Part 647 – Soil Map Development

Subpart B – Exhibits

647.10 Soil Survey Geographic Data Certification

EXAMPLE – Modify to fit the survey.

SPATIAL DATA

1. Digitizing meets NRCS standards and specifications as described in section 647.4 of the National Soil Survey Handbook (NSSH).
2. Quality control included a _____ (100% edit by MLRA soil survey office, for example).
3. Quality assurance included_____ _____ _____[Edits by the MLRA regional office), for example].
4. Soil and survey boundaries are digitized within a _____ [0.01-inch (0.254-mm), for example] line width of the published or revised soil survey.
5. Where a soil area boundary line intersects a quadrangle boundary, the line matches the line in the adjoining quadrangle within 0.01 inch (0.254 mm) measured centerline to centerline.
6. Map data are stored in a _____ (vector, for example) format.
7. Map data have been uploaded to the Soil Data Warehouse for archiving.

ATTRIBUTE DATA

Database tables are current and accurate.

METADATA

The metadata template has been completed and uploaded to the Soil Data Warehouse for archiving.

I certify that the data have passed a 100 percent edit.

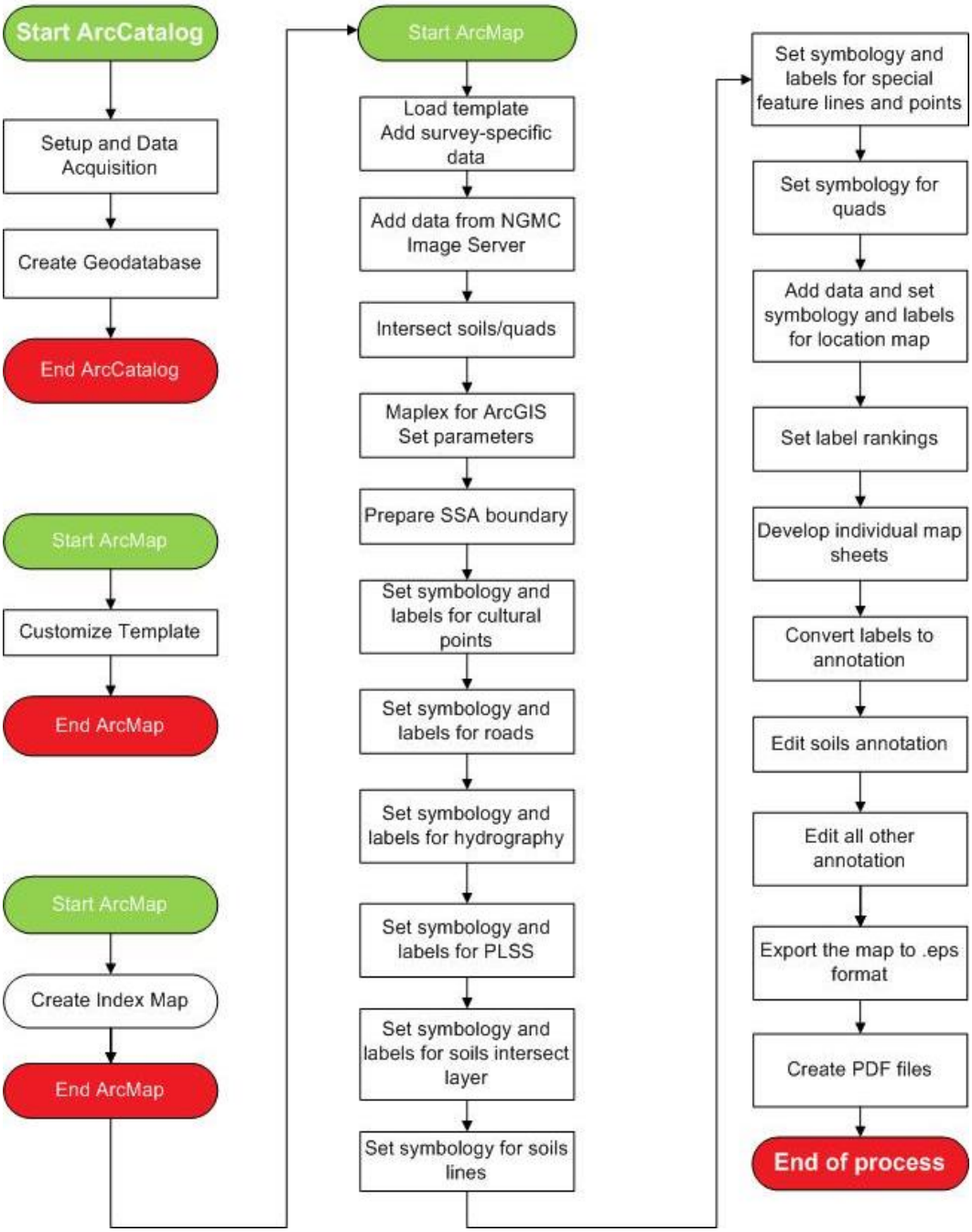
_____

Soil Survey Regional Director Date

_____

MLRA Regional Office Leader Date

647.11 Digital Map Finishing and Print-on-Demand Maps Flowchart



647.12 Digital Map Finishing and Print-on-Demand Maps Specifications

The new Digital Map Finishing and Print-On-Demand Maps (DMF–PODM) process uses ArcMap Version 9.3.1 with the Maplex for ArcGIS extension.

(Note: All measurements cited are approximate. Do not adjust these elements on the templates.)

DMF–PODM Template

Agency Name
Location: Upper left corner of map, 0.5 inch below map margin.
Text: color = black (R–0, G–0, B–0); font size = 10; font = Times New Roman (uppercase)

Soil Survey Area Name
Location: Upper right corner of map, 0.7 inch above map neat line and 0.5 inch below map margin. Also located in lower right corner of map, 0.5 inch below map neat line and 2.1 inches above map margin.
Text: color = black (R–0, G–0, B–0); font size = 10; font = Times New Roman (uppercase)

Quadrangle Name
Location: Upper right corner of map, 0.5 inch above map neat line and 0.7 inch below map margin.
Text: color = black (R–0, G–0, B–0); font size = 10; font = Times New Roman (uppercase)

Quadrangle Sheet Number
Location: Upper right corner of map, 0.3 inch above map neat line and 1 inch below map margin. Also located in lower right corner of map, 1 inch below map neat line and 1.7 inches above map margin.
Text: color = black (R–0, G–0, B–0); font size = 10; font = Times New Roman (uppercase)

Bar Scale Information
Three separate bar scales are located in the lower center of each map as follows:

- The first bar scale represents the mile increment, about 1 inch below the map neat line.
- The second bar scale represents the kilometer increment, 0.5 inch below the first scale.
- The third bar scale represents the foot increment, 0.5 inch below the second scale.

