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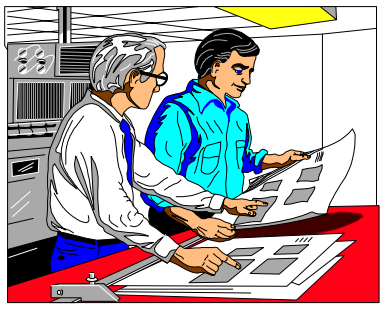
**Editor's Note**

Issues of this newsletter are available on the World Wide Web (www.statlab.iastate.edu/soils/soildiv). Click on NCSS and then on the desired issue number of the NCSS Newsletter.

You are invited to submit stories for future issues of this newsletter to Stanley Anderson, National Soil Survey Center, Lincoln, Nebraska. Phone—402-437-5357; FAX—402-437-5336; email—stan.anderson@nssc.nrcs.usda.gov.



## Are Classification and Interpretation Mutually Exclusive Processes?

By Thomas E. Calhoun, Soil Scientist, Soil Survey Division, Natural Resources Conservation Service, Washington, D.C.

I recently attended a meeting of the MLRA Leaders in which one brief topic of discussion was the need to maintain the Official Series Descriptions (OSD's) and whether or not to incorporate into them some of the estimated chemical and physical properties, water features, phase criteria, and productivity data that had been recorded on the respective Soil Interpretation Records (SIR's). I am not picking on the MLRA Leaders. I have witnessed this same discussion in other forums, such as Soil Business Area Analysis Group (SBAAG) meetings, NASIS systems analysis meetings, and discussions at the National Soil Survey Center.

This topic of discussion has become known as the infamous "National Standard" issue.

When we created NASIS and with it the capability of separating the soil data map unit from the soil survey legend (map unit symbol), we inadvertently created two camps with differing thoughts on the soil survey process. We have always had in our ranks of soil surveyors those we called the Lumpers and those we called the Splitters. Now it seems we have the Interpreters and the Classifiers. In some circles the differences between the Interpreters and the Classifiers over the issue of a "National Standard" have become so divisive that to even utter the phrase "National Standard" requires that the offending utterer pay the penalty of buying all who heard the utterance a round of beer.

It is always dangerous to say what you believe others are thinking, but I have never been known for frivolous discretion. So here is what I think the Interpreters are saying about the OSD issue. (Please note that I did not say "National Standard.")

1. Within NASIS, our rules for interpreting soils are that we will interpret for the entire range of any component we identify in the data map unit. In other words, we are no longer limited to interpreting just those properties within the range of the series for which the component is named.
2. Basically, we interpret what is actually there; we do not interpret a concept (the series).
3. Since we are not confined by the series concept, there is no need to be concerned about the limits or boundaries of the soil series. Therefore, there is no need or, at the least, there is no priority or urgency to capture that information from the SIR's that were used in defining the series limits.

In all sincerity, that was some good thinking. We really got out of the box, if you will, and re-engineered our soil interpretations so they would be more meaningful. For years we had to ask ourselves what we were interpreting. Were we interpreting what was actually on the ground, or were we interpreting the series concept? This became a critical question when our customers started asking us how reliable our

interpretations are. When we started trying to develop reliability statements about interpretations, we had to ask, "Are we talking about how reliable an interpretation is for the actual range of the soils delineated within a map unit, or are we making a statement about how often the soils within a delineation fall within the criteria of the soil series concept upon which the interpretation is based?"

The decision was to interpret what was really on the ground, and meaningful reliability statements could then be developed. But, I digress.

Since, according to this argument, the limits of the series are not meaningful, then by extension the series itself is not meaningful. After all, a series is defined solely by its limits. If the series is not important, then by one more small insignificant extension soil taxonomy is not meaningful, since the series is part of the classification system. Now you may begin to understand why it is dangerous to explain what others may be thinking. You never know about all those extensions.

On the other hand, the Classifiers are equally as adamant about the need not only to capture the information from the SIR's but also to program all the series limits into NASIS so that soils can be classified automatically as pedons are described.

I write this paper in a somewhat lighthearted manner, but in fact these are serious issues impacting the way we carry out our soil survey business these days. The differences over these issues are so great that it has been easier to ignore them all together. Now as we advance with implementation of NASIS, we are at the point of totally losing the class-limiting information once stored on the SIR. That loss will make the decision on how to proceed for us, and I maintain that is not the way to make these decisions.

Responding to the needs of our customers is important. Most of those needs can be described in terms of types of interpretations of soils data. So, it is easy to slip into the mode of thinking that the ultimate, if not the sole, purpose of the soil survey is to provide those interpretations. Even if providing the interpretations were the sole purpose, soil taxonomy, the soil series, and the associated limits of the series would not be superfluous.

