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The Coastal Plainer

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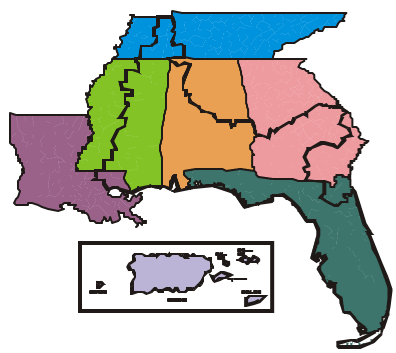
Points from Puckett

by Bill Puckett, SSS/ MO15 Team Leader, Auburn, AL

MO-15 hosted the combined MOs 13, 14, 15, 16, and 18 Board of Directors' meeting on the campus of Alabama A&M University in Huntsville, AL, June 5-6. There were 18 states represented with 11 State Conservationists and the Director of the Caribbean participating. Since most states deal with more than one MO region, the combined meeting provides an efficient way for the State Soil Scientists and the State Conservationists to meet, make plans, and set directions for the soils program.

MLRA Soil Survey Region#15



In addition to NRCS personnel, Larry West, University of Georgia; Joey Shaw, Auburn University; McArthur Floyd, Tommy Coleman, James Shuford, and Wubishet Tadesse, Alabama A&M University; participated as university representatives. Steve Cauthen, Executive Director, Alabama State Soil and Water Conservation Committee, and Tim Gerber, Ohio Department of Natural Resources, also participated.

The Chair of the Board of Directors in each MO gave an update, as did the MO Leader from each region. Presentations from national leadership included Horace Smith, Director; Ken Lubich, National Soil Survey Digitizing Coordinator; Tom Calhoun, Coordinator of the MLRA Implementation; and Sheryl Kunickis, Landscape Analysis.

The group deemed the meeting productive and decided to meet next year in Savannah, GA, in conjunction with the Southern Soils Conference, with MO-14 hosting the meeting.

Hosa Nall, foreground, tells the group about the research going on at the Winfred Thomas Agricultural Experiment Station.

In This Issue:

SPACE AGE TECHNOLOGY FOR SOILS: Laser Induced Breakdown Spectroscopy (LIBS)

by Lee Norfleet, Soil Scientist, Soil Quality Institute, Auburn, AL

Recently scientists from NRCS and Agricultural Research Service have worked with US Department of Energy researchers at the Los Alamos National Laboratory (LANL) in New Mexico on applying laser technology to soil analysis. The LIBS technology is currently being tested in the lab on samples provided by the Soil Quality Institute and National Soil Survey Center. Once this phase is completed, we will conduct a field test in at least 7 locations from coast to coast.

TECHNICAL OVERVIEW

The use of lasers for total elemental analysis of solids, ores, and various precious metals began to be studied in the early to mid 1960's. To date its primary application in the public sector has been with quality control at the industrial level. The LIBS technique is the latest of this science and can be made field portable. It is a form of elemental analysis based on atomic emission spectroscopy (AES). The laser emits pulses of energy with a wavelength of 1064 nm (generating temperatures between 7,000 and 10,000 degrees Kelvin, similar to the sun's surface). This causes a solid sample to form into a microplasma and the high temperature and electron density of the plasma result in atoms that become electronically excited and emit light, where it is detected similarly to AES. This technology will also be included on the next Mars probe for 'soil' and rock analysis. Its potential widespread uses and initial examination as a natural resource tool is literally being handed to NRCS. The LANL group is anxious for this technology to be tested and transferred to as many uses as imaginable.

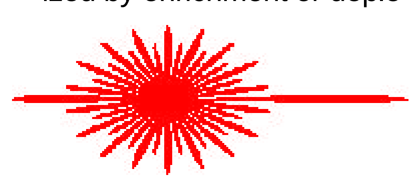
POTENTIAL BENEFITS TO NRCS AND PARTNERS

1. Soil Carbon at the field and point scale. The rapid and inexpensive acquisition of data will allow better evaluation of conservation systems' effect on soil organic carbon (SOC), distribution and spatial variability of SOC at the field and landscape scale, and SOC levels and ranges specific to landuse and soil type. The ability to assess conservation systems will add value and improve technical information such as RUSLE c-factors and improve the current suite of C models touted as potential tools. Most of these models do not have landscape algorithms due to insufficient knowledge and therefore tend to treat all landscape positions and drainage classes the same. Assessing systems could become an invaluable asset if our agency is required through policy to evaluate systems for carbon trading or government programs.

