Group 2
Planning and Preparing for Dynamic Soil Properties Work

Tuesday March 18, 2008   Mini Sessions   3:00-3:55 and 4:00- 5:00
Wednesday March 19, 2008   Mini Sessions   10:00-10:55 and 11:00- 12:00

Larry West, Karl Hipple, Arlene Tugel, Susan Andrews, Chris Smith
Original notes by Lenore Vasilas.

This is a summary of discussions that took place during the 4 mini-sessions. The comments are organized by topic.

A. **Criteria for Selecting Benchmark Soils**
1. Soils that support unique habitats or threatened and endangered species (ecological benchmark soils).
2. Representative soils for parks (ecological).
3. A few in each MLRA.
4. Soils that have data that we might want to supplement.
5. Soils that have no data.
6. Sites that will be monitored over time (not really the soil survey program sampling concept) (e.g. by cooperators or other.).
7. Is "benchmark" the term that soil survey should use? Newer concepts of the term "benchmark" as used by others outside of soil survey have a different meaning from the soil survey usage. The new concepts relate to performance measures, goal setting, and progress tracking; not "representativeness", as used in soil survey.
8. Land area extent not necessarily applicable in all regions. Benchmarks should be spread out throughout the US. Not necessarily just ag. Can be Urban.
9. Ecological, economical, maybe about 5 per MLRA.
10. Extrapolation potential and extendibility. (are there other soils that are closely similar that we can extrapolate to).
11. Be able to piece together a complete picture by extrapolating between soils across a landscape.
12. Soils that help with water quality (environmentally important).
13. Start with geology, geomorphology then pedology, hydrology (this application is down the road).
14. Represent the cross section of what we have taxonomically or catena, not big acreage.
15. Is a cooperator already doing some research in areas that could be used for benchmark sites? Will get additional information.
16. Pick one representative soil that represents multiple soils within the same ecological site.
17. Pick soil with the most land uses.

18. A benchmark soil may be correlated to multiple ecological sites in cases where various map unit phases of the same soil are correlated to different ecological sites.
19. Unique cropping system.
20. Communication among states with same soil critical. DSP project should include plots from one end of its extent to the other.
21. Before we prioritize benchmark soils we need to evaluate our benchmark list. A soil may have been on the list for years, but we may not know why.
22. Most relevant???
23. Important agricultural soils that are going from conventional to no-till. They are the ones that need attention in my MLRA.
24. A soil you have a lot of information on.
25. Soils that you need characterization on.
26. Economically, ecologically important.
27. Some old soils may no longer exist.
28. Lab data may already exist for many of our benchmark soils. We need the management data to be able to interpret the dynamic soil property (DSP) data. Most existing lab data does not provide enough information on management.

B. About the sampling procedures

1. Dynamic soil property field guide. All comments have been included in the guide; it will be reviewed and edited and then released. Probably will be released in the next few months. Will be a loose leaf notebook. Will be posted on the web and available on CD.
2. Need to become a lot more comfortable with our statistical analysis. Sampling guide, step 5 and 6 deal with preparing, analyzing, and developing the data which includes statistics. Will try to automate as much as possible. We need to replicate each system that we sample and then summarize replicated data, including simple statistics.
3. Will be working at the human timescale and not the geologic timescale.
4. Use space-for-time substitution technique. Will not monitor over time. Will find change of use at different locations for a similar soil. Will overcome some issues through replication. Assuming same mapping component phase had similar initial conditions.

C. What systems will we compare?

1. Different land uses.
2. Sample at steady state, not in transition period. We are not monitoring.
3. Use models like EPIC to estimate time in years that it will take to get to steady state. Will vary by soil, location and characteristic.
4. It is going to be difficult to define "steady state" to compare like pieces of data.
5. Soil survey provides potential and attainable. On-site data provides actual.
6. Attainable could be greater than potential, depending on management practices. Potential is not necessarily the highest. Should be changed to inherent not potential.
7. What will we measure.? We measure inherent potential and what's attainable. Discipline specialists describe the management systems to get from actual to attainable.
8. Knowledge of annual soil change after a disturbance or shift to a new management system may be desired for economic information. Current space-for-time strategy does not cover this type of monitoring. Can get this kind of information from the literature in many cases.

