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The Coastal Plainer

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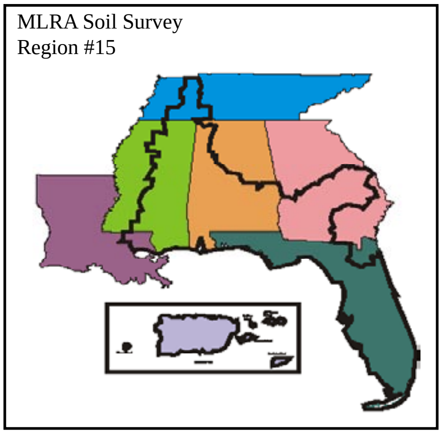
Message from the MO–Leader's Desk

By Charles Love, MO–15 Team Leader



During the week of March 17th, I attended the national State Soil Scientist conference in Florence, Kentucky. The theme of the conference was "Technical Soil Services and Technology for the Future." It was a very good conference. The agenda was filled with national soil survey program business requirements and great demonstrations of technology. The staff of the Soil Survey Division and Kentucky–NRCS did an outstanding job of hosting. Prior to this conference, the last national State Soil Scientist conference was 3 years ago. We really needed this type of face-to-face dialogue with our program leaders at the state, regional, center, and national levels. The dialogue was needed to help clarify our vision of the overall program to meet the expectations of our internal and external customers. I hope in the future that we can have this kind of conference at least every 2 years (if budgets will allow it).

The demonstrations of technology included NASIS 6.0, Web Soil Survey 2.1, the soil survey schedule, geodatabases, and many others from various states across the country. We had a lengthy discussion concerning timelines for the national soil survey program restructuring plan and our commitments for completing this effort by October 2009. It was impressive to see how everyone was so engaged with great discussions during our general and concurrent breakout sessions and the technology demonstrations.

Another major topic that invoked great discussion at the conference was the development of implementation guidance documents for MLRA Soil Survey Offices (MLRA SSOs). MO leaders across the country are working on documents for managing the 146 MLRA SSO work areas. The MO leaders plan to complete these guidance documents by September. We hope the documents will provide a framework to formalize discussion, input, and feedback from state offices, MLRA SSOs, and cooperators. The documents will address the priorities

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and structure of the reorganized soil survey program. The approaches advocated in the documents will provide us with insight about the importance of a thorough evaluation of our existing products. The documents will also address establishing priorities; developing long-range, annual, and specific project plans to address soil survey concerns; increasing cooperator involvement; and improving communications between soil surveys entities. We at MO–15 are already drafting our MLRA SSAO implementation guidance document. It will be sent to the State Soil Scientists in our area for their review within the next few weeks.

If you would like to learn more about the topics and discussions at this conference, go to http://soils.usda.gov/partnerships/ncss/conferences/soil_scientist.html.

As always, thank you for your support. ■

—Charles

"A nation that destroys its soils destroys itself. Forests are the lungs of our land, purifying the air and giving fresh strength to our people."

—Franklin D. Roosevelt

"The love of dirt is among the earliest of passions, as it is the latest. Mud-pies gratify one of our first and best instincts. So long as we are dirty, we are pure. Fondness for the ground comes back to a man after he has run the round of pleasure and business, eaten dirt, and sown wild oats, drifted about the world, and taken the wind of all its moods. The love of digging in the ground (or of looking on while he pays another to dig) is as sure to come back to him, as he is sure, at last, to go under the ground, and stay there."

—Charles Dudley Warner,
***My Summer in a Garden*, 1870**

Florida Soil Carbon Inventory

By Dr. Sabine Grunwald, Associate Professor, University of Florida; Dr. Nick Comerford, Professor, UFL; Willie Harris, Professor, UFL; and Dr. G. Bruland, Professor, University of Hawaii; with collaboration from Deanna Peterson, State Soil Scientist, NRCS

Carbon dioxide (CO_2) is the leading greenhouse gas. It is so named because its accumulation in the atmosphere can trap heat from the sun. One of the strategies for reducing the concentration of atmospheric CO_2 is increasing the storage of carbon in soil. Estimates place the global pool of carbon in soil at about four times the biotic pool and about three times the atmospheric pool, providing ample opportunities to sequester carbon.

