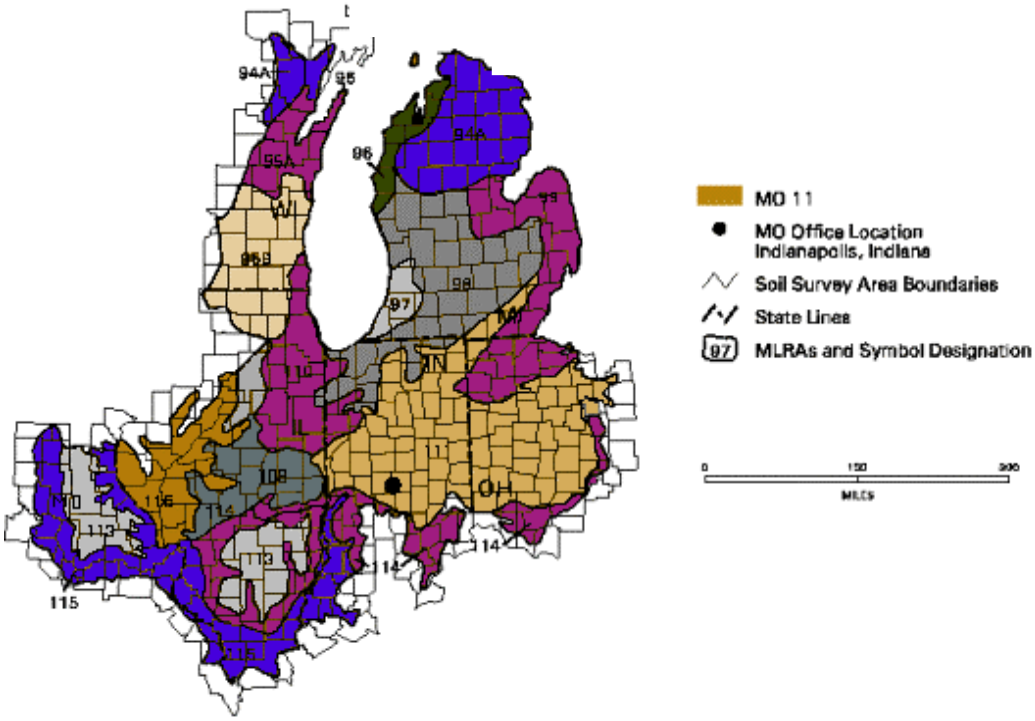
REGION 11

MAJOR LAND RESOURCE AREA

SOIL SURVEY GUIDANCE DOCUMENT



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FORWARD

This document has been prepared with the intent of assisting MLRA Project office and Soil Survey office staffs in the many phases of their soil survey activities. Much of the work in the development of these guidelines has been done by work groups. The work groups consisted of soil scientists from NRCS and our cooperating agencies and from across MLRA Region 11.

This document contains items that are national policy, as outlined in the National Soil Survey Handbook and Soil Taxonomy. It also contains guidelines that have been agreed to by consensus by the soil scientists making up the various work groups. Soil Data Quality Specialists for Region 11 have also provided additional guidelines. It is expected that these guidelines will be an aid to the soil survey programs in the various states that make up the Region 11 area of responsibility.

It is hoped that *Region 11 Major Land Resource Area Soil Survey Guidance Document* will be a valuable reference. It is understood that issues will arise that are not covered in this document. Other issues will arise that seem to be in conflict with guidance in the document. Issues will be addressed as they arise, and resolution of the issues will be incorporated into future revisions.

Travis Neely

Team Leader
Region 11 MLRA Office
Indianapolis, Indiana

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GENERAL INFORMATION

The soil survey area for all soil surveys will be the MLRA. Surveys established by county or other boundaries are considered sub-sets to the MLRA survey area.

This MLRA concept will increase efficiency. With the MLRA being the soil survey area, documentation throughout the MLRA can be used to support subset soil surveys.

MLRA RESPONSIBILITIES

MLRAs within Region 11 and the Soil Data Quality Specialist responsible for all phases of soil survey:

MLRA	**Data Quality Specialist**	**Description**	**States**
95A	Chowdhery	Northeastern Wisconsin Drift Plain	WI, MI
95B	Chowdhery	Southern Wisconsin and Northern Illinois Drift Plain	WI, IL
108*	Chowdhery	Illinois and Iowa Deep Loess and Drift	IL, IA, MO
110	Chowdhery	Northern Illinois and Indiana Heavy Till Plain	IL, IN, WI
99	Endres	Erie-Huron Lake Plain	MI, OH, IN
111A, 111B, 111D, 111E	Endres	Indiana and Ohio Till Plain	IN, OH, MI
94A*	Love	Northern Michigan and Wisconsin Sandy Drift	MI, WI
96	Love	Western Michigan and Northeastern Wisconsin Fruit Belt	MI
97	Love	Southwestern Michigan Fruit and Truck Belt	MI
98	Love	Southern Michigan and Northern Indiana Drift Plain	MI, IN, IL
111C	Love	Indiana and Ohio Till Plain	IN, MI
113*	Struben	Central Claypan Areas	IL, MO

114	Struben	Southern Illinois and Indiana Thin Loess and Till Plain	IN, IL, OH
115*	Struben	Central Mississippi Valley Wooded Slopes	IL, MO, IA
120	Struben	Kentucky and Indiana Sandstone and Shale Hills and Valleys	IN

* MLRA 94A in Wisconsin; MLRA 108 in Iowa and Missouri; MLRA 113 in Missouri; and MLRA 115 in Iowa are correlated through MO Region 10.

MLRA STEERING COMMITTEES

The main objective of the MLRA Steering Committee is to address and resolve key technical issues. A Steering Committee will be established in each MLRA in which there is soil survey activity underway. The Steering Committee will coordinate and review key technical aspects of MLRA soil survey to ensure consistency throughout the MLRA. These committees will be comprised of the Region 11 Soil Data Quality Specialist, Resource Soil Scientists, Project Leaders, NCSS partners and other disciplines as needed. Ad hoc committee members may be added as the need arises.

CORRELATION

Quality assurance is accomplished by the Region 11 MLRA Office through a process of progressive correlation. Progressive correlation ensures that soils are accurately and consistently mapped, named, classified and interpreted within the MLRA. Field reviews are conducted at least once a year for ongoing project soil surveys.

The requirements for preparation for field reviews are documented in the National Soil Survey Handbook, Part 608. The following paragraphs provide additional information and clarification.

FIELD REVIEWS (Initial, Progress, Final)

The Field Review Leader will be the MLRA Project Leader. Region 11 Soil Data Quality Specialists will provide quality assurance of the soil survey projects as they progress from the Initial Field Review through the Final Field Review. Other individuals may be assigned the responsibilities of the Field Review Leader if MLRA project offices have not been established for the project survey area or for other reasons that may arise. The Region 11 Soil Data Quality Specialists will participate at the Initial Field Review, all Progress Reviews, and at the Final Field Review.