2. National Resource Inventory (NRI) and LIBS. Adequate data collection on site has to date been too costly to implement. Statistical subsets could be selected to monitor SOC in the NRI program and enable us to produce much-improved national estimates and trends.

3. National Soil Survey Lab Technology: A fixed base unit could provide tremendous cost and timesavings to the lab for SOC and increase the use of total elemental analyses in soil survey investigations. These types of analyses have been valuable to numerous geomorphic studies, but are probably hampered today due to cost constraints.

4. Soil Survey, Real Time field characterization: It may be possible to develop criteria for *insitu* characterization of some diagnostic horizon and other data necessary for characterization. Irregular distribution of SOC for entisols is an obvious one, but other horizons characterized by enrichment or deple-



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tion may be accomplished in the field and avoids the cost of lab analyses. Obviously, a fair bit of testing would be required, but archival samples could provide the lion's share of the data.

5. Animal Feeding Operation/ Concentrated Animal Feeding Operation (AFO/CAFO): Phosphorus and other potential metal contaminants from animal waste operations could be readily monitored. In addition, one of the problems with waste applications is the variable nature of the nutrient load from operation to operation. Potentially, solid and liquid waste could be assessed with this technology and for that matter, water quality in general, may be another resource concern addressed by LIBS.

6. Urban Soil Concerns: Increasing awareness and concern by our urban customers regarding heavy metal contamination of home gardens, playgrounds, lawns, etc., could be addressed directly by LIBS in the hands of our technical soil services personnel.

The Soil Quality Institute will keep the Auburn MO informed on the progress of this cutting edge technology and of any future opportunities to demonstrate it to field staff.

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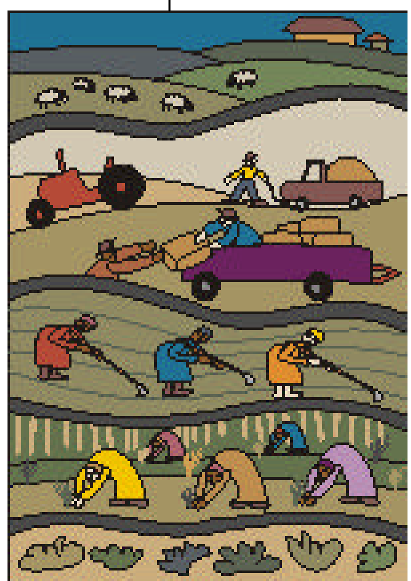
Soil Temperature and Growing Season … Food-For-Thought

by Jerry J. Daigle, State Soil Scientist, LA and Dr. Wayne H. Hudnall, Professor, Louisiana State University

After reviewing the results of the first year data collected as part of the five-year thermic/hyperthermic soil temperature study, a flurry of thoughts and questions resurfaced that were originally exposed in 1990 during the *Eight International Soil Correlation Meeting (VIII ISCOM): Characterization, Classification, and Utilization of Wet Soils – Louisiana and Texas*. In 1989, ten sites were instrumented in Louisiana and several in Texas as part of this wet-soils study. Additional sites were added in both states over the ensuing twelve years and quite a large amount of data has been collected. Analysis of these data reveals interesting facts and raises questions worthy of note.



Problems were noticed with the growing season definition early in the process of developing the hydric soil definition and criteria. It was known, based on soil temperature, that a large portion of Louisiana had 365 day growing seasons and that the soil temperature at 50 cm seldom dipped below biologic zero. However, strong cold fronts carrying sub-freezing air temperature cause leaf fall and dormancy in local vegetation. There is, in fact, a visible non-growing season in spite of soil temperature.

When we speak of growing season, what growing season do we mean; the soil, the below-ground system, or the above-ground system? What implication does that say about the status of hydric soils? Are all those soils in the deep south that meet the hydric soil indicators during the winter hydric? How many acres of wetland would be added if they were? The same would be found for the entire state, and most of the southern states, if data loggers were placed in the northern parishes(counties). Where would the line between a 12-month growing season and a 9-month growing season be drawn? It would not be in Louisiana based upon soil temperature.