Map Scale Information
Location: Lower center of map below bar scales.
Map scale: 1:12,000, 1:24,000; other scales may be used in special circumstances
Text: color = black (R–0, G–0, B–0); font size = 10; font = Arial (uppercase)

Source Note Information
Location: Lower left corner of map, 0.2 inch below map neat line. Lower limit not to exceed 2.2 inches below map neat line (0.5 inch above map margin).
Text: color = black (R–0, G–0, B–0); font size = 8; font = Times New Roman (uppercase and lowercase)

Adjoining Sheet Names
Location: Four adjoining sheet names positioned at the map corners, at a 45-degree angle and within 0.25 inch from map neat line corner. Four additional adjoining sheet names (two parallel and two perpendicular) positioned at map centers and within 0.2 inch from map neat line.
Text: color = black (R–0, G–0, B–0); font size = 6; font = Arial (uppercase and lowercase)

State Coordinate Ticks and Values (optional)
Location: Along the map neat line in 1000-meter increments. Values oriented horizontally.
Text: color = black (R–0, G–0, B–0); font size = 6; font = Arial (uppercase)

Geographic Coordinate Ticks and Values

- The geographic coordinate values are indicated as latitude and longitude at each map corner.
- The coordinate values are 15-minute, 7.5-minute, or 3.75-minute. For 7.5-minute quadrangle format maps, coordinate values representing the 2.5-minute ticks are represented.

North Arrow
A north arrow is displayed between the source note and scale bar, 5.5 inches from the left side map neat line.

Soil Survey Area Information
Text: color = black (R–0, G–0, B–0); font size = 10; font = Times New Roman (uppercase)

Map Projection Information
- Universal Transverse Mercator (UTM), North American Datum of 1983 (NAD 83).
- World Geographic System Datum of 1984 (WGS 84).
- The digital map finishing template is set to UTM projection with GRS 80 spheroid and NAD 83 datum.

Index Map – Quadrangle Index
Location: At the bottom of the map, centrally between the scale bar and the soil survey area name.
Line Symbol: fill color = no color; outline color = black (R–0, G–0, B–0); line width = 0.4
Text: color = black (R–0, G–0, B–0); font size = 4 to 6; font = Arial (uppercase)

Data Layers

Geographic Area Names – Populated Places
Point Symbol: color = no color; size = 0
Text: color = black (R–0, G–0, B–0); font size = 8 to 10; font = Times New Roman (uppercase and lowercase)

Geographic Area Names – Non-Populated Places
Point Symbol: color = no color; size = 8
Text: color = black (R–0, G–0, B–0); font size = 8; font = Arial (uppercase and lowercase) or Times New Roman (uppercase and lowercase)

Hypsographic Features

Text: color = black (R–0, G–0, B–0); font size = 6 to 16; font = Arial (uppercase and lowercase)

Road Names

Text: color = black (R–0, G–0, B–0); font size = 7; font = Arial (uppercase)

Road Emblems
Line Symbol: color = no color
Text: For U.S. Interstate HWY: color = white (R–255, G–255, B–255); font size = 7; font = Arial bold (uppercase).

For U.S. Route HWY and State Route HWY: color = black (R–0, G–0, B–0); font size = 7; font = Arial bold (uppercase)

Hydrography Points/Lines
Point/Line Symbol: color = cyan (R–0, G–255, B–255); point size = 10; line width = 0.25 to 0.65
Text: color = cyan (R–0, G–255, B–255); font size = 6 to 16; font = Times New Roman italic (uppercase and lowercase)

PLSS
Line Symbol: line color = light green (R–170, G–255, B–0); fill color = no color; line width = 0.2

Text: color = light green (R–170, G–255, B–0); font size = 12; font = Arial (uppercase)

Soil Boundaries
Line Symbol: fill color = no color; outline color = black (R–0, G–0, B–0) or amber (R–255, G–190, B–0); line width = 0.5 to 1.0

Political/Administrative Boundaries
Location (Text): Parallel to the boundary line symbol, 0.2 inch above line. There is a 0.3-inch space between boundary name word components and a 1-inch space between county/parish or MLRA name and State name word components.
Line Symbol: fill color = no color; outline color = black (R–0, G–0, B–0); line width = 1.0
Text: color = black (R–0, G–0, B–0); font size = 8; font = Times New Roman (uppercase)

Political/Administrative Areas – Map Interior
Line Symbol: fill color = no color; outline color = black (R–0, G–0, B–0); line width = 1.0
Text: color = black (R–0, G–0, B–0); font size = 12; font = Times New Roman (uppercase)

Soil Labels (Soil Intersect Layer)
Line Symbol: fill color = no color; outline color = no color
Text: color = black (R–0, G–0, B–0) or amber (R–255, G–190, B–0); font size = 6 to 8 (default = 8); font = Arial (uppercase and lowercase)

Soil Leaders
Line Symbol: color = black (R–0, G–0, B–0); line width = 0.005 inch

Special Feature Points/Lines
Point/Line Symbol: color = magenta (R–255, G–0, B–200); point size = 10; line size = 8

Index Map – Quadrangle Index
Location: The bottom of the map, centrally between the scale bar and the soil survey area name.
Line Symbol: fill color = no color; outline color = black (R–0, G–0, B–0); line width = 0.4
Text: color = black (R–0, G–0, B–0); font size = 4 to 6; font = Arial (uppercase)

Index Map – Limit-of-Soil-Survey Boundary
Location: The bottom of the map, centrally between the scale bar and the soil survey area name.
Line Symbol: fill color = no color; outline = red (R–255, G–0, B–0); line width = 0

647.13 Digital Map Finishing Checklist

Soil Survey Area Name: _____
Publication Map Sheet Number_____ of _____
Field Sheet Numbers: _____
USGS Quadrangle Name: _____
Scale: 1:_____
UTM Zone _____and Datum_____

SW Corner Coordinate Values Lat.___/___/___, Long.___/___/___
Editor's Name: _____

Adjoining Sheet Number and Quadrangle Name:/Date Match Completed:
North:_____ _____
East:_____ _____
South:_____ _____
West:_____ _____
___ All features join from map to map