In preparation for Field Reviews, the Field Review Leader will need to submit the following items to the Region 11 MLRA Office, 30 days prior to the review:

a. Descriptive legend for the survey area
b. List of map unit additions, deletions, and changes that have been made since the last field review or that are proposed for approval at the current field review
c. List of Series and their Classification
d. Classification or series changes since last review
e. Pedon description for the map units to be added (including transect data)
f. Completed Region 11 MLRA Correlation Worksheets (see attachment 1) or similar worksheet for map units to be added
g. Completed draft of the Quality Assurance Worksheet (see attachment 2)

h. Itinerary for the review
i. Narrative of questions, concerns or comments on the planned review stops

In addition, the following items should be available at the time of the review:

a. Progress map of completed mapping
b. Current set of tables for the county
c. Updated General Soil Map (unless GSM will not be part of the manuscript)
d. Feature and Symbol Legend for Soil Survey (NRCS SOI-37A) and definitions for the MLRA along with major and minor codes
e. Current copy of MOU, MOA, or Cooperative Agreement
f. Work plan for the subset project area showing major workload items and significant dates
g. Spreadsheet showing status of all documentation
h. Supporting documentation (lab data, transects, field notes, NASIS text notes, etc.)
i. Compiled map sheets for review

Final Field Review Certifications

Normally at the Final Field Review but always prior to holding the Final Correlation Conference the MLRA Project Leader will certify to the following:

1. Field work was completed in _____(month) _____(year).

2. All field sheets join exactly within the subset soil survey area, line for line, symbol for symbol, and data mapunit for data mapunit.

3. An exact join has been made with adjacent survey areas that are currently in progress.

4. An acceptable join has been made with adjacent survey areas with published soil surveys that were not updated under the MLRA updating concept. Statement of acceptable joins are available for inclusion in the preliminary correlation memorandum.

5. The general soil map, if used in the manuscript, has been updated, joins exactly or acceptably with adjacent survey areas (see items 3 and 4 above), and is available.

6. Block diagrams to be used in the manuscript have been drafted and are available.

7. The NASIS legend map units are complete. All map units are designated as either Approved or Correlated.

8. The NASIS legend map units are linked to the appropriate data map unit.

9. All typical pedons are correctly classified according to Soil Taxonomy and the most recent amendment.

10. All NASIS data elements that are needed to run MUG and generate manuscript tables have been populated.

11. A complete draft of the manuscript is available.

12. Official series descriptions are current.

13. All information in the NASIS Soil Survey Schedule is current and correct.

DOCUMENTATION AND DATA COLLECTION

Descriptive Legend - Each project office will develop a descriptive legend. The requirements for a descriptive legend are in the NSSH, Part 627.04. Each survey member is to have a descriptive legend to provide consistency among all project members.

Map Units - The type and amount of documentation for map units is dependent upon the complexity of the map unit, existing documentation for the map unit within the MLRA, and previous correlation decisions within the MLRA.

Each map unit will have a pedon description from a representative area in the MLRA subset soil survey area. The description will be written in sufficient detail that the pedon can be classified. This is to verify that the unit is valid in that subset. The map unit representative pedon will be entered into the PEDON program. Additional documentation from within the MLRA can be used to support the concept and provide a range of characteristics for the map unit.

Each map unit should have sufficient transects to determine the map unit composition. This is critical to develop sound data mapunits in NASIS. Generally, two or three transects on a consociation will provide adequate analysis of the unit, but the complexity of each map unit needs to be considered. Complexes will typically require more transects to fully verify the unit as a complex. Remember, the soil survey area is the MLRA. Accordingly, transect data from other counties within the same MLRA can be used.

Typical Pedons - There will be a "typical pedon" for each series on the MLRA identification legend. This pedon should represent the predominant range for all the major soil properties of the series within the MLRA. Typical pedons will be selected based on an evaluation of present and historical data for that series, i.e. lab data, 232's, typical pedons from published surveys. The typical pedons will be located in representative map units and on representative landforms. Characterization data may need to be collected if there is no data or insufficient data. The selected typical pedon sites, those suitable for representing the series in the MLRA, will be re-visited in order to update the detailed description to current NCSS and MLRA standards. The selected typical pedon will be entered into the PEDON program.

Upon evaluation of the data, the following guidelines will be used in selecting the typical pedon and taxonomic unit description for the MLRA:

a. Each series in the MLRA is represented by one taxonomic unit description.
b. The current official series description typical pedon will be used as the reference pedon for the taxa in the MLRA.

> ***Exception 1.*** If the OSD type location within the MLRA is determined not to be suitable as a typical pedon (i.e., concept changed, type location now paved over, etc.), the OSD pedon will be relocated to another type location within the MLRA and that new pedon will be used as the reference pedon for the MLRA.

Exception 2. If the OSD is located in another MLRA, a representative pedon will normally be selected to represent the series in the MLRA.
Exception 3. For subset publications, if the OSD pedon is from a map unit not correlated in the subset, then a representative pedon may be selected that represents the subset's range of characteristics.

PROGRESSIVE CORRELATION and the CORRELATION MEMORANDUM

The MLRA Project Leader and the Region 11 Soil Data Quality Specialist are responsible for the preparation of the Preliminary Correlation Memorandum and the Correlation Memorandum. The Correlation Memorandum is the final and official record of all correlation decisions made during the progress of the soil survey. The correlation notes made at the initial, progress, and final field reviews are reviewed and become part of the Correlation Memorandum. The NSSH, Part 609.06 and Exhibit 609-1 provide guidance in the preparation of the Correlation Memorandum.

In addition to the items in the Correlation Memorandum called for by NSSH guidance, the Correlation Memorandum will provide a conversion listing for the subset soil survey project legend and the MLRA legend. The Correlation Memorandum will also identify any differences between the subset data map unit and the MLRA data map unit.

CORRELATION AMENDMENT PROCEDURES

An amendment to the correlation document is prepared by the Region 11 MLRA Office if changes are made to correct deficiencies in the names of soil map units or taxonomic units.

The Region 11 Soil Data Quality Specialist assures that the quality of the correlation amendment meets national standards. The Region 11 Team Leader and State Conservationist sign the amendment. Distribution is the same as the final correlation (refer to NSSH 610.07).

The correlation memorandum and its amendments should be archived under NASIS Legend Text Notes. The document(s) will serve as a historical record in NASIS for the survey area.

MAP CHECKING – ROLES AND RESPONSIBILITIES

Quality control of mapping is the primary responsibility of the MLRA Project Leader. Quality assurance of mapping will be done by the MLRA Project Leader and the Region 11 Soil Data Quality Specialist. To assure high quality mapping, the following is the policy for map checking in Region 11.

1. The MLRA Project Leader is responsible for the accuracy of map unit composition along with the line placement, the amount of detail, the use of spot symbols, the legibility, the joining with adjacent maps and the completeness and consistency of all map sheets.

2. The MLRA Project Leader will review all maps for accuracy at regular intervals in order to assure quality and uniformity among all project members. Area resource soil scientists may also be available to provide map checking.

3. All field sheets in once over soil survey projects and all compiled sheets in update soil survey projects will be reviewed and signed off as acceptable by the MLRA Project Leader. This is to be done generally within one month of completing the soil map.

4. Each field sheet will contain, at a minimum, on the back side, the following:

a. Name of mapper
b. Date map was completed
c. Signature of project leader and date of acceptance

5. All compiled sheets will contain, at a minimum, usually in the lower right-hand corner of the mylar, the following:
a. Soil survey area name
b. Publication map sheet number
c. USGS Quadrangle name
d. Scale
e. Projection and datum
f. SW corner coordinate values
g. Index of field sheet numbers
h. Compiler's initials and date

In addition, joins will be initialed and dated on each side after they have be edge-matched to the adjoining sheet.

