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Title 430 – National Soil Survey Handbook

**Part 659 – Amendments**

**Subpart B – Exhibits**

Amended August 2024

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**659.10 Amendment 1 (September 1997)**

A. General changes:

1. Soils Division to Soil Survey Division.
2. National Cartography and GIS Center to National Cartography and Geospatial Center.
3. Electronic Imaging and Design staff at National Headquarters to National Production Service Staff at the National Business Management Center at Fort Worth, Texas.

B. Specific changes:

1. Table of Contents – General
  - a. Add the statement: Unlisted parts are reserved.
2. Table of Contents - Detailed
  - a. Part 601.01(e) changed GIS to Geospatial.
  - b. Strike out 607.02 and renumber 607.03 to 607.02.
3. Subject Index – Conventional and Special Symbols Legend
  - a. Add “and definitions” after legend.

C. Part 607

1. Strike out 607.02 General in contents.
2. Renumber 607.03 to 607.02.
3. Exhibit 607-2 added the following statement to the end of the listing: The sources indicated herein are in no way endorsed by the Government as being the preferred vendor of choice. Proposed acquisitions by the Government shall be in accordance with the applicable Federal Acquisition Regulations and in full compliance with the Competition and Contracting Act and Procurement Integrity Act.

#### D. Part 609

1. 609.05(a)(2) replace the current statement with: The MLRA office assures the quality of detailed soil survey maps prepared for public distribution including assuring that joins are achieved. Joining is addressed from the initiation of a soil survey and achieved through progressive correlation. Joining between previously correlated soil survey areas is addressed prior to the compilation/recompilation step of the digitizing process with an addendum to the correlation.
2. 609.05(a)(3) replace the fifth statement with: the exact or acceptable join of map unit lines and concepts across map sheets within the survey area and across survey area boundaries.
3. 609.05(a)(6) replace the current statement with the following paragraphs: It is the intent of soil survey to provide seamless joins across political boundaries. Where an exact join cannot be accomplished, all discrepancies are to be documented, recorded, and filed in the final correlation. These joining statements are recommended to the MLRA office by the project office or other office discovering the discrepancies. Joining statements and types of joins refer to the boundary of two surveys. When completing a survey, the boundary with each of the other survey areas is to be joined and documented.  
  
Two types of joins are recognized; an exact join and an acceptable join.
  - a. 609.05(a)(i) an exact join occurs when two soil survey areas join lines and features exactly along common boundaries and the joined soil polygons share the same NASIS data mapunit.
  - b. 609.05(a)(ii) an acceptable join occurs when an exact join is not made but the join is acceptable to the MLRA office and the state soil scientist until an exact join can be made. An acceptable join occurs when the lines match as close as possible and adjoined map units have similar soil properties and interpretations.
4. 609.05(a)(7) replace the paragraph with: The following examples describe the most common join situations and provide general guidelines for obtaining an exact or acceptable join between survey areas. A reasonable attempt to join previously correlated surveys should be made before digitizing. An acceptable join is to be made between surveys with current status when an exact join is not immediately possible.
5. 609.05(a)(i) replace the paragraph with: If two ongoing surveys of the same order of mapping are being joined, an exact join is required. Exact joins are required between two adjacent survey areas if both of the areas were correlated after January 1993.
6. 609.05(a)(ii) replace the first two sentences with: If an ongoing survey is being joined with a modern correlated survey and both surveys are of the same order, an acceptable join is required. The lines should be joined exactly between surveys, and soil taxa and interpretations are to be the same or similar. Where obvious errors in the previously correlated survey are

documented and preclude the practical resolution of the join in a timely manner, the mis-join is documented in the correlation of the ongoing survey and with the official copy of the previously correlated survey for future resolution at an update. In some instances, the join may require the addition of small acreage map units to the ongoing soil survey or corrections on the maps of the recently correlated soil survey.

7. 609.05(a)(iii) replace with: If two soil surveys of different orders of mapping are being joined, an acceptable join is in effect since the boundary between soil survey areas also serves as soil area boundaries. A note is printed parallel to the boundaries that separate the areas of each survey order, such as “Limit of Order 3 Survey”. Chapter 2 of the Soil Survey Manual provides more information. Each soil line in the survey of lower intensity must have a corresponding soil line in the adjacent survey of higher intensity, but the converse is not required. Named taxa of a map unit from the survey of lower intensity share a common taxonomic class, at some categorical level, with a named taxon from at least one of the map units in the adjacent survey of higher intensity.
8. 609.05(a)(iv) replace with: If an ongoing soil survey borders a survey area that requires extensive revision and is out-of-date and therefore acknowledged as being obsolete, it is not necessary to attain an exact or acceptable join or revise any part of the out-of-date survey until such time as a maintenance project is initiated. The joining statement in the correlation should state the situation.
9. 609.05(a)(v) add the following: When two previously correlated surveys are prepared for SSURGO, an acceptable join is adequate. In this instance there is usually no Project Office staff available to investigate join discrepancies in the field. Adjust lines and associated data as is practical from the office to affect the best possible acceptable join. This generally involves moving lines slightly to conform with new imagery and to come together at the same point along the survey boundary and coordinating the boundary between the two surveys. At the discretion of the state soil scientist and MLRA office, it may also involve recorrelation of soils in one or both of the survey areas. Digital soil surveys and join documentation and statements in the correlation and its addendums are tools for future update activities to implement MLRA legends and exact joins. The MLRA office initiates a plan for completing an exact join between soil surveys that have been joined for expediency with an acceptable join.
10. 609.06(c)(5) last paragraph now reads: Amendments to the final correlation document are given the same signatures and distribution as the original document.

11. Exhibit 609-1 add EEO statement to the heading: The United States Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, and marital or familial status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (Voice and TDD). To file a complaint, write the Secretary of Agriculture, U.S. Department of Agriculture, Washington, D.C., 20250, or call 1-800-245-6340 (voice) or (202) 720-1127 (TDD). USDA is an equal employment opportunity employer.

E. Part 610

1. 610.01(d) add the following statement: preparing and signing amendments to the correlation.
2. 610.07 add the following statement after the second sentence: The MLRA office and State Conservationist sign the amendment. Distribution is the same as the final correlation. Refer to 609.06(c)(5).

F. Part 617

1. 617.04 and 617.05 change reference to 617.11 to 617.10.
2. 617.10 Step 6(b) add at the end of the paragraph: The new interpretation generator recognizes the progressive effect of a property on the interpretation. The curve for approximate reasoning (fuzzy logic) reflects the increasing, decreasing, or constant effect that varying degrees of a property have on the interpretation. This is implemented in the evaluation phase of the interpretation generator.

G. Part 618

1. 618.01(c) add to the end of the paragraph the following statement: This includes all data elements listed in part 618.
2. 618.10 Climatic Setting
  - a. First paragraph, first sentence - Add evapotranspiration.
  - b. First paragraph, second sentence - Replace frost-free period, precipitation, and temperature with (d) and (e): (d) Daily Average Precipitation. Definition. Daily average precipitation is the total precipitation for the month divided by the number of days in the month for the standard "normal" period, 1961-1990. Entries. Enter the high, low, and representative value in mm. The range of allowed entries is 0 to 750 mm. (e) Daily Average Potential Evapotranspiration. Definition. Daily average potential evapotranspiration is the total monthly potential evapotranspiration divided by the number of days in the month for the standard "normal" period, 1961-1990. Entries. Enter the high, low, and representative value in mm. The range of allowed entries is 0 to 300 mm.

3. 618.43(d)
  - a. Remove and pararock from first sentence of this part.
  - b. At the end of last paragraph, add the following statement: Pararock fragments are not cemented strongly enough to be retained on sieves. They are crushed and estimated into percent passing sieves. ASTM procedures use a roller crusher as a pretreatment of the soil material prior to sieving. Field estimates should try to replicate this procedure.
4. 618.67(h)(2)
  - a. Renumber vii, viii, and ix to vi, vii, and viii.
  - b. Add (ix) and (x): (ix) Limnic materials are used as modifiers to texture to describe the origin or the material. These materials were deposited in water by precipitation or through the action of aquatic organisms or derived from plants and organisms. These modifiers are used to indicate presence and origin without respect to any set amount. Refer to the Keys to Soil Taxonomy for complete definitions of limnic materials. Coprogenous -- Coprogenous-earth or sedimentary peat is limnic layer which contains many very small (0.1 to .001 mm) fecal pellets. Diatomaceous -- Diatomaceous-earth is a limnic layer composed of diatoms. Marly -- Marl is a limnic layer that is light colored and reacts with HCl. (x) Permanently frozen -- Term applied to soil layer in which the temperature is perennially at or below 0 degrees C, whether its consistence is very hard or loose.
5. Exhibit 618-15 remove SR Stratified (Stratified is handled as a YES or NO entry with NASIS).

#### H. Part 622

1. 622.01 policy and responsibilities: Remove the third paragraph referring to the regional office.
2. 622.03(d) change entries 2 through 70 and add 10 as follows:
  - 2 - Prime farmland if drained.
  - 3 - Prime farmland if protected from flooding or not frequently flooded during the growing season.
  - 4 - Prime farmland if irrigated.
  - 5 - Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season.
  - 6 - Prime farmland if irrigated and drained.
  - 7 - Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season.
  - 8 - Prime farmland if subsoiled, completely removed the root inhibiting soil layer.
  - 9 - Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60.

- 10 - Prime farmland if irrigated and reclaimed from excess salts and sodium.
- 30 - Farmland of statewide importance.
- 50 - Farmland of local importance.
- 70 - Farmland of unique importance.

3. 622.09(a)

- a. Rename the section to Rangeland.
- b. Delete first paragraph (Range is any land ...). Intent: Range is a land use not an ecological group.
- c. Move third paragraph (Rangeland is land on which ...) to the first paragraph.
- d. Delete last paragraph (Forested range is forestland that ...). Intent: Forested range is a land use, not an ecological group.
- e. Change the name of Part 622.09 to Rangeland in the contents at front of part 622 and in the detailed table of contents.

I. Part 623

- 1. 623.01(a) change “are” to “and” in last sentence.

J. Part 627

- 1. 627.04(e)(1)(i) after the third sentence add: Avoid using the lowercase letters “i”, “j”, “q”, and “l” because, when handwritten, these letters are easily confused with other letters or the number 1.

K. Part 630

- 1. Exhibit 630-2 Benchmark Soil List By State - Add the Ohio benchmark soils.

OH Bennington	fine, illitic, mesic Aeric Epiaqualfs
OH Canfield	fine-loamy, mixed, mesic Aquic Fragiudalfs
OH Celina	fine, mixed, mesic Aquic Hapludalfs
OH Chagrin	fine-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
OH Chili	fine-loamy, mixed mesic Typic Hapludalfs
OH Cincinnati	fine-silty, mixed, mesic Oxyaquic Fragiudalfs
OH Clermont	fine-silty, mixed, mesic Typic Glossaqualfs
OH Conneaut	fine-silty, mixed, nonacid, mesic Aeric Epiaquepts
OH Glynwood	fine, illitic, mesic Aquic Hapludalfs
OH Guernsey	fine, mixed, mesic Aquic Hapludalfs
OH Hanover	fine-loamy, mixed, mesic Typic Fragiudults
OH Hoytville	fine, illitic, mesic Mollic Epiaqualfs
OH Latty	fine, illitic, mesic Typic Epiaquepts
OH Loudonville	fine-loamy, mixed, mesic Ultic Hapludalfs

OH Mahoning	fine, illitic, mesic Aeric Epiaqualfs
OH Mermill	fine-loamy, mixed, mesic Mollic Epiaqualfs
OH Miamian	fine, mixed, mesic Oxyaquic Hapludalfs
OH Millgrove	fine-loamy, mixed, mesic Typic Argiaquolls
OH Olentangy	fine-silty, mixed, nonacid, mesic Histic Humaquepts
OH Paulding	very-fine, illitic, nonacid, mesic Typic Epiaquepts
OH Platea	fine-silty, mixed, mesic Aeric Fragiaqualfs
OH Rossmoyne	fine-silty, mixed, mesic Aquic Fragiudalfs
OH Toledo	fine, illitic, nonacid, mesic Mollic Endoaquepts
OH Wellston	fine-silty, mixed, mesic Ultic Hapludalfs
OH Wooster	fine-loamy, mixed, mesic Oxyaquic Fragiudalfs

L. Part 639

1. 639.02(b) 2nd paragraph., 2nd sentence: indicated by the NASIS site and group columns.
2. 639.06(a) General Changes
  - a. Change database object to NASIS site object.
  - b. Change database table to NASIS site table.
  - c. Change National Soil Information System database to National Soil Information System site.
3. 639.06(a) Specific Changes
  - a. Title line: The NASIS site object.
  - b. 1st line: The purpose of the NASIS site object is.
  - c. 6th line: Site has an entry in the NASIS site object.
  - d. 2nd paragraph: The NASIS site object includes the NASIS site, group, user.
  - e. 3rd paragraph: The NASIS site table lists all NASIS sites and users. This table enables the National Soil Information System to share data from site to site. NASIS site records accompany requested data. The fields in this table identify the NASIS site and who to contact if you have any questions about that data.
  - f. 5th paragraph: Descriptions for data elements in the NASIS site object are available in National Soil Information System on-line documentation.
  - g. 8th paragraph: Authority to edit a NASIS site object is limited to a user who has NASIS manager privileges for that object.
4. 639.06(a)(1) add:
  - a. NASIS site table: database iid (on screen label: Rec ID).

- (1) Definition. Database iid is the identification number of the NASIS site that created a particular entity. This is a required integer field that uniquely identifies the local NASIS site. This number must be obtained from the soil hotline staff BEFORE the National Soil Information System site is installed.
- b. NASIS site table: database name (on screen label: NASIS site name).
  - (1) Definition. Database name is the name of a particular National Soil Information System site. The database name has a required 30 character field that records the name that identifies the local site. This name must be obtained from the soil hotline staff BEFORE the National Soil Information System site is installed. This is the source of the NASIS site name that is displayed in the National Soil Information System edit windows.
- c. NASIS site table: database description (on screen label: Description).
  - (1) Definition. Database description is a narrative text entry that contains information about a particular National Soil Information System site. The database description has an optional 60 character field that describes the site to other locations.
- d. NASIS site table: database state (on screen label: State).
  - (1) Definition. Database state is the name of the state in which a particular National Soil Information System site resides. It is expressed as the Federal Information Processing Standards (FIPS) alpha state code.
- e. NASIS site table: database county (on screen label: County).
  - (1) Definition. Database county is the name of the county or other division in which a particular National Soil Information System site resides.
- f. NASIS site table: database city (on screen label: City).
  - (1) Definition. Database city is the name of the city or other location in which a particular National Soil Information System site resides.
- g. NASIS site table: database office type (on screen label: Off Type).
  - (1) Definition. Database office type is the name for the type of office in which a particular National Soil Information System site resides.
  - (2) Classes. Add: other, type of office.
- h. NASIS site table: database contact (on screen label: Contact).
  - (1) Definition. Database contact is the name of the primary contact person for a particular National Soil Information System site.
- i. NASIS site table: database phone (on screen label: Phone).
- j. Group table: group name (on screen label: Group).
  - (1) Definition. Group name is the name of a particular National Soil Information System group in a particular National Soil Information System site.
- k. User table: User name (on screen label: ser).
  - (1) Definition. User name is the name of a particular National Soil Information System user in a particular National Soil Information System site.



5. 639.06(b) The query object, 2nd paragraph: The query object comprises the query table. Ownership of a specific query object is indicated by the site and group columns in the query table. Authority to edit the query object is limited to users who are members of the group that owns the query.

M. Part 647

1. 647.01(a)(5); 647.03(b), (d), and (e); part 647.07(h)(2); part 647.08(b); 647.09(a); and under Postscript Plot files - Change Exhibit 627-4 to Exhibit 627-5.
2. 647.01(b)(2) Soil Survey Project Office - Add the following responsibilities:
  - a. achieving an exact or an acceptable join as described in part 609.05 for soil surveys in progress,
  - b. supervising map compilation (or coordinate with dedicated map compilation units if established) for soil surveys in progress in preparation for digitizing and publication as described in NSSH part 647,
  - c. quality control of map compilation activities (100% check) for soil survey in progress,
  - d. quality control of all phases (soil business) of soil survey in progress,
  - e. assisting in development of field correlation under direction of the MLRA office, and
  - f. initiating documentation on joins.
3. 647.01(b)(3) MLRA Office. Replace the section with the following:
  - a. providing technical oversight and quality assurance for all phases of active soil survey projects;
  - b. assuring that exact or acceptable joins are achieved;
  - c. performing correlation activities in a manner that will lead to a coordinated soil survey throughout MLRAs and between MLRAs;
  - d. approving all correlation documents, including amendments to previously correlated surveys, in coordination with the appropriate state conservationist;
  - e. assuring the quality of all map compilation/recompilation through a 10% check and certification (a locally administered certification process may be established where dedicated compilation units exist);
  - f. assuring the quality of soil databases;
  - g. assisting states in the preparation of metadata;
  - h. informing states of any deficiencies in work submitted for review and assisting states with the resolution of these problems;
  - i. coordinating with states as needed for delivery of all map materials, soil data, and metadata to the digitizing unit for processing; and
  - j. initiating plans for completing an exact join between soil surveys that have been joined for expediency with an acceptable join.
4. Add the following section: 647.01(b)(4) State Offices
  - a. The state office is responsible for:

- (1) determining priorities for soil survey areas to be digitized within each state;
- (2) identifying and working with organizations outside of NRCS that can help us achieve our digitizing goals and coordinating with digitizing units and MLRA offices concerning these activities;
- (3) deploying sufficient staff to achieve agreed upon goals for the digitizing initiative;
- (4) obtaining all map materials needed in the state to perform map compilation/recompilation activities, including those needed for a check of joins with other survey areas;
- (5) coordinating with soil survey project offices in the state concerning the flow of map compilation work for soil surveys in progress;
- (6) supervising recompilation (or coordinating with dedicated map compilation units if established);
- (7) reviewing joins with surrounding surveys and making corrections to achieve an acceptable join for recompilation of existing surveys;
- (8) quality control of map recompilation activities (100% check);
- (9) initiating correlation amendments/supplements through the MLRA office as needed for SSURGO for recompiled soil surveys;
- (10) preparing and providing metadata for all compiled/recompiled surveys from the state which are submitted to digitizing units (through the MLRA office) for digitizing;
- (11) downloading soils data for SSURGO for all compiled/recompiled surveys from the state which are submitted to digitizing units (through the MLRA office) for digitizing; and
- (12) certifying, following quality review and completion of digitizing.

5. Add the following section: 647.01 (b) (5) Digitizing Units

- a. Digitizing units are responsible for:
  - (1) coordinating compilation/recompilation and soil business activities with states and MLRA offices to ensure an orderly flow of work for all soil surveys which are to be digitized through the digitizing unit;
  - (2) performing pre-certification review of submitted materials;
  - (3) notifying MLRA offices of any problems discovered during pre-certification review which require action by the MLRA office or states prior to certification;
  - (4) digitizing compiled map materials including scanning soil lines, labeling, and edge matching;
  - (5) performing quality control of final digital data including spatial, tabular, and metadata;
  - (6) coordinating with the MLRA office to obtain a SSURGO certification letter from the state conservationist of the state whose survey is digitized; and
  - (7) submitting certified SSURGO data to National Cartography and Geospatial Center for 10% quality review, and for archiving and distribution.

6. Change NCG responsibilities to 647.01(b)(6) National Cartography and Geospatial Center and replace with the following:
  - a. The National Cartography and Geospatial Center is responsible for:
    - (1) providing training in SSURGO quality assurance activities;
    - (2) providing technical assistance to states, MLRA offices, and digitizing units in spatial, tabular and metadata development to meet SSURGO specifications;
    - (3) communicating changes/updates and enhancements to SSURGO certification routines and procedures;
    - (4) performing 10% review of SSURGO materials received from digitizing units;
    - (5) archiving and distributing certified SSURGO data;
    - (6) developing and updating map compilation, digitizing, and map finishing procedures; and
    - (7) coordinating and implementing software updates to reflect changes in standards.
7. Add the following section: 647.01(b)(7) Regional Offices
  - a. The regional offices are responsible for:
    - (1) allocating funds to states, MLRAs, and digitizing units to be used for soil survey digitizing and SSURGO development;
    - (2) incorporating soil survey digitizing and SSURGO development performance measures in strategic plan; and
    - (3) providing oversight and evaluation to ensure that desired outcomes are met.
8. Change the NSSC responsibilities to 647.01(b)(8) and replace the responsibilities with the following:
  - a. developing standards, guidelines, and procedures for all aspects of soil survey work, soil map development, and SSURGO certification;
  - b. developing and applying geographic information systems for use with soil survey activities; and
  - c. developing, maintaining, and improving soil survey geographic databases.
9. Add the following section: 647.01(b)(9) National Headquarters
  - a. The Soil Survey Division and National Soil Information Coordinator are responsible for:
    - (1) reviewing and monitoring the SSURGO development process;
    - (2) issuing policy; and
    - (3) coordinating with states, MLRA offices, regional offices, National Cartography and Geospatial Center, and National Soil Survey Center on soil survey compilation, digitizing, and map finishing issues.
10. 647.03(e)(3) replace (i) with the following: (i) Soil area boundaries. All soil, miscellaneous, and water areas that occupy area are delineated as map units. Their boundaries will be accurately transferred from field sheets to the compilation documents. All feature edges will be matched and extended

across the neatline of all adjoining sheets to ensure accuracy in the joining. Any discrepancies between matches should be resolved and approved by the MLRA office.

11. 647.03 in the paragraph preceding (g), add (f) to Ad hoc features.
12. 647.05
  - a. Add (a) Planimetric correct base as headline to the first paragraph.
  - b. Add (b) Line adjustment as headline to the second paragraph.
  - c. Add (c) Documenting changes in line placement as headline to the third paragraph.
  - d. Change wording in the third paragraph to be: Document changes in line placement and, if needed, provide a supplement.
  - e. Change (1) Minimal Requirements to (d) Minimal Requirements.
  - f. Change (I) Memorandum of Understanding to (1) Memorandum of Understanding.
  - g. Change (ii) Supplement to A Published Soil Survey Map to (2) Supplement to a published soil survey map.
  - h. Change (iii) Classification and Correlation Document to (3) Classification and correlation document.
13. Exhibit 647-1 Suggested Compilation Edit Checklist
  - a. Replace the statement in the Soils Section that states: “A quality join exists with adjoining soil survey areas” with “An exact or acceptable (choose one) join exists with adjoining soil survey area. Repeat for each adjoining survey area.”
14. Exhibit 647-3 Map Compilation Certification
  - a. Replace statement 3 with: 3. Map unit delineations and their symbols match across map boundaries and an exact or acceptable (choose one for each adjacent survey) join has been achieved with adjacent surveys.
15. Exhibit 647-4 Supplement to A Published Soil Survey Map
  - a. In the last sentence of the first paragraph change the word improved to enhanced.
16. Exhibit 647-11 SSURGO Metadata Template
  - a. Under Data Quality Information remove the phrase “and are current as of the date of digitizing” from the end of the first paragraph.
17. Exhibit 647-12 Checklist for SSURGO Data
  - a. Replace the statement below under the Accuracy title: “Soil delineations and map unit composition match across soil survey area boundaries” with “Soil delineations and map unit composition have an exact or acceptable (choose one) join across soil survey area boundaries.”

#### N. Part 648

1. 648.03(a)(1) change 647.10 to 647.07.

2. 648.04(d) change the 2nd paragraph (d) to (e) and the following to (e) to (f).
- O. Part 649
1. Exhibit 649-1
    - a. Remove 106 from MO10 and add 106 to MO 5.
    - b. Remove 30 from MO 8 and add 30 to MO 2.
    - c. Add 31 to MO 2 list (MLRA 31 is shared between MO 2 and MO 8).

## 659.11 Amendment 2 (November 1997)

### A. Part 601

1. 601.01(d) – Add the following to the first line: including the maintenance and updating of soil surveys.

### B. Part 602

1. Exhibit 602-1, Article III, Section 1.0 change to: Director of Soil Survey.
2. Exhibit 602-1, Appendix A:
  - a. Change Agricultural Stabilization and Conservation Service to Farm Services Agency.
  - b. Change National Bureau of Standards, U.S. Department of Commerce to National Institute of Standards and Technology, U.S. Department of Commerce.
  - c. Add Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture.
  - d. Add National Agricultural Statistics Service, U.S. Department of Agriculture.
  - e. Delete Federal Crop Insurance, U.S. Department of Agriculture.
  - f. Delete Science and Education Administration, U.S. Department of Agriculture, Extension, CRIS.
  - g. Delete State Agricultural Experiment Stations.

### C. Part 606

1. 606.01(a) – Add the following as a paragraph under the bulleted items: Total acreage for all surveys within the state should total the Natural Resource Inventory acreage for the state. This acreage is matched to the scheduler and the map unit records.

### D. Part 607

1. Exhibit 607-2 – Add under color charts:

Color Communications, Inc.

229D Manchester Road

Poughkeepsie, NY 12603

1-800-575-6064

### E. Part 608

1. 608.08(a) – Under Scheduler attributes, add the following: The total acres of the soil survey area is the same as used in the Natural Resource Inventory (NRI). The total acres of all surveys within a state is the same as used in the Natural Resource Inventory (NRI) state total.

