MLRA Soil Survey Region 13 Office

Soil Survey Update Implementation Guide

March 2008

Overview

This implementation plan was developed to provide guidance to MLRA Soil Survey Offices in the Central Appalachian Mountains and Mid-Atlantic Coast Region in initiating the update process. It will assist MLRA Soil Survey Offices to become permanent clearinghouses for all soil-related data in their region. The long-term management of this data is vital to the Agency. The update approach for managing soil survey information here is separated into two, distinct phases: **1) Evaluation and Maintenance; and 2) Enhancement**. The importance of a thorough evaluation of our existing product, establishing priorities, and developing long-range, annual, and specific project plans to address soil survey concerns are outlined in this document. NASIS activities are grouped into database integrity/management and soil properties. A discussion on the importance of increasing cooperator involvement and better communications between all soil survey entities are also included in this plan. The primary guidance document for this plan is the National Soil Survey Handbook.

Introduction

The primary purpose of this document is to provide a framework to formalize discussion, input, and feedback from State Offices (SO), MLRA Soil Survey Offices (MSSO), and Cooperators regarding priorities and structure of the reorganized soil survey program in MO-13 (Central Appalachian Mountains and Mid-Atlantic Region).

The reorganized soil survey program is an exciting opportunity for today's generation of soil scientists to make significant improvements in the soil survey by utilizing new technology. The current restructuring represents a major change in management of the soil survey program and how survey priorities are determined. This is a fundamental change from progressive soil survey and will reward proactive soil scientists with a sense of accomplishment and achievement. For example, instead of waiting 5 to 10 years for a survey to be published, improvements in the soil survey can be delivered to users via the Soil Data Mart or Web Soil Survey in a matter of weeks or months. The restructured soil survey program will allow individuals to emphasize the "science" in soil survey and refocus the program on details that were missed during the "project soil survey" era.

The Soil Survey Division has identified the following priorities which have a direct impact on the soil survey program in our region:

- Enhance the Web Soil Survey (A continual process)
- Implement new technology
- Increase outreach and marketing.
- Soil quality/health and dynamic soil properties
- Support erosion models; water quality models
- Watershed approach to applications
- Cooperation and collaboration with partners

Addressing these activities will help us meet the Agency's strategic goals and assist MSSOs in planning and management. Another objective of this document is to clarify the responsibilities of the MO, MSSOs and SOs and to discuss how these new roles will be implemented (responsibilities are detailed in the NSSH, Part 608). In the past, the MO was responsible for quality assurance and correlation. Although quality assurance remains with the MO, many of the correlation functions will be retained at the field level within the MLRA SSO. The MO views the MSSOs as partners in achieving the final goal of delivering an accurate, reliable product to the Soil Data Mart. The MOs will assist the MSSOs in delivering a high quality final product in an efficient manner.

The MO role is evolving into one that supports the states and MSSOs by: providing quality assurance through review of MSSOs operations, products, and accomplishments. Also noted are:

- developing processes, training, technical assistance
- providing assistance and expertise in designing and completing projects
- coordinating projects and issues among MLRAs by facilitating meetings (e.g. committee meeting to resolve the use of phase terms among MLRAs)
- maintaining NASIS data integrity
- implementing standards in data population, map unit naming conventions, etc.
- providing editorial assistance in publications, open record files, etc.
- providing a clearing house for technical data (directory of PowerPoint presentations, photographs, etc.).

A major goal of restructuring the soil survey program is strengthening the relationships with our cooperators. The MO will explore ways to further the involvement of University, state and federal agencies in our program. As an important first step, MSSOs should assemble a Technical Team and hold regular meetings to solicit cooperators' input and determine survey priorities.

Through the course of the progressive soil survey program, soil scientists have and continue to collect a large amount of soil property and interpretive data. Although much of this information is available through published soil surveys and other sources, a considerable amount of valuable data is not available to the public. The result is that many soil scientists are not aware of technology advances or data collection projects that could improve their operations.