6. The MLRA Project Leader is responsible for quality control and acceptance of compiled map sheets. Exhibit 647-1 in the NSSH or similar checklist should be used for quality control. A signature of the responsible staff person and the date of acceptance will be recorded for each half-tone prior to map finishing. The Region 11 Soil Data Quality Specialist (Soil Business) will provide quality assurance of compiled map sheets.

SOIL BUSINESS – POLICY AND PROCEDURES

1. All map compilation will be done according to NSSH, Part 647. A 10 percent sample of completed compilation mylar quarter quads or quadrangles will be sent to the Region 11 MLRA Office for review as early in the county compilation process as possible.

2. All soil map digitizing will follow SSURGO standards as set forth in NSSH, Part 647. A 10 percent sample will be reviewed by the Region 11 MLRA Office to provide quality assurance of the digitized product before digital map finishing is started and before it is archived (see exhibit 1).

3. Cartographic Requisition forms processed by the Region 11 Soil Data Quality Specialist (Soil Business):

(a) Request for General Soil Map mylar base maps
(b) Request for Block Diagram drafting at Fort Worth
(c) Request for County Locator maps. These will be returned from Fort Worth to the Region 11 MLRA Office in both electronic and hard copy formats.
(d) Requests for review and forwarding of completed GSM, block diagrams, and locator maps

PROCEDURES FOR PROCESSING SERIES DESCRIPTIONS

This instruction establishes the procedure for processing Initial Review Drafts (IRD) and revising established Official Series Descriptions (OSDs). (NSSH Part 614.06)

New Series - New series, if needed for taxonomic and interpretive differences, need to have sufficient documentation to determine 1) that the proposed series has clear differentiae from all existing series, 2) that the proposed series is different in use and management from other series, and 3) to determine the range of soil properties associated with the series.

Generally, if the extent of the series is over 1,000 acres, 10 pedon descriptions are needed. These can come from outside the subset, but generally always from within the MLRA. Lab characterization data is also recommended, especially if separating from adjoining class limits--for example, a coarse-loamy control section from a fine-loamy control section.

Initial Review Drafts

The following procedure is used to reserve the series name and classification.

1. The subset Soil Survey Project Leader or the MLRA Project Leader will prepare the Initial Review Draft of proposed new series. The following materials are submitted to Region 11 Soil Data Quality Specialist assigned responsibility for the MLRA:

a. One hard copy and the electronic copy of the Initial Review Draft of the proposed series. All sections of the Initial Review Draft, in particular the competing series, will be completed. If needed, the Region 11 MLRA Office can provide a list of competing series and the Official Series Description for the series on the list.

b. The NASIS DMU ID that represents the typical pedon should be included in the Initial Review Draft under Remarks or under Additional Data. The DMU should be fully populated, including data needed to generate interpretations commonly used in Region 11.

c. Copies of documentation for the series used to develop the range in characteristics and the series concept. Documentation includes lab data, pedon descriptions, transect summaries, etc. (The documentation will be filed in the "series" folder in the Region 11 MLRA office.)

d. An 8.5 X 11 copy of that portion of the 15 or 7.5 minute quadrangle or a copy of the soil survey field sheet that has the location marked. The name of the quadrangle and the section, township, range, latitude and longitude are to be included. Indicate if a GPS was used to determine location.

2. The Region 11 Soil Data Quality Specialist will review the proposed series and the supporting documentation. If the name and classification are appropriate, the Soil Data Quality Specialist will enter the series name and classification into the National Soil Classification data base. When there is sufficient documentation for the proposed series, the Soil Data Quality Specialist will enter the Initial Review Draft of the series into the National Official Series Description data base. (NOTE: The series name can be reserved by entering it into the soil classification file, and this can be done prior to entering the IRD into the national soil series data base.) When the IRD is submitted for inclusion in the national soil series data base, a ".a file" will be created which provides a brief background or notes pertaining to the series. The ".a file" will be maintained in NASIS by the Region 11 MLRA Office (NASIS Site: MLRA11_Office, Local Query, Query Name: .A files by series name).

Routing Initial Review Drafts for Comment

1. After the Region 11 Soil Data Quality Specialist has reviewed the classification and has made the name reservation, the series will be routed for comment. Routing will be done electronically as much as possible. The routing will be to those individuals on the group mailing list. A sepa-

rate list will be maintained for each MLRA. As a minimum, the series will be routed to the State Soil Scientist, MLRA Project Offices, and cooperating agencies in the state where the series is described, to adjacent state offices and MLRA Regional offices, and to MLRA Regional offices having responsibility for any of the competing series.

2. Comments should be returned to the Region 11 Soil Data Quality Specialist by the date listed on the cover letter, usually within 2 to 4 weeks.

3. Comments will be collected by the Region 11 Soil Data Quality Specialist and routed to the subset Soil Survey Project Leader or MLRA Project Leader. Changes will be made in consultation with the Region 11 Soil Data Quality Specialist. The competing series section will be reviewed again and updated to include any series proposed or established subsequent to the initial review draft.

4. The subset Soil Survey Project Leader or MLRA Project Leader will then submit the following to the Region 11 Soil Data Quality Specialist:

a. An electronic copy with changes marked with a ^ ^ before and after additions and brackets [ ] before and after deletions. Changes highlighted in color will also be accepted. A paper copy of the IRD with changes marked with pen and ink can also be submitted if changes are numerous or might otherwise be confusing.
b. A copy of the review comments and a statement of their disposition. Marginal notes in pen and ink are sufficient.

5. The Region 11 Soil Data Quality Specialist will review the changes, remove the edit marks (^ ^ and [ ], or color edits), update the ".a file", and enter or update the series description in the National Official Series Descriptions data base.

6. After the series is updated in the National Official Series Descriptions data base, the Region 11 Soil Data Quality Specialist will notify those in the MLRA Series Descriptions mail group that the series has been updated and that the update can be downloaded from the national data base. A copy of the ".a" file or a summary of its contents will be provided along with this notification.

7. Information on series classification, competing series, and Official Series Descriptions are available on the internet at http://www.statlab.iastate.edu/soils

Revising Established Official Series Descriptions

The following procedure will be used when revising Established OSDs:

1. The MLRA Project Leader in whose area the OSD resides will maintain and coordinate changes.

2. Requests for changes to an OSD will be made to the MLRA Project Leader with responsibility for the OSD. Changes to properties or series concepts should be based on correlation decisions made during Field Reviews and supported by documentation (lab data, 232's, transects, etc.). Proposed changes to OSDs should be submitted by Project Offices to the Region 11 Soil Data Quality Specialist. The Region 11 Soil Data Quality Specialist will coordinate changes with the MLRA Project Leader with responsibility for the OSD.

3. To avoid duplication of updating efforts, only the proposed change(s) should be submitted to the Region 11 Soil Data Quality Specialist. The MLRA Project Leader in whose area the OSD resides is responsible for updating and maintaining site and profile descriptions, competing series section, etc.