Just try reading the data associated with a data map unit to a colleague and then ask, "Is that the same thing you are mapping?" My point is that the series and soil taxonomy provide the function of relaying concepts in a very structured, standardized, and visual way. They help each of us to form a common picture in our minds of how a soil looks, how it fits the landscape. The very taxa of the system relay concepts on moisture, temperature, parent material, landscape position, age, etc. that are not effectively relayed by just looking at cold data.

The way we map soils is captured by *Soil Taxonomy: A Basic System of Soil Classification for Making and Interpreting Soil Surveys*. According to the first chapter of this book:

> The morphology of each soil, as expressed by a vertical section through the differing horizons, reflects the combined effects of the particular set of genetic factors responsible for its development.
>
> This was a revolutionary concept. One did not need to depend wholly on inferences from the underlying rocks, the climate, or other environmental factors, considered singly or collectively; rather, the soil scientist could go directly to the soil itself and see the integrated expression of all these in its morphology. This concept made it not only possible but also necessary to consider all soil characteristics collectively, in terms of a complete, integrated natural body, rather than individually. Thus, the effect of any one characteristic or a difference in any one depends on the others in the combination. Experience has shown that no useful generalizations about single characteristics can be made for all soils.

I propose that when we look at individual attributes in the data map unit, we are losing the power of relaying to one another what the soil looks like. We lose the power of being able to make those useful generalizations.

The soil series allows us to compartmentalize and better understand the soils draped across the landscape. Our map units are, in fact, designed to group like things as much as possible. Without the series, the groupings we make become more erratic and we find ourselves back to where we were 50 years ago, when we needed a principal correlator who had seen everything to go everywhere to ensure that we were describing and mapping soils consistently. If there are no limits set, no pictures drawn that we as individuals can look at and use as a basis of comparison, we can no longer produce a nationally consistent soil survey inventory. We only have observations and interpretations that have meaning for minute spots across a landscape. We lose the ability to relay concepts; we lose the ability to transfer information from an area we know to an area we are learning about.

So, what am I, a Classifier or an Interpreter? I see the need for both. I think the power we have developed in

NASIS to effectively and efficiently handle data and provide better interpretations of how soils react on their landscapes is essential if we are going to continue to meet the demands of our customers. I believe that soil taxonomy (of which the series is a part) allows us to achieve consistency in our work and enables us to share information and learn from each other. I think that soil taxonomy is essential for the development of our science of pedology. I do, however, have a greater sense of urgency about capturing the information we have used in developing our concepts of soils, i.e., series limits from the SIR's, than do some of my colleagues.

In recent years, we have spent a great deal of time and effort changing the way we go about making, updating, and maintaining soil surveys. We now want to improve the surveys by eliminating duplicated and overlapping concepts and eliminating the inconsistencies that characterized the surveys created when we limited our vision to a single survey area. To make these improvements, we need to know what the limits were for the series concepts we were using when we made the survey. We need to know which of those are real and which are artificial when we look at soils throughout their extent on their particular landscape segment. I believe it to be essential to have that information if we are going to improve our inventory, but I do not believe it is necessary at this point to have it all programmed into NASIS.

If I were forced to choose, I guess I would choose to be a Classifier because I am more concerned about the degradation of our science of pedology and the loss of the concepts we use when mapping soils than I am about losing the ability to interpret point data. ■

## New Soil Quality Test Kit Products Developed

From "USDA NRCS Technology News," March 2001.

Two additional products have been developed to enhance the value and usability of the Soil Quality Test Kit. First, the *Soil Quality Test Kit Guide* has been translated into Spanish. The *Guide* is an 82-page booklet containing procedures for 12 on-farm tests, guidance for interpreting results, data recording sheets, and instructions for building a test kit. The Soil Quality Test Kit is effective in creating an awareness of the importance of soil quality. It can be used to compare soils under different land management systems, track changes in soil quality over time, or demonstrate the effects of practices, such as conservation tillage, on soil quality.

The Institute of Soils of the National Institute of Agricultural Technology of Argentina translated the *Soil Quality Test Kit Guide* into Spanish. The Soil Quality Institute (SQI), with the help of Manuel Rosales, Colorado conservation agronomist, reviewed the Spanish translation.

In addition, the SQI has developed an Excel spreadsheet for Test Kit data. The spreadsheet, available in English only, will calculate test results and basic summary statistics when raw test data are entered.

