

Technical Soil Services – Directions and Activities

State Soil Scientist's Meeting, Florence, KY 3/08
Chris Smith, Ph.D. National Leader for Technical Soil Services

The Soil Survey Program in NRCS and NCSS is rapidly approaching a crossroads. After over a hundred years of an almost single minded goal of providing soil surveys of all the private lands in the US, we can see the fruition of our labors. The mapping of the Federal Lands is becoming a tangible reality as well. This places Soil Survey in a position that appears to some like the job is done, we can disappear into the dust by attrition or move into other disciplines. In times of lean budgets, there are always those looking for additional funds for "their" programs.

I would like to propose that we look upon our soil survey product not as the goal we have always seen it to be. Times change and needs change. Rather than the goal, the soil survey product needs to be viewed as a solid foundation for the next generation of soils information. There is a great deal of work to do. Some has begun already. Many soil surveys are "old". Their map unit design is in places too broad, ill defined, incomplete, data is unpopulated, not validated, and/or interpretations need to be increased because of new uses, issues, laws, and questions. There's still the "join" issue.

Work on existing soil surveys to improve them has been termed "update". An update may take on many forms as most of you know including validation, revising the maps, adding new data, new interpretations, realigning old polygons to improved imagery, adding detail where use pressures dictate, and so on.

We have begun to think of soil scientists in the agency as either soil mappers or resource soil scientists (RSS). I would like to suggest that there is a fuzzy boundary between the two stereo types. For soil scientists conducting initial and update activities, there might not be enough time to validate selected soil properties due to goal pressures. Ideally, the RSS can spend more time transecting, taking notes, collecting data or samples and "fleshing in" the information so that the "science based" approach is strengthened. I am pleased to have seen where field soil scientists have made estimates of properties from guides that were based on research findings somewhere in the dim past and the estimates are quite accurate. I have also seen where the estimates were off and the effects rippled through the interpretation system. The estimate of water permeability is a good example. We need to measure, as variable as the values can be, to be able to stand firmly behind our pronouncements.

Soil is, in part, a living skin of the earth, a fragile thin veneer, an environmental membrane. Nature usually changes it slowly while humans change it rapidly and often not for the better. We have treated soil as a static object in our soil survey work. It is clearly not. In recent years, the concepts of soil quality, sustainability, fragility have come into existence as subjects for scientific definition, discussion and issues for action. Population increases, prime farmlands are paved. The curves will cross in our children's lifetimes.

Ethanol demand is placing a dramatically increasing demand for farmland. Nine billion gallons per year are currently produced and 32 billion gallons per year are called for by 2022. Breaking out CRP HEL lands seems inevitable, nutrient and pesticide loading across the landscape will put more pressure on surface waters. Conservation planning needs can only increase. Science based field specific resource inventories including soils help put the “walk the talk” into the agency mission.

I tell some that part of my job title is to “meddle in the affairs of others”. I have formed working relationships with staff within the Conservation Engineering Division, Ecological Sciences, Conservation Planning, Farmland Protection, and Strategic Planning as well as being a representative to the Business Tools Council for the SSRA deputy area.

Last March, a team (CASPeR) was assembled to answer Dana York’s question of why the field isn’t getting to the field. I was on that team. The basic problem is the programmatic needs that keep the planner tied to the computer. There are over 50 recommendations in that report. One recommends the use of specialist teams which would include the Resource Soil Scientist. I have suggested that the field office personnel consider these teams to be part of the extended field office staff. In some areas, this is already in place. This is not to say that that is the only work the RSS performs. But I would like to submit that the job of a conservation planner has become so complex that a person who is a conservation generalist cannot properly deal with the nuances of many of the issues today. They commonly do not see some of the more subtle features that a trained soil scientist can see.

Resource inventories for conservation planning must be done in the field. For soils, a RSS can observe the characteristics in a field and by experience, determine if the soil is in good health or has been degraded and can then back up the hypothesis with measurements (which then are also stored in NASIS to improve the dataset and interpretations) and there is no reason why the RSS cannot assess the conditions in the field within their expertise and make recommendations to the planner as to the best practices to address the concerns.

The plan must use the data for the soil in that producer’s field. The dominant soil in the field mapped as a complex must be determined. It’s possible, especially in small fields, that the dominant condition is a minor component. If we are to keep the work of NRCS science based, an experienced eye must assist in the planning process.

Another issue regarding RSS assistance to the planning process involves the charge of CTA time during the resource inventory process. This is because the programmatic contract has not yet been developed or signed. TA can only be earned after contract signing. I suggested that to maximize the use of program dollars and minimize the use of scarce CTA funds, that only cursory field examinations be made during the initial stages of planning that are sufficient to determine the resource concerns. Then, after program enrollment, a more detailed inventory and documentation process take place that is then charged to the appropriate program. Some members of the CASPeR group agreed that

this approach was workable while others did not yet see how this could be done. This idea needs further testing.