4. If the MLRA Project Leader agrees to the proposed change(s), an electronic copy of the OSD will be forwarded by the MLRA Project Leader to the Region 11 Soil Data Quality Specialist for processing. The electronic copy will have changes marked with a ^ ^ before and after additions and brackets [ ] before and after deletions. Use of different colors to mark additions and deletions is also acceptable. A record of pertinent information and edits will be recorded in the ".a file" and submitted with the series description. A paper copy of the OSD with changes marked with pen and ink can also be submitted if changes are numerous or might otherwise be confusing.

5. If the MLRA Project Leader with responsibility for the OSD does not concur with the proposed change(s), the Region 11 Soil Data Quality Specialist in the role as correlator will resolve the issue.

6. If the soil series classification or type location is changed, or if changes are made that alter the original series concept, the Region 11 Soil Data Quality Specialist will route the revised OSD. Routing will be done electronically as much as possible. The routing will be to those individuals on the group mailing list. A separate list will be maintained for each MLRA. As a minimum, the series will be routed to the State Soil Scientist, MLRA project offices, and cooperating agencies in the state where the series is described and to adjacent State Offices and MLRA Regional offices. Comments should be returned to the Region 11 Soil Data Quality Specialist by the date listed on the cover letter, usually within 2 to 4 weeks.

7. Changes to type locations can be proposed and approved as part of Progressive Correlation. The new type location should be field visited by the Project Office staff. Supporting documentation, including transect data, field notes, NASIS text notes, and lab data, along with a current detailed soil profile description and soil map should be included with the proposal.

8. All OSDs submitted to the Region 11 MLRA Office for processing should include a current taxonomic classification and Competing Series section.

GUIDES FOR WRITING PEDON DESCRIPTIONS AND OFFICIAL SERIES DESCRIPTIONS

The following information is intended to supplement the guidelines for developing Official Series Descriptions in the National Soil Survey Handbook, Part 614.

Redoximorphic Features:

In describing redoximorphic features include kind, color, amount, contrast and location for all features. Many times location has been omitted and needs to be added. Commonly used locations are: in the matrix, lining pores, on faces of peds, and throughout. Descriptions may include hardness, size, shape and/or boundary if they add clarity, but they are not required.

In describing redoximorphic features, they should be placed in the portion of the horizon description where "additional features" are described.

Redox Concentrations

In describing redox concentrations, many of which were previously identified as high chroma mottles, the approved terminology is "masses of iron oxide accumulation" or "masses of iron accumulation." Either phrase will be accepted. Use these phrases instead of iron concentrations, iron stains or masses of iron oxides. In stating "masses of iron oxide accumulation" or "masses of iron accumulation" both the type (mass) and process (accumulation) is described.

In describing soft bodies of iron and/or manganese the approved terminology is "masses of iron and manganese oxide accumulation" or "masses of iron and manganese accumulation." The term soft is not used because, by definition, masses are soft or non-cemented bodies.

For cemented bodies, the terms concretions or nodules are used in place of accumulations. For example: many fine black (N 2.5/0) moderately cemented manganese concretions (or manganese oxide concretions) throughout.

Redox Depletions

In describing redox depletions, many of which were previously called low chroma mottles (2 or less), the approved terminology is "iron depletions." In some soils iron depletions may be recognized even though the chroma is more than 2 (but not more than 4) as long as the depletions have chroma less than the matrix. For example, a 10YR 5/3 "mottle" could be considered an iron depletion in a 10YR 5/4 matrix. However, such features would not be diagnostic for aquic suborders or subgroups.

The preferred term for what previously were called silt coatings is "clay depletions." Clay depletions more accurately describes the process by which these features are formed. Clay depletions form in place. When not sure of the origin the phrase "silt grains on faces of peds" can be used. As with iron depletions, clay depletions may be recognized even if the chroma is more than 2 (but not more than 4) as long as the depletions have chroma less than the matrix. Also, such features would not be diagnostic for aquic suborders or subgroups.

Surface Features

In describing surface features, include kind, location, amount, color and distinctness. In addition, texture may be described if it adds to the understanding of the soil. The order of describing is: amount, distinctness, color, kind, location.

In describing surface features, "coatings" is grammatically preferable to "coats."

In soil horizons where clay and organic mater have moved together to form films on ped faces, the term "organo-clay films" can be used. Organo-clay films have value and chroma of 3 or less. For example, in a Bt horizon with 10YR 3/2 surfaces on ped faces, the coatings would be most accurately described as organo-clay films rather than just clay films.

Official Series Descriptions:

Range in Characteristics

In describing the depth to carbonates the preferred terminology is "depth to carbonates." "Calcium" can be used as a modifier. The term "free lime" should not be used.

Soil characterization data should be evaluated when Official Series Descriptions are updated. Soil Data Quality Specialists will assist project offices in obtaining pedon data. A comment will be made in the Additional Data section of the Official Series Description stating that available lab data was evaluated in establishing the Range in Characteristics. For example, "Pedon data from soil characterization lab at xxxxx University and the NSSL were evaluated in June 1997 in revising the Range in Characteristics."

Template for Official Series Descriptions

LOCATION?? MI

(Established or Tentative) Series
Rev. (Author initials)
(Date) ??/??

?? SERIES

The ?? series consists of (depth class), (drainage class) soils formed in (parent material) on (landforms). Permeability is?. Slope ranges from ? to ? percent. Mean annual precipitation is about ? inches, and mean annual temperature is about ? degrees F.

TAXONOMIC CLASS: ???

TYPICAL PEDON: (map unit name), on a ?-facing, slope shape (i.e., convex, concave, optional), landform position (optional), ? percent slope in (land use at site) at an (elevation)?. (Colors are for moist soil unless otherwise stated.)

(horizon designator)--? to ? inches; (color)(texture)(textures rubbed and unrubbed for Organic soils)**,** (dry color);(grade, size, type of structure);(consistence); (amount, size, location) roots; (amount, size, kind) pores; additional features (see list below); (effervescence); (reaction); (distinctness, topography) boundary.(? to ?inches thick)

Additional features include:
- Slickensides
- Clay films, organic coatings
- Concretions (other than redoximorphic)
- Carbonates
- Sodium
- Rock fragments
- Brittleness
- Redoximorphic features

TYPE LOCATION: ?County,(state); distance from nearby town; Township name (optional); ?feet(N,S,E,W) and ?feet(N,S,E,W) of the ?(corner or center) of sec?, T.?., R.?.;USGS (quad name) topographic quadrangle;(latitude)?degrees ?minutes ?seconds N., and (longitude)?degrees ?minutes ?seconds W.; NAD ?. or UTM's.

RANGE IN CHARACTERISTICS: The depth to (base or top of argillic, cambic, spodic, glossic, fragipan, carbonates, lithic/paralithic contact, other contacts) ranges from ? to ? inches. The particle-size control section averages ? to ? percent clay and ? to ? percent sand. Percent rock

fragments. Reaction is ? or ? (or Reaction ranges from ? to ?) throughout. (Note: If reaction or rock fragments are stated in this paragraph they should be the same throughout the entire profile. If not, delete them from this paragraph and list in individual horizons below).