2. 608.10(b) – Replace the current paragraph with the following: The operational status categories are displayed on the Status of Soil Surveys map in the following colors: Published (F), dark green; Project (P1), yellow, indicating that the field mapping is in progress or Project (P2), light green, indicating that the field mapping is complete; Nonproject (N), white; Out-of-Date (D), red; Update (U1), blue, indicating that the field mapping is in progress; and Update (U2), orange, indicating that the field mapping is complete.

F. Part 610

1. 610.06(b)(3) – Change the general manual reference from 402.4(c) to 402.5(e).

G. Part 617

1. 617.06 – Replace the last two paragraphs with the following:

The Memorandum of Understanding is to state which interpretations are to be made for a soil survey area. The MLRA office, state soil scientist, and cooperators should agree on whether interpretations are generated for miscellaneous land types and minor soil components. Entry of data and preparation of soil interpretations for miscellaneous areas are encouraged. Omission of data elements is by joint consensus of the MLRA office, state soil scientist, and cooperators.

Data elements used as criteria in an interpretation must be completely populated in order to generate reliable interpretations.

Data elements are to be completely populated for major soil components including map unit components classified as higher taxonomic categories. The MLRA office, state soil scientist, and cooperators should reach a joint decision for special situations where it is not practical to populate data elements for map unit components classified at a higher taxonomic category than soil series. If the range of properties is too wide for interpretations, these areas may not meet the requirements of the user defined needs of the survey.

H. Part 618

1. 618.48(c), 2nd paragraph – Replace 2nd, 3rd, and 4th sentences with the following: In general, soils that are either highly alkaline or highly acid are likely to be corrosive to steel. Soils that have pH < 5.5 are likely to be corrosive to concrete. Soils that have pH > 8.5 are likely to be highly dispersible, and piping may be a problem.

I. Part 627

1. 627.07 – Add “can be” to the first sentence: Phases can be used to create groupings.
2. 627.07(a)(4)(ii) – Add “commonly”: Surface phases are commonly used if stones, boulders.

3. 627.09 – Change the first sentence to the following: Each map unit is given a name that accurately and uniquely identifies the unit within the legend used.

J. Part 631

1. 631.07(a)
  - a. First sentence – Change “over 20,000” to “more than 23,000.”
  - b. Second sentence – Change “over 800” to “more than 600.”
  - c. Add to the end of the paragraph – the internet, or CD-ROM.

K. Part 647

1. 647.07(m)(3) – Replace the first paragraph with the following: Statistics are generated for each quadrangle in the soil survey area and for the survey area. The acreage statistics are generated by UTM projection. In addition to quality control, acreage statistics replace the grid dot counts or planimetered acreage normally performed. These statistics are not submitted as a part of SSURGO. Discrepancies of more than 10 percent of the total between the Natural Resource Inventory (NRI) total and spatially determined totals are noted in the SSURGO review. The state soil scientist and MLRA Office leader review and decide where adjustments are needed.
2. Exhibit 647-11
  - a. Identification Information Section, under Description, first paragraph - change the first two sentences to the following: This data set is a digital soil survey and generally is the most detailed level of soil geographic data developed by the National Cooperative Soil Survey. The information was prepared by.
  - b. Identification Information Section, under Description, second paragraph - change the third sentence to the following: A special soil features layer (point and line features) is optional.
  - c. Identification Information Section, under Description, third paragraph - Replace the paragraph with the following: Purpose: SSURGO depicts information about the kinds and distribution of soils on the landscape. The soil map and data used in the SSURGO product were prepared by soil scientists as part of the National Cooperative Soil Survey.
  - d. Identification Information Section, under Cross Reference - Replace the last paragraph with the following: Purpose: This soil survey depicts information about the kinds and distribution of soils on the landscape. The soil map and data used in the SSURGO product were prepared by soil scientists as part of the National Cooperative Soil Survey.
  - e. Data Quality Information Section, under Attribute Accuracy – At the end of the second paragraph, add the following:

Edge Match Statements: Edge matching of digital data is described in terms of accuracy of matching of feature edges, feature labels, and descriptive attributes between quadrangles or data sets. In SSURGO, all three are required to match between adjacent quadrangles within the



survey. Only the soil survey boundaries are required to match between surveys. Examples of edge match statements for adjacent soil surveys:

- (1) The quadrangles in this soil survey are not edge matched to quadrangles in adjacent soil surveys.
  - (2) The quadrangles in this soil survey are edge matched to quadrangles in adjacent soil surveys.
  - (3) The quadrangles in this soil survey are edge matched to quadrangles in the Alpha Soil Survey but are not edge matched to those in the Beta or Gamma Soil Surveys.
  - (4) Feature edges and descriptive attributes of quadrangles in this soil survey are matched to those in adjacent soil surveys. Feature labels do not match.
- f. Data Quality Information Section, under Attribute Accuracy, following the paragraph on Completeness Reporting – Replace the three paragraphs with the following:
- (1) Soil scientists identify small areas of soils or miscellaneous (nonsoil) areas that have properties and behavior significantly different than the named soils in the surrounding map unit. These minor components may be indicated as special features. If they have a minimal effect on use and management, or could not be precisely located, they may not be indicated on the map.
  - (2) Specific National Cooperative Soil Survey standards and procedures were used in the classification of soils, design and name of map units, and location of special soil features. These standards are outlined in Agricultural Handbook 18, Soil Survey Manual, 1993, USDA, SCS; Agricultural Handbook 436, Soil Taxonomy, Soil Survey Staff, 1975, USDA, SCS; and all Amendments; Keys to Soil Taxonomy, Soil Survey Staff, (current issue); National Soil Survey Handbook, title 430-VI, 1996.
  - (3) The actual composition and interpretive purity of the map unit delineations were based on data collected by scientists during the course of preparing the soil maps. Adherence to National Cooperative Soil Survey standards and procedures is based on peer review, quality control, and quality assurance. Quality control is outlined in the memorandum of understanding for the soil survey area and in documents that reside with the Natural Resources Conservation Service state soil scientist. Four kinds of map units are used in soil surveys: consociations, complexes, associations, and undifferentiated groups.
- g. Under Explanation of Template Metadata Numbered Elements Section – Change the zip code in item 15 to 50309-2180.
- h. Under Explanation of Template Metadata Numbered Elements Section - Add the following as 20a: 20a - Edge Match Statements: Edge matching of digital data is described in terms of accuracy of matching of feature edges, feature labels, and descriptive attributes between quadrangles or data sets. In SSURGO, all three are required to match between adjacent

quadrangles within the survey. Only the soil survey boundaries are required to match between surveys. Examples of edge match statements for adjacent soil surveys:

- (1) The quadrangles in this soil survey are not edge matched to quadrangles in adjacent soil surveys.
- (2) The quadrangles in this soil survey are edge matched to quadrangles in adjacent soil surveys.
- (3) The quadrangles in this soil survey are edge matched to quadrangles in the Alpha Soil Survey but are not edge matched to those in the Beta or Gamma Soil Survey.
- (4) Feature edges and descriptive attributes of quadrangles in this soil survey are matched to those in adjacent soil surveys. Feature labels do not match.

## 659.12 Amendment 3 (April 1998)

### A. Front Page

1. Change the EEO statement to the following:

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice or TDD).

USDA is an equal opportunity provider and employer.

### B. Exhibit 647-11

1. Identification Information section, under Description, 2nd paragraph change optional to required.

2. Data Quality Information section:

- a. At the end of the 2nd paragraph, add: \_\_ (20a) \_\_.

- b. Delete the Edge Match Statements section (5 paragraphs).

- c. Distribution Information section, under Distribution Liability, replace the 2nd paragraph with the following:

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.

## 659.13 Amendment 4 (September 1998)

A. The following changes have been made to the National Soil Survey Handbook in the web version for downloading and in the on-line hypertexted version. The NRCS-SOI-37A will be reprinted and distributed separately.

B. Exhibit 602-1

1. Change in all parts: Director of Soils to Director of Soil Survey Division.
2. Article III - Add the following: Section 2.1.4 Soil scientists from each of the six NRCS regional offices are included as members.
3. Article VI - Change: Section 1.1.4 Four Agriculture Experiment Station Soil Survey Leaders, one from each respective Regional Conference. This normally is the state representative that will be chair or vice chair of the next Regional Conference.
4. Article VI - Add: Section 1.1.7 A representative of the 1890 College from the vicinity of the next conference recommended by the Conference Chair.
5. Article VI - Add: Section 1.1.8 A representative of the Tribal College from the vicinity of the next conference recommended by the Conference Chair.
6. Article VI - Change: Section 4.0 The Steering Committee shall.
7. Article VI - Delete: Section 4.1

C. Exhibit 606-1 and Exhibit 606-2

1. Last paragraph before signatures, replace with the following paragraph:  
Activities conducted under this Memorandum of Understanding will be in compliance with the nondiscrimination provisions as contained in Titles VI and VII of the Civil Rights Act of 1964, as amended, the Civil Rights Restoration Act of 1987 (Public Law 100-259) and other nondiscrimination statutes, namely Section 504 of the Rehabilitation Act of 1973, Title IX of the Education Amendments of 1972, the Age Discrimination Act of 1975, and in accordance with regulations of the Secretary of Agriculture (7CFR-15, Subparts A and B) which provide that no person in the United States shall on the grounds of race, color, national origin, age, sex, religion, marital status, or handicap be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving federal financial assistance from the Department of Agriculture or any agency thereof.

D. Section 618.07

1. Change the formula in 618.07(c) to:

$$DB15 = [(LEP/100) + 1]^3 \times \underline{Dbmoist}$$

where Db15 = bulk density 15 bar,

LEP = linear extensibility percent adjusted to a <2 mm basis.

E. Exhibit 618-7

1. Change the 2nd formula in footnote 3 to:

$$PI = LL - [9 + 0.4(\text{clay})]$$

F. 618.18 Electrical Conductivity

1. Classes. Change class limits to:
  - a. Nonsaline 0 - < 2
  - b. Very slightly saline 2 - < 4
  - c. Slightly saline 4 - < 8
  - d. Moderately saline 8 - < 16
  - e. Strongly saline > 16

G. Section 618.20

1. Change 618.20(a)(1) reference to M-145-91 (1995).
2. Add to the end of 618.20(b)(2) the following: Under average conditions of good drainage and thorough compaction, the supporting value of a material as subgrade may be assumed as an inverse ratio to its group index, that is, a group index of 0 indicates a “good” subgrade material and group index of 20 or greater indicates a “very poor” subgrade material.
3. Add to the end of 618.20(b)(3) the following: Negative group index is reported as zero (0). For soils that are non-plastic and when the liquid limit cannot be determined, the group index shall be considered zero (0).

H. Section 618.26(b)(1) Flooding frequency class.

1. Change the last line of VERY RARE to: but at least 1 time in 500 years.
2. Change OCCASIONAL to: > 5 to 50 percent chance of flooding in any year or > 5 to 50 times in 100 years.

I. Section 618.26(b)(2) Flooding duration classes. Change to:

<u>Class</u>	<u>Duration</u>
Extremely brief	0.1 to < 4.0 hours
Very brief	4 to < 48 hours
Brief	2 to < 7 days
Long	7 days to < 30 days
Very long	> 30 days

- J. Section 618.26(d)(4). Add to the end of the paragraph: Duration is estimated to the nearest hour up to 48 hours, then it is estimated to the nearest day.

- K. Section 618.26(e) Entries. Add as the 2nd sentence: Flooding entries reflect the current existing and mapped condition with consideration for dams, levees, and other man-induced changes affecting flooding frequency and duration.

- L. Section 618.46(b)(2) Ponding frequency class. Change:
1. NONE – No reasonable possibility of ponding, near 0 percent chance of ponding in any year; less than 1 chance in 100 years.
  2. RARE – Ponding unlikely but possible under unusual weather conditions; from 1 to 5 percent chance of ponding any year or 1 to 5 times in 100 years.
  3. OCCASIONAL – Ponding is expected under usual weather conditions; > 5 to 50 percent chance in any year or > 5 to 50 times in 100 years.
- M. Section 618.26(c)(2) Ponding duration class. Change class limits to:
1. VERY BRIEF < 2 days
  2. BRIEF 2 to < 7 days
  3. LONG 7 to < 30 days
  4. VERY LONG > 30 days
- N. Section 618.61(b). Add to end of paragraph (3): When the percent of surface fragment cover is greater than 80 percent, the fragments are then a distinct horizon and also described as a horizon.
- O. Section 618.71
1. Definition. Change to: Water, satiated, is the estimated volumetric soil water content at or near zero bar tension, expressed as a percentage of the whole soil.
  2. Significance. Change 2nd sentence to: Satiated water content approximates the water content for the whole soil at saturated conditions.
  3. Significance. Change last sentence to: Correction for fragments is taken into account in calculating this entry.
  4. Estimation. Change formula to:  

$$\text{Satiated water \%} = (\text{total porosity \%} - \text{entrapped air \%}) (100 - \% \text{ volume fragments})$$
  5. Entries. Change the valid entries to 10 to 70 percent.
- P. Exhibit 627-5 Conventional and Special Symbols Legend, NRCS-SOI-37A
1. Add Point and line features as soil delineations.
  2. Change definitions on the back of the 37A to:
 

BLO Blowout: A small saucer-, cup-, or trough-shaped hollow or depression formed by wind erosion on a preexisting sand deposit. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

BPI Borrow pit: An open excavation from which soil and underlying material have been removed usually for construction purposes. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

**CLA** Clay spot: A spot where the surface layer is silty clay or clay in areas where the surface layer of the named soils in the surrounding map unit is sandy loam, loam, silt loam, or coarser.

**DEP** Depression, closed: A shallow, saucer-shaped area that is slightly lower on the landscape than the surrounding area and is without a natural outlet for surface drainage. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

**ESB** Escarpment, bedrock: A relatively continuous and steep slope or cliff produced by erosion or faulting, which breaks the general continuity of more gently sloping land surfaces. Exposed material is hard or soft bedrock.

**ESO** Escarpment, other: A relatively continuous and steep slope or cliff that generally is produced by erosion but can be produced by faulting, which breaks the continuity of more gently sloping land surfaces. Exposed earthy material is nonsoil or very shallow soil.

**GPI** Gravel pit: An open excavation from which soil and underlying material have been removed and used, without crushing, as a source of sand or gravel. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

**GRA** Gravelly spot: A spot where the surface layer has more than 35 percent, by volume, rock fragments that are mostly less than 3 inches in diameter in an area of surrounding soil with less than 15 percent fragments. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

**GUL** Gully: A small channel with steep sides cut by running water and through which water ordinarily runs only after a rain or after ice or snow melts. It generally is an obstacle to wheeled vehicles and is too deep to be obliterated by ordinary tillage.

**LDF** Landfill: An area of accumulated waste products of human habitation that can be above or below natural ground level. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

**LAV** Lava flow: A solidified body of rock formed through lateral, surficial outpouring of molten lava from a vent or fissure. Often lobate in shape. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

**LVS** Levee: An embankment that confines or controls water, especially one built along the banks of a river to prevent overflow on lowlands.

**MAR** Marsh or swamp: A water-saturated, very poorly drained area, intermittently or permanently covered by water. Marsh areas are dominantly vegetated by sedges, cattails, and rushes. Swamps are dominantly vegetated by trees or shrubs. Not used in map units where poorly drained or very poorly drained soils are the named components. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

**MPI** Mine or quarry: An open excavation from which soil and underlying material are removed and bedrock is exposed. Also denotes surface openings to underground mines. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

MIS Miscellaneous water: Small, man-made water area that is used for industrial, sanitary, or mining applications and contains water most of the year. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

WAT Perennial water: Small, natural or man-made lake, pond, or pit that contains water most of the year. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

ROC Rock outcrop: An exposure of bedrock at the surface of the earth. Not used where the named soils of the surrounding map unit are shallow over bedrock or where “bedrock” is a named component of the map unit. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

SAL Saline spot: An area where the surface layer has an electrical conductivity of 8 mmhos cm<sup>-1</sup> more than the surface layer of the named soils in the surrounding map unit, which have an EC of 2 mmhos cm<sup>-1</sup> or less. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

SAN Sandy spot: A spot where the surface layer is loamy fine sand or coarser in areas where the surface layer of the named soils of the surrounding map unit is very fine sandy loam or finer.

ERO Severely eroded spot: An area where on the average 75 percent or more of the original surface layer has been lost because of accelerated erosion. Not used in map units with component phases that are named severely eroded, very severely eroded, or gullied.

SLP Short, steep slope: Narrow soil area that has slopes that are at least two slope classes steeper than the slope class of the surrounding map unit.

SNK Sinkhole: A closed depression formed either by solution of the surficial rock or by collapse of underlying caves. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

SLI Slide or slip: A prominent landform scar or ridge caused by fairly recent mass movement or descent of earthy material resulting from failure of earth or rock under shear stress along one or several surfaces. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

SOD Sodic spot: An area where the surface layer has a sodium adsorption ratio that is at least 10 more than the surface layer of the named soils in the surrounding map unit, which have a sodium adsorption ratio of 5 or less. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

SPO Spoil area: A pile of earthy materials, either smoothed or uneven, resulting from human activity. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

STN Stony spot: A spot where 0.01 to 0.1 percent of the surface is covered with rock fragments that are greater than 10 inches in diameter in areas where the surrounding soil has no surface stones. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.



STV Very stony spot: A spot where 0.1 to 3 percent of the surface is covered with rock fragments that are greater than 10 inches in diameter in areas where less than 0.01 percent of the surface of the surrounding soil is covered with stones. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

WET Wet spot: A somewhat poorly drained to very poorly drained area that is at least two drainage classes wetter than the named soils in the surrounding map unit. Typically \_\_\_\_\_ to \_\_\_\_\_ acres.

Q. Part 629

1. Replace Part 629 in total with a 1998 version.

## 659.14 Amendment 5 (September 1999)

### A. Part 601

1. Section 601.01(c) add to the responsibilities of the state soil scientist the following:
  - a. supplementing and distributing a state subset of the national soil information system data.
  - b. providing to the responsible MLRA Office, layers desired for map finishing in a compiled or electronic format compatible with digital map finishing. These include such layers as hydrography, public land survey, roads, and recommended cultural features to be used in the survey.
2. Section 601.01(d) add to the responsibility of the MLRA office: coordinating and providing quality assurance for the map finishing process which may involve doing the job, or coordinating with a state, digital map finishing center, or other entity that does map finishing.
3. Section 601.01(e) add NCSS Responsibilities for the Digitizing Units:
  - a. digitizing compiled map materials, and
  - b. performing quality control of final digital data including spatial, tabular, and metadata.
4. Section 601.01(f) add NCSS Responsibilities of the Digital Map Finishing Centers, electronically preparing soil survey maps for publication.
5. Section 601.01(g) add to the responsibilities of NCG, providing the process, procedures, and the training to generate map finished products.

### B. Part 606

1. Section 606.02(f) add as the 2nd paragraph the following: Indicate whether or not small areas of contrasting soils or miscellaneous areas will be shown on the maps using point and/or line features. This will generally involve mapping such areas at a higher level of detail than the majority of the survey area. Such areas will be identified with map unit symbols and are included in the legend for the survey area.
2. Section 606.03(b) revise to read: For maintenance of soil areas that have been previously published, the memorandum of understanding is to include the MLRA project plan and evaluations of all the soil surveys. Send these materials to the National Soil Survey Center with a letter requesting the Director, Soil Survey Division, to approve.
3. Exhibit 606-1 Memorandum of Understanding for a soil survey area.
  - a. Change the 1st paragraph under Specifications to read: Map units will be consociations and complexes of phases of soil series. The maximum size of contrasting inclusions in arable map units will be 5 acre areas. If needed by local users, contrasting inclusions of less than 5 acre areas may be shown by use of conventional or special symbols or mapped as point or

line segments approved by the MLRA office. The maximum size of contrasting inclusions in nonarable map units will be 10 acre areas. The soils in each delineation will be identified by direct field examination. Systematic traverses will be made in arable map units at an interval close enough to detect 5 acre areas that require significantly different management, and in nonarable map units close enough to detect 10 acre areas.

- b. Change the 4th paragraph to read: Field notes will be taken on soil qualities, soil properties, and soil performance to support soil interpretations for cropland, pastureland, windbreaks, rangeland, wildlife habitat, riparian area management, irrigation, rural and community development, recreation, engineering properties, and such groups as hydric soils, highly erodible lands, sodic soils, saline soils, sodic-saline soils, and other soils requiring special management.

#### C. Part 607

1. Exhibit 607-2 List of Potential Sources of Equipment for Soil Surveys. Add to Ben Meadows: Phone 1-800-241-6401, Web site [www.benmeadows.com](http://www.benmeadows.com). Add Ben Meadows to:
  - a. Abney level
  - b. Altimeter
  - c. Area measurement systems
  - d. Clinometer
  - e. Compass, magnetic
  - f. Global positioning systems
  - g. Hand lens
  - h. Penetrometer
  - i. pH kit
  - j. pH meter

#### D. Part 608

1. Section 608.01(b). Replace this paragraph with the following: The NRCS policy for and content of other reviews are discussed in the NRCS General Manual Title 340, parts 404.12, 404.13, and 404.14. NRCS conducts three types of reviews: Oversight and Evaluation Reviews, State Quality Reviews, and State Management Reviews. Each type may include soil survey issues.
2. Section 608.11(b)(1) Initial Field Reviews. (iii) Preparation of the Report. Revise to read as: The leader of the initial field review prepares a report of the review. The report includes a “Quality Assurance Worksheet” that has been approved by the MLRA Office. Exhibit 608-7 is an example. In addition to the Quality Assurance Worksheet, the report includes:
3. Section 608.11(b)(2) Progress Field Reviews. (ii) Preparation of the Report.

- a. Revise to read as: The leader of the progress field review prepares a report of the review. The report includes a “Quality Assurance Worksheet” that has been approved by the MLRA Office. Exhibit 608-7 is an example. In addition to the Quality Assurance Worksheet, the report includes:
  - b. Also revise the 9th included item to read as follows: a letter transmitting the report, in which the MLRA Leader highlights significant issues and items that are agreed upon; and.
4. Section 608.11(b)(3) Final Field Reviews, (iii) Preparation of the Report. Revise to read as: The leader of the final field review prepares a report of the review. The report includes a “Quality Assurance Worksheet” that has been approved by the MLRA Office. Exhibit 608-7 is an example. In addition to the Quality Assurance Worksheet, the report includes.
  5. Section 608.11(c) Signature and Approval of Field Review Reports, (2) Representatives of cooperating agencies. Replace “form NRCS-SOI-233” with “the Quality Assurance Worksheet” (see Exhibit 608-7).
  6. Section 608.11(c) Signature and Approval of Field Review Reports. Add: (3) State Conservationist. The State Conservationist has the opportunity to review and sign the report as a means of documenting the transfer of significant issues and agreed to items pertaining to the review. Change: numbering on items (5), (6), and (7) to (4), (5), and (6).
  7. Section 608.14 Delete this section.
  8. Exhibit 608-3 Initial Field Review Checklist. Item 26. Replace “SOIL-233” with “Quality Assurance Worksheet.”
  9. Exhibit 608-4 Progress Field Review Checklist. Item 28. Replace “SOIL-233” with “Quality Assurance Worksheet.”
  10. Exhibit 608-5 Final Field Review Checklist. Item 27. Replace “SOIL-233” with “Quality Assurance Worksheet.”
  11. Add Exhibit 608-7 to subject index and contents.
- E. Part 617
1. Section 617.01 Add as d, e, and f the following:
    - a. (d) The Memorandum of Understanding states which interpretations will be made for a soil survey area. The MLRA office, state soil scientist, and cooperators agree on whether or not to generate interpretations for miscellaneous land types and minor soil components. The Soil Survey Division encourages the entry of data and preparation of soil interpretations for miscellaneous areas. Omission of data elements is by joint consensus of the MLRA office, state soil scientist, and cooperators.
    - b. (e) Completely populate the data elements that are used as criteria in an interpretation in order to generate reliable interpretations.

- c. (f) Completely populate the data elements for major soil components including map unit components classified as higher taxonomic categories. The MLRA office, state soil scientist, and cooperators should reach a joint decision for special situations where it is not practical to populate data elements for map unit components classified at a higher taxonomic category than soil series. If the range of properties is too wide for interpretations, these areas may not meet the requirements of the user defined needs of the survey.

F. Part 618

1. Section 618.04 Albedo. Change the formula in part 618.04(d) to read:  
Albedo, dry +  $(0.07 \times \text{dry color value}) - 0.12$
2. Section 618.16 Drainage Class. Remove the column of class codes in part 618.16(e) Entries.
3. Section 618.17 Effective Cation-Exchange Capacity. Remove the text following the method citation in the definition.
4. Section 618.21 Erosion Accelerated, Kind.
  - a. Remove the columns of codes in part 618.21(c) Classes.
  - b. Eliminate Landslip erosion, highly deformed and Landslip erosion, slightly deformed.
  - c. Change (d) to read: Entries. Enter the appropriate class for each map unit component. Multiple entries are allowable, but a representative value should be indicated.
5. Section 618.22 Erosion Class. Remove the column of codes in part 618.22(d) Classes. Delete “code” in part 618.22(e).
6. Section 618.23 Excavation Difficulty. Remove the reference to moisture.
7. Section 618.49 Restriction Kind, Depth, Thickness, and Hardness. Remove the column of codes in part 618.49(a)(2) and part 618.49(d)(2). Remove the reference to codes in the paragraph preceding the list in part 618.49(a)(2).
8. Section 618.55 Soil Erodibility Factors, USLE, RUSLE. Replace the reference to Agriculture Handbook 537 to: Agriculture Handbook No. 703, Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE), USDA, ARS, 1997.
9. Section 618.56 Erodibility Factors for WEPP. Change the statement: For cropland soils with less than 30 percent sand in part 618.56(a)(4) to read: Clay must not exceed 50 percent: if clay is greater, use 50 percent.