The spreadsheet and the Spanish version of the *Guide* are available on the SQI Web site at http://www.statlab.iastate.edu/survey/SQI/kit2.html.

For more information, contact:

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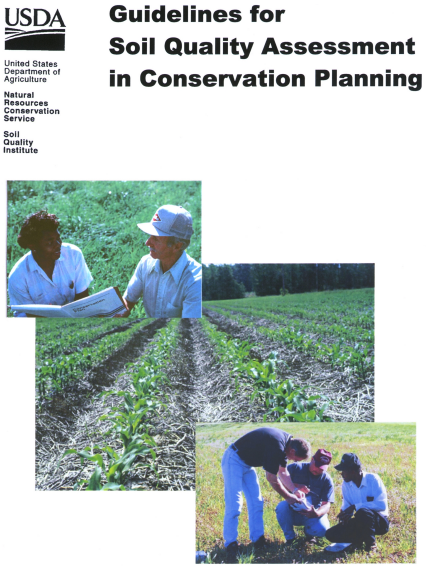



## Publication of *Guidelines for Soil Quality Assessment in Conservation Planning*

From an html file posted by the Soil Quality Institute, Natural Resources Conservation Service, United States Department of Agriculture (http://www.statlab.iastate.edu/survey/SQI/Assess.htm).

You know that soil quality is critical in many natural resource issues, but do you know how to assess and monitor soil quality?

The 47-page *Guidelines for Soil Quality Assessment in Conservation Planning* describes a step-by-step process for assessing soil quality. It will help you decide whether to do an elaborate or simple assessment, which tools to use, and what management practices to use to address soil quality concerns.

The guidelines are presented in the context of the NRCS nine-step conservation planning process. The information is primarily intended for use in a planning process but is also useful in informal assessments or as an educational resource for teaching about soil quality.

The document illustrates the practical use of tools and information developed by the Soil Quality Institute (SQI) and links soil quality assessment to specific practices that help solve soil quality problems.

The *Guidelines* are available in pdf format on the SQI Web site.

If you have questions or comments about the *Guidelines*, contact Michael Hubbs, NRCS, Soil Quality Institute, mhubbs@eng.auburn.edu. ■

## Soil Quality Institute Forum

By Ann M. Lewandowski, National Resources Conservation Service, Soil Quality Institute (alewand@soils.umn.edu).

The Soil Quality Institute recently established an e-mail listserve called "SQIforum" to facilitate communication among NRCS employees and partner conservationists. Any subscriber may post announcements and questions related to the research and application of soil quality technology. The Soil Quality Institute will post announcements of new products and Web site updates.

To subscribe to the listserve, send an e-mail message to:

listproc@nrcs.usda.gov

On one line in the body of the message, write:

subscribe SQIforum [your first and last name]. ■

## Summit on the Soil Survey on CD-ROM and the World Wide Web

By Nathan McCaleb, Chief, Soils Support Branch, National Cartography and Geospatial Center, Natural Resources Conservation Service, Fort Worth, Texas.

A summit focussing on publishing soil surveys on CD-ROM and the World Wide Web will be held at the National Cartography and Geospatial Center in Fort Worth, Texas, on June 12, 13, and 14, 2001. The primary purposes of this summit are to (1) develop specific guidelines for States to use in building products for CD or Web-based publications and (2) determine what tools are needed for enhancements to these products. The results of this summit will hopefully identify a way to reduce the cost of soil survey publications, provide a way to publish soil surveys faster after completion of the fieldwork, and improve the quality and usability of the soil surveys.

Presentations will be made by the following States:

- Alabama
- Alaska

- Arkansas
- California
- Indiana
- Kansas
- Oklahoma
- Oregon
- Vermont

A participant from each of these States will be asked to make a 15-20 minute presentation on the CD-ROM or Web work that the State has done. A discussion of all the formats and styles will take place after all the presentations are completed. ■

## Soil Analysis is Key to Age of Archaeological Site

By Joyce Scheyer, Northeast Area Liaison, USDA, Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska.

Connecticut is one of the older states in our Nation, but some sites may not be as old as they seem. Shawn McVey, Assistant State Soil Scientist in Connecticut, led the effort to sample soils in and around a recently discovered rock shelter containing artifacts in Voluntown, Connecticut. The samples were requested by Nick Bellantoni, Connecticut State Archaeologist, who became suspicious of the type of artifacts found and the context in which they were found.

**Shawn McVey holding an artifact at the archaeological site in Voluntown, CT.**

The site is within the boundaries of the Pachaug State Forest. Concerns were raised that the site and artifacts might be considered sacred by the Mashantucket Pequot and Mohegan Tribes. The artifacts on the site appeared to be evidence of a different ancestoral history and development than is currently understood.