The? horizon(s) has hue of ? or ?, value of ? to ?, and chroma of ? to ?. Redoximorphic features have (hue, value, chroma ranges) (optional). It is (texture or textures). Average clay content ranges from ? to ?. Average sand content ranges from ? to ?. Rock or pararock fragment content ranges from ? to ?. Rock fragments are mainly (kind, size, lithology). Reaction is ? or ? (or Reaction ranges from ? to ?) (Note: If reaction and/or rock fragments are listed in each horizon, don't state them in the opening paragraph of RIC.)

(Some pedons have an ? horizon).

(Some pedons do not have ? horizons.)

The? horizon(s) has hue of ? or ?, value of ? to ?, and chroma of ? to ?. Redoximorphic features have (hue, value, chroma ranges.) (optional). It is (texture or textures). Average clay content ranges from ? to ?. Average sand content ranges from ? to ?. Rock or pararock fragment content ranges from ? to ?. Rock fragments are mainly (kind, size, lithology). Reaction is ? or ?.

COMPETING SERIES: These are the ?, ?, and ? series.

NOTES: The list of competing series is obtained from the Soil Classification file maintained at Ames Statistical lab. The list is available on Internet at: http://www.statlab.iastate.edu/cgi-bin/sc/screports.cgi?-S. This web sit allows you to enter taxonomic classification of the new series and all series with the same classification will be listed. Be aware that not all series have been updated to include cation-exchange activity class. Entering the activity class (semiactive) will not list those series that have not been updated. For now it is a good idea to not enter cation exchange activity class on the query form. The resulting series list will include those series that have not yet been updated. The series that have not been updated to include the cation-exchange activity class should still be listed and differentiating property given.

The competing series on the list can be viewed at Internet site:
http://www.statlab.iastate.edu/cgi-bin/osd/osdname.cgi or
http://www.statlab.iastate.edu/cgi-bin/osd/osdquery.cgi?-S
The first site lets you enter one series name and view the series.
The second site lets you put in series taxonomy and all series are listed and can be viewed by selecting from the generated list.

NOTES: Before writing competing statements, it is critical that the soil series being described has a complete and concise range of characteristics and other properties identified. Poorly written OSDs make it much more difficult to differentiate series. Competing statements should only identify the "major" differences in properties. Generally, only one property is listed. Differences

in every property should not be described. When writing competing statements address only those properties that are distinctly different between the competitors. Properties that overlap should not be used to differentiate series. Only properties within the series control section can be used to separate series. For additional information, refer to NSSH Exhibit 614-2.

Criteria used to separate series must be stated in the Range in Characteristics section. For example, in order to state that "? soils have more than 8 percent sand in the lower part of the series control section," the RIC paragraph must have a statement that indicates the new series has less than 8 percent sand in the lower part of the series control section.

GEOGRAPHIC SETTING: ?? soils formed in (parent material) and are on (landform). Slope gradients range from ? to ? percent. Climate is ?. Mean annual temperature ranges from ? to ? degrees F., mean annual precipitation ranges from ? to ? inches, frost free period ranges from ? to ? days, and elevation ranges from ? feet to ? feet above sea level.

NOTES: The temperature and precipitation data can be obtained from the Internet site:
http://www.wcc.nrcs.usda.gov/water/w_clim.html
Select from the menu " Climate Analysis for Wetlands (individual counties).

GEOGRAPHICALLY ASSOCIATED SOILS: These are the ?, ?, and ? soils.

NOTES: List the soils that most commonly associate with the new series. For each soil listed give its landform position in relation to the new series. Drainage class is commonly listed. Soils in a drainage sequence are sometimes listed. Soils in vegetative sequence are sometimes listed. Some associated soils may be competing series, but generally are not.

For example:
The moderately well drained AAA and RRR soils are in similar and more sloping areas. The III and JJJ soils are on similar nearby landforms and are in a biosequence with MYNEW soils. The poorly drained RRR soils are on broad summits and do not have a dark surface layer. The poorly drained SSS soils have mollic epipedons and are on summits farther from the dissecting drainageways MYNEW soils.

DRAINAGE AND PERMEABILITY: ? drained. The potential for surface runoff is ? to ? (please refer to new runoff terms in the SSM pages 113-115, or NSSH, Part 618.50). Permeability is ?. [or Permeability is ? in the upper part and ? in the lower part of the series control section; or Permeability is ?in the (parent material) and ? in the underlying (parent material)]. In undisturbed areas the depth to the top of an (perched or apparent) seasonal high water table ranges from ? to ? feet for some time in normal years

USE AND VEGETATION: Soils are used to ?. Native vegetation is ?.

DISTRIBUTION AND EXTENT: MLRA? in (state, states, or parts of states). The type location is in MLRA ? (optional). The soils are of ? extent.

MLRA OFFICE RESPONSIBLE: Indianapolis, Indiana.

SERIES ESTABLISHED: ? County, (state), 19??.

REMARKS: Diagnostic horizons and features recognized in this pedon are: (list and give depths and horizons from typical pedon)

NASIS data mapunit ID xx,xxx represents the typical pedon. (Identify the DMU id for the osd pedon. DMU's for other component phases can also be listed.)

ADDITIONAL DATA: (IF AVAILABLE STATE IT AS FOLLOWS: ? data is available for the typical pedon (give pedon number) from the (NSSL, University Lab).

NOTES: also list other pedons if they provide supporting data along with type of data available and source of data.

National Cooperative Soil Survey
U.S.A.

MANUSCRIPTS

1. Manuscript will be submitted in the MUG (map unit generator) format. In counties previously completed that have manuscripts in formats other than MUG, a decision on whether to use the MUG manuscript format or use the existing format will be based on the quality of the manuscript. The most efficient method of moving the manuscript through the publication process will be used.

2. Using the MUG manuscript process requires edits to the soil database for the survey area in NASIS. Edits to the database will be coordinated through the appropriate Region 11 Soil Data Quality Specialist. The decisions to make these edits are part of the correlation process.

3. A complete (100%) quality control technical review of the manuscript will be completed by the MLRA Project Leader prior to submitting the manuscript to the Region 11 MLRA Office. Use the Soil Survey Manuscript Quality Control Review checklist (attachment 3). The Region 11 Soil Data Quality Specialist will perform a quality assurance technical review of the manuscript. Depending on the condition of the manuscript, it may or may not be returned to the MLRA Project Leader to address technical review queries. If the manuscript requires only minimal modifications as a result of technical review, it will be submitted directly for English edit. In most cases, the manuscript will not be returned to the project leader after English edit.

Subset manuscript taxonomic unit descriptions and ranges in characteristics

The MLRA Project Leader or designated subset Soil Survey Project Leader is responsible for evaluating the series used in the MLRA or that part of the MLRA that lies within the Project Leader's geographical area of responsibility. The evaluation will be based on an investigation of the range in characteristic of the OSD and subset taxonomic unit descriptions and an investigation of lab data within the MLRA. This evaluation of the RIC for a particular series may result in expanding the range, or narrowing the range and establishing a new series.

If the typical pedon selected for the subset manuscript is the MLRA taxonomic unit pedon, then the following headings should be used: "TYPICAL PEDON FOR MLRA_____" and "MLRA_____ RANGE IN CHARACTERISTICS."

If the typical pedon selected for the subset manuscript is not the MLRA taxonomic unit pedon (see ***Exceptions*** under Data Collection and Documentation), then the following headings should be used: "TYPICAL PEDON " and "RANGE IN CHARACTERISTICS."