Preliminary estimates place the mass of soil organic carbon in Florida at 2.256 Pg (1 Pg = 10^{15} g; about 1,100,000,000 U.S. tons) (Vasques and Grunwald, 2007). Very little is known, however, about the amount of carbon stored in different soils or how the content is affected by land-use management practices and climatic conditions (e.g. hurricanes, changes to the water table). Research gaps exist regarding the spatial distribution of soil carbon across Florida and the potential of soils to sequester more carbon, mitigating rising CO_2 emission.

Florida ranks highest among all states in the U.S. in terms of soil carbon storage. Climatic conditions, high water tables, and extensive coverage of forest favor accumulation of soil carbon in vegetation and in surface and subsurface soil (see photo on following page). The soil carbon pools depend on various factors, such as topography, hydrology, soil type, and land-use management. Major soils that accumulate carbon are Spodosols (~32% coverage in Florida) and Histosols (~11% coverage in Florida). The latter occur in wetlands, depressions, and areas that have a high water table. Land-use management and change have been documented to significantly affect soil carbon storage. In Florida, rapid urban growth, conservation land management,

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An exposed, deep, thick Bh (spodic) horizon at a heavy-mineral mining site in northeastern Florida. Photo courtesy of Joel Warner, geologist with Dupont Corporation, and Dr. Willie Harris, Soil and Water Science Department, University of Florida.

and loss of wetlands are prominent and may shift soil carbon storage in the future.

In September 2007, a large-scale research project to investigate soil carbon in Florida was launched. The project is being conducted by scientists from the University of Florida and the University of Hawaii in cooperation with the Natural Resource Conservation Service.

The objectives of the project are to:

(1) Develop a comprehensive inventory of soil carbon in Florida;
(2) Understand the effects of various factors, such as land use, hydrology, and topography, on soil carbon;
(3) Develop soil carbon maps that predict the future status of soil carbon based on changes in land use and other factors and compare them to historic conditions (~1990); and
(4) Test a new soil sensing method that will allow cheap, rapid, and accurate predictions of soil carbon.

Approximately 1,000 sites across Florida will be sampled in 2008 and analyzed for soil carbon. The sites are on different soils and subject to different land uses (agriculture, pasture, wetland, urban, rangeland, pine plantations, upland forest, and others). Data layers from a geographic information system (GIS) will be used to characterize hydrology, geology, topography, land use, soil, etcetera throughout Florida. Geospatial methods will be used to scale site-specific field observations up to the landscape scale. Soil carbon pools will be assessed and compared to historic and

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future landscape conditions to assess gains and losses. Dynamic carbon models will be developed to better understand carbon cycling over large landscapes.

Maps will be developed for total soil carbon and for the labile and recalcitrant (“stable”) carbon pools. The labile carbon pools are associated with nutrient cycling in the soil, and the recalcitrant carbon pools are indicators of the long-term storage of carbon in the soil as well as such soil properties as structure and water holding capacity. Various carbon maps will facilitate accurate assessment of soil productivity and enable more informed decisions regarding sustainable land-resource management.

For more information about the project, contact Dr. Sabine Grunwald, associate professor, at sabgru@ufl.edu or visit: http://grunwald.ifas.ufl.edu/Projects/Carbon_FL/Carbon_FL.htm. ■

MLRA Connection

By Scott Anderson, Soil Data Quality Specialist

This is the first article in what is intended to be a regular column in which I will (attempt to) answer questions from readers and otherwise expound upon technical and management issues related to soil survey by MLRA. What makes me the expert you ask? Only that I am willing to write these articles and follow-up on your questions; and I am usually very good at finding answers to questions. Being intensely interested in the subject matter helps as well.

Some of the topics I hope to cover include the evaluation of published soil surveys, tips on how to conduct fieldwork under the MLRA concept, MLRA legends, NASIS (of course), sampling plans, and the roles and responsibilities of the MLRA leader, MO staff, technical team, and board of directors. Topics submitted from readers will also be considered.

