SUBAQUEOUS SOILS COMMITTEE

Southern Regional Cooperative Soil Survey Conference

July 2010

Co-Chairs

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Participants

- Tom Weber,
- Dennis Brezina,
- Susan Casby-Horton,
- Charles Guillory,
- Henry Langston,
- Shawn McVey

Review of subaqueous soils activities in the Southern Regional Cooperative Soil Survey coastal states

- Alabama – no activities
- Florida – research mapping through the Univ. of Florida
- Georgia – no activities
- Louisiana – no activities
- Mississippi – no activities
- North Carolina – no activities
- South Carolina – no activities (hope to start in two years)
- Texas – special soil survey of Lugana Madre adjacent to Padre Island

Subaqueous Soils Rationale

The study of subaqueous soils is a relatively new field in Pedology or soil science. The concept that sediments in shallow water environments undergo soil forming processes, are capable of supporting rooted plants, and meet the definition of soil according to the criteria defined in Soil Taxonomy has been moving soil scientists into a new frontier of soil survey – mapping subaqueous soils.

Subaqueous and Submerged Soils

The difference between subaqueous and submerged soils is that submerged soils became submerged as a result of rising water tables, flooding events (such as a Beaver Dam), or sea level rise. Submerged soils formed in an upland environment but are now underwater. Subaqueous soils formed under a continuous water column (such as in an estuary), although their sediments may have originated from an upland area such as a dune.

Significance of Subaqueous Soils
(*George Demas*)

A major limitation to science-based management of shallow water habitats has been a lack of definitive information on the properties and spatial distribution of subaqueous soils. In part, this lack of information has stemmed from an inadequate paradigm for subaqueous soils, which has not considered them "soils" at all, but rather as "sediments". During the last decade it has been demonstrated that these "sediments" would be better understood as "soils" and that the sedimentary paradigm should give way to a pedological paradigm.

Significance of Subaqueous Soils
(*George Demas*)

An advantage of using the pedological approach to study shallow water habitat is that soils are studied as a collection of horizons that are linked vertically with depth and horizontally across the subaqueous landscape. These horizons are studied and characterized by examining a combination of properties and characteristics, instead of, say, a single component or parameter. In this manner, subaqueous soil can be characterized as ecological map units and provide a site-based system to identify the geomorphic settings that represent the subaqueous landscape. The following are some advantages of a subaqueous soil approach to shallow water classification:

Significance of Subaqueous Soils
(*George Demas*)

- Sediment characteristics presented to a greater depth (2 m), rather than a bottom-type classification (such as mud bottom or rocky bottom).
- Provides a comprehensive classification scheme (Soil Taxonomy, Soil Survey Manual) for shallow water sediments.
- Could provide a major or missing data set for submersed aquatic vegetation (SAV) restoration, estuarine protection, planning and management.

Subaqueous Soil Survey

Several States throughout the U.S. have begun the process of mapping and inventorying subaqueous soils. States with subaqueous soils are responsible for determining the activity in their state related to subaqueous soil mapping.

How are subaqueous soils mapped?

Subaqueous soil mapping is performed in much the same way as terrestrial soil mapping, except the mapper is in water. Instead of topographic maps to provide landscape position, subaqueous soil mapping uses bathymetric maps to identify landscapes and landforms. Shovels are replaced with augers and special tools, such as peat corers and vibracore, to obtain the soil samples.

Uses of Subaqueous Soil Mapping

- SAV Restoration
- Crab Habitat
- Clam Stocking
- Management for Sustainable Production Clam, Oyster, and Scallop
- Nutrient Reduction
- Pathogens Pfesteria Cyst Residence Sites
- Benthic Preservation Site Identification
- Wildlife Management
- Wading Shore Birds, Migratory Waterfowl, Nurseries and Spawning Areas
- Habitat Protection for Horseshoe Crab and Diamondback Terrapin
- Effects of Dredging on Benthic Ecology
- Off Site Disposal of Dredge Spoil
- Acid-Sulfate Weathering Hazards
- Dune Maintenance/Replenishment
- Resource inventory
- Baseline conditions
- Dredging considerations
- Resource remediation
- Aquaculture

Charge 1

Contact Jim Turenne in Warwick, RI and document progress from the Subaqueous Soils workshop

Report from Turenne

Still on for our 2nd National Workshop on Subaqueous Soils - if you want to announce it at your meeting we really need some non-NRCS folks (university, Feds, etc.)to come. Info and registration is at: http://nesoil.com/sasworkshop.htm

Anyone wishing to give a talk/poster should contact me to get on agenda.

I have a list of the SAS Interps needed and being researched on my SAS page: http://nesoil.com/sas look on the left side above the slide show. I need to update this with current research and needs.

Now that 11th edition has wassents/wassists in it we are moving full steam ahead and will have a SAS survey on the data mart by August.

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Charge 2

Review and provide information on progress on methodologies for sample handling protocols and characterization methods for critical data elements

Charge 2

Questions and problems from the Texas project include:

- n-value determination
- ponded vs flooded
- landform/geomorphic terminology
- parent material terminology (estuarine sediments?)
- unfamiliarity with boating in general
- shallow water
- remoteness/hard to access areas

Charge 2

Specialized equipment needs:

- Sidescan Sonar Image and Geologic Interpretation
- Sediment Sampling Using Vibracore Technology
- Coastal Remote Sensing
- Bathymetry – higher resolution than NOAA
- VNIR
- Soil surface topography – NE employed Garnin Depth Finder linked to GPS to map underwater surface (map X-Y-Z-Time)

Charge 3

Document progress of subaqueous soils research in soil survey and applications to interpretations

Charge 3

Research:

- revised salinity classes for subaqueous soils
- leaching through dredge spoil
- soft bottom/hard bottom terminology
- Soils affected by petroleum products

Charge 3

Interpretations:

- soft bottom/hard bottom terminology (local interpretation in NE)
- suitability for mooring -dead weight vs mushroom anchor (local interpretation in NE)
- potential for submerged aquatic vegetation (local interpretation in NE)
- sulfidic materials
- oyster bed suitability

Charge 3

The Southern Region endorses the proposals submitted by the Northeast Region

- Proposed Amendment 5-1 Salinity
- Proposed Amendment Bulk Density
- Proposed Amendment Shelly Modifier
- Proposed Amendment si horizon
- Proposed Amendment Subaqeuous Drainage Class