G. Part 624 Soil Quality. Add part 624 to the National Soil Survey Handbook.

H. Part 630

1. Section 630.03 List of Benchmark Soils. Add part 630.03(c): Access and sort the list of benchmark soils by using the Soil Series Classification (SC) or Official Soil Series Descriptions (OSD) data access search routine. These files are on the National Soil Survey Center web page.
2. Exhibit 630-1. Change the classification in the examples to: fine-loamy, mixed, superactive, frigid Typic Argiustolls for Alpha and fine, smectitic, frigid Argiaquic Argialbolls for Beta.
3. Exhibit 630-2 Add the following statement under the exhibit title: (To search and sort by taxonomic terms, use the Soil Classification search routine).  
Remove the classification of benchmark soils.

I. Part 655. Replace part 655 with the 1999 version.

## 659.15 Amendment 6 (April 2001)

### A. Part 600

1. Exhibit 600-1. Replaced reference list with web addresses.

### B. Part 602

1. Exhibit 602-1 Bylaws
  - a. Replaced Article III Section 2.1.2.
  - b. Replaced Article VI Section 1.1.5 and Section 1.1.6.

### C. Part 606

1. Replaced most of 606.01 concerning policy and responsibility for memorandum of understandings.
2. Removed 606.02(a)(2) and moved to 608.08(b) concerning identification codes for surveys.
3. Replaced 606.03(a) with change in the submission of MOUs.
4. Other rewrites throughout the part to emphasize exact joins.

### D. Part 610

1. Changed 610.03.
2. Changed 610.03(d).
3. Moved 610.04(f) to 610.02(d).
4. Changed 610.07.
5. Changed 610.08(a).
6. Changed last paragraph of 610.08(b).
7. Changed 610.08(d).
8. Revised Attachment 1 of Exhibit 610-3.
9. Revised 610 to increase emphasis on project surveys as subsets to MLRAs.

### E. Part 614

1. Updated wording and citations.

### F. Part 618

1. Changed 618.04(d) Albedo, Dry.
2. Replaced 618.35(b)(2) Hydrologic Group with reference to National Engineering Handbook-4.
3. 618.49 Restriction Kind
  - a. Added Cemented horizon to list of choices for restriction kind.
  - b. Changed terminology from horizon to layer.

4. Replaced 618.50(c) Runoff Classes.
  5. Revised 618-53 Slope Length.
  6. Clarified estimates of 618.57 Soil Moisture States.
  7. 618.67 Texture Modifier
    - a. Changed (h)(2)(v) naming convention.
    - b. Changed (vii) woody fragment reference.
  8. Exhibit 618-3 dropped list, referenced to data dictionary.
  9. Exhibit 618-4, 6, 8, 11, and 12 added graphics into files.
  10. Exhibit 618-9 changed title and changed surface features to ped surface features.
  11. Exhibit 618-15 removed some terms used in lieu of texture and added CEM Cemented to list of Texture Modifiers.
- G. Part 622
1. Removed reference to Soil Memo 74. Wildlife interpretations are not in effect.
  2. Replaced Exhibit 622-1 with current Code of Federal Regulations.
  3. Added Exhibit 622-2 Land Capability Classification Ag. Handbook 210.
- H. Part 627
1. Renamed this part as Legend Development and Data Collection.
  2. Replaced entire Part 627 with rewritten material.
  3. Reordered sections.
  4. Revised 627.04(f). A component entry cannot be a surface texture or other phase.
  5. Revised SOI-37A dated June 2000.
- I. Part 630
1. Removed soil series Tulert from the benchmark list under Nevada.
- J. Part 631
1. Added to 631.01(e).
  2. Changed 631.07 to reflect general changes.
- K. Part 644
1. Moved contents of 644.08 to second paragraph of 644.04.
  2. Added contents of 644.08.
  3. Incorporated SOI-7 into Exhibit 644-1.
  4. Replaced all references to Electronic Imaging at NHQ.
  5. Replaced multiple text throughout the part.



6. Updated taxonomic classes and features list.
- L. Part 647
1. Extensive revisions
    - a. Clarified state responsibility to certify meeting SSURGO standards.
    - b. Clarified responsibilities for digital map finishing sites.
    - c. Changed to reflect new 37A.
    - d. Changed to include point and line soil delineation features.
    - e. Clarified edit responsibilities.
    - f. Deleted Checklist for SSURGO Data.
    - g. Renumbered exhibits.
    - h. Clarified edit responsibilities in Exhibit 647-3.
    - i. Altered material in Exhibits 647-5 to 10, revised to correspond with NASIS 5.0.

## 659.16 Amendment 7 (May 2001)

- A. Part 629 – Glossary of Landform and Geologic Terms
  - 1. Updated the contents.

## 659.17 Amendment 8 (July 2001)

### A. Part 608 – Program Management

1. Updated the contents.

## 659.18 Amendment 9 (December 2002)

- A. Part 600
  - 1. Updated Web addresses.
- B. Part 606
  - 1. Changed title of part 606.02 to Review, Approval, and Distribution of Memorandum of Understanding.
  - 2. Revised section 606.01, 606.02, 606.03, Exhibit 606-1, and Exhibit 606-2.
- C. Part 608
  - 1. Changed section 608.04 title to Limited and Denied Access Areas.
  - 2. Revised sections 608.01 and 608.10.
  - 3. Replaced section 608.04.
- D. Part 609
  - 1. Revised Exhibit 609-1.
- E. Part 610
  - 1. Revised sections 610.01, 610.02, 610.03, 610.04, 610.05, 610.06.
  - 2. Changed references to National Production Services to National Cartography and Geospatial Center.
  - 3. Changed title of Exhibit 610-1 to Sample Map Unit Evaluation Sheet.
  - 4. Changed title of Exhibit 610-2 to Soil Survey Area Evaluation Worksheet.
- F. Part 614
  - 1. Changed references to Alpha series.
- G. Part 618
  - 1. Revised section 618.50, Exhibit 618-3, Exhibit 618-7 and Exhibit 618-11.
  - 2. Replaced Exhibit 618-16 Wind Erodibility Groups (WEG) and Index.
- H. Part 624
  - 1. Changed hyperlinks.
- I. Part 627
  - 1. Revised section 627.04.
- J. Part 629
  - 1. Revised sections 629.02, 629.03, Exhibit 629-1, and Exhibit 629-6.
- K. Part 630
  - 1. Changed hyperlinks.
  - 2. Revised Exhibit 630-1.

L. Part 644

1. Changed reference from National Production Services staff to National Cartography and Geospatial Center.
2. Revised section 644.05, 644.06, 644.07, and 644.08.
3. Changed the title of section 644.06 to Publishing for Areas with Fewer Users.

M. Part 655

1. Revised section 655.01.

## 659.19 Amendment 10 (December 2003)

### A. Part 606

1. Revised 606.02 on procedure to route MOU.
2. Revised 606.04(f) plans for joining adjacent surveys.

### B. Part 608

1. Revised 608.01, 608.11, exhibit 608-5, exhibit 608-7 in the reference to joins.

### C. Part 609

1. Revised 609.04, 609.05, 609.06 to define exact and acceptable joins and where to use them.
2. Added Exhibit 609-2 List of Soil Property or Quality Attributes for Joining.

### D. Part 610

1. Revised exhibit 610-3 to coincide with the definition of an exact join.

### E. Part 614

1. Revised references to permeability and permeability classes to correspond with elimination of the terminology and replacement by saturated hydraulic conductivity.
2. Revised exhibit 614-2 in the general content of series description to illustrate neutral color description as N 5/ to coincide with other references.
3. Revised 614.06 concerning the management of tentative soil series in the OSD and SC files.

### F. Part 618

1. Changed references to permeability in most all sections to saturated hydraulic conductivity.
2. Changed reference to the Soil Survey Laboratory Manual to the latest version.
3. Revised 618.03 for link for NASIS metadata.
4. Revised 618.04 Albedo definition to clarify ratio.
5. Revised 618.23 Excavation difficulty to clarify conditions.
6. Revised 618.35 Hydrologic Group. (Major change by engineering division is pending.)
7. Revised 618.39 Organic Matter to reflect change in laboratory procedure.
8. Revised 618.42 Particle Size to clarify measurement.
9. Revised 618.44 Permeability replaced with Saturated Hydraulic Conductivity to reflect the decision to eliminate permeability. Renumbered as part 618.50.
10. Revised 618.48 Restriction Hardness to reflect wording in the Soil Survey Manual.

11. Revised 618.50 Runoff (renumbered to part 618.49) with new guide to correspond with guide used in the Soil Survey Manual plus addition of overriding conditions. Terminology changed to reflect Soil Survey Manual.
12. Renumbered 618.44 through 618.50 to correspond with drop of permeability.
13. Revised 618.68 Water One tenth Bar and part 618.69 Water One-Third Bar to clarify measurement procedures.
14. Revised 618.72 Wind Erodibility Group and Index to clarify significance and estimates.
15. Revised Exhibit 618-9 Guide for Estimating Ksat from Soil Properties to correspond with guidance in the Soil Survey Manual. (complete change from proposal).
16. Revised Exhibit 618-10 changed with new values and reference.
17. Replaced Exhibit 618-16 Wind Erodibility Groups and Index.

G. Part 622

1. Revised 622.07 Forestland and 622.09 Rangeland into one part titled Ecological sites, reordered the other parts that follow.

H. Part 627

1. Revised 627.04 concerning documentation of soils of minor extent.
2. Revised 627.05 concerning the naming of components with miscellaneous areas.
3. Revised 627.05(e), 627.08, 627.09, and exhibit 627-6 to reflect work of the documentation team and changes to ecological correlation procedures.
4. Added Exhibit 627-8.

I. Part 647

1. Revised 647.01, exhibit 647-1, exhibit 647-3 to coincide with the join policy.

## 659.20 Amendment 11 (September 2005)

### A. Part 602

1. Added regional conference bylaws.

### B. Part 607 Survey Preparation

1. Exhibit 607-1 added references. Changed some references relating to software and added State Statistical Abstracts as reference.
2. Exhibit 607-2 added information on suppliers.

### C. Part 609 Quality Control and Quality Assurance

1. 609.01 Policy and Responsibilities clarified responsibilities of MLRA offices.
2. 609.06 Field Reviews reworded to better reflect current policy of conducting within major land resource areas.
3. 609.07 Soil Survey Manuscripts changed the responsibilities of MLRA office editors.
4. Exhibit 609-1 Format for Correlation Memorandum added statements.

### D. Part 610 Maintaining Soil Surveys

1. References to the “official copy” were changed to official soil survey information. This reflects current policy of providing information electronically.
2. Information was changed related to reprinting to ordering replica CD-ROMs.
3. Text in soil survey evaluation was adjusted.
4. 610.00 changed (b) The purpose of maintaining soil survey information is to ensure current and accurate seamless soil survey information is available to meet the needs of the majority of users.
5. 610.01 replaced.
6. 610.02(a) changed to: To prepare a legend for an MLRA, consolidate the soil legends of surveys of the MLRA land resource area.”
7. 610.02(c) changed to: Update and maintain by major land resource area. Deliver as subsets.
8. 610.04 minor rewording.
9. 610.06 changed the heading and content.
10. 610.06(c) changed to make revisions to the Soil Data Warehouse for all areas of the soils in the major land resource area.
11. Exhibit 610-1 Part C: Minor changes.

### E. Part 614 Applying Soil Taxonomy



1. This section was updated to reflect our current policy of entering data to NASIS as metric measurements and acknowledges that our classification standard (Soil Taxonomy) uses metric measurements in its criteria. Note, this does not impact the use of English units of measure in output products for customers.
  2. 614.01 added responsibility statements for the NSSC.
  3. 614.04(a) added sections on regional and national committees.
  4. 614.05(c)(1) minor change made to 614.05 to reference regional soil taxonomy committee to receive proposals.
  5. Exhibit 614-1 dropped saturated hydraulic conductivity from instructions for first paragraph in OSD.
  6. 614.06 added clarification to the application of soil series.
  7. 614.06 dropped differentiae and refer to Chapter 21 of Soil Taxonomy.
  8. 614.06(l) added statement: Field descriptions and official soil series descriptions should use metric units of measurement.
  9. Exhibit 614-1 changed example to metric units.
  10. Exhibit 614-2 changed guidelines to more closely reflect existing policy and practice. Depths and thickness, temperature, precipitation, and elevation are in metric units of measure; legal descriptions, locations, and acreage are in English units. Examples changed to reflect this existing policy and practice.
  11. Exhibit 614 changed order of redox features to agree with other guidance.
  12. Exhibit 614-2 change to: “Depths and thickness (cm), temperature (degrees C), precipitation (mm), and elevation (m) are in metric units of measure;”
  13. Changed Exhibit 614-2 Content of Type location- revised; feet and miles can be used in general location description.
- F. Part 617 Soil Interpretations
1. National interpretations were introduced and defined as a set of interpretations. This reflects work of the National Soil Interpretations Group.
  2. Responsibilities were adjusted reflect current practice.
  3. Material was added to stress the need to populate data to generate interpretations or receive “Not Rated” result.
  4. 617.01 item (h) added to: maintaining the criteria and templates for state and local interpretations.
  5. 617.01 moved policy in 623.01(a) to 617. (f) Completely populate the data elements for major and minor components including map unit components that are higher taxonomic categories or miscellaneous areas.
  6. 617.04 added section on procedure for proposing changes to standard interpretations.

7. 617.05, 617.06, 617.07, and 617.08 changes incorporated to better reflect current interpretation procedures.
8. 617.10 new section added on procedure for documenting soil interpretation criteria.
9. 617.11 new section added on requirements for naming reports and interpretations.
10. Exhibit 617-1 added new exhibit on Example of Descriptions for Documenting Interpretations.

#### G. Part 618

1. Changed references to SSIR #42.
2. 618.10 updated the definition of “normal period” from the previously accepted 1961 to 1990 to the current standard of 1971 to 2000 for FFP, MAP, MAAT, and the Daily Average Potential Evapotranspiration. This agrees with accepted standards of the World Meteorological Organization and is reflected in the current NRCS “Field Office Guide to Climate Data.”
3. 618.27(e) added for clarification of existing policy: “For example, a flat-shaped rock fragment that is 100 mm x 250 mm x 380 mm has an intermediate dimension of 250 mm, and is not counted as greater than 250 mm. A flat-shaped rock fragment that is 100 mm x 275 mm x 380 mm has an intermediate dimension of 275 mm, and is counted as greater than 250 mm.”
4. 618.55 Soil Erodibility Factors, USLE, RUSLE2
  - a. Clarification added to point out that saturated hydraulic conductivity (formerly permeability) as used in the erosion equation is for the soil profile.
  - b. A conversion guide was added relating the permeability class codes of USLE to Ksat values for estimating K factors from the soil erodibility nomograph.
5. 618.57 Soil Moisture Status
  - a. The suction break between the nonsatiated wet and satiated wet was corrected to 0.0.
  - b. Slight wording changes were made to clarify that soil moisture status refers to map unit component long term information.
  - c. Clarification was added to point out the difference between point data (pedon) entries and the entry for soil moisture status.
  - d. Clarification of intent.
6. 618.58 changed citation to “Landslides Investigation and Mitigation Special Report 247 Transportation Research Board National Research Council 1996” in 2nd paragraph in definition.
7. Exhibit 618-7 added footnote to both LL and PI formulas.

#### H. Part 622

1. 622.06 Hydric soils. Updated reference in (b) Policy to reflect current policy: (b) Policy. The current criteria for generating a list of hydric soils is in the Federal Register, September 18, 2002, volume 67, number 181, page 58756. The reference for field identification of hydric soils is Field Indicators of Hydric Soils of the United States, Version 5.01 2003. (<http://soils.usda.gov/use/hydric>).

#### I. Part 623

1. Cancelled part 623. Material incorporated into part 617.

#### J. Part 627 Legend and Data Development

1. 627.08(e)(4) change citation to 627.03.
2. 627.02(e) updated references to the former “STATSGO” to “Digital General Soil Map of the U.S.”
3. 627.03 and Exhibit 627-1 Emphasis added to use only those miscellaneous areas on the approved list. (This reinforces long-standing policy.)
4. Added criteria to define components.
5. 627.04 changed lead in paragraphs.
6. 627.06(e) depth phases were revised to metric units for consistency.
7. 627.08(d) added statement: All soil descriptions are to be taken in metric units of centimeters to avoid errors of conversion.
8. Exhibit 627-1 Miscellaneous Areas. Added clarification that phase criteria should not be entered in the component field in NASIS. There is a separate field for phase terms. The miscellaneous area “Quarries” was removed from the example list because it is a phase for Pits, and was therefore listed in error.
9. Exhibit 627-5. Added an electronic Feature and Symbol Legend as a tool.

#### K. Part 630 Benchmark Soils-Section rewritten

1. Exhibit 630-2. Dropped list of Benchmark Soils by State as part of the NSSH because this is out of date. Current procedure is to maintain the benchmark soil designation in the on-line Soil Classification file and to print current lists from there.

#### L. Part 644 Delivering Soil Survey Information

1. Changed title and content to 644 Delivering Soil Survey Information.
2. Revised section to reflect current soil survey delivery products.
3. Modifications were made to parts 644.00 through 644.07 to better reflect the broad scope of soil survey information instead of the previous and outdated orientation to complete, hard copy publications.
4. Exhibit 644-1. Added a list of required and optional sections of soil survey publications.

5. Dropped the Guide for Authors of Soil Survey Manuscripts because it is very out of date with current policy and procedures.

M. Part 655 Technical Soil Services

1. 655.01 Revised to better reflect current policy and organizational structure. Added reference to the Soil Data Mart as the official source of soil information.
2. Added responsibilities for the National Technical Support Centers.

## 659.21 Amendment 12 (May 2007)

- A. A new style of formatting is introduced with these revised sections. The following summary points out specific areas where technical content is significantly revised over that of the previous version.
- B. Part 617 Soil Survey Interpretations
1. 617.00(a) Points out that interpretations are also used to assist in pre- and post-planning activities for national emergencies.
  2. 617.00(f) Stresses that National interpretations cannot be modified for state or regional uses because they are designed exclusively for national use across all political boundaries by NRCS and other agencies.
  3. 617.01(g) ADDED responsibility statements for the National Technology Support Centers, State Soil Scientists, and the NSSC.
  4. 617.04(a):
    - a. Assigns the National Technology Support Centers representatives as review coordinators, responsible for coordinating and summarizing all regional feedback, and providing it to the National Leader, Soil Survey Interpretations, for action.
    - b. Stipulates that the regional soil interpretations coordinating team can either be standing or ad hoc committees within the regional conference committee structure.
    - c. The National Leader for Soil Survey Interpretations arranges for all NCSS cooperators to be notified of changes that have been made to an interpretation.
  5. 617.09(h)(4) Contains specific instructions for reporting suspected errors and/or discrepancies in criteria or constructed interpretation logic to the owner of the interpretation, and details of how the interpretation owner will review and evaluate the reported error.
  6. 617.11(c)(1) Dept. of Homeland Security (DHS) added to the list naming protocols for creating a local interpretation from the National/Standard.
- C. Part 618 Soil Properties and Qualities
1. 618.07 Bulk density, 15 bar: The calculations are corrected. The previous calculation was actually for oven dry bulk density, not 15 bar bulk density, and was therefore in error. Soils that are potentially impacted by this change are those with expansive clays.
  2. 618.08 ADDED: Oven dry bulk density plus a calculation for estimating.
  3. 618.27 Flooding Frequency, Duration, and Month: The HTML and MSWord files were out of synch; added to MSWord file “Flooding entries reflect the current existing and mapped condition with consideration for dams, levees, and other man-induced changes affecting flooding frequency and duration.”

4. 618.32 Horizon Depth to Bottom: Corrections are made to comply with 200cm depth of observation—“Measurement should be estimated to a depth of 200 cm for most soils and to a depth at least 25 cm below a lithic contact if the contact is above 175 cm.”
5. 618.36 Hydrologic Group: Revised to contain general discussion only. The intent of this general discussion is to briefly explain hydrologic groups. For the complete definition and official criteria, users are instructed to go to the U.S. Department of Agriculture, Natural Resources Conservation Service. 2007. National Engineering Handbook, Title 210-VI, Part 630, Chapter 7, Hydrologic Soil Groups. Washington, DC.
6. 618.39 Liquid Limit: Specifies that the liquid limit for organic soil material is not defined and is assigned “null.”
7. 618.45 Plasticity Index: Specifies that the liquid limit for organic soil material is not defined and is assigned “null.”
8. NSSH 618.49 (2006) Runoff (Index Surface Runoff)—DELETED. The interpretation for Runoff (Index Surface Runoff), is no longer supported nationally as a standard interpretation. In the survey conducted in 2006, very few states indicated that they still used or had a need for the interpretation. Therefore, the "UTIL-Comparison of Runoff, stored vs. calculated" Pangaea report in NASIS has been set to Ready for Use “No.” States are welcome to make a copy of the report if they choose to use it as a local interpretation.
9. 618.56 Soil Erodibility Factors, USLE, RUSLE2: Establishes the use of “permeability control sections” for determining the K factor of any given mineral soil layer or horizon.
10. 618.68 Texture Class, Texture Modifier, and Terms Used in Lieu of Texture:
  - a. New criteria differentiates terms used in lieu of texture “highly,” “moderately,” and “slightly decomposed plant material” from “muck,” “peat,” and “mucky peat” on the basis of saturation for less than 30 cumulative days versus 30 or more cumulative days.
  - b. New criteria for “mucky” and “peaty” texture modifier to get in synch with definitions in Field Indicators of Hydric Soils of the U.S.: Used to modify near surface horizons of mineral soils that are saturated with water for 30 or more cumulative days in normal years (or are artificially drained). An example is mucky loam. Excluding live roots, the horizon has an organic carbon content (by weight) of:
    - (1) 5 to < 12 percent if the mineral fraction contains no clay; or
    - (2) 12 to < 18 percent if the mineral fraction contains 60 percent or more clay; or
    - (3)  $(5 + (\text{clay percentage multiplied by } 0.12))$  to  $(12 + (\text{clay percentage multiplied by } 0.10))$  if the mineral fraction contains less than 60 percent clay.

- c. ADDED “highly organic” texture modifier for near surface horizons of mineral soils that are saturated with water for less than 30 cumulative days in normal years and are not artificially drained. Excluding live roots, the horizon has an organic carbon content (by weight) of:
  - (1) 5 to < 20 percent if the mineral fraction contains no clay; or
  - (2) 12 to < 20 percent if the mineral fraction contains 60 percent or more clay; or
  - (3) (5 + (clay percentage multiplied by 0.12)) to < 20 percent if the mineral fraction contains less than 60 percent clay.
- d. ADDED recommendations from ICOMANTH:
  - (1) Texture modifiers (i.e., artifactual, very artifactual, extremely artifactual).
  - (2) Terms used in lieu of texture (artifactual material).
- e. Woody, grassy, mossy, and herbaceous texture modifiers: ADDED: Along with histic epipedons, these terms are to be used with organic horizons of any thickness that are saturated with water for 30 or more cumulative days in normal years (or are artificially drained), including those in Histels and Histosols, except for Folists.

11. Exhibit 618-5 Potential Frost Action: Footnotes are revised.

12. Exhibit 618-9 Guide for Estimating Ksat from Soil Properties: DELETED advice to “use non-carbonate clay”. This advice could not be supported in the original intent of Rawls, W.J., and D.L. Brakensiek. 1983. A procedure to predict Green and Ampt. infiltration parameters. In Advances in infiltration. Proc. of the Nat’l Conference on Advances in Infiltration. Dec. 12-13. Chicago, IL.

D. Part 629 Glossary of Landform and Geologic Terms

- 1. This revision includes the vast majority of changes requested since the last official update (2002), especially the subaqueous soils terminology. Questions not resolved at this time will be addressed and incorporated into future versions.
- 2. 629.02 Definitions
  - a. Revised reference codes.
  - b. Clarifying comments attached to glossary terms revised “colloquial.”
  - c. Revised glossary terms: replaced fluvio-marine sediments with fluvio-marine deposits.
  - d. Inserted new terms, added existing terms, and deleted terms.