Now, how about a short history lesson to start things off?

Back in 1995, our agency reorganized the soil survey program based on MLRAs. At that time, the nation was divided into 17 soil survey regions, based roughly on MLRA areas, and the MLRA Regional Offices (MOs) were established. (Yes, I know, we now have 18 of them). The quality assurance function of the National Soil Survey Center was transferred to the appropriate MOs. The correlation function of the state offices was also transferred to the MO, but with the understanding that one day the function would move to the field level. The overall goal was to eliminate bias between soil survey areas and produce what we like to call “perfect joins.”

Time passed and work got done, but perfect joins were still hard to find. The end came in sight for completing the “once-over” and SSURGO. Our national leadership, therefore, decided it was about time to move to the next level: establishing 146 MLRA soil survey offices and consolidating all soil survey staff nationwide to these offices. This is the step where the correlation function moves to the field. The “MLRA Soil Survey Restructuring Plan” attached to National Bulletin 430–7–2 outlines the strategy for establishing these offices and recommends a migration period covering 3 years. The plan also calls for MO leaders and State Soil Scientists to develop a migration plan for each state.

This brings us up to date. MO–15 is still within the transition period.

Want more info?

- Access a copy of the National Restructuring Plan at: http://policy.nrcs.usda.gov/. Go to “Title 430 – Soil Survey”; select “NB.430.7.2, Major Land Resource Area Soil Survey Restructuring Plan”; and, once you open this document, click on “Attachment” at the bottom to view the national plan. Or, just do a Google search on “NB.430.7.2”.
- Contact your State Soil Scientist for a copy of your state migration plan.
- Contact me for a copy of a map showing the locations of the nine MLRA soil survey areas for MO–15.

Have any questions or issues you want discussed? Send them off to scott.anderson@al.usda.gov. I promise not to reference your name without approval. Don’t be shy. ■

Bibb County Soil Survey Team, from left to right: (Back) Stephon Thomas, Jerome Langlinais, Christopher Ford, Charles Love, Lawrence McGhee, and (front) Zamir Libohova.

“Thanks to the Team for a Job Well Done”—Soil Survey Report of Bibb County, Alabama

By Lawrence E. McGhee, Soil Survey Project Leader

Bibb County is near the center of Alabama, about 50 miles southwest of Birmingham and 70 miles northwest of Montgomery. The county encompasses 399,980 acres. Because of its diverse geology, Bibb County has often been referred to as “Where the world comes together.” There are 25 geological formations and 5 geological provinces in Bibb County. The county consists of the Coastal Plain, Appalachian Plateau, Limestone Valley and Uplands, and Major Flood Plains and Terraces soil provinces.

The last-acre ceremony for the soil survey of Bibb County was presented on October 16, 2007. Most of the fieldwork for the survey area was completed from 2002 to 2007. During this period, the project members experienced many spectacular and rare events, including the driest period ever recorded in the state of Alabama (causing some soil explorations to be like digging in concrete), tornadoes, and nationally publicized rural church burnings.

I joined the survey team in May 2005, after a 14-month tour of duty in Operation Iraqi Freedom. The comparative tranquility of this diverse county was a vital part of my rehabilitation. The beautiful water of the Cahaba River, rugged hills of the coalmine

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Review team, from left to right: (Back) Jerome Langlinais, Stephon Thomas, Sylvia Long, and (in hole) Lawrence McGhee.

country, deep pits of the limestone quarries, and vast timber forests and hardwood forests proved to be healing.

A diverse staff completed the soil survey of Bibb County. The team is to be commended for an outstanding display of competence and professionalism. The team used cutting-edge technology, including tablet PCs, GPS, DEM software, and innovative procedures, to convert fieldwork to spatial products in a timely manner. Additional thanks are to be extended to the Bibb County Soil and Water Conservation Committee, Auburn University, the University of Alabama, the U.S. Geological Survey, the U.S. Forest Service, and the soil correlation teams and MO–leaders for MLRA–15 and MLRA–18.