Marginalia
___ Join notes are present and correct
___ Range and township values are present and correct
___ Soil survey area title is correct and accurately placed
___ Publication sheet number is correct
___ Source note is accurate and correctly located

Culture
___ All cultural features appearing on the check maps are approved in Form NRCS–SOI–37A and are the correct symbol and line weight
___ All boundaries are indicated in the appropriate line symbol
___ All road emblems are correct and accurately placed
___ Section lines and numbers have been correctly indicated
___ All cultural features match the publication imagery

Hydrography
___ All hydrographic features appearing on the check maps are approved in Form NRCS–SOI–37A and are the correct symbol and line weight
___ All hydrographic features match the publication imagery
___ Hydrographic features do not coincide with other publication features
___ All lines are complete without skips or overshoots

Soils
___ Soil data is derived from a copy of the certified Soil Survey Geographic Database (SSURGO)
___ Soil labels are legible and placed horizontally where space permits
___ All soil lines are complete without skips or overshoots
___ All leaders are properly positioned to ensure correct association with the soil unit they represent
___ Soil lines and labels do not coincide with other features
___ All water polygons are labeled with the appropriate soil map unit label

Text
___ All text is correctly spelled and placed in the correct location

___ All text is in the appropriate font style and size for all named features

Materials

The following materials are available:

___ Check plots of each publication map with correct features
___ Index to publication maps
___ Final correlation document
___ All source material needed for review
___ Encapsulated postscript (.eps) files and PDFs
___ All DMF–PODM specifications have been adhered to (see part 647, subpart B, section 647.12, of the National Soil Survey Handbook)

647.14 Digital Map Finishing Certification

Soil Survey Area Name: _____

Digital Map Finishing

1. The map finishing was performed according to the NRCS specifications as described in part 647, subpart A, section 647.6, of the National Soil Survey Handbook (NSSH) and the Digital Map Finishing and Print-on-Demand Maps User Guide (2010).
2. The soil data are derived from the certified Soil Survey Geographic Database.
3. A 100 percent edit has been completed.

I certify that all of the above statements are true.

_____

Soil Survey Regional Director Date

647.15 Glossary

Ad hoc features	Ad hoc features are special surface soil features that are too small to delineate at the mapping scale but are large enough and contrasting enough to significantly influence use and management. Ad hoc features are not mapped when the feature they represent is a common component in the map unit. Features that are common components in the map unit should be named, described, and located on the landscape in the map unit description. When mapped, ad hoc features are represented as points or lines.
Annotation	Information or markings on a map for clarification, such as numbers, letters, symbols, and signs.
Approved symbols	Soil survey, cultural, and hydrographic features that have been approved and certified during progressive or final correlation.
Attribute	A characteristic of a geographic feature. Attribute data are linked or related to a feature by an identifier. For example, a soil symbol is linked to an attribute that describes the percentage of slope for the map unit area.
Base map	A map showing background reference information (landforms, roads, boundaries, etc.). Other data themes can be placed on top of the base map.
Coinciding features	Any features that occupy the same place in space.
Compilation	The production of a new map from existing maps, aerial photographs, surveys, new data, and other sources. The new map is generally a geodetically controlled map.
Compilation bases	Base maps, to which previously collected data is transferred, used for map finishing or digitizing. They are generally digital orthoimagery or rectified photographs.
Conventional features	Natural or manmade objects or situations that are represented graphically with standard symbols that are adopted by Federal mapping agencies. These features are referred to as cultural and hydrographic features.
Coordinate pair	A set of Cartesian coordinates describing the two-dimensional location of a point, line, or polygon feature in relation to the common coordinate system of the database.
Cultural features	Any feature created or modified by humans.
Digital	Of or relating to data in the form of numerical digits in binary form.
Digital Map Finishing and Print-on-Demand Maps (DMF–PODM)	A new digital map finishing process that uses ArcGIS/ArcMap and the Maplex extension.
Digital orthoimagery	An image in which individual parts have been shifted to correct displacements caused by tip, tilt, and relief.

Digital orthoimagery quadrangle	Maps prepared from high-resolution aerial photographs that are corrected to eliminate the displacements of perspective, camera tilt, and terrain relief. They are scale true, meet national map accuracy standards, and permit accurate linear or area measurements.
Digital Raster Graphic (DRG)	A raster image of a scanned USGS standard series topographic map.
Digitizing	The process of converting information shown on an analog map into a digital format of x and y coordinates for use in a computer.
Edge matching	An editing procedure which ensures that all features crossing adjacent map sheets have the same edge locations, attribute descriptions, and feature classes.
Export	The process of transferring data or software from one system to another system.
Feature	A representation of a geographic entity, such as a line, point, or polygon.
Field mapping imagery	Rectified or unrectified aerial photographs used for mapping soils or other land features in the field. Field mapping media is generally a paper print with a surface which will take pencil or ink. Sometimes referred to as field map sheet.
Field sheet	Any kind of map provided to field personnel for use in recording collected data. Generally, these are photographs of various kinds, including mosaics, unrectified and rectified digital orthoimagery graphs, and high- or low-altitude flights in varying formats, sizes, and scales.
Geodatabase	A container used to store, query, and manipulate spatial and attribute data.
Geographic information system (GIS)	A combination of software, hardware, data, and people used to input, store, manipulate, analyze, and display geographically referenced spatial and associated attribute information.
Geographic coordinates	A spherical coordinate system used to define the position of points on the Earth.
Georeference	The process of establishing the relationship between page coordinates on an analog map and known real-world coordinates.
Heads-up digitizing	Manual digitization by tracing a mouse or using a stylus over features displayed on a computer monitor.
Hydrography	The science of the measurement, description, and mapping of the surface water of the Earth.
Index map	Maps that show the location or coverage of other maps. Examples are the soil survey map sheet index and the USGS topographic quadrangle index.
Index to field map sheets	A map of a smaller scale on which is depicted the location of field map sheets. It is used for locating field map sheets and referencing the publication map sheets.

