Enhancing Blue Carbon Mapping, Science and Policy in North America

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North America's Blue Carbon: Assessing the Role of Coastal Habitats in the Continent's Carbon Budget

2013-2015: Commission for Environmental Cooperation (CEC) support for project

Trinational Group of Experts: Parks Canada, CONANP (Mexico's Protected Area Commission), CONABIO (Mexico's Commission for Knowledge and Use of Biodiversity), EPA, NOAA and USGS

Coastal Blue Carbon Habitats

- Salt marshes
- Tidal wetlands
- Mangroves
- Seagrasses

Three Tasks

- Facilitate the collaboration of a trinational group of experts through workshops, meetings and exchange of information

- Compile and develop maps of coastal blue carbon habitats for North America

- Support scientific research to collect data that improves estimates of carbon storage, sequestration and flux/emissions, including impacts of natural and human-caused disturbances or restoration of carbon processes

Mapping Work to Date

Leads: Dr. Gail Chmura (McGill University) and Dr. Fred Short (University of New Hampshire)

- Over 50 blue carbon-related maps

- Preliminary distribution data > 79,606 km^2 of blue carbon habitat in North America

- US approx. 49,630 km^2; Mexico approx. 27,931 km^2; and Canada approx. Canada with 2,045 km^2 (doesn't include parts of the Arctic Coast, Hudson and James Bay)

- Seagrass area is the largest

Mangroves
Seagrasses
Salt marshes and tidal wetlands

http://BlueCarbon.Geog.McGill.ca

www.cec.org/naatlas

Blue Carbon in Northern Marshes: Assessing Processes, Stocks and Rates in Undisturbed, Drained and Restored Marshes

Leads: Dr. Gail Chmura (McGill University) and Dr. David Burdick (University of New Hampshire)

- 6 northern salt marshes - data on blue carbon soil stocks and rates in undisturbed, drained and restored sites.

- Test ways to estimate changes in carbon stocks using surface elevation tables (SETs) and two models - 1 estimates carbon losses with drainage and 1 the carbon gained with rising sea level

- *Preliminary SET results:* Southern most marsh suggest that rising sea level is enhancing accumulation of carbon over time

Quantification of Seagrass Carbon Stocks in the Florida and Mexican Gulf Coasts

Leads: Dr. Anitra Thorhaug (Greater Caribbean Energy and Environment Foundation) and Dr. Helen Poulos (Wesleyan University)

- Sampling and analyzing carbon content across a range of restored and native seagrass beds and adjacent natural and polluted barren areas in the Gulf of Mexico and southeast Florida coasts

- Different responses in carbon sequestration after the impact of different pollution events: release of hot effluent, dredging and fill, sewage dumping, oil spills

- *Initial results*: Restored seagrass sites are comparable to natural seagrass beds in the amounts of carbon sequestered, and organic matter accretion occurs rapidly within two years' time after site recovery or restoration

Estimation of Carbon Stocks from Mexico's Pantanos de Centla Salt Marshes and Mangroves

Leads: Dr. Boone Kauffman (Illahee Sciences International, Inc.), Humberto Hernández Trejo, María del Carmen Jesús García, Wilfrido M. Contreras Sánchez (*Universidad Juárez Autónoma de Tabasco*) and Chris Heider (Watershed Professionals Network LLC)

- Carbon stocks of mangroves and salt marshes in the Pantanos de Centla of southeastern Mexico to assess carbon stocks

- Differences in carbon storage between coastal fringe and estuarine mangroves. Also carbon stocks of cattle pastures that were formed on sites previously occupied by mangrove forests

- *Preliminary results:* Mangrove carbon stocks in the Pantanos de Centla are exceedingly high compared to the upland forests of Mexico and other mangrove forest worldwide, and that significant emissions result from the conversion of mangrove forests to cattle pastures

Quantification of Soil Organic Carbon at eight National Estuarine Research Reserve System Marshes in the United States

Leads: Dr. Kristin Wilson (Wells National Estuarine Research Reserve) and Dr. Erik Smith (University of South Carolina)

- Spatial variability of carbon storage within and across the National Estuarine Research Reserves System (NERRS) of Maine, Delaware, South Carolina, Florida, Mississippi, California, Wisconsin, and Ohio

- Quantifying the percent of soil organic matter, carbon content, and soil bulk density in these 8 marshes and current carbon storage in the upper 20 cm of the soil across a range of marsh types that differ in geomorphic setting, dominant vegetation, and salinity

- *Results*: Assist with the prediction of carbon stocks in salt marshes experiencing changing environmental conditions and anthropogenic stressors

Response of Soil Carbon Accumulation Rates in Marshes to Sea-level Rise

Lead: Dr. Matthew Kirwan (Virginia Institute of Marine Science)

- Meta-analysis of literature-derived North American carbon accumulation rates in 112 marshes to historical sea-level rise rates, testing whether carbon accumulation rates in marshes increase in response to sea-level rise

- *Preliminary analysis:* Carbon accumulation rates in these marshes are not significantly correlated with variations in relative sea-level rise. Preliminary observations indicate that factors other than sea-level rise (e.g., temperature, elevation, salinity, and mineral sediment availability) may instead dominate carbon accumulation rates in North American marshes

Greenhouse Gas Offset Methodology Criteria for Tidal Wetland Conservation

Leads: Dr. Igino Emmer (Silvestrum) and Steve Emmett-Mattox (Restore America's Estuaries)

Support to RAE experts for a *Greenhouse Gas Offset Methodology Criteria for Tidal Wetland Conservation* aimed at a Verified Carbon Standard-compliant set of procedures for a greenhouse gas offset methodology for tidal wetland conservation for North America and other coastal countries

Experts Meeting

North American-specific blue carbon experts' workshop

April 2014

Workshop Outcome

Policy

- Policy opportunities in three countries
- Identification of science needs to support policy
- Ways to engage with the CEC process

Mapping

- Prioritize baseline mapping
- Specify attributes and terminology
- Data storage and communication
- Method standards

Science

Information needs

- quantification
- models
- mapping
- technology

Priority Readiness Activities

JPAC Regular Session 14-03:
North America's Coasts in a Changing Climate

November 6-7, 2014 · Arlington, Virginia

THE FUTURE OF NORTH AMERICA'S COASTS:

Take an active role in identifying trinational opportunities with the CEC's Joint Public Advisory Committee

To view the full agenda, visit www.cec.org/JPACArlington.

Goal: Identify opportunities for collaboration and initiatives that the three countries could develop or add value to on coastal ecosystems under the CEC's 2015–2020 Strategic Plan.

The outcome of the meeting will be recommendations that JPAC will present to the CEC Council—North America's highest-level environmental authorities.

Blue Carbon Photo Essay

www.cec.org/BCphotos

North America's Blue Carbon:
Assessing the Role of Coastal Habitats
in the Continent's Carbon Budget

A photo essay

Questions ?

Three Countries, One Environment