New terms	Additions	Deletions
annular drainage pattern	aggradation	anthropogenic feature
artificial drainage pattern	alluvial cone	backswamp deposit
back-barrier beach	anthropogenic feature	bajada
barrier cove	aquiclude	barrier beach
bay bottom	backswamp deposit	barrier flat

<b>New terms</b>	<b>Additions</b>	<b>Deletions</b>
centripetal drainage pattern	bajada	barrier island
circular gilgai	barrier beach	beach
coastal marl	barrier flat	beach sands
colluvial apron	barrier island	beach sands
cone karst	beach	break
coral island	beach sands	cove
deflation flat	block field	creep
deranged drainage pattern	block glide	cuesta valley
diatrema	break	cutter [karst]
drainhead complex	cliff	dendritic drainage pattern
dredged channel	climbing dune	deposit
dredge spoils	cove	desert pavement
dredge spoil bank	creep	dune field
dune traces	cuesta	earth pillar
erosional outlier	cuesta valley	estuarine deposit
erosional pavement	cutter [karst]	flute
estuarine subaqueous soils	dendritic drainage pattern	fluviomarine terrace
everglades	deposit	glacier outburst flood
fault block	dip	glaciomarine deposit
fault-block mountains	drainage pattern	hogback
fenster	dune field	igneous rock
filled marshland	earth pillar	lagoon
flatwoods	estuarine deposit	lake
flood-tidal delta	estuary	lowland
fluviomarine bottom	flowtill	marine deposit
fluviomarine deposit	flute	marl
freshwater marl	fluviokarst	paha
glacial groove	fluviomarine terrace	pediment
glaciokarst	glacier outburst flood	polje
granitoid	graben	pyroclastic
grady pond	gut	radial drainage pattern
half graben	hogback	radial drainage pattern
homoclinal ridge	homoclinal	reef
homocline	igneous rock	seep
inlet	island	shoal



<b>New terms</b>	<b>Additions</b>	<b>Deletions</b>
intertidal	karst	shore complex
karst drainage pattern	karst tower	spoil bank
karstic marine terrace	lagoon	spoil pile
karst lake	lake	strike valley
lagoonal deposit	landform	subaqueous
lava	landslide	submerged - upland tidal marsh
mainland cove	lava flow	talus cone
mangrove swamp	lowland	tidal flat
marine lake [water]	marine deposit	tidal marsh
mine spoil, coal extraction	marl	tilted fault block
pinnate drainage pattern	mud flat	
playette	neck	
point bar [coastal]	outwash fan	
road cut	outwash plain	
sandur	paha	
rectangular drainage pattern	parallel drainage pattern	
relict-tidal inlet	park	
semi-open depression	parna	
slick rock	pavement karst	
slickensides [pedogenic]	pediment	
slickensides [geogenic]	porcellanite	
solution chimney	pyroclastic	
solution pipe	radial drainage pattern	
solution platform	radial drainage pattern	
strike [structural geol.]	reef	
subaqueous landscapes	residuum	
subaqueous soils	sand flow	
submerged back-barrier beach	seep	
thermokarst drainage pattern	shoal	
tidal inlet	shore complex	
toreva block	sinkhole karst	
trellis drainage pattern	slope wash	
tripoli	solution corridor	
valley floor remnant	solution fissure	

New terms	Additions	Deletions
volcanic breccia	spoil bank	
washover-fan apron	spoil pile	
washover-fan flat	strath terrace	
washover-fan slope	strike valley	
window [tectonic]	submerged - -upland tidal marsh	
wind-tidal flat	tableland	
zibar	talus cone	
	tidal flat	
	tidal marsh	
	till	
	till-floored lake plain	
	valley-border surfaces	
	volcano	
	washover fan	
	wave-built terrace	
	wave-cut platform	
	welded tuff	
	yardang	

3. 629.03 References were added or revised.
4. Exhibit 629-1 Revised the lists of landscape, landform, microfeature, and anthropogenic feature terms to accommodate revisions in the glossary.
5. Exhibit 629-2 Revised materials or material-related, structure, or morphological-feature terms to accommodate revisions in the glossary.
6. Exhibit 629-3 Revised the list of genesis - process terms and geologic time terms to accommodate revisions in the glossary.
7. Exhibit 629-6 Revised pyroclastic terms.

E. Part 644 Delivering Soil Survey Information, Information Systems

1. 644.01(b) added [The Soil Data Mart] is the official source for soil information delivered through various applications such as the data mart, Web Soil Survey, and field office technical guides.
2. 644.02(a) official data is replaced with Official soil survey information and emphasizes that the official source of soil information is the Soil Data Mart, a part of the National Soil Information System.

3. 644.02(a)(2) policy statement added: Initial detailed soil survey information is to be posted when the spatial data is certified, the NASIS data is certified, and both databases are ready to send to the Soil Data Warehouse; this is to occur not more than 1 year after mapping is complete.
4. 644.02(c)(1) added MLRA Soil Survey Office responsibilities.
5. 644.06(c) approval by the Director of Soil Survey is required for situations in which printed and bound copies are needed.
6. 644.06(b) includes the Web as an electronic source of soil survey information, and the printing of paper copies of the text requires special approval by the Director of Soil Survey.
7. Exhibit 644-1 added footnote: “As we have progressed to automated development and delivery of soil survey information, taxonomic descriptions (series or higher taxa) are not required for a manuscript to meet minimum standards. Please note that you are not prohibited from publishing these descriptions, including the option to use the OSD. The MLRA regional office leader in the region may have additional insight and suggestions about this.”
8. Exhibit 644-4 deleted Purchase Agreement for which the Natural Resources Conservation Service agrees to furnish hard copies of the published soil survey, complete with maps.

#### F. Part 647 Soil Map Development

1. 647.00(c) Digital data capture: Introduces instruction to field map solely with electronic media and on-screen digitizing as much as possible, which prevents having to compile to orthophotography and hand- or scan-digitize. Responsibilities added or modified for the MLRA soil survey offices and state offices.
2. 647.02(a) Imagery: New instructions to use the on-line NCGC Ordering System at <http://www.ftw.nrcs.usda.gov/nccgos> to acquire imagery and assorted products from the National Cartography and Geospatial Center. The ordering system was developed to streamline the process of ordering products and services from NCGC. The NCGC Ordering System replaces the Carto-19. Items such as imagery and orthophotography, map compilation materials, publication of soil survey products, SSURGO and digital map finishing standards, and status graphics are available through the on-line ordering system.
3. 647.07(d) Permanent water and miscellaneous water will conform to soil map unit labels (i.e., alpha, numeric, or alphanumeric).
4. 647.07(e) Special Labels: Label areas not yet mapped or digitized as part of a progressive survey NOTCOM, for not completed.
5. 647.07(h) Digitizing Specifications Tabular Attribute Data. Removed all the references to the NASIS tables.
6. Exhibits deleted Exhibits 647-5 through 11.

#### G. Part 651 Advance Soil Survey Information

1. 651.00(a) defines advance soil survey information as information that has been gathered but is not yet published to the Soil Data Mart. The purpose of providing advance soil survey information is to furnish users with soil maps, interpretations, and other data prior to final correlation of the data.
2. 651.00(b) policy statement added from NRCS General Manual, GM 430 Part 402.5(D): Soil data posted to the Soil Data Mart is official soil information that has been certified for use by the State Soil Scientist in participation with the State Technical Guide Committee for USDA programs.
3. 651.00(c) interim reports are obsolete with the advent of the Soil Data Mart and Web Soil Survey.
4. 651.04 statements added to help ensure that advance soil survey field sheets and digitized soil map are legible and consistent with adjoining areas, and accompanied with an identification legend, a feature, and special symbols legend, and supporting explanatory material.
5. 651.05(b) Labeling of Advance Soil Survey Information: A statement must specify that, although advance soil survey information may be correct, it is not official NRCS soil information. Only soil information posted to the Soil Data Mart is official NRCS information.

## 659.22 Amendment 13 (May 2007)

- A. This is a summary of changes to the National Soil Survey Handbook (NSSH). The changes reflected in this amendment were introduced to provide policy and guidance in implementing the MLRA Soil Survey Restructuring Plan (previously announced with National Bulletin 430.7.2). Due to the extensive nature of the changes, two rounds of review and comment were conducted between January and April 2007. This summary points out specific areas where technical content has been significantly revised.
- B. Part 601 – National Cooperative Soil Survey Organization
  - 1. 601.00 – Added paragraph recognizing primary Federal agency partners. Also added Appendix A, which briefly describes each Federal partner agency.
  - 2. 601.01 – List of responsibilities for various offices in the NCSS is expanded and reorganized for better coordination with other sections.
- C. Part 606 – Working Agreements
  - 1. 606.01 – Revised to indicate that only the MLRA Region-wide MOU is required; other forms of MOUs may be developed at the State’s discretion and are optional.
  - 2. 606.01(a)(1)(iii) – Added a brief outline for the contents of a MLRA Region-wide MOU.
  - 3. 606.01(e)(1) – Specifies the requirement for each MLRA Soil Survey Office to have a workload analysis – long-range plan, a project plan of operations, and an annual plan of operations.
  - 4. 606.01(e)(2) – Specifies the requirement for each Soil Survey Project Office (conducting initial or extensive update surveys) to have a long-range plan detailing all activities needed to complete the work within about a 5-year period and an annual plan of operations.
  - 5. Exhibits – Deleted exhibit of county-based MOU since it is no longer required. A brief outline of the contents for this type of MOU was added to 606.01(a)(2)(iii).
- D. Part 607 – Initial Soil Survey Preparation
  - 1. 607.00 – The purpose of this section has been narrowed to only address initial soil survey projects.
  - 2. 607.01 – Roles and responsibilities are updated and coordinated with other sections. Also, the need for conducting initial soil survey projects in a coordinated fashion within the context of the larger MLRA region is stressed.
  - 3. 607.02(c) – Added information about preparation of a digital data mapping base. Also, added an example (exhibit 2) of a geodatabase development procedure. This is presented as an example that can be modified to fit local needs.

4. Previous exhibit listing equipment suppliers was deleted because it was not current and is not needed today. Internet search engines fill this need.
- E. Part 608 – Program Management
1. 608.01 – Responsibilities for each organizational level are updated. The section describes MLRA Soil Survey Offices (601.01(g)) and Soil Survey Project Offices (601.01(h)).
  2. 608.01(h) – Specifies that Soil Survey Project Offices (as opposed to MLRA Soil Survey Offices) are established only with the concurrence of the Soil Survey Division Director.
  3. 608.01(e) – Specifies that State Soil Scientists (not MO Leaders) supervise Soil Survey Project Leaders unless the Board of Directors assigns supervision to the MLRA Regional Office Leader.
  4. Information on field reviews is moved to part 609.
  5. 608.04(b) – Recognizes that the considerations expressed by Native Americans regarding privacy of Tribal lands, or national security concerns, are acceptable reasons to not pursue methods to complete surveys where access is denied.
  6. 608.05 – Describes the concept of a “workload analysis – long-range plan” and a “project plan of operations” for MLRA Soil Survey Offices.
  7. 608.08 – This section on managing the Soil Survey Schedule is revised to fit the program as it currently exists (which does not yet adequately accommodate management of soil surveys by MLRA).
  8. 608.08(g) – We are no longer using “maintenance” as a term for soil survey area status.
  9. Exhibits are revised and updated to better reflect current business processes.
- F. Part 609 – Quality Control, Quality Assurance, and Soil Correlation
1. Title revised by adding “Soil Correlation.”
  2. 609.00 – Quality control and quality assurance definitions are revised and expanded.
  3. 609.01 – Responsibilities for each organizational level are updated. Includes clarification that the MLRA Soil Survey Office periodically conducts quality control reviews, and the MLRA Regional Office conducts quality assurance reviews.
  4. 609.02(e) – Clarifies that correlation documents are created for initial soil surveys only. Amendments to existing correlation documents are prepared only up until the time that a survey area is SSURGO certified. From that point forward, correlation decisions are recorded in NASIS, but amendments are not prepared. Also, deleted the requirement for adding farm bill lists (hydric, highly erodible, etc.) as attachments to correlation documents.

5. 609.04 – This is a new section describing quality control reviews, including a new exhibit (exhibit 609-10).
  6. Exhibit 609-2, “List of properties and quality attributes for joining,” is updated.
  7. All other exhibits are updated to reflect current processes.
- G. Part 610 – Updating Soil Surveys.
1. The term “maintenance” is replaced with “update,” including its use in the title of this section.
  2. 610.01 – Responsibilities for each organizational level are updated.
  3. 610.01(b)(1)(i) – This indicates that MO’s and States are to coordinate to develop plans for routine updating of existing NASIS datasets.
  4. 610.02 – This is a new section on workflow for updating by MLRA.
  5. 610.04 – Provides guidance for developing a workload analysis – long-range plan, a project plan of operations, and an annual plan of operations.
  6. 610.05 – This is a new section on NASIS legend management.
  7. 610.06 – This is a new section on managing soil spatial and tabular databases.

## 659.23 Amendment 14 (June 2007)

### A. Part 649 – Land Resource Regions and Major Land Resource Areas

1. 649.01 assigns and defines responsibilities for all contributors to update portions of Agriculture Handbook 296.
2. 649.02 updates instructions for developing all portions of written narratives describing LRRs and MLRAs.
3. 649.04(b) establishes a 5-year repeating timeline for updating and publishing LRR and MLRA maps.
4. Exhibit 649-1 updates and corrects MLRA assignments to MLRA Regional Offices.



## 659.24 Amendment 15 (March 2008)

### A. Section 618-11 Rock Fragment Modifier of Texture

1. The previous exhibit is replaced in its entirety. The previous guide inappropriately skewed the modifier toward “gravelly” where there are significant amounts of cobbles and stones.
2. The previous exhibit applied inconsistent weighting factors across classes of total rock fragments regardless of rock fragment composition. The new exhibit maintains the same weighting factors across all classes of total rock fragments, thereby providing the user with a more realistic portrayal of the soil’s limitations.
3. The current exhibit omitted “bouldery” as a possible modifier. The new exhibit corrects this.
4. A Microsoft Excel spreadsheet is created to calculate rock fragment modifiers for flat and for nonflat rock fragments.

## 659.25 Amendment 16 (June 2008)

- A. Part 601 – National Cooperative Soil Survey Organization
  - 1. Revised discussion of roles and responsibilities to include developing long range, project, and annual plans, as well as leadership and participation on MLRA Soil Survey Area Technical Teams and Management Teams.
- B. Part 606 – Working Agreements
  - 1. Minor revisions stating that quality control activities are the responsibility of the MLRA Soil Survey Office.
- C. Part 608 – Program Management
  - 1. Added new exhibits:
    - a. 608-3 Example of Needs Identified for a MLRA Soil Survey Area Long Range Plan.
    - b. 608-4 Example of a Project Evaluation Ranking Procedure.
    - c. 608-5 Example of a Project Plan.
  - 2. Revised discussion of roles and responsibilities to include developing long range, project, and annual plans, as well as leadership and participation on MLRA Soil Survey Area Technical Teams and Management Teams.
  - 3. State that the MLRA Soil Survey Office is responsible for providing quality control activities for any satellite offices in their area.
  - 4. Added descriptions of the MLRA Soil Survey Area Technical Team and MLRA Soil Survey Area Management Team.
- D. Part 609 – Quality Control, Quality Assurance, and Soil Correlation
  - 1. Minor revisions (like those listed above) to reflect MLRA Soil Survey restructure.
- E. Part 610 – Updating Soil Surveys
  - 1. Updated roles and responsibilities to better reflect MLRA Soil Survey restructure.
  - 2. New exhibit 610-3 Example of a Soil Survey Implementation Guide.
  - 3. Revisions to 610.02 to reflect recommended contents for a Soil Survey Implementation Guide.
  - 4. Revise 610.04 to better address Long Range Plans and Project Plans.
  - 5. Added part 610.07 Certification of Soils Data.

## 659.26 Amendment 17 (August 2008)

### A. Part 618 – Soil Properties and Qualities

1. Part 618 is updated to include minor format changes.
2. Addition of the soil property “Sum of Bases.”
3. Addition of eight new Appendices to document NASIS soil property calculations. These appendices are the following: AASHTO Group Index, Cation Exchange Capacity, Effective Cation Exchange Capacity, Extractable Acidity, Liquid Limit and Plasticity Index, Particle Size, Rock Fragments and Percent Passing Sieves, and Water Content (1/10 bar, 1/3 bar, 15 bar, satiated water content, and oven dry bulk density). These NASIS calculations are included to publish the underlying logic in the calculation of these soil properties.

### B. Part 622 – Ecological and Interpretive Groups

1. This section is revised to correct an error in the application of Land Capability Subclasses. Previously, it indicated that subclasses could not be used with soils in Land Capability Class 8. This section is updated to recognize that capability subclass can be used with Land Capability Class 8.
2. Minor editorial revisions in the text for clarification.

### C. Part 629 – Glossary of Landform and Geologic Terms

1. 629.00 – Revisions to Definition and Purpose section.
2. 629.02 – Added some new terms, and revised or edited some existing definitions. (Definitions that are “edited” simply have editorial changes that do not change their meaning).

New Terms	Revised Definitions	Edited Definitions
Local relief	Alluvial cone	Alluvial plain remnant
Novaculite	Alluvial flat	Cuesta
Physiographic division	Bolson	Cuesta valley
Physiographic section	Bowl	Dip slope
Siltite	Creep	Extramorainal
State physiographic area	Cuesta	Flatwoods
	Cuesta valley	Human transported material
	Divide	Granitoid
	Creep	Pediment
	Drainage pattern	Pedisediment
	Eocene	Riser
	Geomorphic component hills	River valley

New Terms	Revised Definitions	Edited Definitions
	Homoclinal ridge	Sand plain
	Interdune valley	Slickensides
	Landform	Swale
	Landscape	Talus cone
	Miocene	
	Oligocene	
	Paleocene	
	Physiographic Province	
	Pliocene	
	Railroad bed	
	Rhythmite	
	Stream terrace	
	Tertiary	
	Valley floor remnant	

3. 629.03 – Added references: Kidder, D.L., 1987 and Maxwell, D.T., 1973.
4. Exhibit 629-1 – Revised the lists of landscape, landform, microfeature, and anthropogenic feature terms to accommodate revisions in the glossary.
5. Exhibit 629-2 – Revised materials or material-related, structure, or morphological-feature terms to accommodate revisions in the glossary.
6. Exhibit 629-3 – Revised the list of genesis - process terms and geologic time terms to accommodate revisions in the glossary.

## 659.27 Amendment 18 (October 2009)

### A. Part 608 – Program Management

1. Part 608 has been extensively revised to incorporate the new Major Land Resource Regional Area (MLRA) program management structure as well as changes in NASIS 6.0 dealing with goals and progress reporting.
2. Section 608.03, “Soil Survey Area Names and Symbols,” is deleted and its content is merged into a revised Section 608.02. All sections below 608.03 except the exhibits are renumbered.
3. Section 608.08, “Soil Survey Schedule,” are both renumbered and renamed 608.07 “Goals and Progress.”
4. Exhibit 608-7, “Soil Survey Schedule Guidelines,” has been extensively revised and is renamed “Goal and Progress Reporting Guidelines.” Exhibit 608-8, “Soil Survey Business Area Responsibilities,” has been extensively revised and renamed to “Business Area Responsibilities for Goals and Progress.”

### B. Part 610 – Updating Soil Surveys

1. Substantial revisions to content have been made to all subparts to reflect the new MLRA program management structure.
2. Exhibit 610-1, “Sample Map Unit Evaluation Worksheet,” has been replaced. Exhibit 610-2, “Sample Soil Survey Evaluation Worksheet,” has been removed and replaced with a sample of a NASIS report and is now named “Sample Evaluation Information for Long-Range Planning.” Exhibit 610-3, “Example of a Soil Survey Update Implementation Guide,” has been revised.
3. Minor formatting changes and additions to Sections 610.01, 610.06, and 610.07.

### C. Part 617 – Soil Survey Interpretations

1. Part 617 has additional guidance in Section 617.01(b) on populating major and minor components.

### D. Part 618 – Soil Properties and Qualities

1. Sections 618.02, 618.14, 618.15, 618.32, 618.33, 618.34, 618.35, and 618.49 are revised. These changes are intended to provide clearer guidance for populating component horizons and are based on discussions from an MLRA Office Leader meeting in August 2008.
2. Updated hyperlinks for sections 618.03 (NASIS) and 618.36 (Hydrologic Group).
3. Section 618.28, “Fragments in the Soil,” and section 618.62, “Surface Fragments,” are revised to change the nonflat fragment class names from pebbles to gravel.

4. Minor corrections to sections 618.64, 618.65, and 618.68 for content. Additions to sections 618.66 and 618.67 for clarity.
  5. Added “coarse gypsum material” and “fine gypsum material” to terms in-lieu-of texture. This is a result of the work of the Gypsum Task Force last year.
- E. Part 627 – Legend Development and Data Collection
1. Section 627.04 is revised to delete mention of “Unnamed” soil map unit components and to update guidance on naming minor soil components.
  2. Exhibit 627-5, “Feature and Symbol Legend for Soil Survey, NRCS-SOI-37A.” The descriptions to 20 of the 28 standard landform and miscellaneous surface features (spot symbols) shown on page 2 of this exhibit are revised. These changes ensure consistency in the descriptions of the features between the NSSH, the prewritten glossaries used in soil survey manuscripts, and the online glossary used in the Web Soil Survey application.
- F. Part 630 – Benchmark Soils
1. Revised to reflect work by NCSS Standards Committee at the 2009 NCSS Conference at Las Cruces, NM.
  2. Revised definition.
  3. Revised section on responsibilities, including addition of MLRA-SSO.
  4. Expanded discussion listing criteria to consider.
  5. Revised exhibit for sample narrative record.

## 659.28 Amendment 19 (November 2010)

- A. Part 602 – National Cooperative Soil Survey Conferences
  - 1. The bylaws for the North Central Region in exhibit 602-4 were revised.
- B. Part 608 – Program Management
  - 1. Part 608.01 has been revised to reflect the realignment of the Soil Survey Division’s national center structure NSSC and the decommissioning of the National Geospatial Development Center in Morgantown, West Virginia as an NRCS national center.
  - 2. Part 608.01 now has guidance for the MLRA Soil Survey Regional Offices (MO) on the role of the Board of Directors.
  - 3. Exhibit 608-7 has new guidance on reporting procedures for acres updated.
  - 4. Additional text clarifying the pertinent MLRA offices was added to exhibit 608-7.
  - 5. The header for MLRA office in exhibit 608-8 has been updated to clarify that the MO is the responsible business area.
  - 6. Changes from an English edit were made throughout.
- C. Part 618 – Soil Properties and Qualities
  - 1. Changes from English edits were made throughout.
  - 2. The entire part was converted into the style guide required for documents on eDirectives. This conversion involved deleting the Table of Contents pages, separation into a Subpart A for General Information and Subpart B for Exhibits, changing the outline format in Subpart A, relabeling all exhibits to remove the part number (618), and relabeling all 8 appendices into exhibits.
  - 3. Updated the range of valid entries to agree with NASIS 6.0 metadata reports.
  - 4. Guidance on Bulk Density, one-tenth bar, was deleted from Section 618.6 (previously 618.06).
  - 5. Guidance on Bulk Density, 15 bar, was deleted from Section 618.7 (previously 618.07) and all subsequent sections were renumbered.
  - 6. Deleted obsolete SSL method codes from the guidance for the following chemical properties: calcium carbonate equivalent (618.8), cation exchange capacity (618.9), effective cation exchange capacity (618.17), extractable acidity (618.24), extractable aluminum (618.25), free iron oxides (618.28), gypsum (618.30), particle density (extractable iron discussion in 618.41), sodium adsorption ratio (618.53), subsidence, initial and total (field state bulk density discussion in 618.59), and sum of bases (618.60).
  - 7. Sections 618.0 through 618.3 (previously 618.00 – 618.03) have minor revisions for clarification. Office names are updated in part 618.1 Policy and Responsibilities to match the current MLRA structure.

8. Corrected the first sentence in Section 618.5(D)(7) which had been inadvertently truncated in the past.
9. Deleted URL for obsolete version of NASIS data dictionary from section 618.12 and directed users to Subpart B, Exhibits, Section 618.82.
10. Added new drainage class “subaqueous” to Section 618.16(B).
11. Added pedogenic horizons as a type of fragment and added the very angular roundness class and corrected spelling of the well-rounded roundness class (deleted the hyphen) in Section 618.27 (Fragments in the Soil) and Section 618.61 (Surface fragments) to agree with NASIS. Added wood fragments (20 mm or larger in diameter) to definition of Section 618.61 to agree with NASIS.
12. Added equation for calculating percent organic carbon in Section 618.39(C).
13. Section 618.46(B)(3) on Pore Shape, is updated and corrected to match the SSM, NASIS, and the FBDSS.
14. Section 618.48, Restriction Kind, is updated to match NASIS choices.
15. Sections 618.63 (Taxonomic Family Temperature class) and 618.66 (Taxonomic Temperature regime) have been updated to match Soil Taxonomy.
16. Added the Representative Indicator flag “K” to Section 618.67 (Texture, etc.).
17. The exhibit named “Guides for Estimating Risk of Corrosion Potential for Uncoated Steel” is updated to deemphasize drainage class as a critical property. Internal free water occurrence class is added as the critical property used along with general texture group in the first row of the exhibit table. The critical limits for total acidity and conductivity are updated to reflect current research data and NASIS calculations. Three new footnotes were added, including a new reference (Moore and Hallmark, 1987). The location of this exhibit is changed to Subpart B, Exhibits, Section 618.80.
18. The exhibit named “Classification of Soils and Soil-Aggregate Mixtures for the AASHTO System” has corrections in the critical values for the A-3 (% passing #40 sieve) and A-2-5 classes (liquid limit). The location of this exhibit is changed to Subpart B, Exhibits, Section 618.83.
19. Expanded the table in the exhibit named “Potential Frost Action” for ease of use. The location of this exhibit is changed to Subpart B, Exhibits, Section 618.84.
20. Deleted the phrase ‘lithic and paralithic materials’ in section 618.49(D)(3) and changed the title of the corresponding exhibit to match the new wording. The location of the exhibit is changed to Subpart B, Exhibits, Section 618.89.
21. Corrected the word ‘flags’ to ‘flagstones’ in the exhibit named “Rock Fragment Modifier of Texture.” The location of this exhibit is changed to Subpart B, Exhibits, Section 618.90.



