

MAJOR LAND RESOURCE AREA
SOIL SURVEY AREA DATA MAPUNIT AND LEGEND MANAGEMENT

in the
NATIONAL SOIL INFORMATION SYSTEM
under the November 2007
Soil Survey Program Restructuring

Foreword and Purpose: The National Soil Information System (NASIS) provides many functions for the Soil Survey Program, one of which is managing soil survey Legends and Data Mapunits (DMUs). This document provides instructions for managing the MLRA soil survey area Legends and linked Data Mapunits under the restructured Soil Survey Program.

These instructions have been slowly evolving in MLRA Soil Survey Region 10 since 2000, so they are well tested, but until the November 2007 Soil Survey Program Restructuring provided the catalyst, they had not been formally written down.

Background: With the November 2007 MLRA Restructuring of the Soil Survey Program¹, the management focus for soil survey data has shifted from “Non-MLRA Soil Survey Area” to “MLRA” – in other words, from counties to physiographic regions.

From its inception in 1995, NASIS has had the capability of managing legends and DMUs by physiographic region, but until the November 2007 restructuring, it has been underutilized. Currently, nationwide, there are 65 MLRA Legends in NASIS being used for Data Management.

NASIS also provides Data Delivery and Progress Reporting functions which have been and currently remain by county.

Subsequently, this “MLRA Soil Survey Area Legend and Data Mapunit Management” document is divided into those three topics.

Because these three Soil Survey Program functions all reside in the NASIS Legend Object, the Data Delivery and Progress Reporting aspects of the Soil Survey Program are intertwined with Data Management. The guidance contained within this document addresses in detail the Data Management aspect, with separate sections about how that interacts with Data Delivery and Progress Reporting.

Definitions of Data Management, Data Delivery, and Progress Reporting:

- Data Management is the creation of new soil data or the editing of existing soil data² by the MLRA Soil Survey Office and MLRA Soil Survey Regional Office and staffs. These Data Management actions can take place in the Legend Object or in the linked Data Mapunit Object.
- Data Delivery is the export of correlated mapunits and certified Data Mapunits by a state’s data export team, usually to the Soil Data Warehouse.
- Progress Reporting is the entry of mapping goals, mapping progress, and the type of final soil survey products. This is a state function.

¹ The national MLRA Soil Survey Restructuring Plan is available at <http://www.mo10.nrcs.usda.gov/about/SoilSurveyRestructuringPlan.html>.

² “Soil data” is defined as soil mapunits, soil properties, soil qualities, and soil interpretations.

DATA MANAGEMENT

Many of the 12 MLRA Soil Survey Offices in Soil Survey Region 10 are responsible for more than one MLRA; these offices will be managing one Legend³ and the linked Data Mapunits for each.

Building the Legend ... As with any Legend, this task needs performed one time only.

If a Legend for an MLRA has yet to be created in NASIS⁴, follow these steps. Otherwise, skip to either the “Initial / Supplemental Population of the Mapunit Table” or “Managing the Legend, its Mapunits, and Correlation records” sections.

1. If the Default Group in the NASIS Toolbar is not “MLRA XYZ Legend”⁵ (or something similar), change it:
 - a. Click Options – Change Default Group – MLRA10_Office – MLRA XYZ Legend⁶.
2. In the Legend Table, open a new row (click Edit – Insert, or press F8)
3. Populate the Area Type Name, and Area Symbol & Area Name columns:
 - a. Position the cursor in the ‘Area Type Name’ column
 - i. Click the Choice List icon
 - ii. Click the National button
 - iii. Choose the ‘MLRA’ Area Type Name
 - iv. Click Apply.
 - b. Position the cursor in the ‘Area Symbol’ column
 - i. Type the MLRA symbol (for example, 88, 91A, 107A, etc.)
 - ii. Press Enter
 - iii. The Area Name will populate automatically.
4. Population of the remaining columns in the Legend Table is optional.
5. In the Legend Text Table, make note of at least the date of the Legend’s creation. Another note mentioning how the legend and its mapunits (see below) were created would also be helpful to our successors.

³ NSSH 610.05 provides two methods for managing MLRA Soil Survey Area Legends in NASIS. The “alternative” method accomplishes Legend Management in the most efficient manner, and is the preferred choice of the Region 10 Soil Data Quality Specialists.

⁴ Every MLRA in Region 10 currently has a Legend, so this section is presented for information purposes.

⁵ See separate document “NASIS Editing Groups & Data Stewards” for additional information.