Label	A description of a feature.
Leaders	A short line pointing to a label. Used to lead the eye across a space too small or narrow to contain the label.
Limit of soil survey	A boundary that marks the extent of soil survey mapping in a soil survey area. A soil survey area is usually a county, but it may consist of multiple counties or parts of counties or coincide with other political boundaries, physiographic boundaries, or general land office survey sections.
Line	A set of ordered coordinates that represents the shape of a geographic entity too narrow to be displayed as an area.
Manual digitizing	The process of converting an analog map or other graphics display into a digital format with the use of a digitizing tablet and the manual entry of coordinates with a cursor.
Manuscript	Synonymous with document.
Map finishing	The final transfer of all map features to publication format by either manual (scribing) or digital (plotting) methods. The end products of the process are press-ready film negatives.
Metadata	Information about the content, quality, condition, and other characteristics of data.
NAIP	National Agriculture Imagery Program. It provides aerial digital orthoimagery to the Federal government and public. It is administered by the Farm Service Agency's Aerial Photography Field Office.
Neat line	The line surrounding or limiting the image area of the map.
Negative	Film containing an image in which the values of the original are reversed so that the dark areas appear light and vice versa.
Node	The beginning or ending location of a line; the location where lines connect or the location where lines intersect.
Nominal scale	The actual scale (with no rectification) at which photography is flown.
Planimetric map	A large-scale map in which all features are projected perpendicularly onto a horizontal datum plane so that horizontal distances can be measured on the map with accuracy.
Public Land Survey System (PLSS)	A method used in the United States to locate and identify land, particularly for titles and deeds of farm or rural land. Its basic units of area are the township and section.
Point	A single x, y coordinate for a geographic feature too small to be represented as an area or line.
Polygon	A closed area that is described by a string of coordinates that represent the boundary of the area. The beginning and ending points are the same. A series of attributes are usually assigned to the set of boundary coordinates that make up the unit.

Publication index	A map developed using a county highway map as a base which depicts the layout of a soil survey's map sheets; an index to map sheets for publication. It generally includes the publication sheet numbers that are referenced with topographic quadrangles and longitude and latitude graticules.
Raster	A regular grid or array of cells covering a spatial area. A raster is often viewed as consisting of rows and columns of grid cells.
Raster scanning	See Scanning.
Raster digitizing	See Scanning.
Resolution	The accuracy at which the location and shape of map features can be depicted for a given map scale.
Scale	The relationship between a distance on a map and the corresponding distance on the Earth.
Scanning	The process of using a device, generally referred to as a scanner, to capture a raster copy of a map in a digital bitmap or binary format and then saving the copy in a computer-readable file. This process is also an approach to convert black-and-white or color aerial photography into a digital format depicting up to 256 shades of gray or a nearly infinite number of color shades and hues.
Shaded Relief (Hillshade)	An elevation data (derivative) raster image showing a three-dimensional effect of elevation changes and a sense of visual relief for cartography.
Source document	Any document that is used as a source for providing information. For example, the source document for compilation is the field sheet. For scan digitizing, it is the overlay to which the compiled information has been transferred.
Special features	Symbols with unique definitions and uses that are standard to a specified group of users but that are not adopted by all mapping agencies. Examples of special features include those identified for soil survey and SSURGO on the legend on Form NRCS–SOI–37A.
Soil Survey Geographic (SSURGO) database	The most detailed in scale of the three NRCS soil geographic databases. Mapping is generally at scales of 1:12,000 or 1:24,000 but may range to 1:63,360. The database consists of georeferenced digital spatial data, metadata, and a tabular soil database, which gives the proportionate extent of the component soils and their properties for each map unit.
Soil area	A delineation of the mapped soil unit. It is identified by a symbol. A soil boundary depicts the limit of the soil area (a polygon).
Soil legend	A list of the soil map symbols and their names.
Spatial data	Data pertaining to the location of geographical entities together with their spatial dimensions. Spatial data are classified as point, line, and polygon.
Text	Any lettered information that appears on maps.

Topology	A procedure that uses lists of features for explicitly defining spatial relationships. For example, an area is defined by the chains (arcs) comprising its border.
United States National Cartographic Standards for Spatial Accuracy (NCSSA)	The standards that define spatial accuracy as it pertains to map products at scales of (NCSSA) 1:250,000 or larger produced by Federal agencies. They supersede the National Map Accuracy Standards (NMAS) issued June 10, 1941, and most recently revised on June 17, 1947, by the former U.S. Bureau of the Budget.
Vector	A line showing the direction and distance between vertices. A vertex is the termination or intersection of lines or curves.
Vector data	A form of digital data comprising x, y coordinate representations that are portrayed by points, lines (strings of points), or polygons (closed lines).
Vector digitizing	See Heads-up digitizing.

647.16 SSURGO Metadata Template

Identification_Information:
  Citation:
    Citation_Information:
      Originator: U.S. Department of Agriculture, Natural Resources
            Conservation Service
      Publication_Date: ___(1)___
      Title: Soil Survey Geographic (SSURGO) database for
      _____(2)_____
      Publication_Information:
        Publication_Place: Fort Worth, Texas
        Publisher: U.S. Department of Agriculture, Natural Resources
            Conservation Service
      Other_Citation_Details: __(2a)___
      Online_Linkage:
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2_053631
  Description:
    Abstract:
      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 digitizing
      maps, by compiling information onto a planimetric correct base
      and digitizing, or by revising digitized maps using remotely
      sensed and other information.

      This data set consists of georeferenced digital map data and
      computerized attribute data. The map data are in a soil survey area
      extent format and include a detailed, field verified inventory
      of soils and nonsoil areas that normally occur in a repeatable
      pattern on the landscape and that can be cartographically shown at
      the scale mapped. A special soil features layer (point and line
      features) is optional. This layer displays the location of features
      too small to delineate at the mapping scale, but they are large
      enough and contrasting enough to significantly influence use and
      management. The soil map units are linked to attributes in the
      National Soil Information System relational database, which gives
      the proportionate extent of the component soils and their
      properties.

    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.

    Supplemental_Information:
      Digital versions of hydrography, cultural features, and other
      associated layers that are not part of the SSURGO data set may be
      available from the primary organization listed in the Point of
      Contact.