DATA ELEMENTS FOR POPULATION OR EDITING OF NASIS DATA

Each data element will need to be carefully checked to ensure that we can accurately and consistently populate data for soil survey manuscript preparation, FOTG, SSURGO Certification, Customer Tool Kit, etc. Refer to NASIS Training Proceedings, February 1-5, 1999, for additional guidance on data population and procedures.

Data in NASIS should be compared against the OSD ranges. The data should be within OSD ranges unless the properties have been noted as being outside the series range in a correlation document.

PROCEDURES FOR MAKING CHANGES TO DATA MAPUNITS (DMU's)

1. MLRA Project Leader in whose area the DMU resides will maintain and coordinate changes for update soil survey projects.

2. Requests for changes to a DMU will be made to the MLRA Project Leader with responsibility for the DMU. When applicable, change(s) to components of a DMU are to be based on actual lab or field test data.

3. The MLRA Project Leader with responsibility for the DMU will coordinate with Resource Soil Scientist(s) in his/her area, state Technical Soil Specialists, Region 11 Soil Data Quality Specialist, and with MLRA Project Leaders and Resource Soil Scientists from surrounding MLRA's for their comments on the requested DMU change. Either a hard copy or an electronic copy of the data with proposed changes marked will be routed for comment. The minimum area to canvass will be all Project Offices within the MLRA and other MLRA Project Offices that have correlated the map unit in the past.

4. After comments are received, the MLRA Project Leader with responsibility for the DMU makes a preliminary decision on the requested change(s). If the proposed change is not approved, the Region 11 Soil Data Quality Specialist in the role as correlator will determine the need for a new DMU.

INSTRUCTIONS TO POPULATE AND CAPTURE NASIS TEXT NOTES

> In Region 11, all soil survey activities are managed in NASIS. All SSURGO soil business and all Soil Survey Correlation activities are captured in NASIS. NASIS provides us with an opportunity to document and keep all pieces of information that go into the production of a soil survey. That opportunity resides in the "Text" tables available in the NASIS root object tables. To make the most of that opportunity there needs to be some sort of structure and organization of these pieces of information so that they are easily entered into the database to be used by soil scientists and retrieved and understood by our successors. The NASIS Text Note Spreadsheet (see attachment 4) shall provide consistency in capturing soil business and correlation activities.

This NASIS Text Note Spreadsheet has been organized by the "Text" table and the "Kind" data element. For example, a Soil Scientist needs to write a note on farmland classification, but where should that go in NASIS? Using the Spreadsheet, he or she will place this in the Data Mapunit

Text Table, under the miscellaneous note “kind”, farm class “category” and either prime or statewide “subcategory”.

The “NASIS Text Table” and “Kind” are fixed by the NASIS software, so we cannot easily add to or change those, but “Category” and “Subcategories” provide flexibility to choose your “Topic (Subject)”and “Usage”. It might be best that each topic has only one location in NASIS; in other word, its text should be placed in only one NASIS text table, under a single kind, and under a single category (if needed, multiple subcategories are okay). This would make it easy to find all the information on a single topic (like farmland classification), which is particularly important for running queries/reports for the text information and interpretations. This means one simple query will capture all the data into the selected set and we know we have got it all, rather than wonder where someone else may have put it.

In the text field, the soil scientist should place their name and date for each note captured. For example, “The data mapunit is copied and built from the following data mapunits. Ryker variant from Jefferson Co. IN - RyB2—Ryker silt loam, 2 to 6 percent slopes, eroded, Byron Nagel 8/11/98."

WATER TABLES AND DRAINAGE CLASSES

The objective of the water table and drainage class guidelines is to attempt to assign standard water table depth, type, and duration to be used in the region.

In developing these guides drainage classes are used rather than taxonomy in assigning water table properties. Since the drainage classes of Somewhat Excessively and Excessively drained are determined more on the basis of permeability and available water capacity, these two classes are not considered in these guides for assigning water table properties.

Also, due to historical differences in assigning water table properties, these guides set broad ranges for water table depths. **The entire range in water table depths will seldom be used in assigning water table depths. Each MLRA should work to establish a standard set of water table properties that fit within the guidelines presented here.** The ranges are for the depth to the top of the water table. They apply to both the drained and undrained phases. There generally is no difference in water table depths between undrained and drained conditions. The difference is in when the water table is present and/or how long the water table persists (time and duration).

Drainage Class	**Depth to Top of Water Table (ft)**	**Duration - Undrained**	**Duration - Drained**
Very Poor	+2.0 - +0.5	Oct - Sep	Nov - May
Poor	+0.5 - 1.0	Oct - Jun	Nov - May
Somewhat Poor	0.5 - 2.0	Oct - Jun	Nov - May
Moderately Well	1.0 - 3.5	Oct - May	Nov - Apr
Well	$\geq$ 3.5	Oct - May	Oct - May

An *apparent water table* having Endosaturation or a *perched water table* having Episaturation is not true 100 percent of the time for the entire region.

Most soils that **were** in the Typic subgroup of a udic moisture regime and have a fragipan or dense till (permeability $\leq$ 0.2 in./hr) above 100 cm. are now in the Oxyaquic subgroup.

SIMILAR/DISSIMILAR COMPONENTS GUIDE
FOR USE IN REGIONS 10 AND 11

Use this guide to assign similar/dissimilar concepts to components and map units. Although the guide is comprehensive and will cover most situations, soil components may be encountered that are not addressed in the guide. If these circumstances arise, please contact your Regional Soil Data Quality Specialist. An effort will be made to incorporate new criteria in the guide as necessary to cover these circumstances.

This similar/dissimilar key is based mostly on soil properties and on some soil interpretations. Similar/dissimilar status is based on the differences encountered in properties and interpretations, either individually or combination.

The following properties and interpretations are used in the key:

- Drainage class
- Family particle-size class
- Depth to limiting layer
- Surface texture
- Surface layer rock fragments
- Surface stones and boulders
- Erosion class
- Slope
- Flooding frequency
- Surface calcium carbonate content

General Guidelines:

- Any one dissimilar property makes a soil dissimilar.
- Any one very contrasting property makes a soil very contrasting.
- Multiple similar differences between soils cannot make a soil dissimilar.

Drainage Class

Guidelines:

Similar soils: Adjacent classes
Dissimilar soils: Skip one class; except very poorly drained is dissimilar to poorly drained; better drained soils are non-limiting; more poorly drained soils are limiting
Very contrasting: Skip 2 classes except very poorly drained is very contrasting to poorly drained.

Drainage Class Table

Drainage Class	Similar	Dissimilar	Very Contrasting	Limiting
EXCESSIVELY (E)		MW or wetter	SP or wetter	MW or wetter
SOMEWHAT EXCESSIVELY (SE)		MW or wetter	SP or wetter	MW or wetter
WELL (W)	MW	SP or wetter	P or wetter	SP or wetter
MODERATELY WELL (MW)	W or SP	SE or drier; P or wetter	VP or wetter	P or wetter
SOMEWHAT POORLY (SP)	MW or P	W or drier; PP, VP	SE or drier	PP, VP
POORLY (P)	SP, PP	MW or drier; VP drained	W or drier	VP
POORLY (PP) with ponding	P	SP or drier; VP	W or drier	None
VERY POORLY (VP)	None	All	MW or drier	None

Family Particle-Size Class

Guidelines (For the 5 category list):

Similar soils: Adjacent classes
Dissimilar soils: Skip one class; dissimilar components are non-limiting.
Very contrasting: Skip 2 classes; all soils with organic control sections are very contrasting.