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Daigle and Hudnall from page 3

Several other things were noticed during the process of monitoring soil temperature throughout the state of Louisiana. Based on data collected with automatic data loggers, overall soil temperature at 50 cm varied little from north to south Louisiana. Some hyperthermic readings were recorded in extreme northern Louisiana and thermic readings in extreme southern Louisiana. It was surmised that the entire state of Louisiana is the thermic/hyperthermic line and that the line is at least 200 miles wide. It also seems there is a closer relationship to specific soils (based on moisture state and surface color) than to geographic location. This is a well-known fact and the reason the Hobo data loggers for the current study had to be placed in soils with specific textural and drainage classifications.

An LSU graduate student has just completed a study comparing the results of the soil temperature data with soil respiration. The thinking is that growing season can be defined from when soil respiration increases in the spring to when it decreases in the fall. Needless-to-say, respiration data draws the growing season line at a different place on a map than does soil temperature data. Additionally, when the air temperature derivative is considered, a third line (also very broad) can be drawn.

So, the questions remain and the impacts are large. What are the reasons we define and use soil temperature in soil classification? *Soil Taxonomy* states, "Soil temperature, therefore, has an important influence on biological, chemical, and physical processes in the soil and on the adaptation of introduced plant species." Is this influence regional or soil specific? Why were the dividing lines between soil temperature regimes placed where they are? We are all familiar with the correlation of soil temperature regimes to the citrus, cotton, corn, and wheat growing regions of the United States; a broad regional application. What is the range 15°C(59.0°F) to 22°C(71.6°F) supposed to separate; citrus/cotton, citrus/sugarcane, or sugarcane/cotton? Why is a mean annual soil temperature of 22°C used as the divide? A temperature of 20.0°C(68.0°F) is much cleaner than 22.0°C(71.6°F) or 22.2°C(72.0°F). Wouldn't 20.0°C(68.0°F) be just as good?

This is not a new issue. It has been a very big issue since 1989 and the ISCOM Committee meetings. Unfortunately, in the twelve years since those meetings, we have seen very little movement to take a serious look at the science behind the temperature definitions and criteria in *Soil Taxonomy*. The definition, as currently stated and if interpreted literally, would give much of the Deep South a year-round growing season. This, in turn, would have a very large impact on the classification of wetlands throughout the region. This, in turn again, would become a very large political issue. We know, based on vegetative responses, a non-growing season does occur in the south. We also know we cannot define this occurrence based on current soil temperature definitions and the data that has been collected. We know additionally that both thermic and hyperthermic temperatures have been recorded throughout the entire state of Louisiana, and that these data are soil specific. The same is probably true for the rest of the southern states. It appears we know a lot but have few answers. Isn't it time to ask the hard questions and bring this issue to some semblance of closure?

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Soils website that you may want to check out.
The URL is:
http://www.geobop.com/paleozoo/Soils/

Soil-Specific Pine Plantation Management

by John Torbert, Woodlands Technical Services Manager, Mead Coated Board, Phenix City, AL

Pine plantation management has become a very important land use in the South. In some ways, tree farming in the 21st century resembles "regular" farming. Some of the management tools used by the forest industry include genetically-improved seedlings, tillage, herbicides, and fertilization. Another way the forest industry has begun to be like traditional agriculture is in its attempt to utilize soil data to manage land on a site-specific basis.

Like many companies in the forest products industry in the Southeast, Mead Coated Board (MCB) manages its pine plantations much more intensively than they were managed a decade or two ago. MCB owns or leases approximately 525,000 acres on the Piedmont and Upper Coastal Plain in Alabama and Georgia. Approximately 3/4ths of this land is managed as pine plantations to provide wood for a paper mill and two sawmills.

MCB began to use soil data for its management in 1995, about the time that it embarked on its forest fertilization program. Like many forest product companies, MCB owns land in counties which have not yet been mapped by the NRCS. Consequently, a contractor (Forestry & Land resource Consultants, Inc.) was hired to map soils for MCB. The contractor utilizes aerial photos, topographic maps, geology information, and field reconnaissance at approximately one observation point per 17 acres. The contractor supplies a map of soil units and a database comprised of more detailed soil, site, and vegetative measurements.