This lack of timely communication has been identified by the MO-13 leader as one of the major issues affecting the success of update soil surveys. The MO hopes to strengthen communication lines by hosting technical seminars and workshops. Each MSSO will be asked to contribute to these activities. Such actions should also enhance the soil survey program's outreach and marketing activities.

For the purposes of this document, the restructured soil survey program can generally be broken into two broad phases:

1. **Evaluation and Maintenance** of our current spatial and property data base; and,

2. **Enhancement** of our survey for future users. Although much of our emphasis recently has been focused on the use of new technologies to improve our update soil survey; evaluation, maintenance, and enhancement should be viewed concurrently.

Initially, over half of a project office's time should be spent maintaining and evaluating our current soil survey product. Management of the update survey will be through the MSSO planning process, as outlined in the National Soil Survey Handbook (NSSH 608 - 610). The planning process consists of long range, annual and specific project plans, with appropriate workload analyses.

Phase I: Evaluation and Maintenance of Existing Soil Surveys

"A Seven Step Process"

This phase of the update soil survey program will focus on evaluating the status of our current survey, developing a list of soil survey concerns, and maintaining existing survey data. These projects will have an immediate impact on soil survey users via the Web Soil Survey. Items emphasized in this phase will be evaluation of subset legends, map unit geographic distribution, and minor spatial changes for joining. Also discussed are issues related to Benchmark soils, OSD revisions, Taxonomy review, NASIS legend management, soil properties, and organization of existing data.

Step One: The Initial Evaluation

A. The Legend

Our current subset legends were developed over two generations of county soil survey correlations. This has resulted in inconsistencies in naming similar landscapes in adjacent surveys. Many inconsistencies in these legends can be resolved with a comprehensive review of MLRA subset legends.

The MO recommends that all MLRA Soil Survey Leaders undertake a thorough review of their subset legends to identify problem map units, landscapes, or data. This evaluation will create an inventory of "soil survey issues" that will later be prioritized and addressed via project plans.

For example, a review of the legends in MLRA-126 identified the need for update work in several "pre-taxonomy surveys". The project office developed a project plan and set goals for their work in 2008. The update survey was improved by correlating by physiographic areas.

Other examples of legend issues needing evaluation include:

a) use of series that are out-date or have had classification changes
b) series that have had conceptual changes
c) assigning soil series to specific landscapes
d) undifferentiated map units that could be converted to better interpretive map units
e) establishing new series *vs.* phasing existing series
f) consistent use of miscellaneous areas
g) consistent use of the eroded phase
h) consistent use of conventional and ad hoc symbols
i) consistent use of slopes groups within a MLRA
j) consistent use of map unit symbols
k) documentation of all changes in NASIS and LIMS by organizing all Lab data

Correlation includes not only the map unit name but also the map unit composition and data. The legend evaluation should also review which minor map unit components are assigned to a map unit. In some instances, similar map units in adjoining counties have different components because different similar soil criteria were used or new series were established since correlation of one of the counties. The number of data map unit components also needs to be evaluated. Care should be taken not to add redundant components to the map unit that do not improve the map units' interpretive capability. Consistent similar soil criteria will need to be established by MLRA.

The MLRA Legend. The MO supports the development of an MLRA-wide legend to provide the framework for a comprehensive subset legend evaluation. An MLRA-wide legend will promote consistency in map unit naming and symbolization among counties/states. MLRA legends will enhance multi-county analyses for watersheds, common resource areas, etc. and will help joining between subsets. All of this will eliminate a major complaint from external customers and eventually provide seamless applications across county and state boundaries.

There are several viable approaches for developing MLRA-wide legends. Dividing MLRAs or subsets into physiographic regions (e.g. terrace units) or "soil groups" by developing legends for these areas, and then aggregating them into a composite MLRA legend is a recommended method for developing MLRA legends (see

The MO also supports facilitating consistent naming conventions within and among MLRAs. Although the NSSH gives guidance for naming map units, in some cases, clarification is needed.