Project Members:

Jerome Langlinais—MLRA project leader, Tuscaloosa, AL
Lawrence McGhee—Project leader
Christopher Ford—Currently resource soil scientist, Decatur AL
Angela Warden—Currently private soil consultant, TN
Stephon Thomas—Currently MLRA project leader, Cartersville GA
John Burns—Currently soil scientist, Auburn, AL
Sylvia Long—Currently soil scientist, Auburn, AL
Zamir Libohova—Currently Ph.D. scholar's program, Purdue University, Lafayette, IN

The soil survey report for Bibb County is scheduled to be published to the Web Soil Survey by October of 2008. ■

Influence of Long-Term Poultry Litter Applications on Soil Aggregate Stability

By A.J. Foster, Candidate for Ph.D. in Agronomy, Department of Plant and Soil Sciences, Mississippi State University

Aggregation and aggregate stability are dynamic, multifaceted characteristics of soils. They are the result of interactions of internal physical, chemical, and biological properties influenced by external factors, such as climate, plant species, and management. Well aggregated soils benefit from improved infiltration, increased nutrient availability, and reduced soil and nutrient losses via runoff and erosion. Aggregation can be important in the management of poultry litter, which is a well known source of nutrients and is applied to crops as a fertilizer. Poultry litter is often preferred over commercial fertilizers in areas where it is readily available. Repeated applications of poultry litter over long periods have been shown to increase aggregate formation and the content of soil organic matter. Such applications, however, can also lead to high nutrient levels, which can potentially create environmental problems. Management of pastures, e.g., selecting species and varieties, tilling, fertilizing, harvesting, and grazing, are known to influence soil conditions and crop productivity. Because improper management may reduce the benefits of applications of poultry litter, there is an important need to understand the influence of management on aggregation in soils with a history of long-term applications. Studies of this nature are currently being conducted by A.J. Foster, Billy Kingery, Mike Cox, and Grady Jackson from Mississippi State University along with Ralph Thornton and Delaney Johnson from NRCS.

In one study, forage was grown in a greenhouse on soils (0 to 6 inches in depth) that had been subject to annual applications of poultry litter for more than 10 years (Typic Fragiudults* and Typic Hapludults*) and on soils with no history of applications (Typic Hapludults-pine and Typic Paleudults). The soils were obtained from south-central Mississippi, which is the dominant region of poultry production in the state. The content of Mehlich(III)-extractable nutrients in the litter-amended soils was markedly different

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Table 1.—Characteristics of the Soils Used in the Study.

Property	Soil (Land use)			
	Typic Fragiudults* (bahiagrass pasture)	Typic Hapludults* (bermudagrass pasture)	Typic Hapludults-pine (pine timber)	Typic Paleudults (pine timber)
Sand (%)	12	44	24	57
Silt (%)	78	44	65	32
Clay (%)	10	12	11	11
pH	6	7.1	6.1	6.0
Mehlich III-P (ppm)	1,189	488	43	30
Mehlich III-K (ppm)	858	383	181	145

* Greater than 10 years of annual applications of poultry litter.

from the content in non-amended soils (table 1). Common bermudagrass was grown for 120 days. Cuttings were made at 2-inch stubble height at 60 and 90 days after planting. Nitrogen fertilizer (NH_4NO_3) was applied at recommended rates in split applications at planting and after each clipping. Aggregate stability was determined at the end of the study by using an Eijkelkamp wet-sieving apparatus and measuring the percentage of stable aggregates that were greater than 0.125 millimeter and greater than 0.250 millimeter in diameter.