Time_Period_of_Content:
  Time_Period_Information:
    Range_of_Dates/Times:
      Beginning_Date: ____(4)_____
      Ending_Date: ____(4a)____
  Currentness_Reference: publication date
Status:
  Progress: Complete
  Maintenance_and_Update_Frequency: As needed
Spatial_Domain:
  Bounding_Coordinates:
    West_Bounding_Coordinate: _______(5)_______
    East_Bounding_Coordinate: _______(6)_______
    North_Bounding_Coordinate: _______(7)_______
    South_Bounding_Coordinate: _______(8)_______
Keywords:
  Theme:
    Theme_Keyword_Thesaurus: None
    Theme_Keyword: soil survey
    Theme_Keyword: soils
    Theme_Keyword: Soil Survey Geographic
    Theme_Keyword: SSURGO
  Place:
    Place_Keyword_Thesaurus:
      Counties and County Equivalents of the States of the United
      States and the District of Columbia (FIPS Pub 6-3)
    Place_Keyword: ________(9)______

  Place:
    Place_Keyword_Thesaurus:
      Counties and County Equivalents of the States of the United
      States and the District of Columbia (FIPS Pub 6-3)
    Place_Keyword: ________(10)______

  Place:
    Place_Keyword_Thesaurus: USGS Topographic Map Names Data Base
    Place_Keyword: _____(11)_____
    Place_Keyword: _____(11)_____
    Place_Keyword: _____(11)_____
    Place_Keyword: _____(11)_____
    Place_Keyword: _____(11)_____
Access_Constraints: None
Use_Constraints:
  The U.S. Department of Agriculture, Natural Resources Conservation
  Service, should be acknowledged as the data source in products
  derived from these data.

  This data set is not designed for use as a primary regulatory tool
  in permitting or citing decisions, but may be used as a reference
  source. This is public information and may be interpreted by

organizations, agencies, units of government, or others based on needs; however, they are responsible for the appropriate application. Federal, State, or local regulatory bodies are not to reassign to the Natural Resources Conservation Service any authority for the decisions that they make. The Natural Resources Conservation Service will not perform any evaluations of these maps for purposes related solely to State or local regulatory programs.

Photographic or digital enlargement of these maps to scales greater than at which they were originally mapped can cause misinterpretation of the data. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale. The depicted soil boundaries, interpretations, and analysis derived from them do not eliminate the need for onsite sampling, testing, and detailed study of specific sites for intensive uses. Thus, these data and their interpretations are intended for planning purposes only. Digital data files are periodically updated. Files are dated, and users are responsible for obtaining the latest version of the data.

Point_of_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: U.S. Department of Agriculture, Natural Resources Conservation Service
Contact_Position:
Contact_Address:
Address_Type: mailing address
Address: _____(12)_____
City: _____(13)_____
State_or_Province: _____(14)_____
Postal_Code: _____(15)_____
Contact_Voice_Telephone: _____(16)_____
Contact_TDD/TTY_Telephone: 202 720 7808
Contact_Facsimile_Telephone: _____(17)_____
Cross_Reference:
Citation_Information:
Originator: U.S. Department of Agriculture, _____(18)_____
Publication_Date: _____(19)_____
Title: Soil Survey of _____(20)_____
Geospatial_Data_Presentation_Form: atlas
Other_Citation_Details:
This soil survey contains information that can be applied in managing farms and wetlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

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.

Data_Quality_Information:
Attribute_Accuracy:
Attribute_Accuracy_Report: Attribute accuracy is tested by manual comparison of the source with hard copy plots and/or symbolized display of the map data on an interactive computer graphic system. Selected attributes that cannot be visually verified on plots or on screen are interactively queried and verified on screen. In addition, the attributes are tested against a master set of valid attributes. All attribute data conform to the attribute codes in the signed classification and correlation document and amendment(s).

Logical_Consistency_Report:
Certain node/geometry and topology GT- polygon/chain relationships are collected or generated to satisfy topological requirements (the GT-polygon corresponds to the soil delineation). Some of these requirements include: chains must begin and end at nodes, chains must connect to each other at nodes, chains do not extend through nodes, left and right GT-polygons are defined for each chain element and are consistent throughout, and the chains representing the limits of the file are free of gaps. The tests of logical consistency are performed using vendor software. All internal polygons are tested for closure with vendor software and are checked on hard copy plots. All data are checked for common soil lines (i.e., adjacent polygons with the same label). Edge locations generally do not deviate from centerline to centerline by more than 0.01 inch. _____(20a)_____.

Completeness_Report:
A map unit is a collection of areas defined and named the same in terms of their soil and/or nonsoil areas. Each map unit differs in some respect from all others in a survey area and is uniquely identified. Each individual area is a delineation. Each map unit consists of one or more components.

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.

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, 1999, USDA, NRCS; and all Amendments; Keys to Soil Taxonomy, Soil Survey Staff,; National Soil Survey Handbook, title 430-VI.

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.

Consociations - Consociations are named for the dominant soil. In a consociation, delineated areas are dominated by a single soil taxon and similar soils. At least one half of the pedons in each delineation are of the same soil component so similar to the named soil that major interpretations are not affected significantly. The total amount of dissimilar inclusions of other components in a map unit generally does not exceed about 15 percent if limiting and 25 percent if nonlimiting. A single component of a dissimilar limiting inclusion generally does not exceed 10 percent if very contrasting.

Complexes and associations - Complexes and associations are named for two or more dissimilar components with the dominant component listed first. They occur in a regularly repeating pattern. The major components of a complex cannot be mapped separately at a scale of about 1:24,000. The major components of an association can be separated at a scale of about 1:24,000. In each delineation of either a complex or an association, each major component is normally present, though their proportions may vary appreciably from one delineation to another. The total amount of inclusions in a map unit that are dissimilar to any of the major components does not exceed 15 percent if limiting and 25 percent if nonlimiting. A single kind of dissimilar limiting inclusion usually does not exceed 10 percent.

Undifferentiated groups - Undifferentiated groups consist of two or more components that do not always occur together in the same delineation, but are included in the same named map unit because use and management are the same or similar for common uses. Every delineation has at least one of the major components and some may have all of them. The same principles regarding proportion of inclusions apply to undifferentiated groups as to consociations.

Minimum documentation consists of three complete soil profile descriptions that are collected for each soil added to the legend, one additional per 3,000 acres mapped; three 10 observation transects for each map unit, one additional 10 point transect per 4,000 acres.

A defined standard or level of confidence in the interpretive purity of the map unit delineations is attained by adjusting the kind and intensity of field investigations. Field investigations

and data collection are carried out in sufficient detail to name map units and to identify accurately and consistently areas of about ___(21)___ acres.

Positional_Accuracy:
Horizontal_Positional_Accuracy:
Horizontal_Positional_Accuracy_Report:
The accuracy of these digital data is based upon their compilation to base maps that meet National Map Accuracy Standards. The difference in positional accuracy between the soil boundaries and special soil features locations in the field and their digitized map locations is unknown. The locational accuracy of soil delineations on the ground varies with the transition between map units.

