

## MLRA Staff Research Items

- 1) 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 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).
- 2) Two different depositional events occurred at deglaciation in the Champlain Valley: first was a lacustrine depositional event as water filled the Champlain basin behind the retreating ice sheet. Later, as the ice sheet moved north of the St. Lawrence, and the Atlantic Ocean flooded the basin because the Earth's crust was depressed by the ice, there was another marine depositional event. Both of these surfaces were mapped the Vergennes catena soils.
- 3) develop an accurate separation between the marine and lacustrine surfaces.
- 4) differentiate texture in the 2 surfaces that may affect correlation outcome and affect use and management.
- 5) earlier research on the NY side of the basin and in the St. Lawrence basin suggests there is a chemical difference in the soils that may affect stability of these clays and is this significant?
- 6) research/develop a toolset for the use of image-recognition software to divide the landscape into different parent-material types prior to implementing DSM.
  - o Many parent material types have a very distinct photo signature (either with aerial imagery or when viewed with LiDAR). Examples include: Aerial Imagery: Organic bogs, flood plains; LiDAR: lodgment till vs. ablation till, bedrock controlled areas). If we use some kind of image-recognition software to train the computer these distinct photo signatures and how to delineate them consistently across our area of interest, it would expedite the DSM process immensely.
- 7) Saturated Hydraulic Conductivity measurements on Benchmark Soils

- 8) Water Table Studies in Fragipan soils
- 9) Glacial Till soil characterization for Till Lobes
- 10) Flooding Frequency study
- 11) Base Saturation Study on Floodplain Soil Series
- 12) Glacial Boundary Study in Southern MLRA 140 (Pennsylvania part)
- 13) Soil Temperature research to better define mesic/frigid in New England (potential impact of climate change)
- 14) DSP on heavily used urban soils
- 15) CZSS - MLRA 151:
  - 1) Louisiana's Coastwide Reference Monitoring System (CRMS) was designed to monitor effectiveness of more than 200 approved restoration techniques and projects throughout the Louisiana Gulf Coast. The CRMS sites included about 390 sites within a range of ecological conditions across the coast. Within the specific sites, soil properties were recorded based on existing soil map and upper 20 inches or so, and in most all cases, a full soil description is not available. Hydrologic, vegetation, elevation, and land/water composition data are on fixed sampling schedules to access these points, but is there accurate soil data for each specific CRMS site? Efforts should be taken to verify and sample soils among many CRMS sites in this MLRA to better inform the soil concepts.
  - 2) What is the relationship with surface water salinity level to the correlation of salinity levels within the soil profile. Areas of shallow open water map units can be mapped by salinity class and areas may can be linked to ES concepts.
  - 3) What are the Subaqueous soil concepts for MLRA 151? More information is needed to develop suborders and great groups, possibly develop soil catenas within a potential Aquasol soil order.
  - 4) Research staff from Auburn is proposing a research grant for mapping soil map units using drone technology. This proposal will plan to observe technology with recent and future marsh sample sites from the Loxley SSA. More information will be available in the near future.
- 16) MLRA 133A:
  - 1) Many soils series are designated with multiple great groups and subgroups, even soil order. These taxonomy inconsistencies are from early taxonomy and have not be run through updates. Some of these map units may still fit the original soil series and other map units may need updated taxonomy and soil series. Verifications are needed on these map units for correct taxonomy and soil series with developing ESD concepts.

Examples: Tifton – Plinthic Kandiudults and Plinthic Paleudults

Lorman - Chromic Vertic Hapludalfs and Vertic Hapludalfs

Hyde - Typic Umbraquults and Cumulic Humaquepts

Other soil series include: Arkabutla, Benndale, Bowie, Brookhaven, Collins,

Dorovan, Eustis, Greenville, Iuka, Jena, Lakeland, Myatt, Ochlockonee,

Orangeburg, Red Bay, Rosebloom, Ruston, Savannah, Sunsweet, Urbo, Waverly

- 2) Kandic sandy soils have been sampled but not recently correlated as kandic since the updates in taxonomy. Many map units in southeastern Mississippi, southwestern Alabama and northwestern Florida panhandle presently have map units with Kandic soil series. Therefore, a legitimate estimate of the western regional extent of kandic soils is unknown. Many soils mapped or sampled as Troup, Lucy, Orangeburg, Greenville, Tifton, Dothan, and others, did not perform the necessary lab tests to provide the taxonomic classification. These are sampled prior to the kandic update in soil taxonomy and also need verifications for correct taxonomy and soil series with developing ESD concepts.
- 3) There are many vegetative surveys that collect veg data, easy to see and record to a point on the ground, if a correlation of these points on the ground to soils series and if possible a good soil description to verify would help associate it soils concepts for the ES Program. This is a massive undertaking that could extend through all MLRA's that have any veg data, so the veg data would need to be vetted first and prioritize to where the most appropriate and verified data is available.