Note: For components with a contrasting particle-size class only the class for the upper part of the control section will be used.

Five Category Family Textural Class Table

Family Textural Class	Similar	Dissimilar	Very Contrasting	Limiting
Sandy (s)	c-l, c-s	f-l; f-s; f; vf	f; vf	none
Coarse-loamy (c-l); Coarse-silty (c-s)	s; f-l; f-s	f; vf	vf	none
Fine-loamy (f-l); Fine-silty (f-s)	c-l; c-s; f	s; vf		none
Fine (f)	f-l; f-s; vf	c-l; c-l; s	s	none
Very fine (vf)	f	f-l; f-s; c-l; c-s, s	c-l; c-s; s	none

Guidelines (for the 3 category list):
(Note: The 3 category list is not included in the joint MO-10/MO-11 document.)

Similar soils: None
Dissimilar soils: Adjacent classes; dissimilar components are non-limiting.
Very contrasting: Skip one class; soils with organic control sections are very contrasting to components with mineral particle-size control sections.

Note: For components with a contrasting particle-size class only the class for the upper part of the control section will be used.

Three Category Family Textural Class Table

Family Textural Class	Similar	Dissimilar	Very Contrasting	Limiting
Sandy (s)		l or c	c	none
Loamy (l)		s or c		none
Clayey (c)		l or s	s	none

Depth to Limiting Layer

Limiting layers include:

- lithic or paralithic contact
- sand or gravel
- dense till
- fragipan

Depth classes	(inches):
very shallow	0 - 10
shallow	10 - 20
moderately deep	20 - 40
deep	40 - 60
very deep	> 60

Guidelines:

Similar soils: Adjacent classes

Dissimilar soils: A skip of one class; adjacent classes where RV differs by more than 10 inches. Shallower components are limiting. Deeper components are non-limiting.

Very contrasting: Skip 2 classes; skip of 1 class and RV differs by more than 30 inches; very shallow components.

Soil Depth Class Table

Depth Class (Depth in inches)	Similar	Dissimilar	Very Contrasting	Limiting
Very Shallow [VS] (0 - 10)	S	MD, D & VD; or S w/ 10” difference.	D & VD; or MD w/ 30” difference;	none
Shallow [S] (10 - 20)	VS or MD	D & VD; or VS & MD w/ 10” difference	VD; or D w/ 30” difference, or VS w/ 10” difference	VS w/ 10” difference
Moderately Deep [MD (20 - 40)	S or MD	VD & VS or S & D w/ 10” difference	VS; or VD w/ 30” difference	VS, S
Deep [D] (40 - 60)	MD or VD	S & VS or VD & MD w/ 10” difference	VS or S w/ 30” difference	S, VS
Very Deep [VD] (> 60)	D	MD & shallower or D w/ 10” difference	S & VS or MD w/ 30” difference	MD, S, VS

Surface Texture

Guidelines

Similar soils: Adjacent classes
Dissimilar soils: Skip one class; all dissimilar components are limiting.
Very contrasting: Skip 2 classes; organic surface layers and mineral surface layers are dissimilar and very contrasting.

Textural class	Textures
coarse	s, ls, cos, lcos, fs, lfs, vfs, lvfs
moderately coarse	sl, cosl, fsl
medium	l, sil, si, vfsl
moderately fine	scl, cl, sicl
fine	sc, c, sic
organic	muck, peat, mucky peat

Surface Texture Table

Surface Texture	Similar	Dissimilar	Very Contrasting	Limiting
coarse	moderately coarse	medium or finer; organic	moderately fine and fine; organic	medium or finer; organic
moderately coarse	coarse or medium	moderately fine or finer; organic	fine; organic	moderately fine or finer; organic
medium	moderately coarse or moderately fine	coarse; fine; organic	organic	coarse; fine; organic
moderately fine	medium or fine	moderately coarse, coarse; organic	coarse	moderately coarse, coarse; organic
fine	moderately fine	medium or coarser; organic	moderately coarse, coarse, organic	medium or coarser; organic
organic	NONE	all	all	all

Surface Layer Rock Fragments

Less than 15%	unmodified
15 - 35%	modified (GR, CH, CN, CB)
35 - 60%	very modified (GRV, CHV, CNV, CBV)
60% +	extremely modified (GRX, CHX, CNX, CBX)

Guidelines

Similar soils:	Adjacent class w/ less than 10 percent difference
Dissimilar soils:	Adjacent class w/ more than 10 percent difference; components with more rock fragments are limiting.
Very contrasting:	Dissimilar soils w/ 20 percent or more difference

Surface Layer Rock Fragment Table

Modifier	Similar	Dissimilar	Very Contrasting	Limiting
unmodified	modified w/ < 10 % difference	modified w/ >10% diff.; very modified extremely modified	modified w/ >20% diff.; very modified extremely modified	modified w/ >10% diff.; very modified extremely modified
modified	very modified or unmodified w/ < 10 % difference	very modified or unmodified w/ > 10% diff.; or extremely modified	very modified or unmodified w/ > 20% diff.; or extremely modified	very modified w/ > 10% diff.; or extremely modified
very modified	extremely modified or modified w/ < 10 % difference	extremely modified or modified w/ > 10% diff.; or unmodified	extremely modified or modified w/ > 20% diff.; or unmodified	extremely modified w/ > 10% diff.
extremely modified	very modified w/ < 10 % difference	very modified w/ > 10% diff.; unmodified; modified	very modified w/ > 20% diff.; unmodified; modified	None

Surface Stones and Boulders

Class 1	stony; bouldery
Class 2	very stony; extremely bouldery
Class 3	extremely stony, extremely bouldery
Class 4	rubbly
Class 5	very rubbly

Guidelines

Similar soils:	Adjacent classes
Dissimilar soils:	Skip one class; more stony components are limiting
Very contrasting:	Skip 2 classes

Surface Stones and Boulders Table

Surface Stones	Similar	Dissimilar	Very Contrasting	Limiting
Class 1	Class 2	Class 3, 4, and 5	Class 4 and 5	Class 3, 4, and 5
Class 2	Class 1 and 3	Class 4 and 5	Class 5	Class 4 and 5
Class 3	Class 2 and 4	Class 1 and 5	None	Class 5
Class 4	Class 3 and 5	Class 1 and 2	Class 1	None
Class 5	Class 4	Class 1, 2, and 3	Class 1 and 2	None

Erosion Class

Erosion class groups:

Class 1 or 2	(slight or moderate)
Class 3	(severe)
Class 4	(very severe / gullied)

Guidelines

Similar soils:	Class 1 and Class 2 erosion
Dissimilar soils:	Adjacent groups; more severe erosion is limiting.
Very contrasting:	Skip a group

Erosion Class Table

Erosion Class	Similar	Dissimilar	Very Contrasting	Limiting
Class 1 or 2	None	Class 3 or 4	Class 4	Class 3 or 4
Class 3	None	Class 1 or 4	None	Class 4
Class 4	None	Class 1, 2 or 3	Class 1 or 2	None

Slope

Guidelines

Similar soils: Adjacent slope classes or slope ranges
Dissimilar soils: Skip a slope class or slope range; more sloping inclusions are limiting.
Very contrasting: Skip 2 or more slope classes or slope ranges

Slope Class Table

Slope Class	Slope Range	Similar	Dissimilar	Very Contrasting	Limiting
		Absolute Difference			
A	0 to 1	< 3	3	4	> 4
B	2 to 3	< 4	4	6	> 7
C	4 to 8	< 5	5	8	> 13
D	9 to 16	< 7	7	10	> 23
E or F	17 to 30	< 9	9	14	> 39
F or G	> 30	< 12	12	20	12% > upper slope limit

A component must have a slope which differs by the indicated Absolute Difference from the high or low slope of the map unit to be dissimilar.

