Applications and implications of the proposed Coastal Blue Carbon Assessment

Rob Tunstead and Maggie Payne
Skye Wills and Zamir Libohova
CZSS Focus Team
National Coastal Blue Carbon Assessment Project

The National Coastal Blue Carbon Assessment (NCBCA) 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.

Objective:
To provide accurate soil carbon stock data for blue carbon pools through the Coastal Zone Soil Survey (CZSS).
Why?

💧 Coastal Blue Carbon Assessment
NCBCA: Justification

- Recent publications have highlighted deficiencies in current soil survey data in the coastal zone
- Previous soil organic carbon (SOC) accounting efforts have not adequately addressed coastal soils

NCBCA: Goals

- Standardize sampling methods
- Supplement and upscale existing measurements by multiple entities working in coastal systems
- Link measured data to soil and soil survey units
- Provide accurate inventories of SOC stocks in coastal soils mapped to the soil series level
Background – previous efforts in SOC inventory
Rapid Carbon Assessment (RaCA)

Objective: Base-line inventory of soil carbon stocks for conterminous U.S.

Information collected on

- 6,147 sites
- 32,053 pedons
- 144,833 samples

Data available

- Site info, descriptions, scans
  - Web based queries
  - R dataset - package: ‘soilDB’, function: fetchRaCA()
RaCA was inadequate for coastal zones

Legend
- Rapid Carbon Assessment (RaCA)

Barnegat Bay Elevation

6,000 sites sounds like a lot...........

.............but it’s a big country

Zooming in on coastal areas shows very little coverage
RaCa summary indicates that most of CONUS SOC stocks are in wetlands.

And we know from previous work that there's a great deal of potential for carbon storage in coastal zones.
An important consideration for using RaCA samples for future work...........

RaCA methods were developed for mineral, upland soils and might not give the best results for wetlands and coastal zones
How?

Coastal Blue Carbon Assessment
General Protocol for NCBCA

Domain is the entire coast of CONUS

• Mask out upland and areas with no coastal carbon
  • Stratify by Major Land Resource Areas (MLRAs)
  • Identify characteristic landscapes within each MLRA
  • Identify landscape/geomorphic positions within landscape
  • Evaluate existing data – what landscape positions are currently monitored
  • Identify existing samples or monitoring sites
  • Identify additional sampling locations needed
Looking at different data sources the majority of them are on uplands.

Looking closer at a finer scale it becomes obvious that the distribution of the sampled sites is skewed towards certain areas.

- Coastal Blue Carbon data sets is from the current Coastal Zone Soil Survey (CZSS)
- EPA—NGGI data is from the combination of Environmental Protection Agency data and NOAA National Green Gas Inventory.
Evaluate existing monitoring data

Sediment Elevation Table (SET) sites
- NERRs
- National Estuary Program (NEP)
- Mid-Atlantic Coastal Wetland Assessment Group (MACWA)
- Smithsonian Environmental Research Center (SERC)

Other long term monitoring sites

Evaluate data collected
- Carbon
- Bulk density
- Depth of data collected
- Characterization data to 2 meters
Both coastal blue carbon and EPA-NGGI sample locations are on “Emergent Herbaceous Wetlands”:
But none on “Open Water”
Previous studies and surveys have shown that there is plenty of C sequestered "Open Water" (aka subaqueous soils).
Take home messages:

• The National Coastal Blue Carbon Assessment Project will contribute to knowledge and understanding of soil carbon stocks in coastal areas
• Linking SOC assessment to soil survey allows for extrapolation and incorporation into existing products
• Proposed NCBCA will incorporate existing and new sample locations into a hierarchical sampling scheme
• Process of sampling design, sample collection and sample analysis will contribute to general knowledge of coastal zone soils throughout soil survey
SPEAKER 4: Skye Wills
S4 ORGANIZATION: USDA-NRCS
S4 PRESENTATION TITLE: Applications and implications of the proposed Coastal Blue Carbon Assessment
S4 PRESENTATION DESCRIPTION: This presentation will discuss a proposed Coastal Blue Carbon Assessment, including: the relevant soil survey concepts used to form a sampling and aggregation framework, and the existing data that has been gathered. This work should allow accurate coastal zone soil carbon estimates to be integrated into existing soil survey and soil organic carbon (SOC) stock estimates improving understanding, modeling, and decision making related to the SOC pool.