Most routine correlation amendments will be managed via populating the database with the map unit history notes and running the appropriate reports. The MO plans on establishing regional committees to make recommendations related to map unit naming conventions, use of ad hoc/spot symbols, and similar and dissimilar soils.

B. Soil Geography

Along with the legend evaluation, the MO encourages MSSOs to undertake a systematic evaluation of the extent and location of subset map units using SSURGO.

Such a review may highlight trends, anomalies, landform/soil correlations, or other issues that may impact the validity of map units. It is recommended this review be done by physiographic area.

C. Cultural and Ad hoc Symbols

It is recommended that each MLRA SSO evaluate the 37A for each subset (SSURGO and published) and a standard set of symbols and definitions be developed for the MLRA. The goal is to use spot symbols in a consistent manner throughout the MLRA, taking into consideration past use, map unit minor components, etc.

D. Spatial Data

Our SSURGO certified soil survey is an established product that has specific development protocols. **The MO discourages any project that emphasizes the revision of SSURGO using traditional survey procedures**. The MO will require a cost/benefit analysis before approving an update project relying on traditional methods. Cost-effective and efficient soil landscape modeling techniques are or will be available to assist in making necessary changes. This philosophy could be modified for areas of small extent with serious problems with the existing mapping (e.g. watershed project). Any project requiring extensive line change should have MO review and the appropriate State Soil Scientist approval.

The MO concurs with the NSSH and strongly supports creating the best join possible among subsets and encourages MSSOs to include such work in their long range plan. Ultimately a seamless join would involve matching landscapes, map unit names, and data map units along subset boundaries. This perfect join may require substantial field and data base work. However, during the interim, improving the join by any means possible (matching line work, revising map unit names, utilizing similar component properties) is encouraged as a first step. An improved join would enhance GIS products and reduce interpretive discrepancies among subsets. Creating this join is a continuation of the of the legend evaluation process and may identify issues needing further evaluation.

E. Evaluation of SSURGO developed from Topographic Base Maps (no photo image)

In the initial development of SSURGO for subsets in the late 1990s, a limited number of counties lacked orthophoto coverage. Topographic maps were used as a base map in lieu of photo image base. The MO recommends that MSSOs evaluate the line work of these SSURGO subsets and make appropriate recommendations.

Step Two: The Benchmark Soil Review

Review and evaluation of Benchmark soils is an Agency priority. Guidance has been provided by the NSSC on processes to review the current Benchmark soil list (issue paper, Tom Reedy and others). The NCSS has provided excellent guidance in reviewing Benchmark soils. Most evaluations will extend the concept of benchmark soils to the landscape catena and will include comprehensive data mining to compile information related to the benchmark and associated soils.

The MO recommends each MSSO evaluate their current Benchmark soils and make recommendations for changes. The MO will coordinate efforts among MSSOs. This review should include an evaluation of a “data completeness index” as described by the NSSC.

Step Three: The Official Series Descriptions (OSD) Review

Revision and maintenance of OSDs is primarily the responsibility of MSSOs. We urge all MSSOs to initiate a plan to systematically review and revise the OSDs in their MLRA(s). This review should prioritize the OSDs and work should begin on benchmark and extensive series or soils involved in on-going MLRA work. It is recommended that each MSSO develop an OSD maintenance plan as part of their long range plan. This should include the review of a specific number of series annually. MO-13 will assign series responsibility to individual MSSOs.

