

# Blue Carbon Accumulation Assessment Project

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## **Idea in a Nutshell:**

The spatial density of carbon content measurements in coastal wetlands is not sufficient to inform landscape scale estimates of carbon pool / inventory across the United States. Blue carbon is important not only from a climate perspective (sequestration is highest in these wetland ecosystems) but also from an economic perspective as potential funding streams (via to be developed carbon credit trading market) in wetland restoration projects.

A program exists within the National Resources Conservation Service to collect measurements of carbon content in coastal wetlands to improve on the existing available data and National Cooperative Soil Survey (NCSS) product.

We propose to partner scientists from the NRCS with coastal geomorphologists, as well as other coastal scientist, who have active research projects in coastal wetlands. By collaborating with an expert in marsh evolution, coastal geomorphology, etc. the NRCS-collected data can be brought into the full context of historical landscape evolution and primary soil characterization. The partnership would provide NRCS scientists with geomorphological context to associate their data with specific landforms, thereby leveraging the site specific information to maximize the impact of any individual data point and significantly improve the exist soil survey publication. This process would facilitate the application of the collected carbon content data to other similar environments.

The partnership would provide the coastal geomorphologists with measurements of carbon accumulation over time that can be used to develop a richer story about the landscape's evolution, and better predict its carbon futures.

## **What is your specific differentiated recommendation?**

- Evaluate existing blue carbon soil data from Universities, research institutions and organizations, NOAA, NRCS, USGS, USFWS, NASA, NEP's, NERR's, state environmental protection groups, etc. Incorporate all data (with permission), including existing coastal zone soil survey publications, into a standard database. After compiling all data, determine

spatial and landform data gaps and select coastal zone sampling sites accordingly.

- Existing data sets that could serve as a foundation of this project include:
  - CRMS
  - SET Networks (National Estuary Programs)
  - Coastal Wetland Monitoring Network
  - National Estuarine Research Reserves (NERR's)
  - Coastal Colleges and Universities
  - EPA/NRCS National Wetland Condition Assessment
  - NRCS Rapid Carbon Assessment
  
- Establish partnerships with coastal geomorphologists that have active programs in coastal marshes. As a part of the initial partnership, conduct a workshop to integrate work practices. Geomorphologists will discuss site history and relevant physical processes. NRCS scientists will discuss how their samples are collected, lab processing, etc. The objective of the workshop will be to design a field data collection strategy that accomplishes the following:
  - The carbon content of a specific marsh soil mapunit, bounded underneath by a definable soil horizons, and laterally by landscape features, will be measured.
  - Measurements of carbon content will be collected at soil horizon breaks that are associated with specific and known moments in the system's depositional history.
  - Measurement plan should be sufficient to answer the question: How is carbon at the surface stored in the subsoil and substratum soil horizons?
  - Other site-specific data collection request brought forward by cooperators
  
- The final step is to execute the data collection plan that is defined in the workshop.

### **What value or impact does it seek to deliver?**

Effective quantification of coastal carbon pools / reservoirs.

Association of carbon content measurements with specific coastal landforms, NCSS coastal soil mapunits allowing application to other regions.

Improve existing Coastal Zone Soil Survey (CZSS) products specifically current spatial and tabular database information.

**What is the reasoning, justification, and / or supporting evidence behind the idea, if any?**

The National Coastal Blue Carbon Assessment (NCBCA) project is a nationwide effort by the United States Department of Agriculture, Natural Resources Conservation Service (USDA/NRCS), Soil Science Division (SSD), to inventory blue carbon soil stocks in coastal ecosystems with a focus on mangroves, coastal tidal marshes and seagrass meadows. These habitats store large amounts of carbon, called [blue carbon](#), within the soil.

Recent publications from partner organizations have highlighted the fact that current soil data provided by the National Cooperative Soil Survey (NCSS) is insufficient for calculating accurate coastal wetland blue carbon stocks due to lack of measured bulk density and soil carbon data in coastal soils. In 2010, the USDA NRCS Rapid Carbon Assessment (RaCA) attempted to accurately determine soil carbon values on a national scope by land use (cropland, forest land, pasture and rangeland, and wetlands) but did not adequately capture coastal ecosystems like mangroves, tidal marshes, and seagrass meadows as a major land use type. Currently, there are more datasets that can be leveraged to add to the accuracy of blue carbon accounting in addition to ongoing coastal projects that involve NCSS sampling.

The NCBCA aims to standardize soil sampling protocols across agencies, increase the accuracy of coastal soil mapping, and improve public accessibility to coastal wetland blue carbon data. The statistical and scientific NCBCA project would be a defensible soil carbon stock inventory on coastal wetland ecosystems (tidal marshes, mangroves, subaqueous, and near shore wetlands).

The NCSS is the prime platform for scaling up individual soil sampling points to produce a national spatial coverage of blue carbon data. Because coastal ecosystems across the nation vary in shape, size, and soil composition evaluation of coastal wetland blue carbon stocks by soil type is essential.