Example 1. An area of 20% slopes is included in a map unit with a slope range of 6 - 12 %. Since the included area has slopes greater than the upper limit of the map unit slope range, compare the included area with the upper limit of the map unit slope range. The upper limit of the map unit slopes is 12% which fits within the 9-16% slope group. To be dissimilar, the included area must have at least 7% more slope (7% + 12% = 19%) than the map unit. The included area of 20 percent, therefore, is dissimilar. To be very contrasting, the included area must have at least 10% more slope (10% + 12% = 22%) than the map unit. The included area of 20%, therefore, is not very contrasting. Since the area is more sloping than the map unit range the included area is limiting.

Example 2. To compare 3% and 7% components, find the difference required for the LOWER slope component: 3% fits in the 2-3% group, which requires an absolute difference of 4% to be

dissimilar, so the 7% component IS dissimilar. However, the difference required for the UPPER slope component, which fits into the 4-8% group, is 5%. Therefore, the 3% component is not dissimilar to the 7% component.

Example 3: To compare slopes of 5-10% with slopes of 8-16%, compare the lower slopes for each component (5 & 8) and the upper slopes for each component (10 & 16). A slope of 5% requires a difference of 5, so 8% is not dissimilar. A slope of 10% requires a difference of 7, so 16% is not dissimilar. Therefore the areas of 8-16% slopes are not dissimilar.

Flooding Frequency

Flooding groups:
non-flooded
rare
common (frequent or occasional)

Guidelines

Similar soils: Frequent and occasional flooding
Dissimilar soils: Other flooding frequencies; more frequent flooding is limiting.
Very contrasting: Non-flooded and common flooding

Flooding Frequency Table

Flooding Frequency	Similar	Dissimilar	Very Contrasting	Limiting
Non-flooded		Rare, Occasional, Frequent	Occasional, Frequent	Rare, Occa-sional, Frequent
Rare		Non-flooded, Occasional, Frequent		Occasional, Frequent
Occasional	Frequent	Non-flooded, Rare	Non-flooded	
Frequent	Occasional	Non-flooded, Rare	Non-flooded, Rare	

Surface Calcium Carbonate Content

(NOTE: This property is expected to have more applicability in MO-10 than in MO-11)

Guideline

Well drained soils with 5% or more $CaC0_3$ (high value) in the surface layer are dissimilar to well drained soils with no calcium carbonate in the surface layer.

Slope Groups and Slope Percent

Recommended slope classes and the minimum and maximum slopes for each slope class.

Slope Class	Recommended min slope	Recommended max slope	SSM slope limits	Simple slope name	Complex slope name
A slope	0	3	0-3	Nearly level	Nearly level
B slope	0	8	1-8	Gently sloping	Undulating
C slope	4	15	4-16	Strongly sloping	Rolling
D slope	4	25	10-30	Moderately steep	Hilly
E slope	14	40	18-40	Steep	Steep
F slope	18	70	35-60	Steep	Steep
G slope	35	70	> 45	Very steep	Very steep

Questions and answers about slope

Q. Can we live with 1 set of slope breaks throughout the MLRA?
A. No. The documentation likely will not support a single set of slope breaks for the entire MLRA. However, the same soils on the same landform in the same MLRA could and should have the same slope breaks for sloping phases.

Q. Should slope breaks be the same on each landform?
A. Yes. All other things being equal, like landforms within the same MLRA should have the same slope phases.

Q, Should slope breaks be based on transect and research data?
A. Yes. This is the best source of information for establishing the slope ranges for map units. The adjustment of slope ranges based on available data must be weighed against other similar map unit slope ranges and against the users needs (or lack of needs) for making the adjustment.

Q. Should slope breaks be defined by geographical area?
A. Yes. This is not always possible, but as much as landforms can be defined geographically the corresponding slope ranges can also be defined geographically. End moraines and terminal moraines can be defined or displayed by a geographical area. The same can be said for ground moraines, outwash plains, dune fields, areas of loam till, silty clay till, etc. Geologic processes of transport and delivery have occurred in specific areas. These processes result in surface geomorphometry that lends itself to a certain set of soil slope phases.

Q. Should slope letter , slope range and terms be standardized?

A. Yes. Map units in the same MLRA and on the same landform should have standard slope letters, slope ranges, and slope terms. One area of concern is the more sloping units and the slope letter. Map units with slope range of 18 to 25 percent could be either an E slope or an F slope. The slope letter should be standard across the MLRA.

Q. Where does mapability come into the picture?
A. Slope ranges need to be mappable, meaning they are repeated on the same landform within the MLRA, or at least within a geographical area within the MLRA. This may become an issue when updating a survey area where a different set of slope groups were used by the original soil mappers. There may not always be a convenient conversion of slope phases from the old legend to the update soil survey legend.

Q. Should slope breaks be set at major breaks for interpretations?
A. Yes. As much as possible, slope breaks should not cross major interpretive breaks. A crossover of a few percent is not critical, but major interpretive breaks that occur in the mid-range of allowed map unit slopes could cause problems for some uses/users.

Q. Should the scale of base map be a consideration in setting slope ranges?
A. No. At scales of 1:12000 or 1:15840 the map units should be delineated using the same slope ranges. The tendency might be to map more slope phases or to map narrower slope ranges as the map scale increases.

GEOMORPHOLOGY/GEOLOGY

The Geomorphology/geology work group was established develop guidelines for use and standardization of geomorphic and geologic terms used in MLRA Region 11 so that the users of our soils information can understand our reports and soil descriptions across the region. The use of the recommended geomorphic and geologic terms will also provide for consistent application and use in soil survey manuscripts and in the coding used by various applications used in the cooperative soil survey, e.g. PEDON, MUG, NASIS Component Geomorphic Description, and soil survey manuscripts.

The original source document for the list of recommended landscape, landform and microfeature terms was the NSSH, Part 629, and its Exhibits (rev. 1996). The list of terms in attachment 5 include the original list of terms recommended by the work group and additional terms recommended by field soil scientists in Region 11. There are no terms on the recommended list in attachment 5 that are not in the current edition of NSSH, Part 629, and its Exhibits (rev. 2001).

To add a term not listed or recommended for use in Region 11, submit the proposed term to the Region 11 Soil Data Quality Specialist serving your region for consideration. Include a block diagram showing the landform and associated soils. If the term is not defined in the Glossary of Landform, NSSH Part 629, also include a proposed definition.