At a minimum, the following items should be addressed (see NSSH for additional guidance):

a) determine if the pedon is representative for that series (high importance)
b) review the Range in Characteristics
c) review the Competing Series (update this section in the competing series also)
d) review the Associated Series (update this section in the associated series also)
e) review the Geographic Setting
f) review Remarks Section; add statements concerning any diagnostic features
g) update to 2 meters (if possible)
h) convert to metric

The national OSD Check Program will be used in each SSO. The following procedure is suggested for revising OSDs:

a) SSO submits draft changes and justification/documentation to review groups (as appropriate) and the MO. Any change in OSD classification, location, or significant change in morphology needs to be reviewed by a knowledgeable peer group.
b) SSO incorporates final changes and submits to MO; along with additions to the ".a" file.
c) MO submits the OSD file to the national Soil Classification File and maintains the ".a" file locally.

At this time the MO will continue to maintain the OSD and ".a" files. These files can be checked out by MSSOs for series they are working with. A link between the OSD and series property data in NASIS is eventually planned. Until this link is established, a MO-wide decision needs to be made about the amount of soil property information that will be included and maintained in the OSD (versus maintained in NASIS).

The MO supports the development of Soil Monographs as both an outreach activity and as a means of summarizing available property, laboratory, and landscape data.

Step Four: Applying Soil Taxonomy

MLRA Soil Survey Offices have the responsibility for evaluating Soil Taxonomy. We realize that Soil Taxonomy is fairly stable in the Appalachian Region; however, MSSOs need to identify any issues affecting Soil Taxonomy and help collect appropriate documentation to support revisions. Several issues affecting soils in the MO have been identified, including:

a) recognizing anthropogenic induced change in soils

- erosion
- mine-land reclamation
- drainage
- Extent and spatial variation of compaction in minesoils

b) CEC activity class
c) soil moisture and temperature regimes
d) horizon criteria; including the usefulness of subgroups

Step Five: The Database

Database activities have been separated into two distinct categories:

a. Integrity and management of site and legend objects; and,

b. Properties and interpretations (the update of soil property and interpretive data).

A. Integrity and management of site and legend objects

Management of the NASIS **MUST** be **<u>coordinated</u>** with state database managers.

Potential issues:

a) group membership
b) legend management and group organization
c) MLRA vs. Non-MLRA legends—Presently it is a challenge managing groups when our
d) delivery mechanism (Non-MLRA) is different than our management mechanism (MLRA). This results in potential security issues when adjacent MLRA SSO leaders are included in groups to allow permissions for soil survey areas that are along MLRA management area boundaries. To help resolve these issues, MSSOs managing an MLRA Legend need to populate and maintain a set of Non-MLRA soil survey area overlap tables.
e) Management of MLRAs 124-126 North and South. A plan needs to be developed that documents the separation of 124/126 north and south and incorporate these changes into NASIS.
f) effective organization of reports and queries – This task is slated for the MO data base manager
g) report writing assistance
h) site data/site data quality – The MO recommends resources be allocated towards an effort to populate archived site data (OSDs, lab, typical pedon, and other pedon descriptions, transects, field notes) in the NASIS database. There is also a need to evaluate the quality of the site data currently in the NASIS and LIMS databases. (duplicate pedons entered, data transcription errors, etc.)
i) automate the population of side records – Several stand alone data sets exist that need to be
j) updated with changes in NASIS. Methods of updating these data sets automatically will be evaluated.

B. Database – Properties, qualities, and interpretations

The preliminary objective in data evaluation and maintenance is maintaining our existing data, improving consistency among similar soils, and eliminating discrepancy among adjacent counties. Projects to enhance the data base through survey projects will be discussed later.

a) **Typical or modal pedons**. The primary purpose of modal pedons in NASIS is to structure the associated chemical and physical data and provide depths and thicknesses for interpretations. Modal pedons selected to represent both major and minor components in data map units need review to ensure they represent the component in that specific map unit and/or landscape. Modal pedons should be evaluated and chosen based on natural physiographic units. In some cases little significant difference in major soil properties occurs among physiographic units and the similar modal pedons can be used on several surfaces (e.g. use of the same modal pedon. In many cases, this review can be combined with evaluation of the OSDs (see above). A concern exists between interpretations presently being run on "thickest" layer and use of soil horizons in NASIS. The MO recommends that layers be replaced with significant horizons (i.e. separate horizons with significant differences and combine horizons with minor difference, e.g. color change).