The National Soil Survey Laboratory (NSSL) in Lincoln, Nebraska, characterized the soils under a special research project for the archaeological site. Soil samples arrived in Lincoln in the beginning of August 2000, and analysis of the data was complete by February 2001.

The buried artifacts, predominantly pipes and pendants of extraordinary design, were concentrated in small circular areas lined with charcoal. Roots were abundant outside these circular areas but were strangely absent within the circular areas. Some of the artifacts were fashioned out of copper, and proponents of the site believed that the deteriorating copper artifacts were preventing root growth into the areas containing artifacts. The difference in the copper content was measured between sites. Soil analysis showed that concentrations were too low to inhibit root growth in the soils around the artifacts, indicating that the artifacts may not have been in place as long as expected. There were other inconsistencies between paired soil samples from around the artifacts and the rest of the site, such as discrepancies in the age of the charcoal and the presence of undecomposed leaf litter. These findings indicated that the artifacts probably were planted, perhaps as recently as the previous fall.

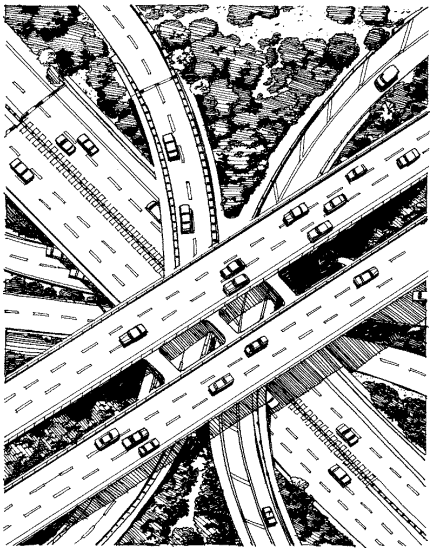
The results from laboratory analysis of soils at the site were very helpful to Bellantoni. He expressed his thanks to the NRCS State Soils Staff and the NSSL for assisting in a key part of the investigation of these special, unexpected archaeological samples.

**Copper snake artifact.**

**Whale artifact.**

The site appears to be a hoax. Several news articles about scientists arguing for or against the authenticity of the site have recently been published. The story was covered by the Associated Press and published on the Web and in newspapers, including the Hartford Courant and the Norwich Bulletin. McVey provided copies of the articles, which have been archived at the National Soil Survey Center in Lincoln, Nebraska, for future reference.

For more information, contact McVey at (860) 871-4044 or Shawn.McVey@CT.usda.gov. ■



## Urban Soils Forum

By Joyce Scheyer, Soil Scientist, USDA, Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska.

In an essay entitled "Soil Survey in the Twenty-First Century," which appeared in the May 2000 issue of the NCSS Newsletter, Horace Smith and Berman D. Hudson, USDA, Natural Resources Conservation Service, observed the following about the model of soil as a structural mantle:

> This model relates to the use of soils for the infrastructure necessary to modern societies. It has direct application to such diverse activities as urban and suburban development; construction of dams, highways, and airports; and onsite waste disposal. The model relies heavily on estimations of soil strength and plasticity as well as the soil's ability to transmit heat, water, and energy. The soil survey of the 21st century will require enhancements to the way this model is applied.

I propose an urban soils forum for future issues of the National Cooperative Soil Survey Newsletter. Every once in a while, we will share a question from the field about urban soils that appears to be of general interest. Send your replies to the editor of the newsletter for publication in the next issue (stan.anderson@nssc.nrcs.usda.gov) . All questions and responses printed in the newsletter will be anonymous, but personal responses can be requested directly from Joyce Scheyer (joyce.scheyer@nssc.nrcs.usda.gov).

*Question 1*.—I was thumbing through the *Soil Survey Manual* and the "National Soil Survey Handbook," trying to see if there are any guidelines as to when to call a soil an urban phase. In residential areas at what density of houses do you give a map unit the name of an urban land complex, such as Alpha-Beta-Urban land complex, 8 to 15 percent slopes? I have heard that, for NRI purposes, urban land has a housing density of at least one house per 1.5 acres. Is there any kind of guideline for mapping?

*Question 2*.—What is the best way to map highways—as phases, components, named series, or miscellaneous areas? Has anyone established a map unit for highways of a certain size? ■

## Language Matters

By Stanley Anderson, Editor, USDA, Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska.

Note that the wording of the following recommendation probably fails to express the author's intended meaning: "Shorten the timeframe in which soil survey information is available to the customer." ■

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