For example, on long gently sloping landscapes the transition occurs gradually over many feet. Where landscapes change abruptly from steep to level, the transition will be very narrow. Soil delineation boundaries and special soil features generally were digitized within 0.01 inch of their locations on the digitizing source. The digital map elements are edge matched between data sets. The data along each quadrangle edge are matched against the data for the adjacent quadrangle. Edge locations generally do not deviate from centerline to centerline by more than 0.01 inch.

Lineage:
Source_Information:
Source_Citation:
Citation_Information:
Originator: _____(22)_____
Publication_Date: ___(23)___
Title: _____(24)_____
Geospatial_Data_Presentation_Form: _____(25)_____
Publication_Information:
Publication_Place: _____(26)_____
Publisher: _____(27)_____
Source_Scale_Denominator: ___(28)___
Type_of_Source_Media: ___(29)___
Source_Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: ___(30)___
Source_Currentness_Reference: _____(31)_____
Source_Citation_Abbreviation: _____(32)_____
Source_Contribution: _____(33)_____
Source_Information:
Source_Citation:
Citation_Information:
Originator: _____(22)_____
Publication_Date: ___(23)___

```
        Title: _____(24)_____
        Geospatial_Data_Presentation_Form: _____(25)_____
        Publication_Information:
          Publication_Place: _____(26)_____
          Publisher: _____(27)_____
      Source_Scale_Denominator: ___(28)___
      Type_of_Source_Media: ___(29)___
      Source_Time_Period_of_Content:
       Time_Period_Information:
         Range_of_Dates/Times:
           Beginning_Date: ___(30a)___
           Ending_Date: ___(30b)___
       Source_Currentness_Reference: _____(31) _____
      Source_Citation_Abbreviation: _____(32)_____
      Source_Contribution: _____(33) _____
    Process_Step:
      Process_Description: _____(34) _____
      Source_Used_Citation_Abbreviation: _____(36)_____
      Process_Date: ___(35)___
    Process_Step:
      Process_Description: _____(34) _____
      Source_Used_Citation_Abbreviation: _____(36)_____
      Process_Date: ___(35)___
Spatial_Data_Organization_Information:
  Direct_Spatial_Reference_Method: Vector
Spatial_Reference_Information:
  Horizontal_Coordinate_System_Definition:
    Geographic:
      Latitude_Resolution: 0.0000001
      Longitude_Resolution: 0.0000001
      Geographic_Coordinate_Units: decimal degrees
    Geodetic_Model:
      Horizontal_Datum_Name: North American Datum of 1983
      Ellipsoid_Name: Geodetic Reference System 80
      Semi-major_Axis: 6378137.0
      Denominator_of_Flattening_Ratio: 298.257
Entity_and_Attribute_Information:
  Detailed_Description:
    Entity_Type:
      Entity_Type_Label: Special Soil Features
      Entity_Type_Definition:
        Special Soil Features represent soil, nonsoil, or landform
        features that are too small to be digitized as soil delineations
        (area features).
      Entity_Type_Definition_Source:
        U.S. Department of Agriculture. 1993. Soil Survey Manual.
        Soil Surv. Staff, U.S. Dep. Agric. Handb. 18.
    Attribute:
      Attribute_Label: Special Soil Features Codes
      Attribute_Definition:
        Special Soil Features Codes represent specific Special Soil
```

Features. These features are identified with a major code, a minor code, and a descriptive label. The codes and label are assigned to the point or line assigned to represent the feature on published maps.
Attribute_Definition_Source:
U.S. Department of Agriculture. 1993. Soil Survey Manual. Soil Surv. Staff, U.S. Dep. Agric. Handb. 18; U.S. Department of Agriculture. (current issue). National Soil Survey Handbook, title 430-VI, part 647. Soil Conserv. Serv.
Attribute_Domain_Values:
Codeset_Domain:
Codeset_Name:
Classification and Correlation of the Soils of _____(45)_____
Codeset_Source:
U.S. Department of Agriculture, Natural Resources Conservation Service

Overview_Description:
Entity_and_Attribute_Overview:
Map Unit Delineations are closed polygons that may be dominated by a single soil or nonsoil component plus allowable similar or dissimilar soils, or they can be geographic mixtures of groups of soils or soils and nonsoil areas.

The map unit symbol uniquely identifies each closed delineation map unit. Each symbol corresponds to a map unit name. The map unit key is used to link to information in the National Soil Information System tables.

Map Unit Delineations are described by the National Soil Information System database. This attribute database gives the proportionate extent of the component soils and the properties for each soil. The database contains both estimated and measured data on the physical and chemical soil properties and soil interpretations for engineering, water management, recreation, agronomic, woodland, range, and wildlife uses of the soil.

The National Soil Information System database contains static metadata. It documents the data structure and includes such information as what tables, columns, indexes, and relationships are defined as well as a variety of attributes of each of these database objects. Attributes include table and column descriptions and detailed domain information.

The National Soil Information System database also contains a distribution metadata. It records the criteria used for selecting map units and components for inclusion in the set of distributed data.

Special features are described in the feature table. It includes a feature label, feature name, and feature description for each

special and ad hoc feature in the survey area.

Entity_and_Attribute_Detail_Citation:
U.S. Department of Agriculture. 1999. Soil Taxonomy: A Basic System of Soil Classification for Making and Interpreting Soil Surveys. Natural Resources Conserv. Serv., U.S. Dep. Agric. Handbook. 436.

U.S. Department of Agriculture. (current issue). Keys to Soil Taxonomy. Soil Surv. Staff, Natural Resources Conserv. Serv.

U.S. Department of Agriculture. (current issue). National Soil Survey Handbook, title 430-VI. Soil Surv. Staff, Natural Resources Conservation Service.

U.S. Department of Agriculture. 1993. Soil Survey Manual. Soil Surv. Staff, U.S. Dep. Agric. Handb. 18.

Distribution_Information:
Distributor:
Contact_Information:
Contact_Organization_Primary:
Resource_Description: _____(46)_____ SSURGO
Distribution_Liability:
Although these data have been processed successfully on a computer system at the U.S. Department of Agriculture, no warranty expressed or implied is made by the Agency regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. The U.S. Department of Agriculture will warrant the delivery of this product in computer readable format, and will offer appropriate adjustment of credit when the product is determined unreadable by correctly adjusted computer input peripherals, or when the physical medium is delivered in damaged condition. Request for adjustment of credit must be made within 90 days from the date of this shipment from the ordering site.

The U.S. Department of Agriculture, nor any of its agencies are liable for misuse of the data, for damage, for transmission of viruses, or for computer contamination through the distribution of these data sets. The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.)

