NEW CONCEPTS - SOIL SURVEY OF THE FUTURE

The new process of doing soil surveys by Major Land Resource Areas (MLRA) highlights this section. Special emphasis is given to an overview of the National Soil Survey Information System (NASIS). The current status of update or maintenance of soil surveys in the state is given.

Maintaining Soil Surveys by Major Land Resource Area

Soil survey reports remain excellent sources of soil data but have become outdated in varying degrees as new information about soils is gathered and as demographics, technologies, environmental questions, and intensities of land use have changed. Incorporating the scientific knowledge developed during the last 30 years is needed to bring soil surveys to a common standard and to develop a coordinated database to support the greatly expanded use of and information needed from soil surveys.

Maintaining soil survey information is an ongoing activity. It is accomplished through continuous collection of data, regular reviews, evaluations, and additions to existing soil survey information.

Soil surveys are updated as part of maintenance projects that are conducted for a Major Land Resource Area or other region in order to improve the uniformity of the soil survey products in the area. Adjoining soil surveys of different ages frequently have map units and interpretations that do not join. Updating an individual soil survey by county does not always improve the join. Maintenance for a broad area presents an opportunity to bring all soil surveys within the area to a consistent level. Boundaries that are not resource-related, such as state and county survey area borders, no longer act as soil boundaries when surveys are updated on the basis of a broad resource area.

The Major Land Resource Area becomes the project soil survey area. The soil surveys of counties or other areas within the major land resource area are considered subsets of the soil survey for the major land resource area and are updated, maintained, published as subsets, or all of these.

The Nebraska State Soil Survey Staff prepared a "Guide for Evaluating Soil Surveys by Major Land Resource Area" in January 1991. The purpose was to determine actions needed to:

1. Bring the existing soil survey reports to a common standard.
2. Collect new soil property data and update interpretations to meet present needs.
3. Develop a coordinated soil survey database for use in informational display systems.

Through the evaluation process a plan is developed for maintaining a soil survey area. Many degrees of deficiencies and variability can exist in each soil survey. Revisions or supplements to the soil map can be divided into five categories:

1. Extensive revision
2. Partial revision
3. Limited revision
4. Supplemental soil mapping
5. Updating the photo base map

The correlation is amended, and the products of the soil survey are then printed, digitized, or both.

The process of maintaining soil surveys was stated as policy in the November 1993 version of the National Soil Survey Handbook. The Handbook provides standards, guidelines, definitions, policy, responsibilities, and procedures for conducting the Natural Resources Conservation Service part of the National Cooperative Soil Survey in the United States.

Soil Survey Update Status as of February 1999

Fieldwork is in progress in the following counties:

Hall
Kimball
Sarpy

Fieldwork is completed in the following counties:

Deuel
Gage
Washington, the Washington County soil survey has been digitized.

Fieldwork has been completed; the updated soil survey has been digitized and certified SSURGO (Soil Survey Geographic Database) in the following counties:

Deuel
Saunders
Dundy

None of the updated soil surveys or automated soil surveys are published.

Other published soil surveys in Nebraska are being automated with minimal or no updating.

No plans exist to update other soil surveys in Nebraska beyond ongoing maintenance activities. Maintenance of soil survey information is being accomplished through continuing data collection, regular reviews, evaluation, and additions to existing soil survey information.

This is the end of an era. Soil survey project staffs in the Natural Resources Conservation Service are being dispersed throughout the state in order to provide maintenance and technical soil services; correlation in Major Land Resource Areas and Major Land Resource Regions is being handled by staff located in other states.

History of Soil Information Systems

Soil scientists have always collected and maintained vast amounts of data. The data was stored on paper, on maps, in cardboard boxes, in scientist's heads, etc. Before the availability and use of computer technology, the soil survey manuscripts were commonly prepared by typing pencil drafts of the Field Soil Scientist descriptions, etc. Preparation of the long interpretative tables generally required a special long carriage typewriter. Preparation of the interpretative tables in the manuscripts for publication was time consuming and required input from soil scientists, resource specialists, and secretarial or clerical support.

In recent decades, computers and databases have become important and valuable tools in the preparation of soil surveys and storage of soil survey information. The State Soil Survey Database (SSSD) was developed to provide the NRCS State Soils staff the capability to store and manage soil survey data for the State and for the publication of reports. The prototype was developed in Colorado and released in 1987 for use by the State soils staff.