b) **Soil property data** for DMUs throughout the MO all have been certified and meet the minimum data requirements of National Bulletin 435-5-7. However, there are inconsistencies in data population standards, guides, use of calculations, data validations, etc. The MO recommends the next step in data population involve evaluation of population standards throughout the MLRAs.

Better data population of primary soil properties will lead to better interpretations for all users.

The evaluation of data will require:

- agreement and coordination of criteria among MLRAs and states
- deriving data from soil properties where possible (e.g. derive K from soil properties).

The following steps are envisioned:

o The MO will work with MSSOs to evaluate standard calculations and algorithms and make recommendations for their use (i.e. populate CEC from algorithm vs. state criteria).

o Existing Data Guides will be reviewed and summarized (e.g. AWC reduction for salinity and stones; SD's K factor guide). A formal revision and distribution procedure will be developed (similar to the present "Data Population Notes") and the MO will develop a web page to provide easy access to all guides, criteria, etc.

o Data population criteria will be evaluated to facilitate population of:

- Organic horizons
- Cd, Cr, and R horizons
- Miscellaneous land types
- Other

Criteria and reports will be developed or reviewed to derive or generate interpretations from soil data. This will impact interpretations such as:

o Land capability class

o Forage suitability groups

o Important and Prime farmland

o Productivity Indexes

o Other

"Local and State" data and interpretive criteria will need to be identified to avoid impacting these data elements. The MO will develop a standard data validation routine consisting of existing reports and validations to run before any SSURGO data downloads. Work is being done on the national level to facilitate quality control of SSURGO downloads.

Step Six: Organization of Existing Data

The establishment of MSSOs in the restructured soil survey program has created the opportunity for these offices to become clearinghouses for all soil survey information for their assigned MLRAs. This can lead to the consolidation and compilation of soil survey data currently housed at various locations. Centralizing this information will leave a legacy the next generation of soil scientists will appreciate. This data will also make positive contributions and improve the efficiency of projects. The MO recommends data libraries are established for:

- County subset 30 year records
- Map unit transects and notes
- Series descriptions
- OSD files
- Survey evaluations
- Laboratory data
- Water table data
- Old soil survey reports
- Photographs
- Geology reports
- Research reports
- Other

It is important to maintain an effective record keeping system. MSSO have become permanent locations and will need to archive files for future reference. Record keeping systems will need to correspond to the Records Guide GM-120-408.

Step Seven: Our Family of Maps – GIS Applications

Along with compiling existing hard copy data, an inventory of existing digital/GIS data will be essential for these new survey offices. The MO will provide a digital "basic cartographic set" which includes SSURGO, roads, hydrography, geology, strongly recommends that each MSSO query GIS sources to develop an inventory of existing data such as ground water, aquifers, land use, geology, STATSGO, etc. Because digital data files can be large, many SOs have developed protocol for storage. It is important that a formal structure is used so data can be easily accessed, updated, protected.

The MO recommends that a series of resource maps be developed for each MLRA. These maps could highlight conservation or resource issues such as:

- water erosion
- major soils
- aquifer
- Drought Potential
- Poultry Composting

Phase II

Soil Survey Enhancement "A Six Step Process"

Step One: The Planning process

Improving the current soil survey spatial, property, and interpretive data in an efficient and cost effective manner is the main goal of the update soil survey. Most update work will be centered on the planning process as outlined in the NSSH (608). Priorities will be determined by input at local technical team meetings and national, SO, MO, and MSSO objectives. Detailed project plans will describe objectives, procedures and impacts on the survey. The MO will provide any needed assistance in the planning process.

