

Part 609 – Quality Control, Quality Assurance, and Soil Correlation

Subpart B – Exhibits

609.10 Format for Correlation Document

The following outline shows the order and character of items and data ordinarily contained in a correlation document. It does not preclude the inclusion of other information pertinent to the survey or the explanation of actions taken in the correlation. An example follows each item.

1. Heading

UNITED STATES DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

Classification and Correlation
of the Soil Survey of
Any Area, Any MLRA, Any State

The United States Department of Agriculture (USDA) is an equal opportunity provider and employer.

2. Introductory Paragraph

In this paragraph cite persons participating in the correlation, the date, the location, data reviewed, the basis for the correlation, and other items if pertinent. For example: “John C. Smith, soil data quality specialist, and David G. White, MLRA soil survey leader, of the Natural Resources Conservation Service, and Joseph I. Black, associate professor, Anytown State University at Any Town, Any State, prepared this correlation the week of October 21-25, 2000. The soil survey database, soil survey publication, field notes, interpretations, laboratory data, correlation samples, field map sheets, and materials from the adjacent soil surveys provide the basis for this correlation.”

3. Headnote for Detailed Soil Survey Legend

This headnote is an explanation of the symbols on the detailed soil maps in the published survey. It appears on the SOIL LEGEND in the published report and precedes the list of map unit symbols and map unit names. For example: “Map unit symbols consist of numbers or a combination of numbers and letters. The initial numbers represent the kind of soil. A capital letter following these numbers indicates the class of slope. Map unit symbols without a slope letter indicate nearly level soils or miscellaneous areas.”

4. Field and Publication Names and Symbols

The correlation of soil map units is formatted into four columns. List map unit symbols for publication alphabetically or numerically in sequence. The heading and format are as follows:

| <u>Field Map Unit Symbol</u> | <u>Field Map Unit Name</u> | <u>Publication Map Unit Symbol</u> | <u>Approved Map Unit Name</u> |
|----------------------------------|--------------------------------|--|-----------------------------------|
| DeB | Delta sandy loam, | AbB | Alpha sandy |

| | | | |
|-------------|---|-----|--|
| | 2 to 6 percent slopes | | loam, 2 to 6 percent slopes |
| Bf | Beta mucky silt loam | Be | Beta silt loam |
| GaB, GhB | Gamma silt loam, 2 to 6 percent slopes | GaB | Gamma silt loam, 2 to 6 percent slopes |

5. Series Established by This Correlation

List the soil series established by this correlation. List in parentheses, after the series name, the county, the parish, or survey area and the State in which the type location occurs if the type location is in a soil survey area other than the one being correlated. For example: “The Alpha series is established by this correlation, the Alpha type location in the adjoining Beta County soil survey area, Any State.” Enter “none” if no new series were established.

6. Series Dropped or Made Inactive by This Correlation

List the tentative soil series that were dropped or the established soil series that were made inactive by the correlation. For example: “The Beta series is inactivated by this correlation.” Enter “none” if no tentative series were dropped or no established soil series were made inactive.

7. Cooperators’ Names and Credits

List the following: The cooperators’ names and credits to be given in the published soil survey.

“United States Department of Agriculture
Natural Resources Conservation Service
In cooperation with
Anystate Agricultural Experiment Station
Anystate Conservation Commission
Anystate Cooperative Extension Service
Any Soil and Water Conservation District”

“This survey was made for Any Survey Area, Anystate, by the Natural Resources Conservation Service and the Anystate Agricultural Experiment Station, Anystate Conservation Commission, and the Anystate Cooperative Extension Service. It is part of the technical assistance furnished to the Any Survey Area Soil and Water Conservation District. The Any Survey Area Board of Commissioners provided financial assistance for the survey.”

8. Prior Soil Survey Publications

Indicate the reference to prior soil survey publications that will appear in the introduction of the published soil survey. A prior published soil survey is a literature citation in the soil survey publication. For example: “The first soil survey for Any Survey Area, Anystate, was published by the U.S. Department of Agriculture in 1903. Maps were printed in 1905. This soil survey is on an aerial photography base and contains more interpretative information.” Enter “none” if there is no prior soil survey publication.

9. Miscellaneous Items

Use the appropriate headings and include items pertinent to the correlation or publication of the survey. For example, the soil-vegetation-climate schema, or model, used to guide correlation for the

survey area should be included. Other examples include a summary of soil temperature or moisture studies or special investigative reports that provided guidance for the survey area.

10. Instructions for Map Development

These brief instructions should include:

- Who is responsible for the development of digital spatial data
- The date and projection of the orthophoto imagery being used for the base map
- Who is responsible for digitizing the maps and when it is scheduled
- Who is responsible for finishing the digital maps and when it is scheduled
- Whether or not a layer for point and linear map units will be compiled and digitized
- Any other instructions that may be relevant to the achieving a digital soils layers

Detailed instructions for soil map data capture are found in part 647 of this handbook.

11. Feature and Symbol Legend

Include a copy of form NRCS-SOI-37A and indicate the features and symbols that are used in the survey area by highlighting or underlining in red. For example: “Only those symbols indicated on the NRCS-SOI-37A will be shown on the legend.” Complete the descriptions for standard landform and miscellaneous surface features and descriptions for ad hoc features on the back of the form for those features indicated.

12. General Soil Map Unit Legend

List the general soil map units that will be shown on the legend of the general soil map of the survey area. For example:

“The following map units will be used on the general soil map legend:
 Alpha-Beta to Alpha-Beta association
 Beta-Gamma-Zeta to Beta-Gamma-Zeta association.”

13. Conversion Legend

List all field symbols and their approved publication symbols. A conversion legend is not needed if field symbols and publication symbols are identical. For example:

CONVERSION LEGEND, ANY SURVEY AREA, ANYSTATE

| Field Symbol | Publication Symbol | Field Symbol | Publication Symbol |
|--------------|--------------------|--------------|--------------------|
| 7A | 7A | 20B | 20B |
| 7B | 7B | 21C | 21D |
| 7C | 7C | 21E | 21E |

14. Legend of Map Units in Alphabetical Sequence

This legend is used only where numeric symbols will be published to assist publication crosschecking. For example:

LEGEND OF MAP UNITS IN ALPHABETICAL SEQUENCE, ANY SURVEY AREA, ANYSTATE

| Publication Symbol | Approved Map Unit Name |
|--------------------|--|
| 43 | Alpha clay |
| 37 | Beta clay loam, 5 to 9 percent slopes, eroded |
| 39 | Beta clay loam, 9 to 14 percent slopes, eroded |

15. Classification of Pedons Sampled for Laboratory Analysis

This table lists pedons that have laboratory data or engineering test data. Give the source of the data and other pertinent information. In the table “Publication Symbols,” refer to the map symbol that identifies the area from which the sample was taken. Additional columns can be added if needed.