Similar properties to NRCS mapping are measured; however, as a special-purpose soil survey, greater emphasis is given to those soil/site properties likely to influence day-to-day operational decisions. Like many other companies, MCB's soil mapping units consist of an alpha numeric code. The soil code contains information on subsoil texture, depth to the argillic horizon, landscape position, slope percent, drainage class, site index, and geology. The code also includes a variety of modifiers to indicate the presence of features such as a high pH, plastic, rhodic, or thin subsoil; a gullied or stony surface; a fragipan; or a lighter or heavier than usual surface soil texture. Less emphasis is placed on properties such as soil color and deep subsoil properties such as plinthite, although this information is collected from horizon descriptions of individual soil borings and stored in a database.

There is a good correlation between the MCB code and the NRCS soil series, especially when developed county by county. For example, a common MCB soil code (72RBW4/Bg1) would most likely be mapped by the NRCS as a Cecil on a biotite gniess geology. If the solum is thin and the "t" modifier is attached (72RBW4t/Bg1), the comparable soil series is usually Pacolet. A common micaceous soil on a schist parent material with the "m" modifier (72RBW4m/Pms1) would be a Madison.

Soil data was easily integrated into GIS and other databases. Over the past few years, decision guidelines have been developed for using soil data. At the strategic level, soil code helps determine land management potential. (i.e. whether the site is suitable for a "Moderate", "Intensive", "Accelerated Growth", or "Wet Weather Wood" level of management), which influences harvest scheduling and budgeting. Within individual pine plantations, soil code influences which species

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Land Judging

by Sandy Page, Project Soil Scientist, Clarke County, AL

Recently, I attended the National Land Judging Contest in Oklahoma City. Held every year during the first week in May, the contest includes 4H and FFA (Future Farmers of America) teams of high school students from all across the nation. This year was the 50th anniversary of the contest. Originally, the land judging contest began as a way to educate youth about soil, and was designed to be similar to a livestock-judging contest. The land-judging contest focuses on soil properties and conditions and best use and management practices for a given site. Later, pasture and range judging and home site evaluation contests were added.

Teams came from as far away as Maryland, Florida, New Jersey, Oregon, Washington, and even Hawaii. A total of 36 states participated, with many states having multiple teams. Alabama was represented by the first and second place teams from the State Land Judging Contest. The winner of the Alabama state contest this year was an FFA team of four seniors from Leroy High School in Washington County. Jackie Ganus, the Ag teacher and coach, invited me to participate. I was familiar with the Washington County team because I have assisted with coaching them for the county contest. Also, my wife Jody, a high school science teacher at Leroy H.S., had all four boys as students in her class. These connections made the trip to Oklahoma City a little extra special for me.

The land judging contest gives hands-on experience to young people with regard to analyzing the soil properties and characteristics to determine what is the best use for a given soil type and how to go about managing the site characteristics to achieve the goals of agronomic production, while conserving the soil resource. Contestants examine soil characteristics such as texture, structure, depth, permeability, degree of erosion, slope, drainage, and flooding potential to decide the major factors that determine land capability classification. The major factors are used to recommend conservation practices and soil amendments.

The national land judging contestant handbook states that land judging can help to:

- Understand basic soil differences
- Know how soil properties affect crop growth
- Know why soils respond differently to management practices
- Realize the influence of land features on production and land protection
- Select suitable soil and water conservation practices
- Determine land capability classes
- Determine proper use and treatment

Land judging contestants at work.

This was a great experience for the high school boys, Mr. Ganus, and me. Although the Leroy team did not place in the contest, they worked hard, had a good time, and were very competitive. They placed 24th out of 152 registered teams and raised the level of competition for Alabama state teams competing in future national contests.

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NRI Update

by Herbert Ross, NRI Specialist, Auburn, AL

The transition to continuous inventory continues in 2001. We have selected 73,500 NRI sample sites (PSUs – Alabama 1,400; Caribbean 450; Florida 1,950; and Mississippi 1,700) for data collection by photo-interpretation and remote sensing. Sample data will be gathered in 2001 to meet the agency's responsibility to report to Congress in early 2003 on status, condition, and trends of soil, water, and related resources on the Nation's non-Federal lands.

During 2001, additional procedures and protocols will be developed and tested for the continuous inventory process; these include on-site monitoring of grazing land condition and several other resource issues, estimation of erosion using new erosion prediction models, and adaptation of additional Quality Assurance protocols. Prescribed on-site data collection, as a regular part of the continuous inventory process, will therefore be initiated for the 2002 NRI.