The complexity associated with aggregation is reflected in the percentages of stable aggregates at the end of the experiment (figure 1). The commonly observed granular structure of surface soils is actually a display of associations in which relatively large aggregates (0.25 to 5 millimeters in diameter) are made up of smaller ones (0.002 to 0.25 millimeter). Smaller aggregates are generally more stable than the more highly favored larger ones, which require careful soil management to maintain and/or promote. The Fragiudults* and Paleudults had similar percentages of 0.125-millimeter aggregates, which were lower than the percentages of Hapludults* and Hapludults-pine (figure 1). Given the hierarchical concept of aggregation, one might expect that the percentages of larger aggregates (0.250 millimeter) would be correlated with those of the smaller aggregates. This was not seen in that the Fragiudults*, Hapludults-pine, and Paleudults had greater percentages of 0.250-millimeter aggregates than the Hapludults* (figure 1). Soil-specific factors that influence aggregate formation and stability are grouped into physico-chemical processes and biological processes. Because the physico-chemical processes, such as flocculation and swelling, are most strongly associated with the clay-sized fraction of soils and the soils had similar clay contents (table 1), these processes are probably not the best means for explaining differences. On the other hand, biological processes tend to exert a stronger influence on aggregation in coarse-textured soils. These processes include activities of soil fauna, roots and fungal hyphae, bacteria and fungi, and soil organic matter. Management can induce interactions among these factors. For example, some studies have indicated that high levels of phosphorus can influence the extent of hyphal formation and thus affect aggregation.

In this experiment, there is a lack of clear patterns with respect to either soil properties or previous land use (table 1). The investigators suggest that this provides evidence of the intricacy of aggregation and that the study of specific soil properties and processes in relation to aggregation may benefit from considering them in the context of soil-management systems. ■

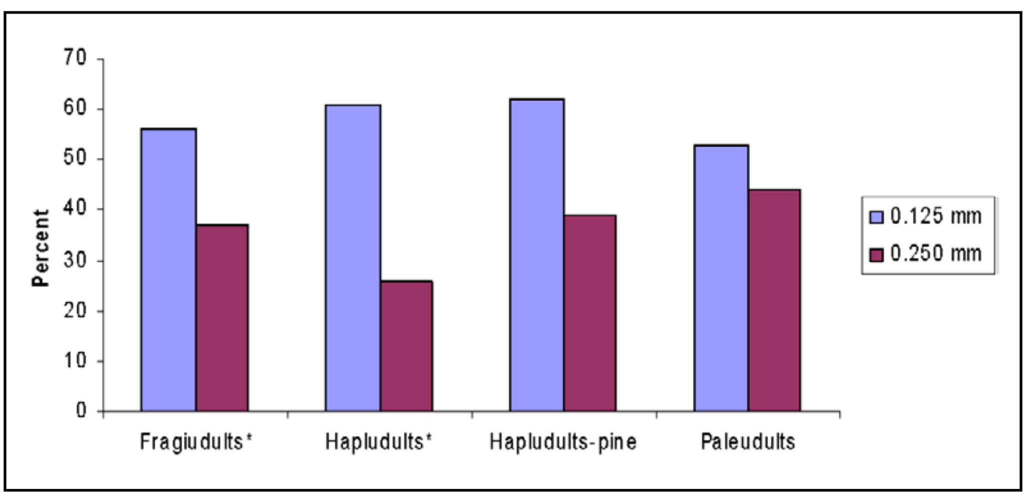

Figure 1.—Stable aggregates in litter-amended (*) and non-amended soils.

Final Field Review of Webster County, Georgia

By Gregory R. Brannon, Soil Data Quality Specialist, MO–15

The final field review of Webster County, Georgia, was conducted the week of March 24, 2008. The review was a joint effort between MO–14 and MO–15 because almost half of the county is split between the Sand Hills MLRA (137) and the Southern Coastal Plain MLRA (133A). Participants were: Scott Moore, project leader for Webster County; Ken Monroe, project leader for adjoining Stewart County; Alfred Green, project leader for Harris County; Greg Brannon, soil data quality specialist, MO–15; John Kelly, regional soil scientist, MO–14; Steve Lawrence, assistant state soil scientist, Georgia; Charlie Ogg, MLRA soil survey leader, MLRA Office 14–3; and Sherry Carlson, resource soil scientist.

Several sites were visited, and the features observed included plinthite; deep, sandy soils; and kaolinitic soils. The review included a visit to President Jimmy Carter's boyhood home (just outside of Webster County) and to Providence Canyon, which is in adjoining Stewart County.

Decisions were made regarding several mapping units and the boundary between MLRAs 137 and 133A.