CLASSIFICATION OF PEDONS SAMPLED FOR LABORATORY ANALYSIS

| Sampled as | Soil Survey Sample No. | Publication Symbol | Approved Series Name or Class Identification |
|---|------------------------|--------------------|--|
| 1. Laboratory Data from the NSSC Kellogg Soil Survey Laboratory | | | |
| Alpha | S79AS-047-003 | AbB | Alpha |
| Beta | S79AS-047-004 | GbB | Gamma |
| 2. Laboratory Data from the Anystate Agricultural Experiment Station Laboratory | | | |
| Beta | S79AS-047-005 | BgB | Beta |
| Gamma | S79AS-047-006 | AaA | Alpha |
| 3. Laboratory Data from the Anystate Highway Department Laboratory | | | |
| Alpha | S79AS-047-007 | AaA | Alpha |
| Beta | S79AS-047-008 | BbC | Beta |

16. Sampled Pedons in Published Soil Survey Report

This table lists the pedons and laboratory data that will be included in the published soil survey report. These pedons should represent the typical pedon for the series in the survey area. If the pedon is not the typical pedon for the series in the survey area, place a tabular or semi-tabular description in the soil survey report.

| <u>Series</u> | <u>Sample No.</u> | <u>Status</u> |
|---------------|-------------------|---|
| Alpha | S79AS-047-003 | Typical pedon for the Alpha in the survey area. |
| Alpha | S79AS-047-011 | Typical pedon from map unit Aa. |

17. Notes to Accompany the Classification and Correlation of the Soils in the Survey Area

Notes of general explanation that contribute to the understanding of the correlation can be included as an introductory paragraph. For example: “This survey area is in a transitional zone of soil temperature regimes. Soils with mesic and thermic temperature regimes have been correlated.”

In the notes, include items such as:

- (a) Pertinent information about series being established. For example: “Alpha Series. The Alpha series is established by this correlation for soils that were formerly mapped as Beta but that have mixed mineralogy rather than siliceous mineralogy as defined for Beta.”
- (b) How taxadjuncts differ from the series concept. For example: “Gamma Taxadjunct. This soil is a taxadjunct to the Gamma series because it contains less than 15 percent sand that is coarser than very fine. The soil classifies as coarse-silty.”
- (c) A correlation note for soils that are slightly outside the official series range, but are not taxadjuncts. For example: “Beta soils in this survey have a redder subsoil and are slightly more acid

throughout than those defined in the OSDs. These differences do not affect taxonomic placement or use and management. The OSD was not revised because the color and reaction differences are due to the inherent characteristics of the Theta geologic formation in which these soils formed and which is not the typical formation in which the Beta series formed.”

18. Classification of the Soils

This table lists the classification of the taxonomic units that are used in the survey area. Classify taxonomic units that are named at a level above the series as precisely as the data permits. Designate taxadjuncts with an asterisk only if the representative pedon is a taxadjunct. Address map units with major components that are taxadjuncts in the “notes.” Do not list miscellaneous area names in the classification table. For example:

CLASSIFICATION OF THE SOILS OF ANY SURVEY AREA, ANYSTATE

| Soil Name | Family or Higher Taxonomic Class |
|------------|---|
| Alpha | Coarse-loamy, mixed, active, frigid Aridic Haploxerolls |
| Beta | Fine-silty, mixed, active, frigid Cumulic Epiaquolls |
| Gamma* | Coarse-loamy, mixed, active, frigid Dystric Eutrudepts |
| Udorthents | Udorthents |

*Taxadjunct. See “Notes to Accompany Classification and Correlation of the Soils of Any Survey Area, Anystate” for details.

19. Join Statement

The join statement prepared at the final field review is included. It explains where an exact join was not achieved and identifies what map units need review and their joins resolved.

20. Certifications

The correlation document is to contain certification of the following:

- (a) Mapping is complete. For example: “Mapping completed in June 1999.”
- (b) General soil maps and detailed maps join exactly with those of adjacent survey areas, and detailed maps join within the survey area. Discrepancies in the join of maps with those of adjacent areas are documented, and a detailed statement of join differences is referenced and included in the correlation document. The reason the maps cannot be joined is given in the join statement.
- (c) Databases and interpretations are coordinated and complete. For example: “Databases and interpretations are coordinated, map unit lines of adjoining surveys are continuous across and along the shared borders, and the joined map units share basic soil properties and selected soil qualities. All data elements are populated and no obsolete terms are used.”
- (d) Type locations are in soil areas that have the referenced names, and location descriptions are correct. For example: “The locations of all typical pedons used in this survey are within the major land resource area, are correct, and are within delineations that have the referenced name.”
- (e) Forestland and rangeland site plots were taken in soil areas that have the referenced series names, the series names have been correlated in the forestland and rangeland databases, and all data is certified.

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(f) All typical pedons are classified according to *Soil Taxonomy*, 2nd edition and the latest edition of the *Keys to Soil Taxonomy*. For example: “All typical pedons are correctly classified according to *Soil Taxonomy*, 2nd edition and the latest edition of the *Keys to Soil Taxonomy*.”

(g) Only approved names for miscellaneous areas have been used as component names, as specified in Part 627, Exhibit 627-1, of this handbook.

(h) The soil maps have been reviewed for completeness, accuracy, and consistency. For example: “The soil maps are complete, accurate, and consistent.”

21. Approval Signatures and Date

Soil Survey Regional Director

Date

609.11 List of Soil Property or Quality Attributes for Joining

The following list provides basic soil properties and selected soil qualities that are to be joined between soil surveys to achieve an “exact” join. NASIS data element names are used for convenience, but their usage is not intended to suggest a database solution.