22. The exhibit named ‘General Guidelines for Assigning Soil Loss Tolerance “T”’ has a major revision to the general guidelines and criteria on T factor. The location of this exhibit is changed to Subpart B, Exhibits, Section 618.93.
  23. Added Ustivitrandid as a subgroup to footnote 5 in the exhibit named “Wind Erodibility Groups (WEG) and Index”. The location of this exhibit is changed to Subpart B, Exhibits, Section 618.95.
- D. Part 620 – Soil Interpretations Rating Guides
1. Part 620 (dated 1996) was deleted. The policy and general guidance in this part was previously incorporated into Part 617 – Soil Survey Interpretations. The legacy interpretations ratings guides from the 1993 version of part 620 are still available for download, if needed for historical purposes only.
- E. Part 638 – Soil Data Systems
1. This part is completely revised from the prior version dated 1996.
  2. The entire part was converted into the style guide required for documents on eDirectives. This conversion involved deleting the Table of Contents page.
  3. All exhibits were removed from part 638. Exhibit 638-3 was retained, slightly revised, and moved to Part 639, Subpart B, Exhibits, Section 639.10.
- F. Part 639 – National Soil Information System (NASIS)
1. This part is completely revised from the prior version dated 1997.
  2. The entire part was converted into the style guide required for documents on eDirectives. This conversion involved deleting the Table of Contents page, separation into a Subpart A for General Information and Subpart B for Exhibits, changing the outline format in subpart A, and relabeling exhibit 1 to remove the old part number (638).
- G. Part 655 – Technical Soil Services
1. Part 655.00 (Definition) is revised to direct users to the new Technical Soil Services Handbook (TSSH). The URL for the TSSH is added.
  2. Part 655.01 (Types of Service) is revised to use the same headings and types of service as used in the TSSH. The guidance for Information Services was shortened because there is a detailed discussion in the TSSH.
  3. Part 655.03 (Responsibilities) is shortened and revised to direct users to part 604 of the TSSH.
  4. Part 655.04 (Order 1 Soil Surveys) is deleted.
  5. Part 655.05 (Marketing) and exhibit 655-1 (Example of a Marketing Plan) are deleted. Guidance on promoting customer awareness (marketing) is retained in part 638 of the TSSH.

## 659.29 Amendment 20 (October 2011)

- A. Part 602 – National Cooperative Soil Survey Conferences
  - 1. Exhibits 602-2, 602-3, and 602-5 were revised because of the work of the bylaws committees from the 2010 regional NCSS conferences.
  - 2. Edited to ensure consistent naming for the titles of the NSSC national leaders as well as updates to the names and acronyms of NRCS offices (e.g., From: NCGC To: NGMC).
- B. Part 631 – Soil Survey Investigations
  - 1. Revised paragraph in section 631.07(a), at the request of soils hotline staff, to update the information about the laboratory database.
- C. Part 649 – Land Resource Regions and Major Land Resource Areas
  - 1. Updated office names.
  - 2. Corrected name of the PRISM model.
  - 3. Other extensive, but relatively minor edits throughout.

## 659.30 Amendment 21 (January 2012)

### A. Part 608 – Program Management

1. Section 608.01, Responsibilities and Organization, was edited to clarify the responsible agency staff person. The names of the functional branches of the NSSC are updated. The responsibilities for all offices are edited for clarity and some omissions are corrected. The responsibilities of the Management Team and Technical Team are added as new section items 608.01(e) and (f), respectively.
2. Acronyms, such as “MLRA SSO,” are used more consistently to reduce the verbiage.
3. Section 608.03, Areas of Limited Access, Denied Access Areas, and Areas Not Completed, is revised to add a definition and purpose and provide guidance on Identifying Areas Not Completed (NOTCOM).
4. Section 608.04, Determining Workloads, is revised to add a definition and purpose and is expanded to clarify the required workload plans for initial soil survey versus update soil survey.
5. Section 608.05, Priorities for Soil Survey Activities, is revised to add a definition and purpose and clarify the guidance.
6. All references to Part 610 were updated to match the revision for this other part of the NSSH.
7. The exhibits were changed as follows:
  - a. Previous exhibits 608-1 Long-Range Plan of Operations for Initial Soil Surveys and 608-2 Annual Plan of Operations for Initial Soil Surveys, are retained but are renamed to remove mention of “update soil surveys requiring extensive revision.”
  - b. Previous exhibit 608-3, Example of Needs Identified for an MLRA Soil Survey Area Long-Range Plan, was removed.
  - c. Previous exhibit 608-4, Example of a Project Evaluation Ranking Procedure, was removed from Part 608 and moved into Part 610 (as new exhibit 610-5).
  - d. Previous exhibit 608-5, Example of a Project Plan, and exhibit 608-6, Annual Plan of Operations for an MLRA Soil Survey, were removed.
  - e. Previous exhibit 608-7, Goal and Progress Guidelines, and exhibit 608-8, Business Area Responsibilities for Goals and Progress, are renumbered as 608-3 and 608-4, respectively.
  - f. Exhibit 608-4, Business Area Responsibilities for Goals and Progress, was edited to correct some table names and data elements. New subsection (II C.) for ESD Development Progress was added.

### B. Part 610 – Updating Soil Surveys

1. Edited to incorporate a proposed protocol requested by an adhoc committee appointed by the MO leaders related to purpose, format and use of MLRA soil survey update documents; maximizing the use of NASIS; and streamlining the planning and implementation process.
2. Sections 610.00 through 610.07 were extensively revised and renamed in a major effort to provide clear and concise guidance because of input received after two comment periods during 2011.
3. All references to Part 608 were updated to match the revision for this other part of the NSSH.
4. The exhibits were changed as follows:
  - a. Exhibit 610-1 Sample Project Evaluation Worksheet was retained and renumbered as exhibit 610-4.
  - b. New exhibit 610-1 Resources for the Inventory and Assessment Report was added.
  - c. Previous exhibit 610-2 Sample Evaluation Information for Long-Range Planning was removed.
  - d. Previous exhibit 610-3 Example of a Soil Survey Update Implementation Guide was removed.
  - e. New exhibit 610-5 Example of a Project Evaluation Ranking Procedure was added.
  - f. New exhibit 610-6 Project Plan Checklist was added.
  - g. New exhibits 610-7a, 610-7b, 610-7c, and 610-7d Project Plan Examples were added.

## 659.31 Amendment 22 (February 2012)

### A. Part 647 – Soil Map Development

1. The entire part was converted into the style guide required for documents on eDirectives. This conversion involved deleting the Table of Contents page, separation into a Subpart A for General Information and Subpart B for Exhibits, changing the outline format in Subpart A, and relabeling all exhibits to add section numbers.
2. Sections 647.03 (Compilation), 647.04 (Compilation Techniques), and 647.05 (Recompilation for Digitizing) are deleted. Pertinent guidance has been moved to new Sections 647.4 (Data Capture Specifications) and 647.6 (Digital Map Finishing and Print-on-Demand Maps).
3. Sections retained have been updated and renumbered.
4. Exhibits 647-1, 647-2, 647-3, 647-4, 647-6, 647-7, 647-8, and 647-9 are deleted.
5. The exhibits that were retained, updated, and renumbered are 647-5 (now in Subpart B, Section 647.10), 647-10 (now in Subpart B, Section 647.13), 647-11 (now in Subpart B, Section 647.14), 647-12 (now in Subpart B, Section 647.15), and 647-13 (now in Subpart B, Section 647.16).
6. Subject index was updated.

## 659.32 Amendment 23 (February 2013)

### A. Part 618 – Soil Properties and Qualities

1. Corrected abbreviation for the MLRA soil survey office in Subpart A, section 618.1
2. Updated 2 occurrences of “Soil Survey Laboratory” to “NSSC Kellogg Soil Survey Laboratory.”
3. Added new section named “Artifacts in the Soil” (Subpart A, section 618.5) to provide guidance on populating data for anthropogenic soils. Renumbered all subsequent sections in Subpart A.
4. Added new section named “Bulk Density, Satiated” (Subpart A, section 618.9) to provide guidance on populating data for subaqueous soils.
5. Added sentences to the “significance” items of the following properties and qualities explaining their use in soil classification:
  - a. Bulk Density One-Third Bar
  - b. Calcium Carbonate Equivalent
  - c. Cation-Exchange Capacity NH<sub>4</sub>OAc pH 7
  - d. Electrical Conductivity
  - e. Electrical Conductivity 1:5 (volume)
  - f. Exchangeable Sodium
  - g. Extractable Acidity
  - h. Extractable Aluminum
  - i. Fragments in the Soil
  - j. Gypsum
  - k. Linear Extensibility Percent
  - l. Reaction, Soil (pH)
  - m. Saturated Hydraulic Conductivity
  - n. Sodium Adsorption Ratio
  - o. Slope Gradient
  - p. Sum of Bases
  - q. Texture Class, Texture Modifier, and Terms Used in Lieu of Texture
6. Modified identical statements in the sections named “Diagnostic Horizon Feature - Depth to Bottom,” “Diagnostic Horizon Feature - Depth to Top,” “Horizon Depth to Bottom,” and “Horizon Depth to Top,” to reconcile the NSSH with the Soil Survey Manual on what the top of the soil is when surface cover of fragments is 80 percent or more.
7. Revised the “Effective Cation-Exchange Capacity” section (now Subpart A, section 618.19) to correct errors and omissions in the guidance.
8. Added sentences to the “Entries” items of several soil properties (Electrical Conductivity, Linear Extensibility Percent, and Reaction, Soil (pH)) to clarify that high and low values do not need to correspond with class limits if more precise data is available.

9. Added new section named “Electrical Conductivity 1:5 (volume)” (Subpart A, section 618.21) to provide guidance on populating data for subaqueous soils.
10. Added new section named “Exchangeable Sodium” (Subpart A, section 618.27) to provide guidance on populating this new data element in NASIS.
11. Revised the “Entries” item for the “Flooding Frequency Class, Duration Class, and Month” section (now Subpart A, section 618.30) to clarify the guidance on data population.
12. Added some clarification and a new reference to the “Fragments in the Soil” section (now Subpart A, section 618.31) to clarify differences between fragments and artifacts.
13. Revised guidance on entries when populating the depths of combination horizons in the “Horizon Designation” section (now Subpart A, section 618.37).
14. Revised the “Reaction, Soil (pH) section (now Subpart A, section 618.51) to add discussion on oxidized pH by the hydrogen peroxide test, delta pH method. Added a reference document (SSIR 51) as a third item in the measurement portion of the section.
15. Revised the “Slope Aspect” section (now Subpart A, section 618.54) with changes proposed by the SDJR technical team.
16. Corrected several abbreviations in the “Soil Erodibility Factors for WEPP” section (now Subpart A, section 618.59).
17. Revised the “Soil Temperature” section (now Subpart A, section 618.62) to accommodate the new data element on mean annual soil temperature in the NASIS Component table. Revised, reorganized, and clarified all statements pertaining to mean monthly soil temperature data.
18. Modified the paragraph in the “Texture Class, Texture Modifier, and Terms Used in Lieu of Texture” section (now Subpart A, section 618.71(E)) allowing multiple textures for surface horizons. Also expanded text on the sentence which specifies the need for setting the RV indicator. Updated text to specify that the term used in lieu of texture “material” is only appropriate to use with the texture modifier “cemented” reflecting current usage. Numerous revisions were made to item H “Texture Modifier” to clarify and better organize the guidance as well adding new application rules for horizons containing combinations of artifacts and fragments.
19. Added new section named “Water Temperature” (Subpart A, section 618.76) to provide guidance on populating this new data element in NASIS.
20. Added one correction and some suggested additions for Subpart B, Exhibits, Section 618.84 Potential Frost Action.

## 659.33 Amendment 24 (April 2013)

### A. Part 629 – Glossary of Landform and Geologic Terms

1. Editorial revisions to sections 629.00 Definition and Purpose and 629.01 Responsibilities.
2. Section 629.02. Definitions, (a) Reference Codes has several changes to alphabetize the references, add one new reference, and remove 9 others not used in the glossary.
3. Section 629.02(c). Glossary has some new terms added, some significant changes in existing terms (spelling or definition), and some minor editorial changes in existing terms. The list of changes is shown in the following table. For more detail, see the revised glossary. Several terms were moved to alphabetically resort the glossary.

<b>New terms appearing in the glossary</b>	<b>Change in spelling or definition of terms</b>	<b>Minor editorial changes to terms</b>
andesitic lahar deposit	aa lava	ash
anthroscape	aa lava flow	ash flow
artifact	ablation till	avalanche chute
ash field	barrier beach	backswamp deposit
bauxite	barrier beach [relict]	bar (landform and micro.)
bioswale	basal till	beveled base
breached anticline	bay [geom.]	block field
breaklands	block [volcanic]	block glide
canyon wall	bomb [volcanic]	block lava
composite cone	bowl	block lava flow
coral limestone	burial mound	block stream
diatomaceous earth – [Soil Taxonomy]	buried soil	blue rock
diatomite	chimney	caldera
dissected breaklands	cinders	canyon bench
dissected plateau	coprogenous earth	caprock
fold-thrust hills	cove [water]	cat clay
gypsite	crater [volcanic]	channel
headwall – [anthropogenic]	cut	chenier
highwall	diatomaceous earth – [geology]	chenier plain
human artifact	diatrema	circular gilgai
interfurrow	dike	cirque headwall
lagoon [relict]	epiclastic	collapsed outwash plain



<b>New terms appearing in the glossary</b>	<b>Change in spelling or definition of terms</b>	<b>Minor editorial changes to terms</b>
lahar deposit	fan piedmont	complex landslide
lakebed [relict]	first bottom	coulee
lava dome	flow till	cove
limonite	glaciokarst	creep
longshore bar	granitoid	crevasse
microslope	gulf	debris avalanche
nearshore zone	gut [channel]	debris fall
nearshore zone [relict]	gut [valley]	debris flow
plowpan	head slope	debris slide
pluvial lake [relict]	human-transported material	debris spread
polder	ice pressure ridge	debris topple
rock anhydrite	igneous rock	desert pavement
rock gypsum	intermediate position	detritus
rock halite	lagoon	diamicton
sabkha	lahar	drainage pattern
scour channel	lakebed	dump
subglacial flow till	lapilli	earth dike
supraglacial flow till	lava	earth hummock
terrace remnant	levee	earth spread
tillage mound	linear gilgai	earth topple
volcanic block	local relief	earthflow
volcanic bomb	lodgment till	erratic
volcanic crater	longshore bar [relict]	fall
water-lain moraine	maar	fissure vent
wave-worked till plain	mangrove swamp	flatwoods
	melt-out till	flow
	mesa	glacial-valley floor
	meta-stable slope	herbaceous peat
	microhigh	kame terrace
	microlow	landslide
	microrelief	lateral spread
	muck	lava flow
	mucky peat	louderback
	nuée ardente	low hill
	peat	low marsh

<b>New terms appearing in the glossary</b>	<b>Change in spelling or definition of terms</b>	<b>Minor editorial changes to terms</b>
	permafrost	marl
	pluvial lake	moss peat
	pothole lake	mudflow
	puff	nonsorted circle
	pumice	notch
	pyroclastic flow	paha
	pyroclastic surge	pahoehoe lava
	reworked lake plain	pahoehoe lava flow
	rise	parna
	scour	piedmont slope
	slickrock	pillow lava
	slump	pillow lava flow
	solifluction deposit	playa lake
	sorted circle	playette
	sound	reclaimed land
	spatter cone	rib and groove topography
	strait	rockfall
	subaqueous soil	rockfall avalanche
	subglacial melt-out till	rock spread
	subglacial till	rock topple
	supraglacial melt-out till	rotational debris slide
	supraglacial till	rotational earth slide
	tidal inlet [relict]	rotational rock slide
	till	rotational slide
	Toreva block	sand flow
	truncated soil	scoria
	tumulus	sea
	turf hummock	sedimentary peat
	volcanic crater	sedimentary rock
	volcanic neck	shoal [relict]
	volcanic pressure ridge	sill
	volcaniclastic	slide
	volcanic plug	slope alluvium
	zibar	soil fall
		solution chimney
		string bog

New terms appearing in the glossary	Change in spelling or definition of terms	Minor editorial changes to terms
		toe
		topple
		translational debris slide
		translational earth slide
		translational rock slide
		translational slide
		tread
		volcanic
		woody peat

4. Exhibit 629-1, Lists of Landscape, Landform, Microfeature, and Anthropogenic Feature Terms Contained in the Glossary, was revised to add new terms and add codes to all terms.
5. Exhibit 629-2, List of Materials or Material-Related, Structure, or Morphological-Feature Terms Contained in the Glossary, and exhibit 629-3, Genesis – Process Terms and Geologic Time Terms Contained in the Glossary, were both revised.
6. Exhibit 629-4, North American Glacial Episodes and General Geologic Time Scale, was revised to insert a new table. A new reference document (Walker and Geidman) was added.
7. Exhibit 629-5, Till Terms, was revised to correct spelling of till types, update footnotes, and update one reference.
8. Exhibit 629-6, Pyroclastic Terms, was revised to correct cell entries, clarify the footnotes, and update the references.

## 659.34 Amendment 25 (July 2013)

- A. Part 602 – National Cooperative Soil Survey Conferences
1. Added two sentences in section 602.00 (b) that reference the exhibits.
  2. Updated 19 occurrences of “Soil Survey Division” to “Soil Science Division” and 8 occurrences of “Director, Soil Survey Division” to “Soil Science Division Director” in the definition section and several bylaws exhibits.
  3. Updated “National Society of Consulting Soil Scientists, Inc.” to “Consulting Soil Scientists Division (S12) of the Soil Science Society of America”, in exhibits 602-1, 602-2, 602-3, and 602-5, to reflect the integration of NSCSS into the SSSA.
  4. The following edits were made in the Tuesday, June 18, 2013, Standards session at the 2013 NCSS conference in Annapolis, MD and approved at the business meeting on Thursday, June 20, 2013:
    - a. Updated Article VI, Section 1.1 on the membership of the steering committee to allow a quorum with less than 9 members to conduct business.
    - b. A suggested rotation among the regions for the national meetings was added to Article VII, Section 2.0 in exhibit 602-1.
    - c. Updated Article IX on amending the bylaws to allow a majority voice vote instead of a ballot.
    - d. Added dates on when the bylaws were amended and when the amendments were approved by the business meeting of the 2013 conference.
  5. Updated the bylaws for the Western region in exhibit 602-2 because of proposed revisions discussed and approved at the 2012 meeting in Davis. The revisions are: Article I, Section 1.0 – Revised wording for what constitutes the region including updating the name for the Pacific Basin to the Pacific Islands Area; Article III, Section 3.0 – Separated the NRCS state soil scientists from the MLRA regional office managers to recognize the recent division of the job positions, added text to mention that representatives of other federal positions are included in the permanent membership, removed the National Congress of American Indians (also removed from article VI, section 6.2.2, 8.), and clarified the name of FLAG as the Federal Lands Advisory Group; Article III, Section 3.1 – Added a USFS representative; Article VI, Sections 6.0 and 6.4 – Deleted text about Special Task Force Committees.
  6. Updated the bylaws for the Northeast region in exhibit 602-3 because of proposed revisions discussed and approved at the 2012 meeting in Orono. The revisions are: Article III, Section 1.4 – Changes MO numbers to office names and “team leader” to “director”; Article III, Section 1.6 – Deleted NGMC as a permanent participant; Article III, Section 1.8 – Revised to hosting-state professional soil scientist association; Article IV – Deleted four sections pertaining to the editorial board of the Northeast Cooperative Soil Survey

Journal; Article V, Section 1.0 – Added a suggestion rotation for the meetings through 2032; Article VI, Sections 4.1 through 4.8 are deleted since paper copies of proceedings are no longer distributed; Article IX, Section 6.0 – Deleted; Added new Articles XI, XII, and XIII to elevate the hydric soils, subaqueous soils, and soil and ecosystem dynamics as standing committees.

7. Updated the bylaws for the North Central region (NCRSSC) in exhibit 602-4 because of proposed revisions discussed and approved at the 2012 meeting in Lincoln. The revisions are: Changed liaison of the NCRSSC from the NL for Technical Soil Services to the NL for Soil Survey Research and Laboratory; Increased the number of standing committees from 3 to 5 by adding a committee for interpretations and a committee for soil and ecosystem dynamics; Allowed a representative (designee) of the chair of the standing committees to be representative at the NCSS conference.
8. Updated the bylaws for the Southern region in exhibit 602-5. The revisions are: Updated position title of “MLRA leaders” to “soil survey regional directors”; Updated 2 occurrences of “National Society of Consulting Soil Scientists, Inc.” to “Consulting Soil Scientists Division (S12) of the Soil Science Society of America”; Updated Table 1 for conference structure based on new MO structure and numbers; Updated MO numbers in composition of the Soil Taxonomy and Standards Co-committee.
9. Added new exhibit 602-6 titled “Conducting NCSS Regional Conferences.”

#### B. Part 622 – Interpretative Groups

1. The name of Part 622 is revised from “Ecological and Interpretative Groups” to “Interpretative Groups.”
2. Section 622.04 Prime Farmland Soils is deleted and subsequent sections, 622.05 through 622.14, are renumbered. Some previous content on quality control of prime farmland map units is retained and incorporated into Section 622.03.
3. Sections 622.00 Definition and Purpose through 622.09 contain many substantive changes in content to update policy, guidance on data entry, and reference documents as well as to add hyperlinks with Web addresses to other pertinent documents.
4. The replica of Agriculture Handbook 210 (Land Capability Classification) as shown in exhibit 622-2 is deleted and replaced with a hyperlink to a Web address where a scanned version of the document is available.
5. A National guide for assigning land capability class (new exhibit 622-2) and State-specific guides for assigning land capability class, subclass, and unit (exhibits 622-3 through 622-7) are added.

#### C. Part 649 – Land Resource Regions and Major Land Resource Areas

1. Revised Exhibit 649-1 to reassign all MLRAs to the new regional office structure. Reformatted all cell entries in the exhibit to Times New Roman font. Replaced MLRA 44 with new MLRAs 44A and 44B for the Bozeman,

Montana soil survey regional office. Replaced the acronym “MO” with “SSRO.”

2. Corrected footnote to Ag Handbook 296 in section 649.00 and 649.05 as well as the citation for the document in exhibit 649-2.
3. Minor editorial changes were made.

## 659.35 Amendment 26 (August 2013)

### A. Part 606 – Working Agreements

1. Corrected branch contact in section 606.01(a)(2)(iii).
2. Updated office names in section 606.01(a)(5)(iii).
3. Updated position titles throughout.
4. Deleted the term “update soil surveys requiring extensive revision” from sections 606.01(a)(2) and 606.01(e).
5. Clarified the wording on interagency agreements in section 606.01(d).
6. Updated 3 occurrences of “Soil Survey Division” to “Soil Science Division.”
7. Updated the Specifications section of exhibit 606-1 to the current standards for Part 647 of the NSSH.
8. English edit changes were made throughout.

### B. Part 607 – Initial Soil Survey Preparation

1. Updated office names in section 607.01.
2. Edited the paragraph in section 607.01(b) to remove mention of the obsolete Soil Survey Schedule.
3. English edit changes were made throughout.

### C. Part 617 – Soil Survey Interpretations

1. Revised one occurrence of “Soil Survey Division” to “Soil Science Division.”
2. Updated 1 occurrence of “Soil Survey Laboratory” to “NSSC Kellogg Soil Survey Laboratory” in section 617.00.
3. Changed header for item 617.03(a) to reflect name change for Part 622.
4. Updated 3 occurrences of “MLRA soil survey regional office (MO)” to “soil survey regional office (SSRO).”
5. Replaced 14 occurrences of “Soil Data Mart” with “Web Soil Survey” in the context of product delivery.
6. In section 617.11(f), updated the hyperlink to download the SSURGO Template Database Customization Guide.
7. In section 617.11(g), updated the hyperlink (to download the national SSURGO template database), from the Soil Data Mart to the Web Soil Survey.

### D. Part 630 – Benchmark Soils

1. Deleted section 630.01(e) and merged the responsibilities of the former National Geospatial Development Center (now Geospatial Research Unit) into the National Soil Survey Center.