D. Operational questions
1. Progress reporting.
    a. If it exists across 3 states, it is desirable to include sites across all 3 states. Progress reporting will include acres benefited. If you cover whole MLRA, you claim acres for whole MLRA. If you sample all in one county, you can only claim acreage in that county.
    b. Need to get management buyoff on plan to move up in priority for creating data reporting system.
    c. Are we going to have something ready to give to SS MLRA leaders by FY09 for management for soil survey by MLRA? Will have something to talk about. May not be finalized. Need to get started.

2. Data bases.
    a. Will the data be collected in NASIS aggregate data base? No. It will be a point database. Currently planned to include DSP's in post NASIS 6.0.
    b. Where will the data be stored?—interim storage is currently in spreadsheets. May need to assign staff to create an interim database if EXCEL is not adequate.
    c. Point database business requirements are being developed.
    d. Instructions are provided on how to collect and present the data.
    e. Need to link LIMS to NASIS. LIMS may be a better place to store data.
    f. We have a lot of soils data in our databases that lack management data. Most management or cover information for LIMS pedons is too general, may say only cropland, rangeland, perennial grass. Woodland, etc.

3. Ecological sciences
    a. We need to engage ecological sciences to make decisions on the ecological sciences data collection requirements. Interested in moving data collection protocols for ecological site data collection to NASIS.
    b. How do dynamic soil properties fit in to ESDs? Certain near surface soil properties are an indication of health. We can quantify soil aggregate stability, organic content, crusting. Data will supplement ESDs. State and transition model should be first.
    c. Do we need an ESD to collect dynamic soil properties? Best to have at least a draft ESD and a draft STM first. We are advocating integrated soil and vegetation data collection. All plots sampled as the same ecological state should have the same vegetative community (if vegetation is present). We should not collect soil data without vegetative data. Need vegetation data to help interpret the soil data and vice-versa.

4. Customers needs
    a. Priorities for projects may be customer driven. Needs to be on all landscapes, not just cropland. Need to be human influenced landscapes. Also, will come from the top down. Where do we need the data?
    b. How will it help our customers? Our data will show a customer what is attainable.
    c. Customers in dynamic equilibrium. Our customers are changing. We need to keep up with our customers.

5. Training
    a. Take a course in rangeland health by BLM National Technical Center, Phoenix, AZ. to clarify confusion about function-based interpretations. Basic principles in course illustrate use of properties to reflect functional capacity. Many NRCS employees take course. Could request one at desired location.
    b. Three Levels of training are proposed.
        1st course. Plan to modify current NEDS Soil Quality course specifically for dynamic soil properties. Conservationists already take the course. Soil scientists are to take the course as a prerequisite to the 2nd course.
        2nd course. Going over info in guide. How to do comparison studies. Need field exercises to cover sampling procedures. For soil scientists, range and forestry specialists, and agronomists.
        3rd item. Workshop on more specialized statistical tests and interpretations. May be able to do distance learning techniques.
    c. Need assurances that soil scientists will get authorization to attend necessary training sessions.
    d. To supplement NEDS, workshops (half to full day) could be presented at Soil and Water Conservation Society Annual meeting or at NCSS conferences (regional and national). Range Management specialists do this at Society for Range Management meetings.

6. Operations
    a. Need to communicate the need for staff to spend time on DSP work. Talk to state conservationists, NLT.
    b. How do we get support from discipline specialists? SSO staffing plans.
    c. What is involved in a project? Range and forest lands, do 1 plot per day with 3 to 6 soil scientists and 1-2 veg specialists. Do minimum of 5 plots for each plant community or management system in a project.
    d. DSP study projects are soil survey update projects. SSO Leader has primary responsibility for study.