National Attributes *

| Soil Property or Quality Name | |
|--------------------------------|-------------------------------|
| aashto_group_classification | geomorph_feat_modifier |
| aashto_group_index | geomorph_micro_relief |
| albedo_dry | geomorphic_feat_id |
| aluminum_oxalate | geomorphic_position_flats |
| available_water_capacity | geomorphic_position_hills |
| bulk_density_fifteen_bar | geomorphic_position_mountains |
| bulk_density_one_tenth_bar | geomorphic_position_terraces |
| bulk_density_one_third_bar | gypsum |
| bulk_density_oven_dry | hillslope_profile |
| calcium_carbonate_equivalent | horizon_depth_to_bottom |
| cation_exch_capcty_nh4oacph7 | horizon_depth_to_top |
| clay_sized_carbonate | horizon_designation |
| clay_total_separate | horizon_thickness |
| component_kind | horz_desgn_discontinuity |
| component_name | horz_desgn_letter_suffix |
| component_percent | horz_desgn_master |
| corrosion_concrete | horz_desgn_master_prime |
| corrosion_uncoated_steel | horz_desgn_vertical_subdvn |
| diag_horz_feat_depth_to_botm | hydrologic_group |
| diag_horz_feat_depth_to_top | iron_oxalate |
| diag_horz_feat_kind | linear_extensibility_percent |
| diag_horz_feat_thickness | liquid_limit |
| earth_cover_kind_level_one | local_phase |
| earth_cover_kind_level_two | major_component_flag |
| effective_cation_exch_capcty | manner_of_failure |
| electrical_conductivity | mean_distance_between_rocks |
| Elevation | month |
| erosion_accelerated_kind | organic_matter_percent |
| erosion_class | parent_material_general_mod |
| excavation_difficulty_class | parent_material_group_name |
| excavation_difficulty_moist_st | parent_material_kind |
| exists_on_feature | parent_material_modifier |
| extractable_acidity | parent_material_order |
| extractable_aluminum | parent_material_origin |
| flooding_duration_class | particle_density |
| flooding_frequency_class | ph_01m_cacl2 |
| fragment_hardness | ph_1_1_water |
| fragment_kind | phosphorous_bray1 |
| fragment_roundness | phosphorous_oxalate |
| fragment_shape | phosphorous_total |
| fragment_size | phosphorous_water_soluble |
| fragment_volume | plasticity |
| free_iron_oxides | plasticity_index |
| | ponding_depth |

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| |
|-------------------------------|
| ponding_duration_class |
| ponding_frequency_class |
| pore_continuity_vertical |
| pore_quantity |
| pore_shape |
| pore_size |
| potential_frost_action |
| restriction_depth_to_bottom |
| restriction_depth_to_top |
| restriction_hardness |
| restriction_kind |
| restriction_thickness |
| rock_frag_3_to_10_in |
| rock_frag_greater_than_10_in |
| rupture_resist_block_cem |
| rupture_resist_block_dry |
| rupture_resist_block_moist |
| rupture_resist_plate |
| rv_indicator |
| sand_coarse_separate |
| sand_fine_separate |
| sand_medium_separate |
| sand_total_separate |
| sand_very_coarse_separate |
| sand_very_fine_separate |
| sat_hydraulic_conductivity |
| shape_across |
| shape_down |
| sieve_number_10 |
| sieve_number_200 |
| sieve_number_4 |
| sieve_number_40 |
| silt_coarse_separate |
| silt_fine_separate |
| silt_total_separate |
| slope_aspect_clockwise |
| slope_aspect_counterclockwise |
| slope_aspect_representative |
| slope_gradient |

| |
|-------------------------------|
| slope_length_usle |
| sodium_adsorption_ratio |
| soil_erodibility_factor_rf |
| soil_erodibility_factor_whole |
| soil_moist_depth_to_bottom |
| soil_moist_depth_to_top |
| soil_moisture_status |
| soil_temp_depth_to_bottom |
| soil_temp_depth_to_top |
| soil_temperature_mean_monthly |
| stickiness |
| stratified_textures_flag |
| structure_grade |
| structure_group_name |
| structure_id |
| structure_parts_to |
| structure_size |
| structure_type |
| sum_of_bases_nh4oacph7 |
| surface_frag_cover_percent |
| surface_frag_hardness |
| surface_frag_kind |
| surface_frag_roundness |
| surface_frag_shape |
| surface_frag_size |
| t_factor |
| terms_used_in_lieu_of_texture |
| texture_class |
| texture_modifier |
| texture_modifier_and_class |
| total_subsidence |
| unified_soil_classification |
| water_fifteen_bar |
| water_one_tenth_bar |
| water_one_third_bar |
| water_satiated |
| wind_erodibility_group |
| wind_erodibility_index |

* Soil performance elements (range and forest production, etc.) and linkage to data related to ecological sites are not included as being required to be joined but should at least be coordinated between surveys.

609.12 Quality Control Template for Initial Soil Surveys (subject to change to reflect local conditions)

**INITIAL SOIL SURVEY
QUALITY CONTROL REVIEW**

Date:

Area name:

State Soil Survey Area Identification:

Major Land Resource Area(s):

This quality control report is to ensure this soil survey is science-based, the legend and correlation use the MLRA concept, and the survey meets the standards and specifications of the NCSS. This report consists of several soil survey functions. Each function (legend, soil mapping, database, etc.) can be completed at different times of the year depending on the flow of work during the year. However, after 1 year, each function should be reviewed. As a function is reviewed, the document should be signed and sent to the SSR for a quality assurance check.

GENERAL INFORMATION AND SCHEDULING

Agency in charge of survey:

Cooperating agencies:

Total acres from NASIS (see legend/legend land category): land _____; census water

Status of memorandum of understanding:

Scheduled date - mapping completion:

Scheduled date - final correlation:

Scheduled date - manuscript to the technical team for technical review:

- manuscript to the MLRA SSR for technical review:

Scheduled date - map digitizing completion:

Has a long range plan been developed? _____

Does the soil survey office have an official electronic soil survey area boundary? _____

What soil surveys does the project survey match to and what is the status of each survey:

1) _____

2) _____

3) _____

4) _____

For each adjoining soil survey, attach a list of map units requiring a join by soil survey area

NASIS: Provide location where NASIS tabular data is stored and edited:

Area Symbol _____

Area Name _____

Survey Status _____

Is soil mapping being compiled and digitized to the imagery to be used for publication?