Photos courtesy of John Kelly. ■

A partial view of Providence Canyon, which is in Stewart County of western Georgia. This is a massive erosional feature that was exasperated by farming in the late 19th and early 20th centuries.

Soil profile of a Troup soil. Troup soils are common in both the Sand Hills and the Southern Coastal Plain.

Resource soil scientist Sherry Carlson observing a sample of Greenville soil.

Piedmont Rhododendron (Rhododendron minus) *in bloom on the lowest slopes in Providence Canyon. This plant is normally found north of the Southern Coastal Plain, but the cool damp environment provided by this erosional feature has allowed it to flourish.*

Florida Hosting the Southern Regional Cooperative Soil Survey Conference

The Southern Regional Cooperative Soil Survey Conference (SRCSSC) will be held July 14–17, 2008, in Gainesville, Florida. The Theme for the 2008 conference is "Innovative Technologies for the New Soil Survey."

Located in the north-central Florida, Gainesville is home to Florida's largest and oldest university, the University of Florida, and the "Gator Nation." In the midst of northern Florida's rolling sandy terrain and ecological communities, karst geological formations are evident throughout the Gainesville natural areas, including Paines Prairie State Preserve and Devil's Millhopper State Park.

A field trip on Monday the 14th will combine visits to soil/ecological sites at Austin Cary Memorial Forest and GIS demonstrations at the University of Florida. Beginning on Tuesday, the conference sessions will include (but not be limited to) information sharing from national leadership and partners, breakout groups, poster sessions, and reports from SRCSSC's committees. The following are the standing committees: Soil Taxonomy and Standards, Research Priorities, New Technology, and Soil Interpretations. The Subaqueous Soil Ad Hoc Committee will also be meeting.

Check out our website (http://conference.ifas.ufl.edu/ssc) for additional information and to register, or contact Deanna Peterson by phone at (352) 338-9535 or by e-mail at deanna.peterson@fl.usda. ■

"I am led to reflect how much more delightful to an undebauched mind, is the task of making improvements on the earth, than all the vain glory which can be acquired from ravaging it, by the most uninterrupted career of conquests."

—George Washington

Editor's Note

Issues of this newsletter are available on the Internet on the MO–15 homepage (http://www.mo15.nrcs.usda.gov/). Click on "News" and then on "The Coastal Plainer."

You are invited to submit stories for future issues to Aaron Achen, editor, MO–15, Auburn, Alabama. Voice—(402) 437-4157; FAX—(402) 437-5336; e-mail—Aaron.Achen@al.usda.gov.

Technical Soil Services

An informational flier promoting technical soil services is now available (see next page). The flier, which describes the basic services provided by resource soil scientists, is intended to increase awareness of technical soil services. The target audience for the flier includes soil conservationists, technicians, and NRCS line officers from State Conservationists to district conservationists. The flier is available for download at http://www.mo15.nrcs.usda.gov/news/.

Technical Soil Services

A Valuable Resource; An Important Tool

Within NRCS, **Technical Soil Services** provided by the **resource soil scientists** span and assist the agency's operations from national headquarters to the county-based conservation field office. A key role of the **resource soil scientist** is to provide tailored, accurate information for site-specific planning.

Technical Soil Services provide the following basic services:

Information Services

- Standard and Local Soil Interpretations
- Special Studies
- Training (e.g., toolkit, soil data viewer)
- Resource Inventories
- Guidance for External Customers

Technical Policy, Content, and Program Services

- eFOTG
- Conservation Practice Standards
- Assistance to Programs
- Scientific Review
- Technical Soil Services Handbook Development

Broad Planning Services

- Web Soil Survey Products
- Soil Data Mart Products
- Thematic Maps
- Rapid Watershed Assessment
- Area Wide Plans

Site-Specific Planning Services

- Soil Investigations
- Soil Testing
- Soil Evaluation and Interpretation for Soil Quality, HEL, Wetlands, and Others

And More!

For more information, contact your State Soil Scientist, National Technology Support Centers' Regional Resource Soil Scientist, or National Leader for Technical Soil Services, Soil Survey Division, Washington, DC