⁶ It is assumed that the Data Steward or one of the Group Members (editors) will create the Legend. Otherwise, “MLRA XYZ Legend” will not be a choice.

Initial / Supplemental⁷ Population of the Mapunit Table:

1. Load the “MLRA” Legend into your selected set.
2. For a “Non-MLRA Soil Survey”, load just the correlated mapunits into your selected set⁸.
3. Highlight the correlated mapunits and copy them.
 - a. Note - If two or more MLRAs overlap a “Non-MLRA Soil Survey” area, highlight only those mapunits that exist in the MLRA Legend being built / supplemented.
4. In the MLRA Legend:
 - a. Navigate to its Mapunit table and paste the mapunits.
 - b. Change the status of all the “correlated” mapunits to “provisional”⁹.
 - i. Note: If an “Edit – Global Assign” is used, please remember that this will change the status of all unprotected mapunits in the selected set.
 - c. Change the Mapunit Symbols¹⁰
 - i. Each mapunit symbol consists of a letter prefix¹¹, then the next consecutive number (for example, H256). Except for the letter prefix, these symbols are intended to be non-connotative¹².
5. Repeat for as many correlated “Non-MLRA Soil Survey” county subsets as exist in the MLRA.¹³

This first step of building the Legend can be time consuming, but once completed, the future benefits (as bulleted in the “Managing the Legend, its Mapunits, and Correlation records ...” section) more than make up for the investment of an estimated few hours to two days.

Region 10 Soil Data Quality Specialists are prepared to work jointly with the MLRA Soil Survey Leaders to accomplish the above steps. *It is strongly suggested that this be accomplished over the course of a few days, rather than strung out over a longer period of time.*

When the Mapunit Table is sorted by Mapunit Name, duplicate or near duplicate¹⁴ mapunits usually occur – these are the correlated mapunits from each of the “Non-MLRA Soil Survey”

⁷ Since 2000, soil scientists in Region 10 have been building MLRA Legends and populating the Mapunit Table in NASIS, but some are incomplete or have not had much attention over the years. These steps can also be used to add Mapunits to an existing Legend.

⁸ For soil survey areas with ‘initial’ status (or other surveys without correlated mapunits), use of approved or provisional mapunits is an option.

⁹ These mapunits were correlated in the county (“Non-MLRA Soil Survey” Area) from which they came, but are not yet correlated for the MLRA into which they have been pasted.

¹⁰ This will prevent the “unique constraint” error when saving – NASIS does not permit the combination of the same Mapunit Symbol / Status; each of these combinations in the same Legend must be unique.

¹¹ See separate document “Letter Codes for MLRAs in Region 10”.

¹² In 2000, the Region 10 staff reluctantly agreed to allow the letter prefix – which is connotative – but needed to do so to prevent a possible double occurrence of a mapunit symbol in a county subset that has two MLRAs. For example, H256 from MLRA 94B and C256 from MLRA 90A could be symbols in the same county subset, rather than two 256 symbols with different mapunit names.

¹³ Steps 1 to 5 are estimated to be a few hours to two days per MLRA. Two recently completed MLRAs took six and ten hours.

¹⁴ “Near duplicates” are mapunits with minor name differences. Three examples are a difference of 1% slope, or a similar textural phase, or a mapunit without a slope phase vs. one with a slope phase.

areas. Selecting a single mapunit from each group of duplicates to represent (correlate) that mapunit's concept in the MLRA can be projects for the Long-Range plan.

DRAFT

Managing the Legend, its Mapunits, and Correlation records ...

This is the single Legend in which all the changes to map unit symbol, name, status, kind, etc. are recorded during the course of a soil survey project. That “soil survey project” can be an initial soil survey, or a project from an MLRA Soil Survey Office’s Annual Plan of Operation.

Major advantages include:

- All the data for each physiographic region is in one location - one Legend, rather than scattered in multiple subsets.
- All changes to that data automatically occur in the Overlap tables, rather than attempting to make the identical change in multiple subsets.
- Existing “Non-MLRA Soil Survey” legends, mapunits, correlations, and DMUs are not compromised or altered in any way.
- Duplicate “Non-MLRA Soil Survey” or “MLRA” Legends are no longer needed for data management purposes.
- The Legend is a true physiographic region legend, rather than an assemblage of unrelated (in time and spatially) “Non-MLRA Soil Survey” areas.
- The MLRA Soil Survey Leader and Soil Data Quality Specialist have one work location in NASIS to manage the legend and to record all decisions for each mapunit.
- Initial and update soil survey projects are accommodated under the same data management / delivery techniques.