Data and source of imagery _____

Will the survey have a general soil map? _____

Will the survey have a published soil survey report? _____

If yes, list the manuscript sections and NASIS generated reports/tables to be included (this may change as reports are updated or revised)

Comments:

PROGRESS AND LEGEND

Date

- 1) Cumulative total of acres reported as mapped in NASIS (see Legend / Legend Mapping Progress):

- 2) Are ALL map symbols on the official soil maps for the survey in the legend:
 - Attach a legend from NASIS by map unit status
 - Attach a legend from NASIS by map unit name and include the additional symbols
 - Attach the SOI-37A indicating miscellaneous features and ad hoc features
 - Attach a list of map units added to the legend since the last quality control review
 - Attach a list of map units correlated or dropped since the last quality control review and include a correlation note report from NASIS identifying reason for decisions

- 3) Does the legend contain all map units from adjacent surveys in order to have an exact join? _____ If no, list the map units that are matching but not in the legend:

Comments:

Action or Recommended Items:

TYPICAL PEDONS

Date _____

- For each series or higher taxa in the legend, is the typical or representative pedon entered into NASIS pedon? _____ If no, list the series or taxa not in NASIS pedon:

- Are all new series names used in approved map units reserved? _____ If no, what names are not reserved?

- Are all series and higher taxa properly classified using Soil Taxonomy?

Attach a classification table from NASIS

- Provide a list of all soil series (OSDs) having their type location in the survey area :

- Are all typical pedons for series and higher taxa located within the survey area?
If no, list the series or higher taxa and the survey area in which it occurs:

- List the typical pedons (and its range of characteristics) reviewed and compared to the OSD:

- List the OSDs to be submitted to the SSR for revision with a proposed date for submission:

Comments:

Action or Recommended Items:

DATABASE

Date _____

- Are all map units in the legend table linked to a data map unit (DMU) thru the correlation table?

If no, list the map units that are not linked to a DMU.

- Are all components (major and minor) to be fully populated? _____
- SSRO-X Technical Note ZZ provides guidance on reviewing Soil Survey Data Quality in NASIS.

List the map units and associated data map units reviewed:

- List the Standard Reports as identified in Tech. Note 38 that were used to review data quality, for example:
 - * UTIL – Comparison of LL and PI, stored vs. calculated (National)
 - * UTIL – T. Factor Validation (National)
 - * CORR – Slopes and Climate Data (SSRO-X)
- List the NASIS Validations as identified in SSRO Tech. Note XX that were used to review data quality, for example:
 - * Component / Horizon
 - percent passing sieves
 - particle-size distribution
 - * Horizon Texture Group

Comments:

Action or Recommended Items:

MAP UNIT DESCRIPTIONS

Date _____

- List the NASIS MUG report to be used for the soil survey:

- List the map unit descriptions reviewed for quality and quantity of data populated:

- For each map unit description reviewed, identify data voids or data elements needing review (see SSRO-X Tech. Note XX for data population guides):

Map Unit Symbol

Database element needing review

Comments:

Action or Recommended Items:

SOIL MAPPING

Date _____

- What are the official soil maps for the survey (field sheets, compilation sheets, digital files/plots)?
- What is the minimum size polygon (acres) to be delineated?
- Attach a small scale soil mapping progress map for the survey area.
- List the field sheets reviewed along with date reviewed:

Review

- Are all symbols on the maps in the NASIS legend? _____ If no, which symbols are missing?
- Do map unit polygons conform to landforms/landscapes and are their segments visible on the photo base?
- Are all miscellaneous or ad hoc features on the maps identified on the NRCS SOI-37A? _____ If no, which features are on the maps but not on the 37A?
- Is the use of the feature symbol(s) consistent across the soil survey extent?
- Are size of polygons consistent with specifications in the MOU?

Comments:

Action or Recommended Items:

DOCUMENTATION

Date _____

- List the map units in which transects were made since the last quality control review to determine map unit kind and composition:

- Are the transect locations georeferenced with a GPS unit?

- Has a spatial documentation layer in GIS been created? This layer would document by polygon, how the map unit was determined. Each polygon would be coded using a legend. For example: 1. transect made in polygon, 2. polygon was visited to confirm map unit, 3. polygon was observed with “high” degree of confidence, 4. polygon was observed with “low” degree of confidence, 5. polygon was remotely sensed.

- For each new series proposed how many complete pedon descriptions are available? List the series name and number of descriptions:

Comments:

Action or Recommended Items:

COMPILATION AND DIGITIZING

Date _____

- Describe the map compilation and digitizing process being used for the soil survey:

- Provide the following information for off-site security of soil maps:

Location of site _____

Date of last security update _____

Type of security material: paper or electronic _____

- List the compilation sheets (quads) reviewed and digital sheets reviewed, along with date reviewed:

- For each sheet reviewed, list issues or concerns:

Map Sheet (Quad)

Issues/Concerns

Comments:

Action or Recommended Items:

INVESTIGATIONS

Date: _____

- Are there plans to have a project investigation within the survey area? _____ If yes, when is the projected date for sampling?
- List all pedons sampled within the survey area. This list will consist of all pedons sampled for laboratory analysis (reference and complete characterization), and will be a running list from year to year. For example:

| <u>Sampled as Name</u> | <u>Map Unit Symbol</u> | <u>Pedon ID</u> | <u>Laboratory</u> | <u>Site ID</u> |
|----------------------------|----------------------------|-----------------|-------------------|----------------|
| Cosbie | 2017 | 050R035003 | KSSL | 99-JFD-04 |

Comments:

Action or Recommended Items:

609.13 Outline of Items Considered in an Operations Management Review or Program Operations Review for Soil Survey

A. Objectives and Plans

1. Long-range plan and priorities
 - a. Soil survey evaluations
 - b. Soil survey maintenance
 - c. Soil survey areas
2. State soil survey conference
3. Memorandum of understanding for soil survey areas
4. Cooperative and contribution agreements for soil survey activities
5. Annual, monthly, and weekly plans of operation

B. Personnel and Schedules

1. Previous soil survey appraisals
2. Staffing and assignments
3. Workload analysis and scheduling
4. State and local contributions to the National Cooperative Soil Survey (NCSS)
5. Cooperative relations
 - a. Other Federal agencies
 - b. State agencies and representatives
 - c. Local agencies and representatives
6. Training given and received
7. Adherence to Equal Employment Opportunities/Civil Rights policies and procedures