2. Updated 1 occurrence of “Soil Survey Laboratory” to “NSSC Kellogg Soil Survey Laboratory” in section 630.02.
  3. Updated the name of the NCSS soil characterization database in section 630.02.
  4. Expanded the information for accessing benchmark soil list in section 630.03.
  5. Updated office names, entities, and abbreviations to the current structure of the Soil Science Division.
- E. Part 638 – Soil Data Systems
1. Updated 3 occurrences of “Soil Survey Laboratory” to “Kellogg Soil Survey Laboratory.”
  2. Updated 4 occurrences of “SSL” to “KSSL.”
  3. Replaced 10 occurrences of either “MO” or “MOs” with “SSRO.”
  4. Deleted 5 occurrences of the abbreviation “MLRA” when used as an adjective modifying either the soil survey office or the soil survey regional office.
  5. Deleted URL for the Soil Data Mart webpage in section 638.2(B)(2).
  6. Deleted URL for the Soil Data Mart webpage in section 638.2(B)(8) and replaced it with the URL for the Web Soil Survey, as the source for STATSGO2 data.
  7. Deleted 6 occurrences of “Soil Data Mart” in the context of either product delivery or the webpage.
- F. Part 639 – National Soil Information System (NASIS)
1. Revised guidance on populating data for combination horizons in section 639.3(F)(3)(v) for accuracy and clarity.
  2. Revised one occurrence of “Soil Survey Division” to “Soil Science Division.”
  3. Revised URL for the eAuthorization homepage in Subpart A, section 639.2(C) to reflect the current address.
  4. Edits were made to describe the addition of new tables with NASIS version 6.0, reassign responsibility for ensuring training in NASIS software from the state office to the MO, and clarify guidance under the Site, Pedon, Transect, Site Association, Legend, Mapunit, Data Mapunit, and Project objects.
  5. Replaced 1 occurrence of “Soil Data Mart” with “Web Soil Survey” in the context of product delivery.
  6. Replaced 3 occurrences of “MO” with “SSRO.”
  7. Deleted 10 occurrences of the abbreviation “MLRA” when used as an adjective modifying either the soil survey office or the soil survey regional office.
- G. Part 644 – Delivering Soil Survey Information



1. Updated 2 occurrences of “Director of Soil Survey” to “Soil Science Division Director.”
  2. Updated 2 occurrences of “Soil Survey Laboratory” to “Kellogg Soil Survey Laboratory” and 1 occurrence to “SCS Soil Survey Laboratory.”
  3. Updated 2 occurrences of “SSL” to “KSSL.”
  4. Updated 9 occurrences of “National Cartography and Geospatial Management Center” to “National Geospatial Center of Excellence.”
  5. Updated 7 occurrences of “MLRA office” to clarify the office (SSO vs. SSRO).
  6. Updated name of Soil Geochemistry Spatial database in section 644.01(d).
  7. Updated USDA non-discrimination statement in section 644.06(f)(2).
  8. Updated section 644.07(c) for components used in the U.S. general soil map of the U.S.
  9. Updated references to sections of Part 608.
  10. Updated title for “MLRA regional leader” to “soil survey regional director” in exhibit 644-1.
  11. Deleted section 644.01(b) about the Soil Data Mart being a type of soil survey online delivery system.
  12. Replaced 16 occurrences of “Soil Data Mart” with “Web Soil Survey” or certified data source in the context of product delivery.
- H. Part 651 – Advance Soil Survey Information
1. Replaced 9 occurrences of “Soil Data Mart” with “Web Soil Survey” in the context of product delivery.
  2. Reworded the text in section 651.03(c) about sensitive areas for clarity.
  3. Corrected references to sections of the NSSH outside of Part 615.
  4. Removed page header from page 1 to match other parts of the NSSH.
- I. Part 655 – Technical Soil Services
1. Replaced one occurrence of “Soil Data Mart” with “Web Soil Survey” in the context of product delivery.

## 659.36 Amendment 27 (September 2013)

### A. Preface

1. Edited the front page to add the new version of the USDA nondiscrimination statement as well as to the Preface for the NSSH.

### B. Part 609 – Quality Control, Quality Assurance, and Soil Correlation

1. Updated office abbreviations and titles to current terms.
2. Deleted 16 occurrences of the term “update soil surveys (or update projects) requiring extensive revision” in table of contents (5), general information sections (7), and exhibits (4).
3. Revised sections 609.00 through 609.02 for clarity and to ensure consistency with Parts 608 and 610.
4. Updated 1 occurrence of “National Soil Survey Laboratory” and 1 occurrence of “Soil Survey Laboratory” to “Kellogg Soil Survey Laboratory.”
5. Updated 13 occurrences of “National Cartography and Geospatial Center” (and NCGC) to “National Geospatial Center of Excellence” (and NGCE).
6. Updated 10 occurrences of “MLRA-SSO” to “SSO.”
7. Deleted many occurrences of “MLRA” when used as an adjective with the soil survey office and soil survey regional office.
8. Updated 2 occurrences of “NSSL” to “KSSL.”
9. Updated occurrences of the U.S. General Soil Map (STATSGO2).
10. Updated USDA non-discrimination statement and contact information in Exhibit 609-1.
11. Edited list of items for a correlation document in section 609.02(d) to match the items presented in Exhibit 609-1.

### C. Part 627 – Legend Development and Data Collection

1. Updated the names of the MLRA offices to either the soil survey office (SSO) or the soil survey regional office (SSRO) as appropriate.
2. Removed all instances of the terms “soil survey project office” or “project office.”
3. Updated position title of “MO leader” to “soil survey regional director.”
4. Revised cell entries in Table 1 - Description of Kind of Map Unit.
5. Revised the previous section on taxonomic categories above the series into new sections 627.04(b) Families and 627.04(c) Taxonomic categories above the family, to synchronize with the NASIS domain “component\_kind.”
6. Replaced information on miscellaneous areas which is now in section 627.04(e).

7. Added corrections to section 627.05(e) on naming human-altered and human-transported soils; section 627.05(g) on naming areas not completed and areas of denied access; section 627.06(a) on surface layer texture phases; section 627.06(h) on salinity phases; section 627.06(i) on sodicity phases.
  8. Replaced some text in section 627.08(f)(1)(i) on map unit symbols for clarity.
  9. Revised Exhibit 627-1 on miscellaneous areas to incorporate the decisions made in 2010 at the NCSS regional meetings on the miscellaneous areas workgroup proposals.
  10. Corrected the FTP hyperlink for the Soil-Crop Yield Data form (NRCS-SOI-1).
  11. Revised section 627.06 Phases Used to Name Soil Map Units, to clarify and expand the guidance in items (e) Eroded phases, (g) Soil water phases, (j) Physiographic phases, (k) Climatic phases, and (l) Other phases.
  12. Replaced page 1 of form NRCS-SOI-37A in exhibit 627-5 based on revisions made in June by the NGCE. Deleted the previous date of 5/2001 (or 5/01) from all occurrences in the text of Part 627.
  13. Changed title of Exhibit 627-8 to “Matrix of Investigation Intensity of Soil Surveys and Documentation.”
- D. Part 631 – Soil Survey Investigations
1. Reformatted the Word file into one column.
  2. Updated numerous occurrences of “Soil Survey Laboratory” to “NSSC Kellogg Soil Survey Laboratory.”
  3. Updated 7 occurrences of “SSL” to “KSSL.”
  4. Clarified the office (soil survey or soil survey regional) in several places.
  5. Deleted the NRCS-SOI-8 Input Form for the Index of Laboratory Data (previous exhibit 631-1) and the Instructions for Completing the NRCS-SOI-8 Input Form for the Index of Laboratory Data (previous exhibit 631-2). The form and instructions have been obsolete since the mid-2000’s.
  6. Renumbered the remaining 3 exhibits for research and characterization work plans.

## 659.37 Amendment 28 (February 2014)

### A. Contents

1. Updated the Word version of the table of contents to reflect the deletion of Part 615 (Amendments to Soil Taxonomy) and the name change for Part 622 (Interpretative Groups).

### B. Part 600 – Introduction

1. Updated 3 occurrences of “Soil Survey Division” to “Soil Science Division.”
2. Updated some technical references in exhibit 600-1 to current status.

### C. Part 601 – National Cooperative Soil Survey Organization

1. Updated office names in section 601.01 for the soil survey office (SSO), soil survey regional office (SSRO), and National Geospatial Center of Excellence (NGCE).
2. Updated 4 occurrences of “Soil Survey Division” to “Soil Science Division.”
3. Revised the list of NCSS responsibilities in section 601.01 for all offices and positions to align duties in the reorganized Soil Science Division.
4. English edit changes were made throughout Part 601 and Appendix 601-1.

### D. Part 608 – Program Management

1. Updated office names, position titles, and responsibilities in section 608.01 Responsibilities and Organization, to align text with the reorganized Soil Science Division.
2. Updated 9 occurrences of “Soil Survey Division” to “Soil Science Division.”
3. Updated 1 occurrence of “SSL” to “KSSL.”
4. Updated section 608.02 Soil Survey Area Designation, to reflect the new scheme for ID symbols of SSOs.
5. Updated section 608.05 Priorities for Soil Survey Activities, to clarify the guidance on the purpose and use of priority lists.
6. Updated section 608.07 Goals and Progress to add a reference to the Technical Soil Services Handbook. Other text was revised to clarify the purpose of progress and progress reporting for soil survey and ecological site inventory.
7. Exhibits 608-3 and 608-4 we revised to align the content for the reorganized Soil Science Division.
8. Deleted “MLRA” from two occurrences of “MLRA Soil Survey Regional Office.”
9. Deleted 10 of 11 occurrences of “Soil Data Mart” and replaced with “Web Soil Survey” if the context involved product delivery.

### E. Part 610 – Updating Soil Surveys

1. Updated office names, position titles, and responsibilities to align text with the reorganized Soil Science Division.
2. Updated 2 occurrences of “Soil Survey Division” to “Soil Science Division.”
3. Updated 1 occurrence of “National Soil Survey Laboratory” to “Kellogg Soil Survey Laboratory” in Exhibit 610-7c—Project Plan Examples.
4. Updated 2 occurrences of “NSSL” to “KSSL” in Exhibit 610-7c—Project Plan Examples.
5. Replaced two occurrences of the “Soil Data Mart” with “Web Soil Survey” in the context of product delivery.

## 659.38 Amendment 29 (October 2014)

- A. Part 608 – Program Management
  - 1. Updated 608.03(d) and 608.03(d)(1) to include the map unit symbol “ANS” for designating “Area not surveyed, access denied.”
- B. Part 614 – Applying Soil Taxonomy
  - 1. Extensively revised and updated throughout. Documented procedures to be used in receiving, processing, reviewing and approving proposals for Amendments to Soil Taxonomy, establishes the International Committee on Soil Taxonomy. Extensive updates to the section on Soil Series descriptions and content and includes new exhibits on rounding and significant digits in OSDs.
- C. Part 617 – Soil Survey Interpretations
  - 1. Added subsection 617.12 “Interpretation overrides.” This section is used to explain new population guidelines for over-riding standard interpretations.
- D. Part 627 – Legend Development and Data Collection
  - 1. Updated 627.04(e)(1) Definition of miscellaneous areas to coincide with the definition in Exhibit 1.
  - 2. Updated 627.04(e)(5). Data population to identify the minimum population requirements.
- E. Part 644 – Soil Survey Investigations
  - 1. Updated Exhibit 644-1 “Sections of a Soil Survey Publication” to remove the “required” and the “optional” sections with the intent of identifying those sections within the soil survey publication.

## 659.39 Amendment 30 (March 2016)

### A. Preface

1. Updated the text and citation.

### B. Part 649 – Land Resource Areas

1. Changed name for Part 649 from ‘Land Resource Regions and Major Land Resource Areas.’
2. 649.00 Definition and Purpose: Was expanded to further explain the Land Resource Areas. Establishes a consistent terminology to be used within the document.
3. 649.01 Policy and Responsibilities: Emphasizes the need for the State Soil Scientist to work with NCSS partners to propose changes. Places the SSS as the primary editor for MLRA overlap tables. Includes the Soil Survey Office and provides responsibilities. Includes the SSRO as the primary reviewer of all changes. Includes the NSSC Director as the person to resolve boundary disputes. Added the SSD Director as the final arbitrator.
4. 649.02 Descriptions is expanded to establish a consistent terminology of the Land Resource Areas that the Soils Division is responsible for maintaining: Land Resource Areas, Major Land Resource Areas, Land Resource Units, and included the soils maps State General Soils Map Units, and Soil Survey Geographical Database as a source of information used in the LRA.
5. 649.03 Changes ‘Criteria’ to ‘Resource Area Concerns’ to expand the 7 concerns used to identify and define the LRAs.
6. 649.04 Cartographic Standards: Included a separate section for cartographic standards. Established the cartographic publication scales for each resource map. Removed all reference to Common Resource Areas.
7. 649.05 Names and Symbols: Clearly identified the symbol convention and naming convention for national consistency by establishing the Number as the MLRA and the letters as the LRU.
8. 649.06 Establishing and Revising Land Resource Areas: Sets forth the process steps for creating Land Resource Units.
9. 649.07 Publication: Defines the publication as a digital product.
10. Removed Exhibit 649-1 previously used to identify the LRR shared by the MLRA Regional Offices.
11. Moved ‘References’ to Exhibit 649-10.

## 659.40 Amendment 31 (July 2016)

### A. Part 649 – Land Resource Areas

1. Changed name to ‘Land Resource Areas’ from ‘Land Resource Regions and Major Land Resource Areas’ for Part 649.
2. Expanded the 649.00 Definition and Purpose.
3. Updated 649.01 Policy and Responsibilities.
4. Updated 649.02 Descriptions to establish the Land Resource areas the Soils Division is responsible for maintaining: Land Resource Areas, Major Land Resource Areas, Land Resource Units, State General Soils Map Units, and Soil Survey Geographical Database. Established the cartographic publication scales for each resource map. Removed all reference to Common Resource Areas.
5. Renamed 649.03 ‘Criteria’ to ‘Resource Area Components’ to clearly identify the components used to group land resource areas.
6. Included 649.04 Cartographic Standards to identify the standard for map scales and the polygon line work.
7. Re-symbolized 649.04 names and symbols to 649.05. Clearly identified the symbol convention and naming convention for national consistency.
8. Updated 649.05 to identify the process steps for creating Land Resource Units and edits to major land Resource Areas.
9. Updated 649.06 to provide instruction on establishing and revising Land Resource Areas.
10. Removed Exhibit 649-1 to identify the LRR shared by the MLRA Regional Offices.
11. Re-symbolled Exhibits 649-2 and 649-3 to 649-1 and 649-2, respectively, to specify the ownership of MLRAs by MLRA Regional Offices and LRUs by MLRA Regional Office, respectively.
12. Returned ‘References’ to Exhibit 649-3.



## 659.41 Amendment 32 (March 2017)

- A. Part 609 – Quality Control, Quality Assurance, and Soil Correlation
  - 1. Change the format to agree with requirement for posting to eDirectives.
  - 2. Updated various terms and acronyms, updated broken hyperlinks.
  - 3. Clarified and redefined the roles and responsibilities at the NRCS State Offices including the State Conservationist and State Soil Scientist.
  - 4. Changed the signatory of the correlation document, as well as preparation and distribution, from the State Conservationist to the Soil Survey Regional Director.
  - 5. Minor updates and clarification to various exhibits.
- B. Part 610 – Updating Soil Surveys
  - 1. Change the format to agree with requirement for posting to eDirectives.
  - 2. Updated various terms and acronyms and updated broken hyperlinks.
  - 3. Some English editing to provide additional clarity.
  - 4. Revised exhibits as needed to align with Part A narrative.

## 659.42 Amendment 33 (August 2017)

### A. Part 600 – Introduction

1. Changed font and style to align with NRCS handbook policy.
2. Retained the Mission of the Soil Science Division as “Provide leadership and service to produce and deliver scientifically based soil information to help society to understand, value, and wisely manage global resources” rather than changing it to “Helping people understand the soils.”
3. Updated and corrected hyperlinks.
4. Removed the word “policy” as one of the purposes of the National Soil Survey Handbook.
5. Clarified that regional and local offices cannot amend or supplement the National Soil Survey Handbook.
6. Added Subpart 600.04 Conventions and Terminology to define conventions and terminology used in the National Soil Survey Handbook.
7. Added Subpart 600.05 Standards of the National Cooperative Soil Survey to further clarify the purpose of standards.
8. The List of Technical References was updated where appropriate.
9. An exhibit showing the NSSH Amendments Tracking Flowchart was added.

### B. Part 601 – National Cooperative Soil Survey Organization

1. Changed font and style to align with NRCS handbook policy.
2. Changed the abbreviation for the Soil Survey Regional Office from SSRO to SSR.
3. The Organization and Responsibilities of 601.01 was simplified to show the types of responsibilities at each office or organizational level within the National Cooperative Soil Survey. It is not intended to be a complete list of all NCSS responsibilities.
4. Added State Conservationists to the list of NRCS staff having NCSS responsibilities, particularly related to their role on the Board of Advisors for Regional Soil Survey Offices.
5. Removed policy development as a role of the National Soil Survey Center.
6. Removed the National Geospatial Management Center from having specified NCSS responsibilities.

### C. Part 602 – National Cooperative Soil Survey Conferences

1. Changed font and style to align with NRCS handbook policy.
2. Corrected typos.
3. Minor updates to Acronyms and organizational units.

4. Content of bylaws not otherwise changed, but it appears these may not necessary be the most bylaws of all the regions. Regions should submit any updates.
- D. Part 606 – Working Agreements
1. Changed font and style to align with NRCS handbook policy.
  2. Removed references to Subpart 104I-73.101 of the NRCS Property Management Regulations, NRCS Grants and Cooperative Agreements Handbook, and the Contribution Agreements Handbook because many of these procedures are no longer in place or applicable and many are under revision.
  3. Under 606.01 added references from the Federal Register (Title 7, Subtitle B, Chapter VI, Subchapter B) that describe requirements of Soil Survey Program operations.
- E. Part 607 – Initial Soil Survey Preparation
1. Changed font and style to align with NRCS handbook policy.
  2. The Purpose section has been clarified to distinguish initial soil survey mapping from extensive revisions. Extensive revisions are handled per guidance in Part 610.
  3. Responsibilities were updated to align with the new soil survey structure.
  4. Minor updates were made to the exhibit on Reference Materials for Soil Surveys.
- F. Part 608 – Program Management
1. Changed font and style to align with NRCS handbook policy.
  2. Responsibilities for numerous program management activities were updated to align with the soil survey program structure.
  3. Added responsibilities of the Associate Director SSD.
  4. Minor updates to terminology and acronyms.
  5. References to other Parts of NSSH were updated as appropriate.
  6. Performance measurement was clarified and updated.
- G. Part 609 – Quality Control, Quality Assurance, and Soil Correlation
1. The State Conservationist is responsible for:
    - a. “Actively participating as a member of” changed to participating as a member or via designated appointee to the board of advisors (BOA) for the MLRA soil survey region, and
    - b. Certifying that the soil survey products (SSURGO) are the Official Soil Survey data and maps for conservation planning and agricultural program implementation (e.g., Farm Bill).

## H. Part 614 – Applying Soil Taxonomy

1. Changed font and style to align with NRCS handbook policy.
2. Minor updates to terminology and acronyms.
3. Updated hyperlinks and references to exhibits.
4. Elaborated on the uses of Soil Taxonomy and the discussion of the soil series.

## 659.43 Amendment 34 (January 2018)

### A. Part 617 – Soil Survey Interpretations

1. Changed font and style to align with NRCS handbook policy.
2. Adjusted sentence structure and removed reference to the MOU in section 617.0.
3. Removed the words “the actual and visual presentations of” in first paragraph of section 617.1.
4. Deleted section on “Agreement on the use of interpretations” because interpretations of choice can be generated by the user and are no longer applicable to the MOU development.
5. Reworded sentence describing responsibilities of Federal agencies developing additional interpretations on their lands.
6. Removed hyperlinks to NRCS documents in what is now section 617.1(6)(vi) for the National Engineering Manual, National Biology Manual, National Forestry Manual and National Range and Pasture Handbook.
7. Made slight adjustments of wording in section 617.9(3) for identifying site features.
8. In section 617.11(6), corrected the hyperlink to access detailed instructions for modifying the Access template database.
9. In section 617.11(7), reworded the paragraph on how to access the National SSURGO Template Database.
10. Changed the abbreviation for the Soil Survey Regional Office from SSRO to SSR.

### B. Part 618 – Soil Properties and Qualities

1. Changed font and style to align with NRCS handbook policy.
2. Corrected or removed web links that did not work.
3. Updated references to the Soil Survey Field and Laboratory Methods Manual Report No. 51, Soil Survey Field and Laboratory Methods Manual to Version 2.0, 2014.
4. In section 618.2, replaced “soil survey memorandum of understanding for individual soil survey areas” with “project plans.”
5. Added clarification to the definition of Available Water Capacity in section 618.6.
6. In section 618.30(D)(3), added FEMA Flood Map Service Center as a source for flooding information.

7. Made significant changes to the description of Landscape, Landform, Microfeature, Anthroscape, Anthropogenic Landform, and Anthropogenic Microfeature in section 618.40.
  8. In section 618.50(A), made slight modifications to the definition of Pores.
  9. Made significant changes to Section 618.55, “Slope Gradient.”
  10. Deleted the sentence “Use worse case organic matter content assuming long term cultivation” in section 618.58(D)(3) on Soil Erodibility Factors, USLE, RUSLE2.
  11. In section 618.60(E)(4), changed wording from “If local knowledge is supported by data, so much the better.” to “When possible, use documented measurements.”
  12. Added clarification on Texture Modifier in section 618.71(H)(2)(iv).
- C. Part 621 – Soil Potential Ratings
1. Changed font and style to align with NRCS handbook policy.
  2. Corrected or removed web links that did not work.
  3. Updated cross references to this and other parts of the NSSH.
  4. In section 621.0, added “landforms” to the list factors that may change criteria for soil potential ratings.
  5. Updated responsibilities in section 621.1.
  6. In section 621.3(G), changed the wording to say technical experts from outside NRCS “should be consulted” instead of “must be consulted” and changed “must concur” to “should also be consulted.”
  7. In section 621.11(A), deleted the last sentence: “Soil potential ratings are not to be used by NRCS unless the systematic procedures that are outlined in the National Soil Survey Handbook, part 621, are followed.”
- D. Part 622 – Interpretive Groups
1. Changed font and style to align with NRCS handbook policy.
  2. Corrected or removed web links that did not work.
  3. In section 622.1 changed heading from “Policy and Responsibilities” to “Procedures and Responsibility.”
  4. In section 622.2(C), deleted “the Farmland Protection Policy Act” because land capability classification is not used in its implementation.
  5. Updated Section 622.5, “Hydric Soils.”
  6. Updated Section 622.6, “Ecological Sites.”
  7. In 622.20 the exhibit on Prime and Unique Farmlands was kept in. The Soil Survey Standards Staff would like feedback from users if they wanted it to remain in the NSSH.

E. Part 624 – Soil Quality

1. Changed font and style to align with NRCS handbook policy.
2. Corrected or removed web links that did not work.
3. Changed definition of Soil Quality in section 624.0 to agree with definition on Soils Health web page.
4. In section 624.0(D)(2)(iii), added “maintaining a reliable food supply and ensuring national security.”
5. In section 624.10, added clarification on the Soil Quality Test Kit.

F. Part 627 – Legend Development and Data Collection

1. Changed font and style to align with NRCS handbook policy.
2. Corrected or removed web links that did not work.
3. Corrected references to the Soil Survey Manual to agree with the new 2017 version.
4. In section 627.3(C), deleted the sentence “It represents the size of an area most users would agree is the smallest area that is managed for an intended land use” because precision farming techniques and other technologies now allow soil to be managed at a level of detail not available in Order 2 soil surveys.
5. Added clarification to eroded phases of map units in section 627.6(D).
6. Added reference to the National Ecological Site Handbook in section 627.9.
7. In first paragraph of Exhibit 627.10 changed “are heavily contaminated by toxic substances” to “are heavily disturbed.”
8. In exhibit in section 627.12(f)(2), changed reference to NASIS-related metadata.

G. Part 629 – Glossary of Landform and Geologic Terms

1. Changed font and style to align with NRCS handbook policy.
2. Corrected or removed web links that did not work.
3. In section 629.1, changed “NRCS” to “NCSS” and “Soil scientists at MLRA soil survey offices” to “Soil Science Division staff” to clarify who is encouraged to propose additions and changes to the Glossary of Landform and Geologic Terms.
4. In section 629.2(A), updated selected references to the codes used.
5. In section 629.2(C), clarified descriptions of numerous entries and added the following terms to the glossary:
  - a. Agricultural anthroscap
  - b. Anthropogenic feature
  - c. Coppice dune field

- d. Ephemeral lake
- e. Estuarine tidal stream
- f. Hillslope terrace anthroscape
- g. Reclaimed mineland anthroscape
- h. Resource extraction anthroscape
- i. Suburban anthroscape
- j. Terrace (soil survey)
- k. Urban anthroscape

6. In section 629.3, added citation for Daniels, Buol, Kleiss, Ditzler, 1999.

#### H. Part 630 – Benchmark Soils

- 1. Changed font and style to align with NRCS handbook policy.
- 2. Corrected or removed web links that did not work.
- 3. In section 630.0(B), made a few changes to examples of uses for benchmark soils.
- 4. In sections 630.1(B)(2) and (3), changed SSR responsibility from “Assuring” to “Ensuring.”
- 5. In section 630.1(B)(3), edited the responsibility of SSRs from “approving/denying recommendations” for benchmark soils to “approving recommendations” because approving assumes the authority to not approve.

#### I. Part 631 – Soil Survey Investigations

- 1. Changed font and style to align with NRCS handbook policy.
- 2. Corrected or removed web links that did not work.
- 3. In section 631.1(A), changed NRCS International Conservation Division to International Programs Division. Also changed to the USDA Office of International Cooperation Division to USDA Office of Capacity Building and Development.
- 4. In section 631.1(B), moved the responsibility of attribute data in NASIS from the SSR to the SSO.
- 5. In section 631.3(A), updated the reference to the Soil Survey Laboratory Methods Manual, to the 2014 Version 5.0.
- 6. In sections 631.4(B)(3) and (6), deleted sentences related to GPR and EMI equipment maintained by NRCS State offices.
- 7. In section 631.5(B), added the statement that “All investigations within NCSS should first be identified as a needed component of an approved initial soil survey or MLRA update project plan.”
- 8. In section 631.7(A), updated the number of pedons in the Soil Characterization Database.

