after certification” in 2011
4. Registries (Markit, APX , CDC)

Requirements for Carbon Credits

Real	Demonstrate that reductions have actually occurred
Additional	Ensure reductions result from activities that would not happen in the absence of a GHG market
Permanent	Mitigate risk of reversals Verify reductions ex-post
Verified	Provide for independent verification that emission reports are free of material misstatements
Owned unambiguously	Ownership of GHG reductions must be clear
Not harmful	Avoid negative externalities
Practicality	Minimize project implementation barriers

Types of Carbon Credits

Sample Credit Project Types

- Clean cook stoves
- Biochar
- Methane reduction
- Wind energy

Agriculture, Forestry and Other Land Uses (AFOLU)

- 25% of voluntary market in 2011
- Average price $9 - $13/ton in 2011
- VCS is leader in AFOLU
- Wetlands projects currently not allowed

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Existing VCS AFOLU Activities

- Afforestation, Reforestation, Revegetation (ARR)
- Agricultural Land Management (ALM)
- Improved Forest Management (IFM)
- Reduction Emissions from Deforestation and Degradation (REDD)
- Peatland Rewetting and Conservation (PRC)
- *Wetland Restoration and Conservation (WRC), forthcoming*

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GHG Accounting

1. Set project boundary and GHG pools
   - CO_2, CH_4, N_2O
2. Additionality assessment
3. Baseline assessment
   - What would have happened with no project
4. Monitoring, Reporting and Verification (MRV) of GHG reductions and removals
5. Credit issuance

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Application to Tidal Wetlands Activities

1. Seagrass
   - Soil carbon sequestration
     - CO_2 through water column?
     - Source of sediment (plant-based or offsite)
   - Biomass
   - Loss of seagrass beds
     - Loss of sequestration, unknown fate of soil carbon
   - Restoration – good potential, if issues resolved, for sequestration and biomass
   - Avoided loss – uncertainties

Application to Tidal Wetlands Activities

2. Mangroves
    - Soil carbon sequestration, source?
    - Biomass (tree carbon)
    - Conversion to shrimp ponds
        - High emissions, loss of sequestration
    - Avoided conversion - high credit potential for maintaining soil and biomass sequestration, avoiding emissions
    - Restoration - good potential for soil and biomass sequestration

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Application to Tidal Wetlands Activities

3. Salt marsh
    - Soil carbon sequestration, source?
    - Biomass – one time credit if restored
    - Conversion to other land uses
        - High emissions, loss of sequestration
    - Erosion/drowning due to sea level rise
        - Fate of soil carbon?
        - Loss of sequestration
    - Avoided conversion to other land use - high credit potential
    - Avoided erosion/drowning from SLR - good potential, depends on fate of soil C
    - Restoration – good potential

Application to Tidal Wetlands Activities

4. Brackish marsh
    - Generally same as salt marsh, plus methane considerations

5. Freshwater wetland
    - Generally same as salt marsh, plus methane considerations
    - Subsidence reversal – high potential for rapid carbon sequestration, avoided ongoing emissions, e.g. Sacramento Delta

Value of carbon sequestration for marsh restoration (3 tons CO_2/yr; 50 years)

Price per ton CO_2	100 acres	1000 acres
$5.00	$75,000	$750,000
$10.00	$150,000	$1,500,000
$40.00	$600,000	$6,000,000
$80.00	$1,200,000	$12,000,000

Before subtracting baseline, methane, uncertainty, insurance, verification, …

Are Wetland Carbon Credits Attractive?

- Existing standards for co-benefits, require additional certification, increase value of credit

- 54% of credits are purchased for Corporate Social Responsibility and public relations reasons

- Tidal wetlands credits could be highly charismatic in the marketplace

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Making the Connection

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Making the Connection

2010 National Blue Ribbon Panel and Action Plan

Described Four Focus Areas

1. Eligibility – VCS Requirements
2. Additionality – concept, approach
3. Quantification – NCEAS model, science working group, integration into methodology
4. Permanence – addressing with methodology

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VCS Requirements

- RAE leading technical team
- Expanding AFOLU requirements to include wetlands
- Higher level rules for projects and methodologies
- Necessary precursor to methodologies
- Peer review Feb 2012, public review June 2012
- Awaiting VCS Board approval Sept 2012

www.v-c-s.org, search “wetlands”

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Additionality

- Funded by NOAA OHC
- RAE leading working group
- Develop tools for restoration community/coastal managers to address “additionality”
- Shifted to new VCS standardized approach
- Researching “activity penetration” to justify inclusion on the “positive list”
- Will make all tidal wetlands restoration projects additional, if not otherwise required
- Incorporate into methodology

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Tidal wetlands restoration GHG offsets methodology

- NERRS Science Collaborative funded project with research in Waquoit Bay and a GHG flux model
- Step by step requirements for project managers for baseline, additionality, MRV, permanence, verification, etc.
- Describes eligible project activities
- Team includes Crooks, Emmer, Myers, Needelman, Megonigal
- Future – guidance for the restoration/management community, training for NERRS managers

Making the Connection

Snohomish Estuary Coastal Blue Carbon Opportunities Assessment

- Funded by NOAA OHC
- Land use, SLR, restoration plans, carbon values
- What is the potential contribution of carbon?
- Anticipated report spring 2013

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Making the Connection

Policy Initiatives

1. National Ocean Policy
2. Gulf Coast Restoration Task Force
3. National Legislation

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Making the Connection

Outreach, Coordination, Partnerships

1. Coordination with Louisiana, Maryland, others
2. International Blue Carbon Initiative
3. GHG measurements at North River Farms, NCCF
4. Presentations, partner meetings, workshops

   (e.g. AAAS, SWS, RAE)

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Next Steps

Field Demonstration

- Consider potential GHG values (baseline, avoided emissions, sequestration, all 3 GHGs)
- Baseline data
- Funding for project and for carbon accounting
- Relatively simple setting and project design/activities
- High chance for success
- Louisiana?, Texas?, Maryland ?, Other?

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Thank you to our many funders and partners

AECOM, America's WETLAND Foundation, Climate Action Reserve, CA Coastal Conservancy, CH2M HILL, CA Ocean Protection Council, Center for Collaborative Policy, Clayton Fund, ConocoPhillips, Conservation International, Duke University Carbon Offsets Initiative, Earth Corps, Entergy, Environmental Defense Fund, ESA PWA, GenOn Energy, KBR, International Union for the Conservation of Nature, LA Office of Coastal Protection and Restoration, MD Department of Natural Resources, **National Estuarine Research Reserve System - Science Collaborative**, **NOAA Office of Habitat Conservation**, People for Puget Sound, SAIC, Silvestrum, The San Francisco Foundation, The Nature Conservancy, USDA Natural Resources Conservation Service, U.S. Geological Survey, Verified Carbon Standard, and U.S. Fish and Wildlife Service.

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Thank you.

Questions and Discussion

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