C. Field Operations and Quality Control

1. Soil survey automation at all levels
2. Status of digitizing soil maps
3. Status of imagery
4. Interdisciplinary needs and inputs to soil survey
5. Quality control procedures used
6. Soil survey appeals and disposition
7. Archival of soil survey records
8. Adherence to policies in the National Soil Survey Handbook (NSSH)
9. Application of technology, such as computers, field equipment, ground-penetrating radar, global positioning systems, and remotely sensed data, to increase efficiency

D. Soil Interpretations

1. Maintenance of database
2. Maintenance of field office database
3. Guidelines and criteria used for developing national, State, and local interpretations
4. Updating and coordinating interpretations in State by major land resource areas
5. Status of automated soil survey interpretation development and application (GIS, Pedon-PC, and other)
6. Status of special lists, such as prime farmlands, hydric soils, and highly erodible land
7. Technical guides
8. Training given and received

E. Field and Laboratory Investigations

1. Plan for soil survey investigations
2. Existing laboratory data availability
3. Coordination of field and laboratory studies
4. Benchmark soil data
5. Special projects and interagency coordination
6. Reference sampling for interpretations, classification, and correlation

F. Preparation and Processing of Maps and Text for Publication

1. SSURGO review
2. Publication development

G. Soil Survey Use

1. Effectiveness and use of soil surveys, whether or not they meet objectives
2. Inventory of published soil surveys
3. Information activities
4. Procedures for distributing published soil surveys
5. Advance information
6. Special and interim reports
7. Supplemental reports

609.14 Initial Field Review Checklist for Initial Soil Surveys

(Completed by the review leader)

- 1) Review completed mapping (digital or field sheets) for completeness
- 2) Review acreage for completed mapping and map units
- 3) Inspect mapping in the field
- 4) Review taxonomic and map unit descriptions
- 5) Review progressive correlation of map units
- 6) Review U.S. General Soil Map update and map unit descriptions
- 7) Review U.S. General Soil Map join
- 8) Check join to adjacent surveys and among field sheets
- 9) Review photographs and other figures for soil survey publication
- 10) Review soil interpretations
- 11) Review lab data
- 12) Review classification of all pedons with lab data
- 13) Review classification of all described pedons
- 14) Compare typical pedon to the OSD
- 15) Review transect/random sampling data
- 16) Review statistical data
- 17) Check documentation distribution and content
- 18) Update databases
- 19) Update long-range plan as needed
- 20) Review memorandum of understanding
- 21) Discuss development of annual plan for coming year
- 22) Complete quality assurance worksheet
- 23) Complete comments, correlation notes, things-to-do, agreed-to-items, and commendable items
- 24) Provide completed report to SSR
- 25) Review proposed new soil series and assign dates to submit OSDs to the SSR
- 26) Circulate proposed new soil series for peer review
- 27) Update soil data in Field Office Technical Guide (FOTG)
- 28) Update existing OSDs as needed
- 29) Review and revise scheduling dates

609.15 Quality Assurance Worksheet for Initial Soil Surveys (subject to change by the SSRs to reflect local conditions)

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

QUALITY ASSURANCE WORKSHEET

MLRA _____

_____ County, State

_____ (stssaid)

(Date)

This quality assurance report is to ensure that the soil survey is science-based, the legend and correlation use the MLRA concept, and the survey meets the standards and specifications of the NCSS.

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All negative responses identified in this report must be adequately addressed in a narrative.

QUALITY ASSURANCE REVIEW

_____ County, State - a subset of MLRA(s) _____
(Date)

GENERAL INFORMATION and SCHEDULING

Agency in charge of survey:

Cooperating agencies:

Survey team (name and agency):

Total acres (land, census water):

Acres updated/mapped and percent of survey:

Status of memorandum of understanding (e.g., current, signed)

List quality assurance reviews (type and date):

Scheduled date - next quality assurance review:

Scheduled date - mapping completion:

Scheduled date - final correlation:

Scheduled date - publication to the SSR for technical review:

Scheduled date - map compilation completion:

Participants at this review:

MANAGEMENT ISSUES

_____ Are deficiencies and agreed-to items stated in previous quality assurance reviews satisfied?

_____ Are management documents, such as long-range plan, project plans, annual plan of operations, and standards of performance, current?

_____ Are there management problems associated with this survey?

_____ Is the survey party accessing and using the latest versions of the NSSH, *Keys to Soil Taxonomy*, SSR technical notes and other guidance documents, past quality assurance reports, and other relevant documents?

_____ Is the scheduling information for the soil survey correct in NASIS?

List in the narrative the specific technical training needs of soil survey staff not already identified by the local staff as part of their development plans.

CORRELATION and DESCRIPTIVE LEGEND

All map units correlated must have data to support the correlation—if not from the subset, then from the MLRA. The MLRA concept must be used for developing the legend.

One legend is maintained for the survey containing the provisional and the approved map units for the MLRA. The legend is the official, progressively correlated subset legend of the MLRA. The map units in the legend have been approved by the SSR. The legend contains “provisional” map units that are being mapped but have insufficient acreage or documentation. The type and amount of documentation required for the map units to become approved depends on the complexity of the map unit, existing documentation for the map unit within the MLRA, and previous correlation decisions.

Attach the legend. Include a list of map units added, dropped, or changed since the last review. Summarize the documentation gathered and provide a narrative of the field stops seen on this review.

_____ Is documentation sufficient for approved data map units on the legend?

_____ Do all new series components of map units to be added to the legend classify properly in accordance with the current edition of the *Keys to Soil Taxonomy*?

_____ Are the properties (representative values) of all new components of map units as mapped in the survey area within the range of the named series?

_____ Are the OSDs up-to-date and contain current data for all series used in the survey area (e.g., typical pedon georeferenced, taxonomic classification, metric units of measure, horizon designations, competing series section, diagnostic horizons and features listed)?

_____ Have names for new series been reserved in the Soil Classification Database (SC Database) accompanied by an OSD uploaded to the OSD file share?

_____ Are the map unit names and design consistent with the MLRA soil survey area for this initial soil survey?

_____ Are all proposed changes in the legend recorded and reported in the appropriate NASIS tables?

_____ Are notes recorded in NASIS detailing the location and acreage of provisional map units until they are approved for the ID legend?