#### J. Part 638 – Soil Data Systems

- 1. Changed font and style to align with NRCS handbook policy.



2. Corrected or removed web links that did not work.
  3. Under “Responsibilities” in 638.1(B)(1), added the statement that “State offices are responsible for downloading and making available soils information for NRCS field offices FOTG and Web Soil Survey for customers.”
  4. In section 638.1(B)(2), updated responsibilities for state offices, soil survey offices, regional soil survey offices, and the NSSC.
  5. In section 638.2(B)(8) deleted paragraph (iii) because National Instruction 430-302 is no longer available in eDirectives.
- K. Part 639 – National Soil Information System (NASIS)
1. Changed font and style to align with NRCS handbook policy.
  2. Corrected or removed web links that did not work.
  3. In section 639.1(A), changed “publication” to “public release.”
  4. Added Section 639.3(D)(5), “Vegetation Plot Object.”
- L. Part 644 – Delivering Soil Survey Information
1. Changed font and style to align with NRCS handbook policy.
  2. Corrected or removed web links that did not work.
  3. Added 7 CFR Section 611.10(a) (October 8, 2004) to the authority subsection of section 644.0.
  4. Added a statement on personally identifiable information in “Policy and Responsibilities” section.
  5. Deleted “populating and maintaining general soil information in the NASIS database and submitting to the national coordinator for the General Soil Map of the U.S. (STATSGO2);” from State office responsibilities.
  6. Deleted responsibilities of the National Geospatial Center of Excellence.
  7. In section 644.7(A)(3), deleted “however, States are required to fully populate a minimum data set of properties.”
- M. Part 647 – Soil Map Development
1. Changed font and style to align with NRCS handbook policy.
  2. Corrected or removed web links that did not work.
  3. Updated paragraph on Digital Data Capture 647.0(C).
  4. Added reference to the general manual in Section 647.1, “Procedures and Responsibilities.”
  5. Added statement on issues with enlarging soil maps beyond the detail of mapping in section 647.1(A)(2).

6. In section 647.1(B)(2), added “Tribal” to the lands NRCS has soil survey responsibilities for.
7. In section 647.1(B)(8), deleted most soil survey responsibilities for the National Geospatial Center of Excellence (NGCE), but added that it is responsible for helping coordinate NRCS aerial imagery and LIDAR acquisitions.
8. In section 647.2, added the Geospatial Data Gateway as a source for imagery acquisition.
9. In section 647.16, changed the acreage from 3,000 to 4,000 acres for when one additional 10 point transect is needed per map unit to agree with 430-NSSH-627-A-627.8.

#### N. Part 649 – Land Resource Areas

1. Most changes to this part of the NSSH are to correct minimum delineation size of map units and reverse earlier structural changes to the symbology and naming of LRRs, MLRAs, and LRUs, and to add a coding and naming system for ecological sites aligned to the land resource areas. The coding system will allow large complex MLRAs to be subdivided or small neighboring MLRAs to be merged.
2. 649.2(D).—Clarified that LRUs would be captured in soil data systems and displayed on maps, but not fully developed, described, and delineated as part of Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin, U.S. Department of Agriculture Handbook 296.
3. 649.4 Cartographic Standards.—Corrected error in the minimum delineation size (hectares and acres) for LRR, MLRA, LRU, STATSGO, and SSURGO representation on maps.
4. 649.5 Names and Symbols.—Returned the MLRA map symbology to the way it had been at the time of development of AH#296 in 2006. That is, MLRA consisting of both numbers and letters. This reversed the previous instruction to combine all previously split MLRAs indicated by both number and letter symbology into one MLRA, and recognizing the MLRAs with number and letter designations as LRUs. The decisions regarding splits and combinations will remain the decision of the Soil Survey Region responsible.
5. Clarified symbology and naming used for LRR, MLRA, and LRU.
6. Minor edits to responsibilities of various work units.
7. Added coding system of the symbology of LRR down through MLRA, LRU and including the ecological site code. Ecological sites will follow the hierarchy of the Land Resource Areas in organization, naming and database coding.

#### O. Part 651 – Advance Soil Survey Information

1. Changed font and style to align with NRCS handbook policy.

2. In section 651.0(B), deleted “typically correlated, but nonetheless” because it is not needed.
  3. In section 651.1(A), deleted the last sentence “Some of these data may be posted to the Web Soil Survey at the discretion of the state soil scientist or agency.” This is because in section 651.2 (new A) it says, “Placing soil survey information onto the Web Soil Survey removes the information from the status of advance soil survey information.”
  4. In section 651.2, deleted A, the first paragraph, because both cooperators and noncooperators are treated the same, as shown in the new part B.
  5. Edited section 651.2(B) (now A) to clarify that this sentence is talking about an NRCS- Conservation District Cooperative Working Agreement and not a soil survey MOU.
  6. In section 651.2(C) (now B), deleted “of either type” because it is not needed.
  7. In section 651.3(A), deleted reference to National Instruction 120-310 because it is no longer posted in eDirectives. Added reference to GM policy on the Freedom of Information Act and Privacy Act.
  8. In section 651.5(B), clarified use of advanced soil survey information in USDA programs.
  9. Added a C section to 651.5 for identifying advance soil survey information in a digital format.
- P. Part 655 – Technical Soil Services
1. Changed font and style to align with NRCS handbook policy.
  2. Corrected or removed web links that did not work.
  3. Clarified the definition of technical soil services in section 655.0.
  4. Added “Tribal” to section 655.1(1).
  5. In section 655.1(4), changed the contact from NRCS State administrative officer to “... your supervisor if you are subpoenaed by a court, are requested to be an expert witness, or if legal services are requested by any means.”
  6. In section 655.1(D)(4), deleted reference to Title 360, General Manual, Part 415, Subpart E, because it is an unrelated section on annual, sick, and family leave. Added reference to part 635 of the Technical Soil Services Handbook for guidance and recommendations on acting as an expert witness.
  7. In section 655.2(A), added an exception for Farmland Protection Policy Act (FPPA) requests as they are a congressional mandate on the agency and do not require an MOU or cooperative agreement.

## 659.44 Amendment 35 (August 2019)

- A. Part 602 – Conferences of the National Cooperative Soil Survey
  - 1. Revisions to subpart A, section 602.0.
  - 2. Revisions to subpart B, sections 602.10 and 602.15.
- B. Part 618 – Soil Properties and Qualities
  - 1. In subpart A, section 618.2, added definition and explanation of representative values (618.2(C)).
  - 2. In subpart A, section 618.3(A) through (C), section 618.5(C) and (L)(2), and section 619.47(D), changed “75 mm” to “76 mm”.
  - 3. In subpart A, section 618.7(D), corrected entries (eliminated rounding to 0.05).
  - 4. In subpart A, section 618.8(B), corrected equation given.
  - 5. In subpart A, section 618.13, added definition and explanation of “Continuous Inundation.”
  - 6. In subpart A, section 618.21(B), Figure 618-A6, revised class breaks.
  - 7. In subpart A, section 618.31, Flooding, revised.
  - 8. In subpart A, section 618.32(K)(3)(i) and (ii), Figures 618-A12 and 618-A13, revised class breaks.
  - 9. In subpart A, section 618.32(K)(3)(iii), adjusted range in diameter for gravel.
  - 10. In subpart A, section 618.47(D), Figure 618-A17, revised size breaks.
  - 11. In subpart A, section 618.50, Ponding, revised.
  - 12. In subpart A, section 618.56(C)(4) and (6), added references to new section 618.106 of subpart B.
  - 13. In subpart A, section 618.66(D)(3)(i) and (ii), Figures 618-A28 and 618-A29, revised class breaks.
  - 14. In subpart A, section 618.72(H)(2)(v), added definition of shell fragments and shelly modifiers.
  - 15. In subpart A, section 618.72(I), corrected how stratified textures are listed.
  - 16. In subpart A, section 618.73, added definition and explanation of von Post Humification Scale.
  - 17. In subpart B, section 618.95, added shelly texture modifiers and term “shells.”
  - 18. In subpart B, added section 618.106, which consists of references for subpart A, section 618.56(C).
  - 19. Sections and figures were renumbered accordingly.

C. Part 627 – Legend Development and Data Collection

1. In subpart A, section 627.3(D), Figure 627-A1, clarified percentage for dissimilar components not included in map unit name.
2. In subpart A, section 627.4(A), clarified which components are used in map unit names.

## 659.45 Amendment 36 (August 2019)

### A. Part 618 – Soil Properties and Qualities

1. In subpart A, section 618.2, added definition and explanation of representative values (618.2(C)).
2. In subpart A, section 618.7(D), corrected entries (eliminated rounding to 0.05).
3. In subpart A, section 618.8(B), corrected equation given.
4. In subpart A, section 618.13, added definition and explanation of “Continuous Inundation.”
5. In subpart A, section 618.21(B), Figure 618-A6, revised class breaks.
6. In subpart A, section 618.31 revised.
7. In subpart A, section 618.32 and throughout Part 618, subpart A, the diameter of gravel is  $\geq 2\text{mm}$  and  $< 75\text{mm}$ , as in 618.32(K)(3)(i) and (ii), Figures 618-A12 and 618-A13, revised class breaks.
8. In subpart A, section 618.32(K)(3)(iii), adjusted range in diameter for gravel.
9. In subpart A, section 618.47(D), Figure 618-A17, revised size breaks.
10. In subpart A, section 618.50 revised.
11. In subpart A, section 618.56(C)(4) and (6), added references to new section 618.106 of subpart B.
12. In subpart A, section 618.66(D)(3)(i) and (ii), Figures 618-A28 and 618-A29, revised class breaks.
13. In subpart A, section 618.72(H)(2)(v), added definition of shell fragments and shelly modifiers.
14. In subpart A, section 618.72(I), corrected how stratified textures are listed.
15. In subpart A, section 618.73, added definition and explanation of von Post Humification Scale.
16. In subpart B, section 618.95, added shelly texture modifiers and term “shells.”
17. In subpart B, added section 618.106, which consists of references for subpart A, section 618.56(C).
18. Sections and figures were renumbered accordingly.

## 659.46 Amendment 37 (January 2021)

- A. Updates to the General Manual 430-402A and 430-402B—Soil Survey
  - 1. Subpart 402A was expanded to include ecological site activities and the “Plant List of Accepted Nomenclature, Taxonomy, and Symbols” (PLANTS) databases. This part also added (1) a section of 7 CFR Section 2.61 providing leadership in inventorying and monitoring of soil, water, land, and related resources of the Nation, and (2) reference to the coordination of USDA input and assistance to the Department of Commerce and other Federal agencies consistent with section 307 of the Coastal Zone Management Act of 1972 (16 U.S.C. 1456).
  - 2. Subpart 402B was expanded to specify the branches at the National Soil Survey Center, responsibilities of the NSSC director and national leaders, as well as descriptions of responsibilities and supervision of regional directors, the FBC-Geospatial Enterprise Operations Division director and staff, the Board of Advisors, State Soil Scientists, resource soil scientists, and soil survey office staff.
- B. General Manual 360-Part 420AA and 420BB—Boating Safety in Coastal Zone Soil Survey
  - 1. The Boating Safety guidance was placed in the General Manual rather than the National Soil Survey Handbook (NSSH) to be included with the other safety guidance for NRCS employees. Withing the NSSH Part 656A—Coastal Zone Soil Survey, however, the reader is directed to the boating safety section the GM.
  - 2. Subpart 420AA (new). The purpose of this subpart is to establish policy and guidance for safe operation, training, and maintenance of boats operated by NRCS personnel. Subpart 420AA specifically provides the background, scope, responsibilities, training, equipment, inspections, and method of keeping vessel records.
  - 3. Subpart 420BB (new) provides information about regulations and laws for boat safety and operation. It also provides checklists for float plans, fueling, operation, trailering, and maintenance.
- C. Part 656A—Coastal Zone Soil Survey
  - 1. Part 656A (new) describes the concept of coastal zone soil survey. This includes an explanation of the physical setting (i.e., where land meets bays, sounds, estuaries, tidal rivers, seas, oceans, or other water bodies). It also describes landforms in these settings (i.e., dunes, marshes, beaches, and anthropogenic coastal areas shallow subtidal and subaqueous soils that can support submerged aquatic vegetation). It provides justification for coastal zone soil as an order 2 soil survey useful for marine spatial planning, aquaculture, and coastal and nearshore restoration projects, such as sea-grass planting, oyster reef creation, beach replenishment, and salt marsh restoration.

#### D. Section 622.3(A)—Prime Farmland

1. This update was designed to ensure NSSH standards are in compliance with the Code of Federal Regulations (CFR) regarding designating farmland classes to soil survey map units. Specific revisions included:
  - a. The replacement of the National Resources Inventory definition of urban and built-up areas with NCSS standards.
  - b. The removal of a requirement that farmland of statewide importance must be land within a jurisdiction for which a cropland productivity index has been developed in the land evaluation part of land evaluation and site assessment (LESA).
  - c. The removal of a requirement that determination of prime farmland map units be based on guidelines provided by the National LESA handbook, citing instead the Code of Federal regulations, and qualifying the LESA handbook as a guide. Also updated were all references and links.
  - d. Specific wording changes include.
    - (1) 622.2(D) Land Capability Classification  
“The National Leader for Soil Survey Interpretations at the National Soil Survey Center provides...” changed to “Soil and Plant Science Division (SPSD) national staff provides....”
    - (2) 622.3(F) Farmland Classification  
“...provided by the National Leader for Technical Soil Services.” changed to “...provided by Soil and Plant Science Division (SPSD) national staff.”
    - (3) In subpart A, section 618.2, added definition and explanation of representative values (618.2(C)).

#### E. Section 602.12 Northeast Bylaws

1. Organization and heading names were changed to match current editorial style on eDirectives. Updated name of division to “Soil and Plant Science Division” was made as well as updated steering committee responsibilities in accordance with the Timeline of Activities in NSSH part 602.15. Standing committee names and objectives were updated and now consist of the Bylaws, Soil Taxonomy and Standards, Research Priorities, Applied Technologies, Hydric Soils, Coastal Zone/Subaqueous Soils, Soil and Ecosystems Dynamics, and Interpretations. Urban soils is now an ad hoc committee.
2. Updated name of division to “Soil and Plant Science Division” was made as well as updated steering committee responsibilities in accordance with the Timeline of Activities in NSSH part 602.15. Standing committee names and objectives were updated and now consist of the Bylaws, Soil Taxonomy and Standards, Research Priorities, Applied Technologies, Hydric Soils, Coastal Zone/Subaqueous Soils, Soil and Ecosystems Dynamics, and Interpretations. Urban soils is now an ad hoc committee.



## 659.47 Amendment 38 (January 2021)

### A. Part 606 Subpart A

1. This amendment makes changes to Subpart A with the primary purposes of extending this guidance to encompass ecological site inventory activities and to replace past protocols with regional and local MOUs with Federal agencies to national MOUs with Federal agencies and reference the “Statements of Commitment” to record project-specific details. The recent creation of the Farm Production and Conservation (FPAC) Mission Area and FPAC Business Center and the concomitant changes to agreement and MOU protocols necessitated these changes to ensure timely completion of division work and consistent collaboration with cooperators.
2. Specific changes that were introduced to accomplish this are:
  - a. Adding references to ecological site inventory wherever soil survey was mentioned.
  - b. Removing references to regional MOUs and replacing them with references to national MOUs and Statements of Commitment.
  - c. Removing references to the Code of Federal Regulations as it was determined that the cited sections did not provide more clarity and were in some cases in need of revision as well.
  - d. Assuring working agreements are referenced appropriately for field-oriented work on Federal lands.
  - e. Removing the descriptions of different agreements as those definitions are now housed and managed at the FPAC Business Center level.

### B. Part 606 Subpart B

1. Prior to this amendment, the only text available in Part 606 Subpart B was as follows – “(This exhibit is purposely left blank until a template is developed).”
2. This amendment establishes an actual template for the “Statement of Commitment” document mentioned in the changes in Subpart A. This template is meant to act as a guide for Soil and Plant Science Division staff and to ensure that the intent of the Statement of Commitment is carried out in practice.

## 659.48 Amendment 39 (May 2021)

- A. Part 618 – Soil Properties and Qualities, Subpart A – General Information
1. Added Section 618.2(D), “Minimum and Full Data Population.”
  2. Where applicable in Section 615.5(D)(3) “Artifacts in the Soil,” Section 618.32 “Fragments in the Soil,” Section 618.48 “Percent Passing Sieves,” Section 618.53 “Restriction Kind, Depth, Thickness, and Hardness,” and 618.66 “Surface Fragments,” the word “cemented” was changed to “coherent,” and the word “cementation” was changed to “coherence.”
  3. Changed the number of Section 648.22 to 618.22.
  4. Changed the number of Section 318.31 to 618.31.
  5. Changed the heading of Section 618.52 from “Reaction, Soil pH” to “Reaction.”
  6. In Section 618.52 “Reaction,” added “Acid Volatile Sulfides (Whiff Test)” and “Hydrogen Peroxide (Sulfidic Materials).”
  7. Changed the number of Section 618.52(A) to 618.52(C) and clarified the classes.

## 659.49 Amendment 40 (June 2023)

### A. Table of Contents

1. Changed the title of Section 602.11 “Bylaws of the Western Regional Cooperative Soil Survey Conference (Updated June 2012)” to “Bylaws of the Western Regional Cooperative Soil Survey Conference.”
2. Changed the title of Section 602.12 “Bylaws of the Northeast Cooperative Soil Survey Conference (Updated June 2012)” to “Bylaws of the Northeast Regional Cooperative Soil Survey Conference.”
3. Added Section 618.13 “Continuous Inundation Class, Depth, and Month” and 618.79 “Wind Erodibility Group and Index.”
4. Changed the title of Section 618.73 to “Von Post Humification Scale.”
5. Renumbered the following Sections 618.14 “Corrosion” through 618.79 “Wind Erodibility Group and Index.”
6. Added Part 648 “Digital Soil Mapping - Raster Products for Soil Survey,” Subpart A “General Information” and Subpart B “Exhibits.”
7. Changed the title of Part 656 “Coastal Zone Soil Survey” to Part 656 “Coastal Zone Soil Survey (CZSS).”
8. Added Section 656.2 “CZSS Laboratory Sample Collection Methods,” Section 656.3 “CZSS Laboratory Sample Analysis Methods,” and Section 656.4 “CZSS Cartographic Standards.”

### B. Part 602 – Conferences of the National Cooperative Soil Survey, Subpart B, Exhibits

1. Changed the title of Section 602.11 “Bylaws of the Western Regional Cooperative Soil Survey Conference (Updated June 2012)” to “Bylaws of the Western Regional Cooperative Soil Survey Conference” and updated section numbers within each Article as needed.
2. Updated Section 602.11, Article V. “Meetings,” Section 2.0 “Location of Meetings,” by changing the 2024 state to Montana and adding 11 more conference dates and locations.
3. Added Section 602.11, Article VI. “Committees,” Section 8.0, called “Regional Hydric Soils Committee.”
4. Added in Section 602.11, Article X. “Amendments,” Section 1.0, “Amendments,” the date the bylaws were amended.
5. Changed the title of Section 602.12 “Bylaws of the Northeast Cooperative Soil Survey Conference (Updated June 2012)” to “Bylaws of the Northeast Regional Cooperative Soil Survey Conference.”
6. Updated Section 602.12, Article VI. “Conference Business Meeting,” Section 1.0, to include “prioritize committee recommendations.”

7. Updated Section 602.12, Article VII. “Time and Place of Conference,” Section 1.0, to remove past host states and years.
  8. Updated Section 602.12, Article IX. “Conference Standing and Ad Hoc Committees,” Sections 5.0 to 5.7, to clarify and include additional responsibilities.
  9. Updated Section 602.12, Article IX. “Conference Standing and Ad Hoc Committees,” Section 6.0, to split the Soil Taxonomy and Standards committee into two standing committees: Taxonomy and Standards.
  10. Updated Section 602.12, Article IX. Conference Standing and Ad Hoc Committees, Section 6.5 from “Applied Technologies” to “Technologies.”
  11. Added in Section 602.12, Article XI. Amendments, Section 1.0, the date the bylaws were amended.
  12. Added Section 602.14 “Bylaws of the Southern Regional Cooperative Soil Survey Conference,” Article 1. “Name,” Section 2.0 “Conference Geographic Area.”
  13. Renumbered Section numbers in Section 602.14 “Bylaws of the Southern Regional Cooperative Soil Survey Conference” in Article II to Article IX.
  14. Removed a sentence about representatives from Section 602.14, Article III. “Membership and Participants,” Section 2.0 “Associate Membership.”
  15. Updated Section 602.14, Article V. “Meetings,” Section 2.0 “Location of Meetings,” by changing the 2024 state to Montana and adding 11 more conference dates and locations.
  16. Changed Section 602.14, Article VI. “Committees,” Section 4.0 “Conference Steering Committee,” and Article VIII. “Historical Records,” Section 1.0 “Conference Historical Records,” to include the Soil and Plant Science Division.
  17. Removed Section 602.14, Article VI. Committees, old Section 6.3.1, “Soil Taxonomy and Standards Co Committee.”
  18. Added Section 602.14, Article VI. “Committees,” Section 4.0 “Conference Steering Committee,” and Section 8.0 “Coordination of Activities.”
  19. Changed Section 602.14, Article VIII. “Historical Records,” Section 1.0 “Conference Advisors,” by replacing “National Soil Survey Center” with “Soil and Plant Science Division.”
  20. Added in Section 602.14, Article IX. “Amendments,” Section 1.0 “Amendments,” the date the bylaws were amended.
- C. Part 614 – Applying Soil Taxonomy
1. Changed all references of Soil Science Division in Part 614 to Soil and Plant Science Division.

2. Clarified adoption date of “Soil Taxonomy” by including date first edition was published, which is the date the “Soil Survey Manual” uses as its adoption date.
  3. Updated Section 614.11 “Example of an Official Soil Series Description in HTML” to include semi-tabular and sentence format. Changed the format of OSD section headings and sideheads.
  4. Designated the “Explanation of a Soil Series Description,” as “A” and adjusted list numbering to make it consistent with other sections of the handbook. Updated Section 614.12(A) “Explanation of a Soil Series Description,” to include semi-tabular and sentence format, to clarify and simplify guidelines and content of soil series descriptions, to explain the updated format, to clarify the use of English and metric units, to add the indicator solution to soil pH, and to change cemented to coherent under concretions.
  5. Designated the “Content of a Soil Series Description,” as “B” and adjusted list numbering to make it consistent with other sections of the handbook. Updated Section 614.12(B) “Content of a Soil Series Description,” (4) Type Location to clarify how a type location should be written and checked against NASIS.
  6. Updated Section 614.12 “Explanation and Content of a Soil Series Description,” (10) “Use and Vegetation,” to clarify what vegetation information should be included and how it should be written.
  7. Updated Section 614.12 “Explanation and Content of a Soil Series Description,” (14) “Remarks,” to include information about the pronunciation of a soil series and taxonomic version.
  8. Corrected spelling, capitalization, punctuation, and formatting throughout Part 614.
- D. Part 618 – Soil Properties and Qualities, Subpart A- General Information
1. Updated Section 618.72 “Texture Class, Texture Modifier, and Terms Used in Lieu of Texture,” to clarify and simplify the wording.
  2. Updated Section 618.72(A) “Definition,” to make the link to the online soil texture calculator 508 compliant.
  3. Updated Section 618.72(H)(2)(iii) and (iv) to remove the obsolete sliding scale of calculating the organic carbon content depending on the percent clay to use the modifiers and adding that the horizon must have 5 to less than 12 percent organic carbon (by weight) to use the modifiers.
  4. Removed Section 618.72(H)(2)(x), which included rare instances of using texture modifiers.
  5. Updated Section 618.72(H)(3) “Entries,” to include that an organic compositional modifier is listed first.

6. Moved the Section 618.72(F)(1)(i) texture class definition to 618.72(A) “Definition,” to align section with other sections in Part 618 and to reduce redundancy.
  7. Updated Section 618.72(A) with information other than the definition moved to F. Texture Class, (1)(ii) to align section with other sections in Part 618 and to reduce redundancy.
  8. Moved Section 618.72(J) “Stratified Texture Flag,” to the end of 618.72(I)(2) “Entries,” to increase clarity.
  9. Moved Section 618.72(K), “Representative Indicator Flag,” to end of 618.72(E), “Entries,” to increase clarity and reduce duplicate wording.
- E. Part 648 – Digital Soil Mapping – Raster Products for Soil Survey
1. Updated Subpart A “General Information,” Section 648.0 “Definition and Purpose.”
  2. Changed Subpart A “General Information,” Section 648.1 from “Accuracy and Uncertainty” to “Raster Soil Surveys.”
  3. Changed Subpart A “General Information,” Section 648.2 from “References” to “Soil Landscapes in the United States.”
  4. Added Subpart A “General Information,” Sections 648.3 “Accuracy and Uncertainty,” and 648.4 “References.”
  5. Updated Subpart B “Exhibits,” Sections 648.10 to 648.12.
  6. Changed Subpart B “Exhibits,” Section 648.13, from “Metadata” to “Map Scale.”
  7. Added Subpart B “Exhibits,” Sections 648.14 to 648.16.
- F. Part 656 – Coastal Zone Soil Survey (CZSS)
1. Changed the title of Part 656 from “Coastal Zone Soil Survey” to “Coastal Zone Soil Survey (CZSS).”
  2. Added Sections 656.2 “CZSS Laboratory Sample Collection Methods,” 656.3 “CZSS Laboratory Sample Analysis Methods,” and 656.4 “CZSS Cartographic Standards.”