Standard_Order_Process:
Digital_Form:
Digital_Transfer_Information:
Format_Name: ARC/INFO coverage
Format_Information_Content: spatial
Transfer_Size: ___(48)___
Digital_Transfer_Option:

Offline_Option:
Offline_Media: CD-ROM
Recording_Format: ISO 9660 Level 1
Digital_Form:
Digital_Transfer_Information:
Format_Name: ARCE
Format_Information_Content: spatial
Transfer_Size: ___(48)___
Digital_Transfer_Option:
Offline_Option:
Offline_Media: CD-ROM
Recording_Format: ISO 9660 Level 1
Digital_Form:
Digital_Transfer_Information:
Format_Name: ArcView shapefile
Format_Information_Content: spatial
Transfer_Size: ___(48)___
Digital_Transfer_Option:
Offline_Option:
Offline_Media: CD-ROM
Recording_Format: ISO 9660 Level 1
Digital_Form:
Digital_Transfer_Information:
Format_Name: ASCII
Format_Information_Content: keys and attributes
Transfer_Size: ___(49)___
Digital_Transfer_Option:
Offline_Option:
Offline_Media: CD-ROM
Recording_Format: ISO 9660 Level 1
Fees:
The charge is $50 for a CD-ROM that contains one or more data sets. A data set is one soil survey area that includes both spatial and attribute data.

Ordering_Instructions:
Call or write to organizations listed under Distributor. Spatial line data and locations of special feature symbols are in ARC/INFO coverage and export formats, and ArcView shapefile format. The National Soil Information System attribute soil data are available in variable length, pipe delimited, ASCII file format.

Turnaround: 10 working days
Metadata_Reference_Information:
Metadata_Date: ___(51)___
Metadata_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: U.S. Department of Agriculture, Natural Resources Conservation Service
Contact_Position: State Soil Scientist

Contact_Address:
Address_Type: mailing address
Address: _____(53)_____
City: _____(54)_____
State_or_Province: __(55)__
Postal_Code: __(56)__
Contact_Voice_Telephone: _____(57)_____
Contact_Facsimile_Telephone: _____(58)_____
Metadata_Standard_Name: Content Standard for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

EXPLANATION OF METADATA TEMPLATE'S NUMBERED ELEMENTS

[Unless otherwise noted, all references refer to *Content Standards for Digital Geospatial Metadata* (Federal Geographic Data Committee. 1998. Washington, DC).]

Numbers in Identification Information Section

1 *Publication Date.*—The date when the data set is published or otherwise made available for release. Enter the year the data are submitted for archiving and distribution. Enter the year in the date format YYYY. Reference is from p. 53, sec. 8.2. Example:

Publication Date: 1994

2 *Title.*—The name by which the data set is known. Enter the complete name of the soil survey area as defined in the memorandum of understanding. Reference is from p. 53, sec. 8.4. Example:

Title: Polk County, Iowa

2a *Other Citation Details.*—The non-MLRA soil survey area symbol. Enter the non-MLRA soil survey area symbol as defined in Title 430, National Soil Survey Handbook Part 608, Subpart A, Section 608.2. Reference is from p. 54, sec. 8.9. Example:

Other Citation Details: IA153

4 *Beginning Date.*—The first year of the event. Enter the year in the date format YYYYMMDD. Reference is from p. 56, sec. 9.3.1. Example:

Beginning Date: 19980601

4a *Ending Date.*—The last year of the event. Enter the year in the date format YYYYMMDD. Reference is from p. 56, sec. 9.3.1. Example:

Ending Date: 20080930

Bounding Coordinates.—The limits of coverage of a data set expressed by latitude and longitude values in the order westernmost, easternmost, northernmost, and southernmost. The bounding coordinates are for the soil survey area.

5 *West Bounding Coordinate.*—The westernmost coordinate of the limit of coverage expressed in longitude. Enter the coordinate in decimal degrees. Reference is from p. 5. Example:

West Bounding Coordinate: –93.750

6 *East Bounding Coordinate.*—The easternmost coordinate of the limit of coverage expressed in longitude. Enter the coordinate in decimal degrees. Reference is from p. 5. Example:

East Bounding Coordinate: –93.250

7 *North Bounding Coordinate.*—The northernmost coordinate of the limit of coverage expressed in latitude. Enter the coordinate in decimal degrees. Reference is from p. 5. Example:

North Bounding Coordinate: 41.750

8 *South Bounding Coordinate.*—The southernmost coordinate of the limit of coverage expressed in latitude. Enter the coordinate in decimal degrees. Reference is from p. 5. Example :

South Bounding Coordinate: 41.375

9 *Place Keyword.*—The name of the State that the data set is in. Enter multiple States as separate entries. Reference is from p. 7. Example:

Place Keyword: Nevada
Place Keyword: Utah

10 *Place Keyword.*—The name of the county that the data set is in. Enter multiple counties as separate entries. Reference is from p. 7. Example:

Place Keyword: Rains County
Place Keyword: Hopkins County

11 *Place Keyword.*—The name of the quadrangle in the data set. Enter the USGS quadrangle name from the National Topographic Map Names database. The quadrangle numbers are available from the SSURGO Support Section, National Geospatial Management Center. The quadrangle names and numbers are also in the NASIS Area table where Area Type Name equals "USGS 7.5 Minute Quadrangles." Enter all quadrangles that make up the soil survey area and enter each as a separate entry. Reference is from p. 7. Example:

Place Keyword: Pleasantville Quadrangle (s4109338)
Place Keyword: Hartford Quadrangle (s4109337)

12 *Address.*—The address line. Reference is from p. 59, sec. 10.4.2. Example:

Address: 210 Walnut Street, Suite 693

13 *City.*—The city of the address. Reference is from p. 59, sec. 10.4.3. Example:

City: Des Moines

14 *State or Province.*—The State or province of the address. Reference is from p. 59, sec. 10.4.4. Example:

State or Province: Iowa

15 *Postal Code.*—The ZIP or other postal code of the address. Reference is from p. 59, sec. 10.4.5. Example:

Postal Code: 50309–2180

16 *Contact Voice Telephone.*—The telephone number by which individuals can speak to the organization or individual. Reference is from p. 59, sec. 10.5. Example:

Contact Voice Telephone: 402 437 5499

17 *Contact Facsimile Telephone*.—The telephone number of a facsimile machine of the organization or individual. Reference is from p. 60, sec. 10.7. Example:

Contact Facsimile Telephone: 402 437 5336

18 *Originator*.—The name of an organization that developed the data set. This is the name from the published document. Reference is from p. 53, sec. 8.1. Example:

Originator: Natural Resources Conservation Service or Originator: Soil Conservation Service

19 *Publication Date.*—The date when the data set is published or otherwise made available for release. Enter the year the data is submitted for archiving and distribution. Enter the year in the date format YYYY. Reference is from p. 53, sec. 8.2. Example:

Publication Date: 1994

20 *Title.*—The name by which the data set is known. Enter the complete name of the soil survey area as defined in the memorandum of understanding. Reference is from p. 53, sec. 8.4. Example:

Title: Polk County, Iowa

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:

The quadrangles in this soil survey are not edge matched to quadrangles in adjacent soil surveys.