_____ Is a strategy in place for gathering documentation and are there instructions as to kind and quality of field notes needed?

_____ Does each project member have an up-to-date copy of the descriptive legend?

_____ Is the descriptive legend adequate to ensure consistency of the mapping by all project members and to ensure a timely completion of the publication?

_____ Are the pedon descriptions stored in NASIS?

_____ Are field notes, transect data, and laboratory data summarized regularly? Is the descriptive legend brought up to date?

_____ Is a conversion legend generated? Is it up-to-date?

The project leader is responsible for updating the section “Notes to Accompany Classification and Correlation of the Soils.” Refer to section 609.10, item 17 for an example. Attach the notes or the plans for developing this document.

SOIL INVESTIGATIONS

_____ Is a soil investigation work plan prepared and approved by the SSR?

_____ Are the taxonomic classification of NCSS lab pedons current with the latest edition of the *Keys to Soil Taxonomy*?

_____ Is the disposition of the laboratory pedon data given and provisions made to update the NCSS soil characterization database?

The project leader is responsible for updating the section “Classification of Pedons Sampled for Laboratory Analysis.” Refer to section 609.10, item 15 for an example. Attach the document or the plans for developing this document.

SOIL MAPPING

Describe in a narrative the process used by the soil survey office to ensure:

- quality control of mapping and approval by the soil survey project leader;
- an exact join as described in NSSH 609.3; or an acceptable join
- join statements to allow an exact join in the future (consider metadata)

_____ Is there a process for ensuring security of the original maps, compiled maps, and data files (e.g., fire-safe copies, back-up disks at a secure location, etc.)?

Attach a list of field sheets (or quadrangles) reviewed: _____

_____ Is recent and/or update mapping consistent throughout the subset and MLRA?

_____ Does the map unit design represent the landscape/landform position and other information in the data map unit?

_____ Do map unit boundaries generally conform to landscape features and other features visible on the photo base?

_____ Is the level of detail in mapping consistent and does the level of detail conform to the specifications in the memorandum of understanding?

Title 430 – National Soil Survey Handbook

_____ Do map sheets join?

_____ Is a Feature and Symbol Legend for Soil Survey, NRCS-SOI-37A (NSSH Part 627, Exhibit 627-5) applied properly and consistently?

_____ Is the NRCS-SOI-37A current and are major/minor codes completed?

_____ Are typical pedons located in a delineation with the component named?

_____ Is there a system in place to track, for each field sheet, the surveyor's name, dates, acreage mapped, acreage reported, and date of completion of the field sheet?

_____ Do completed maps show: survey name and State, date of survey, name of soil scientist, "advance copy"?

_____ Are legible and oriented symbols in all delineations?

_____ Are typifying pedons accurately georeferenced?

_____ Are all ad hoc features clearly defined?

_____ Where appropriate, are section corners marked?

_____ Is a progress map maintained?

_____ Is the general soil map concurrent with mapping?

MAP DEVELOPMENT and DIGITIZING

If applicable, describe the process to ensure quality control of soil map development activities (100 percent check).

_____ Was the digitizing performed according to the NRCS data capture specifications as described in the NSSH, part 647?

_____ Is the soil survey spatial data captured to NRCS approved base maps?

_____ Do map unit delineations and their symbols match across map boundaries? Has an exact or acceptable (choose one for each adjacent survey) join been achieved with adjacent surveys?

_____ Do plans ensure a 100 percent edit of the digital spatial data prior to sending the map files to the SSR for quality assurance and geographic data certification?

Attach plans to digitize the survey, including plans for preparing the maps for publication.

PUBLICATION PREPARATION

Date the following publication items that are complete. Address incomplete items in the narrative. Note: Not all of the items listed below are required for a publication (see NSSH Part 644, Exhibit 644-1).

- _____ Map unit descriptions
- _____ Taxonomic unit descriptions
- _____ General soil map
- _____ General soil map unit descriptions
- _____ Edited prewritten material
- _____ “General Nature of the County” section
- _____ Climate tables and narrative
- _____ Interpretive tables
- _____ Database populated for generation of interpretations and map unit descriptions
- _____ Pictures and captions
- _____ Block diagrams or other graphics
- _____ Input from appropriate partners
- _____ Input from other disciplines
- _____ Soil formation section
- _____ Use and management narratives
- _____ Draft publication for technical review

NASIS and DATABASES

- _____ Is NASIS being populated by the soil survey office staff?
- _____ Are data elements for all map unit components (including miscellaneous areas, as appropriate) being populated sufficiently with data to meet nationally mandated requirements, as well as State and local needs?

Attach plans to populate the database. Include NASIS training received and training needed for all project members, along with the staff member(s) who have responsibility for editing.

INTERPRETATIONS

_____ Are existing interpretations adequate for the purposes of the survey as described in the memorandum of understanding?

_____ Are interpretive ratings being reviewed and tested?

In a narrative, describe:

What special interpretations or interpretive tables are needed?

What assistance have other disciplines provided or scheduled for making, testing, and coordinating interpretations?

What soil performance data (e.g., crop yields, site indices) are collected and how?

MISCELLANEOUS ISSUES

Attach responses to these in a narrative:

Have resource soil scientists participated in this survey? If yes, in what capacity and has work been reviewed for quality control?

What input and involvement is there from soil survey partners?

Describe the survey party's involvement with technical soil services (i.e., Conservation Reserve Program (CRP), soil quality, global climate change, FOTG, etc.).

1) What are the plans for certifying and updating the FOTG?

What are the plans to provide advanced information and support to users?

How is the survey being publicized?

What are the plans to update the U.S. General Soil Map (STATSGO2) database when the survey is completed?

Other issues

ATTACHMENTS and NARRATIVES

All negative responses are to be addressed. In addition, include the following with this report:

Identification legend

Provisional legend

List of the map units added, dropped, or changed

Conversion legend

Summary of documentation

Field stops report

Notes to accompany classification and correlation of the soils

Title 430 – National Soil Survey Handbook

Classification of pedons sampled for laboratory analysis
Field sheets reviewed
Plans to digitize the survey, including plans for preparing the maps for publication
How publication items planned but not completed are being addressed
Technical training needs
Response to miscellaneous issues
Quality control process of soil maps
Quality control process of soil compilation (if applicable)
Plans to populate the database
Commendable items
Recommended or significant items
Action items (agreed-to items)

SIGNATURE PAGE

We, the undersigned, have reviewed this report and concur with its findings.