## 659.50 Amendment 41 (June 2024)

### A. NSSH

1. Changed formatting to reflect new handbook template.
2. Changed formatting to reflect the directives discontinued use of amendment numbers in the headers and footers. The header will now state the month and year of the amendment and a new part 659 “Amendments” will be added.

### B. Table of Contents

1. Changed numbering for part 621, subpart B, to begin with 621.20.
2. Added part 632 National Commodity Crop Productivity Index.
3. Added part 659 Amendments.

### C. Part 601 – National Cooperative Soil Survey Organization

1. 601.1 Definition updated to include the definition of the soil survey program.
2. 601.1 Responsibilities updated to provide only those responsibilities of various NRCS staff and as they pertain to the National Cooperative Soil Survey.

### D. Part 602 – Bylaws of the National Cooperative Soil Survey Conference, Subpart B

1. 602.10 Article II. Objectives, section 1.1 updated to include plant and ecological site information.
2. 602.10 Article II. Objectives, section 1.2 updated to include guidance and procedures related to soil surveys, plants, and ecological site information.
3. 602.10 Article V. Executive Services, section 2.0 updated and clarified the responsibilities of the NRCS SPSD staff.
4. 602.10 Article VI. “Steering Committee” changed to “National Conference Steering Committee” and updated the steering committee membership to include the host NRCS state soil scientist and NCSS university member and clarified responsibilities of the National Conference Steering Committee.
5. 602.10 Article VII. Conferences updated to include the host region for years 2033, 2035, and 2037.
6. 602.10 Article VIII. Standing and Ad Hoc Committees, sections 1.0 and 3.0 updated to clarify that the chair of each regional standing committee should attend the national committee meetings to ensure recommendations are addressed and clarify responsibilities of chairs.
7. 602.10 Article VIII. Standing and Ad Hoc Committees, section 4.0 changed to list and define the standing committees of the national conferences. Updated to include and define the Hydric, Urban, and Subaqueous committees.

8. 602.10 Article VIII. Standing and Ad Hoc Committees, section 5.0 changed to include permanent standing committee chairs of the national conferences.
  9. 602.10 Article VIII. Standing and Ad Hoc Committees, section 6.0 added using the old section 4.0 wording with regards to ad hoc committees.
  10. 602.10 Article VIII. Standing and Ad Hoc Committees, section 7.0 added using the old section 5.0 wording and updating it to state that each committee has a chair, co-chair, and maybe a secretary.
  11. 602.10 Article VIII. Standing and Ad Hoc Committees, section 8.0 added to state that decisions are made by majority voting and to define eligible voters as active members of that committee or sub-committee.
  12. 602.10 Article VIII. Standing and Ad Hoc Committees, section 8.1 added to clarify that voting should be completed online at least 30 days prior to the conferences and open for at least 10 business days.
  13. 602.10 Article IX. “Amendments” changed to “NCSS Awards.” This is an entirely new article in the national bylaws.
  14. 602.10 Article IX. “Amendments” changed to “Article X Amendments.”
  15. 602.10 Article IX. Amendments, section 1.0 updated to state that decisions are made by majority voting and to define eligible voters as active members of that committee or sub-committee.
  16. 602.10 Article IX. Amendments, section 2.0 added to clarify how approved amendments would be reviewed and published.
  17. 602.15 Conducting NCSS Conferences updated to clarify responsibilities of liaisons, official communication and file storage, notifications method, and the timeline of activities.
- E. Part 608 – Program Management, Subpart B
1. 608.12 Part II: Goal and Progress Guidelines (B) updated re-correlation to correlation.
- F. Part 610 – Updating Soil Surveys, Subpart A
1. 610.3 Update Strategies(C)(2) updated re-correlate to correlate.
  2. 610.5 Prioritizing and Ranking (C) updated re-correlation to correlation.
- G. Part 610 – Updating Soil Surveys, Subpart B
1. 610.11 Information Items for the Inventory and Assessment (6)(a)(2) updated re-correlated to correlated.
  2. 610.13 Sample Project Evaluation Worksheet updated Part B re-correlated to correlated.
  3. 610.14 Significant Digits for Soil Property or Quality Measurements Used as Criteria in Soil Taxonomy, Objectives and Procedures updated re-correlation to correlation.



- H. Part 614 – Applying Soil Taxonomy, Subpart A
  - 1. 614.6 The Soil Series (G) updated recorrelation to correlation.
- I. Part 631 – Soil Survey Investigations
  - 1. 631.12 Example of a Soil Characterization Work Plan, Reason for Investigations Project updated recorrelation to correlation.
- J. Part 648 – Digital Soil Mapping – Raster Products for Soil Survey, Subpart B
  - 1. 648.14, Digital Soil Mapping Project – Final Correlation Document Example Project under Scope and Area Definition updated re-correlated with correlated.
  - 2. 648.14, Digital Soil Mapping Project – Final Correlation Document Example Project under Objectives Include updated re-correlate to correlate.
  - 3. 648.15, Metadata Under II. Raster Soil Survey Level: Level B updated re-correlation to correlation.

## 659.51 Amendment 42 (August 2024)

### A. Table of Contents

1. Changed the title of part 607 from “Initial Survey Preparation” to “Soil Survey Program Management.”
2. Changed the title of part 608 from “Program Management” to “Soil Survey Program Operations.”
3. Changed the title of part 609 from “Quality Control, Quality Assurance, and Soil Correlation” to “Quality Control and Quality Assurance.”
4. Changed the title of part 610 from “Updating Soil Surveys” to “Correlation.”

### B. Part 607 – Soil Survey Program Management

1. Changed the title of part 607 from “Initial Survey Preparation” to “Soil Survey Program Management.”
2. Changed the title of section 607.0 from “Purpose” to “Definition and Purpose.”
3. Updated section 607.0 to include ecological site activities.
4. Changed the title of section 607.1 from “Policy and Responsibilities” to “Responsibilities.”
5. Updated section 607.1(A) to include ecologists and additional information about responsibilities in other sections.
6. Updated section 607.1(A)(1)(a) to the director of the Soil and Plant Science Division.
7. Added three new bulleted items on approving changes in boundaries, coordinating soil survey program management activities, and providing technical expertise to section 607.1(A)(1)(a).
8. Added the associate director for soil services and information along with five bulleted items to section 607.1(A)(1)(b).
9. Added two new bulleted items on supervised staff and maintaining soil survey area symbols, names, and acreage to section 607.1(A)(1)(c).
10. Added four new bulleted items on supervised staff, providing leadership for communications, maintaining the soil science web pages, coordinating national standards, and partnering with Federal land management agencies to section 607.1(A)(1)(d).
11. Moved the director of the National Soil Survey Center under the National headquarters office to section 607.1(A)(1)(e).
12. Removed supervision of standards, webmaster, training, and interpretations staff in section 607.1(A)(1)(e).
13. Removed the National Geospatial Center of Excellence in section 607.1.

14. Changed the title of section 607.2 from “Preliminary Survey Activities” to “Developing and Planning Workloads” and added text from section 608.6 “Planning Workflow.”
15. Changed the title of section 607.3 from “Areas of Limited Access, Denied Access Areas, and Areas Not Completed” to “Inventory and Assessment.”
16. Added text from sections 607.10 “Reference Materials for Soil Surveys,” 610.11 “Information Items for the Inventory and Assessment,” 610.12 “Resources for the Inventory and Assessment,” and 610.13 “Sample Project Evaluation Worksheet” in subpart B to section 607.3. Removed exhibits.
17. Clarified the term evaluation in sections 607.3(A) and 607.3(C).
18. Added section 607.4 “Prioritizing and Ranking” and updated text from section 610.5 “Prioritizing and Ranking.”
19. Added text from section 610.13 “Sample Project Evaluation Worksheet” in subpart B to section 607.4 and removed the exhibit.
20. Added section 607.5 “Acreage Management” and updated text from section 608.7 “Goals and Progress.”
21. Added section 607.6 “Soil Survey Area Designations” and updated text from section 608.2 “Soil Survey Area Designation.”
22. Added section 607.7 “Areas of Limited Access, Denied Access Areas, and Areas Not Completed” and updated text from section 608.3 “Areas of Limited Access, Denied Access Areas, and Areas Not Completed.”
23. Removed the word “official” before “non-MLRA soil survey areas” in section 607.5.
24. Added section 607.8 “Status Maps” and updated text from section 608.9 “Status Maps.”
25. Updated the soil data availability status map legend colors and categories in section 607.8(D).
26. Moved section 607.10 “Reference Materials for Soil Surveys” text to section 607.3 “Inventory and Assessment.”
27. Changed section 607.10 from “Reference Materials for Soil Surveys” to “Example of a Project Evaluation Ranking Procedure” that was previously section 610.15.
28. Added text on how to conduct the ranking procedure in the introduction in section 607.10.
29. Included ecological sites, contributions to the development of a seamless soil survey, and improves joins over a significant MLRA or soil survey area as part of the criteria in section 607.10(A).
30. Changed from rating the ratio of acreage affected and the time required to complete the project to rating the required number of resources and extent of the MLRA or soil survey area in section 607.10(G).

31. Changed the criteria of low, medium, and high to account for the number of resources and extent of the MLRA or soil survey area in section 607.10(G).
32. Moved section 607.11 “Example of a Procedure for Geodatabase Development, File Naming, Archiving, and Quality Assurance” to section 609.6 “Geodatabase Development, File Naming, and Archiving.”

#### C. Part 608 – Soil Survey Program Operations

1. Changed the title of part 608 subpart A from “Program Management” to “Soil Survey Program Operations.”
2. Added text from parts 610 “Updating Soil Surveys” and 607 “Initial Survey” to part 608.
3. Clarified the definition and purpose of soil survey program operations in section 608.0.
4. Changed the title of section 608.1 from “Responsibilities and Organization” to “Responsibilities.”
5. Clarified responsibilities of major land resource area (MLRA) soil survey leaders, state conservationists, state soil scientists, resource soil scientists and other specialists, soil survey regional directors, and national headquarters staff for soil survey program operations in section 608.1.
6. Removed the responsibilities of the National Geospatial Center of Excellence in section 608.1.
7. Changed the title of section 608.2 from “Soil Survey Area Designation” to “Long-Range Plan.”
8. Updated section 608.2 “Long-Range Plan” with a new definition, purpose, responsibilities, and development of the long-range plan.
9. Removed National Soil Information System (NASIS) data entry information in section 608.2(D). It will be placed in the NASIS User Guide.
10. Changed the title of section 608.3 from “Areas of Limited Access, Denied Access Areas, and Areas Not Completed” to “Annual Plan of Operation.”
11. Added information about the definition, purpose, responsibilities, and development of the annual plan of operation from section 610.7 “Annual Plan of Operation” to section 608.3.
12. Changed the title of section 608.4 from “Determining Workloads” to “Project Plan of Operation.”
13. Added information about the definition, purpose, responsibilities, and development of the project plan of operation from section 610.4 “Project Plan” to section 608.4.
14. Removed NASIS data entry information in section 608.4(D). It will be placed in the NASIS User Guide.

15. Changed the title of section 608.5 from “Priorities for Soil Survey Activities” to “Managing Workloads.”
16. Added more responsibilities of the MLRA soil survey leaders, soil survey regional directors, and national headquarters staff to section 608.5.
17. Changed the title of section 608.6 from “Planning Workflow” to “Project Types and Subtypes.”
18. Added a definition, purpose, and assignment to section 608.6.
19. Added and defined 5 project types and 11 subtypes in section 608.6(D) and (E).
20. Changed the title of section 608.7 from “Goals and Progress” to “Project Milestones.”
21. Added a definition and purpose for project milestones to section 608.7(A) and (B).
22. Added 11 milestones to section 608.7(C).
23. Moved text from section 608.8 “Developing Other Schedules for Soil Survey Operations” to section 608.1 “Responsibilities.”
24. Moved text from section 608.9 “Status Maps” to 607.8 “Status Maps.”
25. Changed the title of part 608 subpart B from “Program Management” to “Soil Survey Program Operations.”
26. Updated section 608.12 “Project Plan Checklist” with new project types and milestones terms and references to other sections in the NSSH.
27. Updated section 608.13 “Project Description Examples” to include only one example of a summary opening paragraph.
28. Moved the acreage management protocols from section 608.14 “Goals and Progress Guidelines” to section 607.5 “Acreage Management.”
29. Removed the references to four business areas and update projects in section 608.14.
30. Removed items that are in the NASIS user guide from section 608.14.
31. Updated section 608.15 “Business Area Responsibilities for Goals and Progress” by combining the national headquarters and National Soil Survey Center responsibilities and removing the National Geospatial Center of Excellence.
32. Added project subtype and 11 new project milestones to section 608.15.
33. Removed obsolete milestones under the ecological site description development progress, map finishing, digitizing, and manuscript development from section 608.15.

#### D. Part 609 – Quality Control and Quality Assurance

1. Changed the title of part 609 from “Quality Control, Quality Assurance, and Soil Correlation” to “Quality Control and Quality Assurance.”
2. Changed the title of section 609.0 from “Definition and Purpose of Quality Control and Quality Assurance” to “Definitions and Purpose.”
3. Clarified the definitions and purpose of quality control, quality assurance, field reviews, and field assistance in section 609.0.
4. Changed the title of section 609.1 from “Policy and Responsibilities for Quality Control and Quality Assurance” to “Responsibilities.”
5. Removed the word policy and clarified responsibilities of major land resource area soil survey leaders, soil survey regional directors, state soil scientists, state conservationists, and national headquarters staff in section 609.1.
6. Changed the title of section 609.2 from “Soil Correlation” to “Quality Control Reviews.”
7. Included the responsibility and activities of a quality control review in section 609.2(B).
8. Changed the title of section 609.3 from “Seamless Soil Survey” to “Quality Assurance Reviews.”
9. Included leadership and participation in section 609.3(B).
10. Clarified what the quality assurance report includes in section 609.3(D).
11. Changed the title of section 609.4 from “Quality Control Reviews” to “Initial, Progress, and Final Field Reviews.”
12. Clarified information about the three types of field reviews in section 609.4.
13. Updated the signature and approval of representatives of cooperating agencies to reflect that partners maybe given the opportunity to sign and concur with project review report findings in section 609.4(5)(b).
14. Changed the title of section 609.5 from “Quality Assurance Reviews” to “Field Assistance Visits.”
15. Changed the title of section 609.6 from “Field Assistance Visits” to “Geodatabase Development, File Naming, and Archiving.”
16. Changed “ArcCatalog” to “ArcGIS Pro Catalog” in section 609.6
17. Moved text from section 607.11 “Example of a Procedure for Geodatabase Development, File Naming, Archiving” to section 609.9.
18. Moved section 609.8 “General Soil Maps, Index Maps, and Location Maps” to section 610.5.
19. Moved section 609.10 “Format for Correlation Document” to section 610.10.
20. Moved section 609.11 “List of Soil Property and Quality Attributes for Joining” to section 609.10.

21. Moved section 609.12 “Quality Control Template for Initial Soil Surveys (subject to change to reflect local conditions)” to section 609.11.
  22. Removed section 609.13 “Outline of Items Considered in an Operations Management Review or Program Operations Review for Soil Survey.”
  23. Moved section 609.14 “Initial Field Review Checklist for Initial Soil Surveys” to section 609.12.
  24. Moved section 609.15 “Quality Assurance Worksheet for Initial Soil Surveys (subject to change by the SSRs to reflect local conditions)” to section 609.13.
  25. Moved section 609.16 “Progress Field Review Checklist for Initial Soil Surveys” to section 609.14.
  26. Moved section 609.17 “Final Field Review Checklist for Initial Soil Surveys” to section 609.15.
  27. Moved section 609.18 “Project Review Checklist for MLRA Soil Surveys” to section 609.16.
  28. Moved section 609.19 “Quality Assurance Worksheet for MLRA Soil Surveys (subject to change by the SSRs to reflect local conditions)” to section 609.17.
- E. Part 610 – Correlation
1. Changed the title of part 610 from “Updating Soil Surveys” to “Correlation.”
  2. Added the definition and purpose of correlation in section 610.0 “Definition and Purpose.”
  3. Changed the title of section 610.1 from “Policy and Responsibilities” to “Responsibilities.”
  4. Included correlation responsibilities of MLRA soil survey leaders, soil survey regional directors, state soil scientists, state conservationists, and national headquarters staff in section 610.1.
  5. Changed the title of section 610.2 from “Inventory and Assessment” to “Correlation.”
  6. Added the definition, purpose, documentation, conduct of the review, development, and distribution of progressive and final correlations in section 610.2.
  7. Changed the title of section 610.3 from “Update Strategies” to “Seamless Soil Survey.”
  8. Moved text from old section 609.3 “Seamless Soil Survey” to 610.3.
  9. Changed the title of section 610.4 from “Project Plan” to “Data Certification and Publication.”
  10. Moved text from section 610.4 “Project Plan” to section 608.4 “Project Plan of Operation.”

11. Added text from section 610.8 “Certification of Soils and Data” and 610.9 “Publication of Soils Data” to section 610.4.
12. Moved text from section 610.5 “Prioritizing and Ranking” to section 607.4.
13. Moved text from section 610.6 “Long-Range Plan” to section 608.2.
14. Moved text from section 610.7 “Annual Plan of Operation (APO)” to section 608.3.
15. Removed sections 610.6, 610.7, 610.8, and 610.9.
16. Removed section 610.10 “Agency Resource Concerns” and placed resource concerns into section 607.4 “Prioritizing and Ranking.”
17. Changed the title of section 610.10 from “Agency Resource Concerns” to “Format for Correlation Documents.”
18. Added text from section 609.10 “Format for Correlation Document” to section 610.10.
19. Removed section 610.11 “Information Items for the Inventory and Assessment” and placed the text in section 607.3 “Inventory and Assessment.”
20. Removed section 610.12 “Resources for the Inventory and Assessment” and placed the text in section 607.3 “Inventory and Assessment.”
21. Removed section 610.13 “Sample Project Evaluation Worksheet” and placed the text in section 607.3 “Inventory and Assessment.”
22. Removed section 610.14 “Project Plan Checklist” and placed it in section 608.12.
23. Removed section 610.15 “Example of a Project Evaluation Ranking Procedure” and placed the text in section 607.10.
24. Removed section 610.16 “Project Description Examples” and placed it in section 608.13.

F. Part 614 – Applying Soil Taxonomy

1. Added text to provide context and clarity of the class placement for the quantity of redoximorphic features, roots, pores, and concentrations in section 614.12(B)(1).

G. Part 618 – Soil Properties and Qualities

1. Changed all symbols (<, >, %, and =) in sentences to words.
2. Removed the em dashes and reformatted the text using bold font and colons.
3. Updated references to publications and section numbers.
4. Added titles to tables.
5. Updated references and links to the National Soil information System (NASIS) User Guide and NASIS database metadata.



6. Added section 618.0(D) to include a definition and purpose for data population standards, data integrity reports, and Database Focus Team.
7. Updated section 618.1(D) from National Soil Survey Center to Soil Services and Information staff.
8. Added section 618.1(E) to clarify the responsibility for maintenance of data integrity materials.
9. Updated section 618.2(D)(5)(c) to remove obsolete project types.
10. Added section 618.3(D) “NASIS calculations for T Factor, K Factors, Wind Erodibility Group, Wind Erodibility Index, Hydrologic Soil Group, and Corrosion.”
11. Updated section 618.5 “Artifacts in the Soil” by using artifacts and not fragments when needed and removing the entering of NASIS data into the “Pedon Horizon Human Artifacts” table.
12. Updated section 618.5 to remove entering the artifact kind in the “Pedon Horizon Human Artifact” table.
13. Updated section 618.5 (I)(3) artifact roundness classes table to a list.
14. Updated section 618.5(K)(3) to include the definitions of the artifact shape classes.
15. Updated section 618.5(L)(1) to expand the definition to include artifact size is by the longest dimension for elongated or irregular bodies.
16. Updated section 618.5(L)(3) artifact size classes table to a list.
17. Updated section 618.5(M)(2) by including rock or pararock fragments.
18. Updated the title of section 618.13 from “Continuous Inundation Class, Depth, and Month” to “Continuous Inundation.”
19. Updated section 618.13 to clarify what is entered into NASIS.
20. Updated sections 618.14(B)(5) and (C)(5) to include using the NASIS component calculation and ensuring supporting data is populated.
21. Updated section 618.21(E) salinity classes and electrical conductivities table to a list.
22. Updated section 618.26(D) to include definitions of the five erosion classes.
23. Updated section 618.27(D) excavation difficulty classes table to a list.
24. Updated section 618.31(E) flooding frequency classes, flooding duration classes, flooding inundation type tables to lists.
25. Updated section 618.32 by changing cemented to coherent.
26. Updated section 618.32(H)(3) fragment roundness classes and definitions table to a list.
27. Updated section 618.32(K)(3) flat and nonflat fragment classes tables to lists.

28. Updated section 618.34(D) potential frost action classes table to a list.
29. Updated section 618.38(C)(2) to clarify that generalized horizon layer designations were used for the conversion of the State Soil Survey Database to NASIS.
30. Updated section 618.40(F) to include using the NASIS component calculation and ensuring supporting data is populated.
31. Updated section 618.42(C)(3)(c) shrink-swell potential classes table to a list.
32. Updated section 618.43(D) to state calculations can be found in the NASIS database.
33. Added section 618.44 “Odor” and renumbered the following sections numbers after this addition.
34. Updated section 618.48(D) USDA particle-size separate classes table to a list that matches the Soil Survey Manual.
35. Updated section 618.51 ponding duration and frequency classes from tables to lists that match the Soil Survey Manual.
36. Updated section 618.52 pore quantity, size, shape, and vertical continuity classes from tables to lists that match the Soil Survey Manual.
37. Updated section 618.53 to include reaction of 3 and 30 percent hydrogen peroxide.
38. Updated section 618.53(B)(2)(a) to clarify when to use the “se” suffix symbol.
39. Updated section 618.53(B)(3) to include the reaction classes for 3 and 30 percent hydrogen peroxide.
40. Updated section 618.53(C)(5) reaction classes and ranges in pH from a table to a list that matches the Soil Survey Manual.
41. Updated section 618.53 to remove references to delta pH and replace it with the oxidized pH method.
42. Updated section 618.54(D)(4) restriction hardness classes from a table to a list that matches the Soil Survey Manual.
43. Added titles to figures 618A-4 and 618A-5.
44. Updated section 618.60(E) to include using NASIS horizon calculations for the soil erodibility factors and ensure supporting data is populated.
45. Updated section 618.60(E)(1) to remove the discussion on comparison reports and calculation scripts in NASIS.
46. Updated section 618.62(E) water state classes from a table to a list that matches the Soil Survey Manual.
47. Updated section 618.67(D)(3) flat and nonflat fragment classes from a table to a list that matches the Soil Survey Manual.

48. Updated section 618.67(F)(2) surface fragment roundness classes from a table to a list.
49. Updated section 618.67(G)(4) to read surface fragment hardness (rupture resistance) classes are identical to the rupture resistance classes in section 618.54(D)(4).
50. Updated section 618.68(F) to include using NASIS component calculations for T factor and ensure supporting data is populated.
51. Updated section 618.73(D)(2) to include artifacts when estimating the portion of the soil volume they occupy.
52. Updated section 618.73(H)(2)(e) to include examples of the shell fragment modifier.
53. Updated section 618.73(H)(2)(g) to clarify when and how to use artifact texture modifiers.
54. Updated section 618.74(A) and (D) to clarify the definition and values of the Von Post Humification Scale.
55. Updated sections 618.75, 618.76, and 618.77 by deleting the references to the NASIS calculations in subpart B, which were removed.
56. Updated section 618.79 to clarify the definition, significance, estimates, measurement, and entries for water column measurements.
57. Updated section 618.80(D) to include using NASIS horizon calculations for the wind erodibility group and wind erodibility index and ensure supporting data is populated.
58. Removed section 618.82 “Crop Names and Units of Measure.”
59. Removed section 618.87 “Estimating LL and PI from Percent and Type of Clay.”
60. Updated section 618.88 “Guide to Estimating Water Movement Through Bedrock for Layers Designated as R and Cr” by changing the table to a list.
61. Removed section 618.98 “Example Worksheets for Soil Moisture State by Month and Depth.”
62. Removed section 618.99 “NASIS Calculation for Estimating AASHTO Group Index.”
63. Removed section 618.100 “NASIS Calculation for Estimating Cation Exchange Capacity.”
64. Removed section 618.101 “NASIS Calculation for Estimating Effective Cation Exchange Capacity.”
65. Removed section 618.102 “NASIS Calculation for Estimating Extractable Acidity.”
66. Removed section 618.103 “NASIS Calculation for Estimating Liquid Limit and Plasticity Index.”

67. Removed section 618.104 “NASIS Calculation for Estimating Particle Size.”
68. Removed section 618.105 “NASIS Calculation for Estimating Rock Fragments and Passing Sieves.”
69. Removed section 618.106 “NASIS Calculation for Estimating Water Content Data.”

H. Part 659 – Amendments

1. Added section 659.51 titled “Amendment 42 (July 2024).”