The agency's NRI efforts for 2001 will concentrate on photo-interpretation (data collection) of high quality aerial photography for the 73,500 PSUs, finalizing the year-2000 NRI for reporting to Congress in early-2002, and further analysis and utilization of the revised 1997 NRI database. The agency will not conduct on-site data collection for the NRI in 2001, except as needed for Quality Assurance and for situations where remote sensing techniques will not provide definitive interpretations for wetlands and other resource conditions.

NOTE: Following the MO Board of Directors' meeting in Huntsville in June, representatives from the states included in the Auburn Inventory Collection and Coordination Site (ICCS #15 - Alabama, Caribbean Area, Florida, and Mississippi) met to discuss centralized vs non-centralized NRI data gathering. Dean Thompson, NRI Program Leader, Ames, IA, and George Rohaley, Resource Inventory Division, Beltsville, MD, made presentations relative to the benefits of centralized NRI data gathering. The group agreed that the concept is good; funding is the issue.

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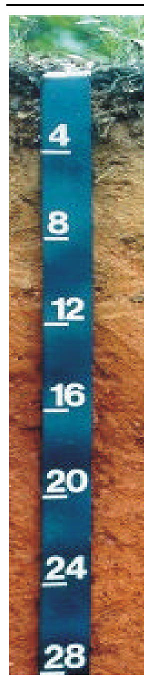
to plant (loblolly or sand pine), whether to apply tillage, and, if so, which tillage implement to use, which herbicides to use, which stands to schedule for wet weather harvest, susceptibility to *Fomes annosus*, and (to some extent) fertilization regime.

We are constantly looking for new opportunities to wisely use soil data. Most of our current guidelines are based on evolving "working hypotheses", not hard science. There is still very much to be learned about how to use soil data to guide forestry decisions. We rely heavily on the relatively limited (compared to agriculture) amount of pine management information gleaned from the literature, University research cooperatives, interaction with other companies, and in-house research to develop and continuously refine our soil interpretation guidelines. ###



Soil Profile Gallery: http://www.ga.nrcs.usda.gov/mlra15/soilprofiles/soilprofiles.html

Under construction, but available. More information, better profiles, and better scans will be added as they are available. Take a look! Additions are welcome. Send profiles to Julie Best.

Caribbean Area Global Change Projects

by Carmen Santiago, Staff Soil Scientist, Caribbean Area

During the weeks of February 8-13 and May 7-11, 2001, the Caribbean area staff, along with personnel from the National Soil Survey Center, National Water and Climate Center, and Southeastern Regional Climate Center participated in the maintenance of three Scan Stations and the establishment of four new Global Change Project in the Caribbean Area.

Guánica State Dry Forest Scan Station Soil scientists Ron Paetzold, from Lincoln, NE, (front) Jorge Lugo (right) and Samuel Ríos, PR (back) carrying the tower stand.

We did maintenance work on the three Scan Stations at the National Park Service in St. John, US Virgin Islands. These three Scan Stations are: Cinnamon Bay, Lameshur Bay II, and Lameshur Bay IV.

Four new Scan Stations were established in the southwestern area of Puerto Rico. These stations will collect soil moisture and temperature data along with precipitation and solar radiation that will support soil temperature and moisture regimes classification in the Caribbean Area.

Workplace relationships - 4 ways to make conflict productive

(Adapted from **Communication Solutions**)

Conflict in the workplace is not only inevitable, it's desirable. It keeps people sharp and ensures accountability.

However, conflict can be destructive if people lack the communication skills needed to manage it. Here's some advice for handling conflict the right way:

Always play fair. Think of a dispute you had with someone in the past. You probably don't even recall the details of the fight, but you do remember how it was fought. You'd never forget, for example, if someone insulted or embarrassed you. It's okay to stand up for what you want—just keep it fair.

Engage in conflict over ideas, not personalities. Conflict over ideas is good and healthy. Problems arise when personalities intervene, when being right—and proving the other person wrong—is more important than objectively exploring all viewpoints and finding the best solution.

Show mutual trust and respect. Acknowledge that the other party's motivations are valid. For example, a credit manager might say to a salesperson, "I understand how important this sale is to you, and I know we're eager to capture new accounts, but the prospect has a poor credit history. It's not in our best interest to extend credit this time."

Think long-term. View the disagreement you're now having with a colleague in the context of a long-term relationship, and act accordingly. You'll need that colleague tomorrow, as he or she will need you. Use today's conflict to fortify bridges, not burn them.