MLRA Soil Survey Leader Date

Soil Data Quality Specialist Date

NCSS Partner(s) Date

State Soil Scientist Date

CERTIFICATION

As of _____, this soil survey meets the standards and specifications of the NCSS. The survey is science-based and joins adjacent survey areas using the MLRA concept.

Director of _____ (city, State) _____
Soil Survey Regional Office

609.16 Progress Field Review Checklist for Initial Soil Surveys

(Completed by the review leader)

- 1) Review SSURGO spatial and attribute data for completeness
- 2) Review acreage for completed mapping and map units
- 3) Review previous agreed-to-items and prepare response(s)
- 4) Review field sheets in the office
- 5) Inspect field mapping
- 6) Review classification of all new lab data pedons
- 7) Review classification of all described pedons
- 8) Review comparison of all typical pedons to the OSD
- 9) Review all taxonomic and map unit descriptions
- 10) Continue progressive correlation approval
- 11) Review U.S. General Soil Map legend and descriptions
- 12) Review U.S. General Soil Map join
- 13) Check join to adjacent surveys and among field sheets
- 14) Review spot check of map digitizing
- 15) Review photographs for the soil survey publication
- 16) Review database entries and interpretations
- 17) Order or review set of interpretation tables
- 18) Review lab data
- 19) Review transect/random sampling data
- 20) Review statistical data
- 21) Check documentation distribution and content
- 22) Update long-range plan as needed
- 23) Review memorandum of understanding
- 24) Discuss development of annual plan for coming year
- 25) Complete quality assurance worksheet
- 26) Complete comments, correlation notes, things-to-do, agreed-to-items, and commendable items
- 27) Provide completed report to SSR
- 28) Review proposed new soil series and assign dates to submit OSDs to the SSR
- 29) Circulate proposed new series for peer review
- 30) Update soil data in the FOTG
- 31) Update existing OSDs as needed
- 32) Provide OSDs and checklist tables to soil survey office
- 33) Review and revise scheduling dates
- 34) Review special studies data, such as yield or water table data
- 35) Review or schedule assistance from other disciplines
- 36) Review soil survey information program and activities
- 37) Review check plots of digitized quads

609.17 Final Field Review Checklist for Initial Soil Surveys

(Completed by the review leader)

- 1) Review SSURGO spatial and attribute data for completeness
- 2) Review previous agreed-to-items and prepare response(s)
- 3) Review field sheets in the office
- 4) Review acreage for completed mapping and map units
- 5) Review classification and geo-reference of all described pedons
- 6) Review comparison of all typical pedons to OSD
- 7) Review classification of all new lab data pedons
- 8) Review all taxonomic and map unit descriptions
- 9) Review documentation distribution and content
- 10) Review legend and descriptions for U.S. General Soil Map
- 11) Check join for U.S. General Soil Map update
- 12) Check join among field sheets
- 13) Review cartographic spot check of map digitizing
- 14) Review photographs for the soil survey publication
- 15) Check line work and database for the join with adjacent surveys
- 16) Review soil interpretations and all NASIS entries
- 17) Review lab data
- 18) Review transect/random sampled data
- 19) Review statistical data
- 20) Complete correlation approval
- 21) Review completed legend
- 22) Update laboratory database for correlated names and classifications
- 23) Review memorandum of understanding
- 24) Discuss development of annual plan for completion
- 25) Complete quality assurance worksheet
- 26) Review preliminary correlation if prepared
- 27) Complete correlation notes, things-to-do, agreed-to-items, and commendable items
- 28) Prepare final field review report
- 29) Prepare preliminary correlation memorandum without certifications to attach to final field report
- 30) Update OSDs, the Soil Classification Database (SC Database), and NASIS
- 31) Provide OSDs, soil interpretations information, and checklist tables to soil survey office
- 32) Review and revise scheduling dates
- 33) Review check plots of digitized quads
- 34) Review complete report draft

609.18 Project Review Checklist for MLRA Soil Surveys

_____ MLRA Soil Survey Area, _____

(Completed by the review leader)

- 1) Review previous agreed-to-items and prepare response(s)
- 2) Review SSURGO spatial and attribute data for completeness
- 3) Review spatial and attribute revisions in the office
- 4) Review classification and geo-reference of all described pedons
- 5) Review changes or proposed revisions to OSDs
- 6) Review classification of all new lab data pedons
- 7) Review documentation distribution and content
- 8) Review legend and descriptions for U.S. General Soil Map
- 9) Check join for U.S. General Soil Map update
- 10) Review photographs and other figures for the soil survey publication
- 11) Check line work and database for the join with adjacent areas
- 12) Review soil interpretations and all NASIS entries
- 13) Review lab data
- 14) Review transect/random sampled data
- 15) Review statistical data
- 16) Complete correlation approval of map units
- 17) Review completed legend
- 18) Update laboratory database for correlated names and classifications
- 19) Discuss development of annual plan (if needed) for completion
- 20) Complete quality assurance worksheet
- 21) Complete correlation notes, things-to-do, agreed-to-items, and commendable items
- 22) Prepare project review report
- 23) Review correlation documentation in NASIS for completeness.
- 24) Submit updated OSDs and soil classification data
- 25) Review and revise scheduling dates
- 26) Review check plots of digitized quads

609.19 Quality Assurance Worksheet for MLRA Soil Surveys (subject to change by the SSRs to reflect local conditions)

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

QUALITY ASSURANCE WORKSHEET

MLRA _____

_____ MLRA SSA
_____ (MLRA ssaid)

(Date)

This quality assurance report is to ensure that the soil survey is science-based, that the legend and correlation use the MLRA concept, and that the survey meets the standards and specifications of NCSS.

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CERTIFICATION PAGE.....

All negative responses identified in this report must be adequately addressed in a narrative.

QUALITY ASSURANCE REVIEW

_____ MLRA project area – a subset of MLRA(s) _____
(Date)

GENERAL INFORMATION and SCHEDULING

Agency in charge of survey:

Cooperating agencies:

Survey team (name and agency):

Total acres (land, census water):

Acres updated/remapped and percent of survey:

List of quality assurance reviews (type and date):

Scheduled date - next quality assurance review:

Scheduled date - project completion:

Participants at this review:

MANAGEMENT ISSUES

_____ Are the deficiencies and agreed-to items stated in previous quality assurance reviews satisfied?

_____ Are management documents such as long-range plan, project plans, annual plan of operations, standards of performance, and individual development plans current?