The quadrangles in this soil survey are edge matched to quadrangles in adjacent soil surveys.

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.

Feature edges and descriptive attributes of quadrangles in this soil survey are matched to those in adjacent soil surveys. Feature labels do not match.

21 *Minimum Size Delineation.*—The minimum size of map unit delineation as defined in the memorandum of understanding for the data set. Enter the size in acres. Example:

2

Numbers in Data Quality Information Section

The Spatial Data Transfer Standard Data Quality Report consists of five parts covering lineage, positional accuracy, attribute accuracy, logical consistency, and completeness. The Data Quality Report is presented in part 1, section 3 of the Spatial Data Transfer Standard.

22 *Originator*.—The name of an organization or individual that developed the data set. Reference is from p. 53, sec. 8.4. Example:

Originator: U.S. Geological Survey

23 *Publication Date.*—The date when the data set is published or otherwise made available for release. Enter the year in the date format YYYY. Reference is from p. 53, sec. 8.2. Example:

Publication Date: 1983

24 *Title.*—The name by which the data set is known. Reference is from p. 53, sec. 8.4. Example:

Title: Soil Survey of Polk County, Iowa

25 *Geospatial Data Presentation Form.*—The mode in which the geospatial data is presented. Reference is from p. 54, sec. 8.6. Example:

Geospatial Data Presentation Form: Topographic quadrangle map

26 *Publication Place.*—The name of the city and State where the data set was published or released. Reference is from p. 54, sec. 8.8.1. Example:

Publication Place: Reston, Virginia

27 *Publisher.*—The name of the individual or organization that published the data set. Reference is from p. 54, sec. 8.8.2. Example:

Publisher: U.S. Geological Survey

28 *Source Scale Denominator.*—The denominator of the representative fraction on a map. Reference is from p. 13, sec. 2.5.1.2. Example:

Source Scale Denominator: 12000

29 *Type of Source Media.*—The medium of the source data set. Reference is from p. 13, sec. 2.5.1.3. Example:

Type of Source Media: Stable-base material

Single Date/Time.—This is a single element and must be followed with the element Calendar Date.

30 *Calendar Date.*—The year. Enter the year in the date format YYYY. Reference is from p. 56, sec. 9.1.1. Example:

Calendar Date: 1960

Range of Dates/Times.—This is a compound element and must be followed with the elements Beginning Date and Ending Date.

30a *Beginning Date.*—The first year of the event. Enter the year in the date format YYYY. Reference is from p. 56, sec. 9.3.1. Example:

Beginning Date: 1989

30b *Ending Date.*—The last year for the event. Enter the year in the date format YYYY. Reference is from p. 56, sec. 9.3.1. Example:

Ending Date: 1992

31 Source Currentness Reference.—The basis on which the source time period of content information of the source data set is determined. Reference is from p. 14, sec. 2.5.1.4.1. Example:

Source Currentness Reference: Publication date

32 *Source Citation Abbreviation.*—The short-form alias for the Source Citation. Reference is from p.14, sec. 2.5.1.5. Example:

Source Citation Abbreviation: NRCS1

33 *Source Contribution.*—A brief statement identifying the information contributed by the source to the data set. Reference is from p. 14, sec. 2.5.1.6. Example:

Source Contribution: Digitizing source

34 *Process Description.*—An explanation of the event and related parameters or tolerances. Reference is from p. 14, sec. 2.5.2.1.

35 *Process Date.*—The date when the event was completed. Enter the year in the date format YYYY. Reference is from p. 14, sec. 2.5.2.3. Example:

Process Date: 1993

36 *Source Used Citation Abbreviation.*—The source citation abbreviation of a data set used in the processing step. Reference is from p. 14, sec. 2.5.2.2. Example:

Source Used Citation Abbreviation: NRCS1

Numbers in Spatial Reference Information Section

45 *Codeset Name.*—The name of the soil survey area as it appears in the title of the soil classification and correlation document. Example:

Codeset Name: Polk County, Iowa

Numbers in Distribution Information Section

46 *Resource Description.*—The identifier by which the distributor knows the data set. Reference is from p. 43, sec. 6.2. Example:

Resource Description: Polk Country, Iowa SSURGO

48 *Transfer Size.*—The size, or estimated size, of the transferred data set in megabytes. This is the sum for all DLGs in the data set. Reference is from p. 45, sec. 6.4.2.1.7. Example:

Transfer Size: 14.4

49 *Transfer Size.*—The size, or estimated size, of the transferred data set in megabytes. This is the sum for all attribute tables in the data set. Reference is from p. 45, sec. 6.4.2.1.7. Example:

Transfer Size: 0.4

Numbers in Metadata Reference Information Section

51 *Metadata Date.*—The date that the metadata were created or last updated. Enter the date in the format YYYYMMDD. Reference is from p. 50, sec. 7.1. Example:

Metadata Date: 19940311

53 *Address.*—The address line. Reference is from p. 59, sec. 10.4.2. Example:

Address: 210 Walnut Street, Suite 693

54 *City.*—The city of the address. Reference is from p. 59, sec. 10.4.3. Example:

City: Des Moines

55 *State or Province.*—The State or province of the address. Reference is from p. 59, sec. 10.4.4. Example:

State or Province: Iowa

56 *Postal Code.*—The ZIP or other postal code of the address. Reference is from p. 59, sec. 10.4.5. Example:

Postal Code: 50309-2180

57 *Contact Voice Telephone.*—The telephone number by which individuals can speak to the organization or individual. Reference is from p. 59, sec. 10.5. Example:

Contact Voice Telephone: 402 437 5499

58 *Contact Facsimile Telephone.*—The telephone number of a facsimile machine of the organization or individual. Reference is from p. 60, sec. 10.7. Example:

Contact Facsimile Telephone: 402 437 5336