The procedures, principles, and philosophies of progressive correlation contained in the National Soil Survey Handbook apply to the management of these MLRA Legend, Mapunits, and Correlation Records. The only difference in this progressive correlation method from the pre-restructuring method is the boundary of the soil survey area¹⁵, not the way we correlate.

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Critical to the progressive correlation process is the management of the Data Mapunits. Mapunits in the Legend cannot move toward and achieve their eventual correlation without a representative DMU.

DMUs contain Soil Property<sup>16</sup>, Soil Quality<sup>17</sup>, and Soil Interpretation<sup>18</sup> data.

For the representative DMU for a mapunit in the MLRA Legend,

1. Populate / edit the Soil Properties
2. Populate / edit the Soil Qualities

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<sup>15</sup> It is no longer a county, but now a physiographic region.

<sup>16</sup> Soil properties are measured or inferred from direct observations in the field or laboratory. Soil properties include, but are not limited to, particle-size distribution, cation exchange capacity, and pH.

<sup>17</sup> Soil qualities are behavior and performance attributes that are not directly measured. They are inferred from observations of dynamic conditions and from soil properties. Criteria used to derive soil qualities do not change by geographic location. Examples are AASHTO classification, soil texture class, and taxonomic classification.

<sup>18</sup> Soil interpretations use soil properties and soil qualities as criteria to predict soil behavior. Criteria and rating guides used to develop soil interpretations may change by geographic area. Examples are crop yields, soil drainage class, land capability classification, and conservation tree and shrub groups.

3. Populate / edit as many Soil Interpretations as are mutually agreeable to each state's interpretations expert(s).

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In the MLRA Legend, after a mapunit achieves "correlated" status, and its representative DMU achieves "certified" status, the data package is ready for delivery to the public. Because the above process employs progressive correlation, a small physiographic region¹⁹ rather than an entire county can be periodically and incrementally delivered to the public, rather than waiting for the entire county to be completed.

DATA DELIVERY

- *Definition: Data Delivery is the export of correlated mapunits and certified Data Mapunits by a state's data export team, usually to the Soil Data Warehouse, Soil Data Mart, or Web Soil Survey.*

Because the NASIS Export and subsequent Soil Data Warehouse – Soil Data Mart – Web Soil Survey import system is still county based, the recently correlated Mapunits and certified DMUs from the MLRA Legend need periodically refreshed into the "Non-MLRA Soil Survey" Legends.

In the future, when the data delivery is no longer county based, this topic can be eliminated.

When notified that correlated mapunit(s) and certified DMUs from the MLRA Legend are ready for public use, each state's data exporter can:

1. Load those mapunit(s) from the MLRA Legend into NASIS.
2. Copy those Mapunit(s) from the MLRA Legend.
3. Paste the mapunits into the "Non-MLRA Soil Survey" Legend.
4. Soil Interpretations that were not mutually agreed upon by the state's interpretations expert(s) can be added or modified prior to the Export. When Soil Interpretations are no longer contained in the DMU, this step will be unnecessary.

The Export will contain MLRA (physiographic region) Soil Properties and Soil Qualities, plus state (or county) based Soil Interpretations.

¹⁹ Mapped in the summer, data base populated / edited and progressively correlated over the following winter, and delivered to the public by spring – an achievable time frame.

PROGRESS REPORTING

- *Definition: Progress Reporting is the entry of mapping goals, mapping progress, and the type of final soil survey products. This is a state function.*

Currently, this function is by “Non-MLRA Soil Survey Area”, but is expected to be by “MLRA” in NASIS 6.0. Consideration is also being given to performing this function via NRCS PRS²⁰. In either case, when progress reporting is no longer county based, this topic can be eliminated.

SUMMARY

So, for the time being, “Non-MLRA Soil Survey Area” Legends need to be kept in NASIS, but to be used only for Data Delivery and Progress Reporting. All Data Management functions for initial and MLRA soil surveys are to be performed in the “MLRA” Legends and linked Data Mapunits.

With this document, the MLRA Soil Survey Office and MLRA Soil Survey Regional Office and staffs will be “out of the business” of managing “Non-MLRA Soil Survey” areas, as directed by the national MLRA Soil Survey Restructuring Plan, guided by the National Soil Survey Handbook, and within the current capabilities of the National Soil Information System database architecture.

²⁰ Natural Resources Conservation Service Performance Results System.