_____ Are there management problems associated with this survey?

_____ Is the survey party accessing and using the latest versions of the NSSH, *Keys to Soil Taxonomy*, SSR technical notes and other guidance documents, past quality assurance reports, and other relevant documents?

_____ Is the scheduling information for the soil survey correct in NASIS?

List in the narrative the specific technical training needs of soil survey staff not already identified by the local staff as part of their development plans.

CORRELATION

One legend is maintained for the survey containing the provisional and the approved map units for the MLRA. The legend is the official, progressively correlated subset legend of the MLRA. The map units in the legend have been approved by the SSR. The legend contains “provisional” map units that are being mapped but that have insufficient acreage or documentation. The type and amount of documentation required for the map units to become approved depends on the complexity of the map unit, existing documentation for the map unit within the MLRA, and previous correlation decisions.

Attach the legend. Include a list of map units added, dropped, or changed since the last review. Summarize the documentation gathered and provide a narrative of the field stops seen on this review.

_____ Do all project members and participants understand the concept of map units, data mapunits, and the MLRA process?

_____ Is documentation sufficient for approved data map units on the legend?

_____ Do all new series components of map units to be added to the legend classify properly in accordance with the current edition of the *Keys to Soil Taxonomy*?

_____ Are the properties (at least the representative values) of all new components of map units as mapped in the survey area within the range of the named series?

_____ Are the OSDs up-to-date and contain current data for all series used in the survey area (e.g., typical pedon georeferenced, taxonomic classification, metric units of measure, horizon designations, competing series section, diagnostic horizons and features listed)?

_____ Have names for new series been reserved in the Soil Classification Database (SC Database) accompanied by an OSD uploaded to the OSD file share?

_____ Are the map unit names and design consistent with purposes and scale of the MLRA soil survey area?

_____ Are all proposed changes in the legend recorded and reported in an accepted systematic procedure in the appropriate NASIS tables?

_____ Is a strategy for gathering documentation in place and are there instructions as to kind and quality of field notes needed?

_____ Are the pedon descriptions stored in NASIS?

_____ Are field notes, transect data, and laboratory data summarized regularly?

_____ Is a conversion legend generated? Is it up-to-date?

SOIL INVESTIGATIONS

_____ Is a soil investigation work plan prepared and approved by the SSR?

_____ Are the taxonomic classification of NCSS lab pedons current with the latest edition of the *Keys to Soil Taxonomy*?

_____ Is the disposition of the laboratory pedon data given and are provisions made to update the NCSS soil characterization database?

SUPPLEMENTAL SOIL MAPPING

Describe in a narrative the process used by the soil survey office to ensure:

Quality control of supplemental mapping and approval by the soil survey leader

An exact join as described in NSSH section 609.3

Attach a list of spatial data reviewed

_____ Is supplemental mapping consistent throughout the subset and MLRA?

_____ Does the map unit design represent the landscape/landform position and other information in the data map unit?

_____ Do map unit boundaries generally conform to landscape features and other features visible on the imagery?

_____ Is the level of detail in mapping consistent and does the level of detail conform to the objectives of the project plan?

_____ Is a Feature and Symbol Legend for Soil Survey, NRCS-SOI-37A (NSSH Part 627, Exhibit 627-5) applied properly and consistently?

_____ Is the NRCS-SOI-37A current and are major/minor codes completed?

_____ Are typical pedons located in a delineation with the component named?

_____ Are typifying pedons accurately georeferenced?

_____ Are all ad hoc features clearly defined?

_____ Is a progress map maintained?

_____ Is the provisional U.S. General Soil Map (STATSGO2) map concurrent with mapping?

SSURGO DEVELOPMENT and REVISIONS

_____ Do digitized map unit delineations and their symbols match across project boundaries? Has an exact join been achieved with adjacent MLRA soil survey areas?

_____ Do plans ensure a 100 percent edit of the digital spatial data prior to sending the map files to the SSR for quality assurance and geographic data certification?

NASIS and DATABASES

_____ Are all data elements for all map unit components including miscellaneous areas populated with data?

Attach plans to populate the database. Include NASIS training received and training needed for all project members, along with the staff member(s) who have responsibility for editing.

INTERPRETATIONS

_____ Are interpretations consistent with the purposes of the survey as described in the project plan?

_____ Are interpretive ratings being reviewed and tested?

In a narrative, describe:

What special interpretations or interpretive tables are needed?

What assistance have other disciplines provided or scheduled for making, testing, and coordinating interpretations?

What soil performance data (e.g., crop yields, site indices) are collected and how?

MISCELLANEOUS ISSUES

Attach responses to these in a narrative:

What are the roles and responsibilities of the resource soil scientist(s) with this project? Conversely, what are the roles and responsibilities of the survey party with the resource soil scientist(s)?

What input and involvement is there from soil survey partners?

Describe the survey party's involvement with technical soil services (i.e., CRP, soil quality, FOTG, onsite investigations, etc.).

1) What are the plans for the State certifying and updating the FOTG?

What are the plans to update the U.S. General Soil Map (STATSGO2) database when the survey is completed?

Other issues

ATTACHMENTS and NARRATIVES

All negative responses are to be addressed. In addition, include the following with this report:

- Identification legend
- Provisional legend
- List of the map units added, dropped, or changed
- Conversion legend
- Summary of documentation
- Field stops report
- Notes to accompany classification and correlation of the soils
- Classification of pedons sampled for laboratory analysis
- SSURGO data reviewed
- Web Soil Survey reviewed
- Technical training needs
- Response to miscellaneous issues
- Quality control process of soil maps
- Plans to populate the database
- Commendable items
- Recommended or significant items
- Action items (agreed-to items)

SIGNATURE PAGE

We, the undersigned, have reviewed this report and concur with its findings.

MLRA Soil Survey Leader Date

Soil Data Quality Specialist date

NCSS Partner(s) Date

State Soil Scientist Date

State Soil Scientist Date

CERTIFICATION

As of _____, this soil survey meets the standards and specifications of the NCSS.
The survey is science-based and joins adjacent MLRA survey areas.

Director of _____ (city, State) _____
Soil Survey Regional Office