Technical Soil Services (TSS) within NRCS is focused on maximizing the use of soil survey information amongst the greatest number of customers as possible. TSS works to expand the knowledge of non-traditional users of soils (Urban Planners, Landscape Architects, Realtors, and Developers) as well as increasing the use of soils information by traditional users. We are working to increase the demand for our product. Even current users of soils data and interpretations and properties at times do not use it properly. Therefore a strong educational and advisory role is important. Through identifying customer types, certain topics become revealed that can lead to the need for new interpretations or delivery mechanisms. It is essential that TSS works with as many NRCS disciplines and external entities as possible and at every level in the agency to ensure that soils issues are properly addressed.

At the National level, aside from involvement with the CASPeR Team, I am on the National Conservation Practice Standard Subcommittee (as is Ed Griffin). In conjunction with that, Conservation Practice Physical Effects need to be reviewed to assure effects on soils are noted where appropriate. One way of creating demand for the services of a RSS is to assure soils issues are addressed within every applicable conservation practice. This is a job for every soil scientist doing RSS type of work. States create state versions of the national standards and a soil scientist is or should be on the Tech Guide Committee and reviewing these standards. If soils concerns are not addressed in the state standard, there is an excellent chance it was missed in the National Standard version. Ed, Terry , Leander or I should be notified so we can address the omission. Also, our Regional Resource Soil Scientists have been doing an excellent job of training other agency staff in the use of Soil Data Viewer.

The agency's current Strategic Plan nicely focuses on Soil Quality. The agency measures erosion reductions. In spite of significant reductions in erosion, USGS still reports high N and P loading in many surface waters. We need to do more in the nutrient management arena. We RSS need to have our knowledge refreshed on nutrient/soil dynamics to assist in soil sampling and understanding test results. Do not leave this to only the engineers and planners or water quality specialists. Work with them to add our expertise in how various soils respond to nutrients and their carrying capacity. When one thinks about it, it is probable that the hydrologic function of the nation's cropland has been significantly altered through reductions in infiltration by soil structure destruction and compaction pan formation. Obviously, the best way to keep nutrients and pesticides out of waterways is to keep the water in the field. This said, it is understood there is no free lunch and the increase in infiltration brings its own set of issues.

I see a potentially large workload for RSS in the Soil Survey update efforts and in dynamic soil property data collection. Where the term "update" means populating new data elements or validating existing data, much of this data collection can be couched under the concept or DSP which, in turn, may be couched within ESD efforts. Where soil survey crews are conducting field work to refine polygon boundaries or create new map

units, there will probably be little time to collect more time consuming data via transects or plots. This is where the RSS can augment the soil survey effort.

By collecting a DSP database, eventually we will be able to document the effects of conservation practices and even state the degree of improvement or decline as a function of a practice or management system. This includes the topic of carbon sequestration. We need to develop a comprehensive protocol to assess the sustainability of our soil resource. It is literally a national security issue.

Web Soil Survey is a huge success. There are over 5200 visits per day presently and the increase in use continues in a linear fashion with no signs of plateauing. Even though the site is the envy of other natural resource agencies and NRCS Divisions, it is still confusing to some users. And the information accessed may not be most appropriate for the users needs. I have found that helping people walk through the site at least once is met with much appreciation. Also, more work needs to be done to bring WSS to provide the other types of information that our hard copy products provided.

In order to strengthen the role and need for the RSS, we must educate the line officers and top leadership in the value of our participation from field to national planning and external customer assistance. You will find in your packet, a one page flier aimed at heightening awareness of functions and activities of RSS. I will send this electronically for you to circulate by the best means within your state. In states where RSS are actively assisting NRCS activities, we have become our best advertisement. In other states, for various reasons, there's work to do. There will be a session this week highlighting success stories in various states. I hope we will get some new ideas to take back home and even be inspired.

In order to tell our story to management and leadership, a modified version of Russ Kelsey's RSS Reporting system is being programmed into NASIS. The hope is that the reportable items can then be linked to TCAS through IDEA to provide a more robust sorting of progress and kind of work performed. You, as state soil scientist, will be the ones to show the state conservationist what work is being done and where if need be.

A major effort is underway to produce a Technical Soil Services Handbook. The intent is to enumerate all of the major topics addressed by RSS at any level of the agency. It is not intended to repeat information that can be found at other sites or sources but, rather, to reference to those resources. The intent is for the "Handbook" to be electronic to facilitate url references. Input is being obtained from BLM and Forest Service on TSS they provide to be included in the Handbook. This will become an interdepartmental effort. A draft is planned for the end of the fiscal year.

There is also a TSS NEDC course being revised. We may not be able to pilot this year but it should align with the handbook well.

In closing, the major efforts in TSS are in advertising, education, inserting soils concerns and information in agency technical documents, influencing field office operations,

reporting progress, training, and documenting TSS procedures via the handbook. RSS should also enhance soil survey activities with soil measurements to validate and add to the database and to be leaders in dynamic soil property data collection.