The soil survey update planning process, as outlined in the NSSH, consists of the **long range, annual, and specific project plans**. MO-13 would like to add an MLRA SSO annual status report that would summarize achievements for the year and be a focal point for quality assurance activities. All of these documents contribute toward organizing, prioritizing, and documenting survey activities. These plans, field visit reports, and associated final reports will constitute the long-term record of the survey office (in lieu of field review reports). They should be maintained in an "open record" format, accessible, and well organized.

Although the writing of technical documents to guide the management of a survey office may seem like the antithesis of traditional field soil survey activities, planning has always been a part of the NSSH guidelines. ***When one considers that over $1 million dollars of public funds can easily be expended to support a single MLRA SSO for 5 years, well-designed and documented work plans seem a minor but essential requisite.***

A. Long Range Plan

The Long Range Plan should address activities in the MSSO for up to a five year period. It should identify long-term equipment, personnel, and other needs. The Long Range Plan should include a Soil Survey Concerns List which is an inventory of needs, issues, and concerns identified by MSSO through the evaluation process completed in Phase I. Survey concerns should be sorted by topic (e.g. correlation needs, classification needs, data base issues, landscape issues, etc.). The Soil Survey Concern List is a dynamic document that will be revised as update work progresses. See NSSH Part 608 Exhibit 608-8.

Prioritizing Projects

Although seemingly straightforward, prioritizing projects is a delicate balancing of local concerns with national, state, and MO issues. The objective is to create an efficient survey program by "weaving" together a variety of projects with various timeframes that will efficiently utilize SSO staff, account for adverse weather, and allow annual accomplishments to be reported. Prioritizing projects must consider benefits/cost ratios, easily accomplished projects, importance, acres impacted, staff capabilities, etc. The NSSH recommends analyzing the cost of the revision (project) in comparison to the anticipated gain of additional information.

The Soil Survey Concerns List, developed in the evaluation phase of the update, along with input from Technical Team meetings and cooperators will help determine local priorities. These local issues will be merged with national office, MO, and SO priorities identified at regional and state work planning conferences to create a list of priorities that will be addressed by the soil survey long range plan (5 year). The State Soil Scientist and MO Leader should approve the issues included in the soil survey long range plan. These priorities will be presented to the regional Board of Directors for review and comment.

Many states have developed criteria for ranking update and maintenance work. One approach is to numerically rank projects based on the following criteria:

- Scientific merit
- External merit
- Internal merit
- Financial/Partnership inputs
- Efficiency
- County Soil Survey Deficiencies

There is merit to implementing some type of process to evaluate the need and importance of individual projects, especially projects that will require substantial resources. The MO will investigate ranking projects to determine priorities further. MLRA SSOs are urged to review these ranking procedures to assure they are addressing important issues. In the mean-time, we will rely on peer review comments to evaluate the significance of projects.

The Long Range Plan should also include a general workload analyses that briefly describes how staff time is allocated. The Long Range Plan should be approved and signed by the SSS and MO Leader. The plan should be updated annually and submitted to the appropriate supervisor by early September.

B. The Annual Plan (See NSSH Part 608 Exhibit 608-11)

The Annual Plan outlines activity for the current year. It identifies reportable items, current priority projects, requests for assistance, and needed resources. It includes a workload analyses, detailing project time, training, annual leave, etc. The Annual Plan is approved and signed by the SSS and/or MO Leader. The plan should be developed annually and submitted to the appropriate supervisor by early September.

C. Specific Project plan (See NSSH Part 608 Exhibit 5)

Project plans discuss a project in detail; including objectives, timeframe, reportable items, products, etc. All project plans should be peer reviewed and approved by the SSS and MO Leader. They should be coordinated with other MSSOs as appropriate. As with the other types of plans, a formal file system should be created that includes the project plan, field visits, correspondence, final report, and future work needs. All project plans should be dated and numbered systematically. They should include provisions for quality control/assurance. Project plans need to be approved and signed by the SSS and MO Leader. They may be submitted at any time.