The State Soil Survey Database (SSSD) was a relational database used for State Soil Survey data. The concept was to use database management system technology to link several natural data sets. The data sets included were the Map Unit Record (SOI-6), Soil Interpretation Record (SOI-5), Range, Plants, Climatic data, and other data elements as defined by the state.

The following benefits were available to SCS soil scientists who used SSSD to provide soil survey information:

- SSSD software was easy to use
- Automated features accomplish most tasks
- Soils information was easy to access and store
- Data could be tailored for specific geographic areas
- Data was easy to maintain
- Soils data was quickly and efficiently provided

The following were some important facts concerning SSSD:

- Menus provided direct, automated access to the soil survey data
- The data contained information on basic soil properties
- The data provided soil interpretive ratings on selected uses
- The data could be integrated and linked with other natural resource data sets
- The data could be added, deleted, or modified
- Standard reports were available
- Assisted and unassisted queries were optional features

The primary function of SSSD was to provide SCS State Soils Staff the ability to store, manage, and retrieve soil survey information of the state. From 1987 to 1994, SSSD was the mechanism form providing a State Database for the Computer Assisted Management and Planning Systems (CAMPS), which was operational in most SCS Field Offices throughout the United States. From 1994 to 1997, SSSD was the mechanism for providing a Soil Database for the Field Office Computing System (FOCUS). Many users of soil survey data were provided various formats of the data. The SSSD provided the initial soil survey information for the new National Soil Information System (NASIS) in 1996.

National Soil Information System

The analysis for the National Soil Information System (NASIS) proceeded through the stages specified in the STRADIS methodology. The Draft Requirement Statements (DRS), completed in 1991, spelled out the objectives for a dynamic automated system to provide more complete, current, and accurate soil information and respond to changing user needs. The system model described in the DRS focused on the management and interpretation of soil data in a highly generalized form to avoid limitations imposed on earlier soil databases.

The What and Why of NASIS:

The National Soil Information System (NASIS) provides for the collection, storage, manipulation, and dissemination of soil survey information within NCSS. The data model in the Outline Physical Design (OPD), completed in 1992, was not radically different from the existing State Soil Survey Database (SSSD) but provided expanded capabilities in such areas as the number of components per map unit and associated map units to multiple legends.

The current system was replaced for the following reasons:

- To build and manage data from the field level to the national level
- To quickly and easily revise and maintain soil properties and interpretations
- To add new national or unique local data elements and generate appropriate interpretations
- To incorporate digitized spatial data to create SSURGO, STATSGO, NATSGO, and other products
- To provide for quick and easy evaluation and coordination of soil properties and interpretations
- To provide NRCS and other customers with increased options and flexibility in the use of soil survey information

The National Soil Information System (NASIS) has been the official depository for soil survey information since 1994. NASIS integrates soil survey information, operations, and management. NASIS also provides a soil database for the computer system used in agency field offices. It divides soil survey information into major categories including: 1) map unit records, 2) geographic area records, 3) point characteristics, and 4) standards, criteria, and guidelines.

Within NASIS, map unit records are split into data objects, including the area object, the legend object, and the data map unit object.

AREA OBJECT. The purpose of the area object is to maintain soil survey, political, and physiographic area records.

LEGEND OBJECT. The legend object maintains map unit symbols, names, and correlation records for each map unit in the legend and provides a link between the area object and the data map unit object.

DATA MAP UNIT OBJECT. The data map unit object is a record or collection of records concerning composition, physical, chemical, morphological, and interpretation properties and performance for a map unit and each of its components.

Geographic area records include symbols, names, and acreages for soil survey areas as well as other political and physiographic areas.

Point characteristics include soil profile descriptions, laboratory characterization data, field measurements, transect observations, and other soil survey data collected at individual sites. Some of these data are currently in PEDON or the Soil Survey Laboratory soil characterization database. Development of capabilities to coordinate these data in NASIS is ongoing.

Standards, criteria, and guidelines include taxonomic class limits, series ranges in characteristics, interpretation criteria, and other data and documents used to establish concepts, assist aggregation, and communicate policy in soil survey. Some standards, criteria, and guidelines, such as interpretation criteria, are managed as data in NASIS. Other standards, criteria, and guidelines, such as the National Soil Survey Handbook and Soil Survey Manual, are managed as printed or online documents.