This plan could easily be modified for routine soil survey. Some projects will lend themselves to publications (e.g. Soil Survey Horizons, NSSC Newsletter) or presentations at professional meetings (oral or poster). Where appropriate, the MO recommends project plans be implemented with publication as a consideration.

Some projects, such as evaluating dynamic soil properties may be broader than individual MLRAs and may originate at State Offices or the MO.

D. Annual Status Report

The MO requests a summary report from each MSSO annually. The objective of this document is not to record reportable items but rather a summary of activities, accomplishments, and suggestions for improvements. These reports will allow the MO to consolidate quality assurance activities. These reports should be submitted to the SSS and/or MLRA Leader by the end of December.

Step Two: Revising Spatial Data

Results from projects may lead to the need to revise spatial data. Spatial revisions can be updated by traditional means, GIS Assisted Editing, and GIS derived Soil-Landscape Modeling. **The MO does not support traditional means of updating soil survey unless the project is approved by the SO and the Soil Survey Division Director**. GIS Assisted Editing relies on the use of simple GIS tools (ArcMap) to display SSURGO, DEMs, etc. to assist implementing map unit design changes.

For example,GIS Assisted mapping has been used to:

- separate slope breaks (e.g. a 6 to15% unit into 6-9% and 9 to 15% units)
- delineate eroded, wooded, and dissected areas
- delineate consistent fluvial units between subsets (flooding duration and frequency).

Sophisticated Soil-Landscape Modeling is the probable future of any terrain analyses, including soil survey. The implementation of this technology can be considered the 3rd generation of soil survey. Besides delineating soil boundaries, Landscape Modeling has potential to statistically evaluate soil variability and correlate soil properties to landscape position. It may provide resource maps for precision farming or precision conservation that could be aggregated into Order 2 soil surveys.

Step Three: Revising Existing Soil Properties, Qualities, Interpretations

Soil survey projects designed to revise and quantify existing soil properties will allow representative data values and ranges to be determined statistically, with confidence levels assigned. This will assist in risk analyses and understanding specific property variance.

For example, assigning confidence levels to our Ksat values may persuade designers of septic system to consider other alternatives. Evaluating data elements should be prioritized by importance, such as data elements (OM, pH, CEC, AWC, PSA, dB, Ksat). Evaluating existing characterization and other sources of hard data (university/ARS research), calculating "data completeness indexes" and identifying data voids are all part of the evaluation process. Once data voids or needs are identified, field data collection, sampling, Amoozemeter, EM-38, and Hach kits all can be utilized to quantify properties. Work should initiate on benchmark soils or suites of similar soils (benchmark landscapes).

Step Four: New Data Elements

Several new data soil properties, not currently supported in NASIS and related to dynamic soil properties or geochemical data, are being considered for data evaluation. These properties, such as infiltration, POM, aggregate stability, and trace metals will address emerging resource concerns. Soil Quality Specialists in the Midwest are developing multi-state plans to implement the collection of dynamic soil properties and geochemical data into routine soil survey.

Step Five: New Interpretations

Several recommendations for new or revised interpretations are being considered by the MO. MSSOs will be requested to assist in testing any new or revised reports. Examples include: source of secondary road material, compaction rating for mining and forestry, animal waste, septic systems, Ksat calculations, range PIs, road construction/reclamation on steep areas, and wildlife.

Step Six: Miscellaneous Issues

Several miscellaneous issues need additional consideration:

1. Managing and revising STATSGO
2. Effective outreach and marketing
3. 01 activities
4. Training new soil scientists
5. Sharing job aids
6. Establishing long-term monitoring sites
7. MO business plan (Annual)

####END###

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March 2008

Prepared by MLRA Region Offices 7 and 13 in consultation with other MO Offices