MANUSCRIPT GUIDANCE FOR MO9

JANUARY 2007

Contents

Note: Manuscript development guidance and other reference materials will be posted at http://www.tx.nrcs.usda.gov/soil/mo9.html

Overview

This guidance provides basic information on manuscript preparation for initial and update soil surveys, which will also be relevant for special project surveys. It is subject to change.

Initial soil surveys
At present, the final product for initial surveys includes 50 bound books, 1,000 CDs, and posting to the Web Soil Survey as a complete document. The content will include information that is similar to those traditional books of the past. The checklist for initial manuscripts is provided in this document.

Update soil surveys
At present, the final product for update surveys will be posted to Web Soil Survey. CDs will be furnished if needed. Our goal is to streamline the process for those in the field. There is a separate checklist for update manuscripts.

MLRA write-ups in the Use and Management (U&M) section
Only those special sections relevant to your survey are needed. We are shifting from county-wide special section write-ups to MLRA-specific ones. Project leaders should schedule specialists to write the relevant sections for the specific MLRA for inclusion in the manuscript. Special sections include rangeland, forestland, wildlife habitat, urban development, etc. The MO9 Geomorphologist will be writing MLRA specific sections as well. If a specialist is not available, see past surveys for examples of write-ups, and copy and edit as needed. The MO editors can assist with these write-ups.

Some original and prewritten material
There is some original material that is required to be submitted. Some of these sections have "fill in the blanks," and other sections are examples of the kind of material needed for the section. Also, there is a discussion of needed prewritten material.

Checklists
The checklists will help you compile the information needed to develop an initial or update manuscript. Each section of the manuscript is identified and specific items are addressed that need to accompany the manuscript when it is delivered to the MO9 editor.

Manuscript tables
The list of manuscript tables identifies the NASIS reports available and the sections within the manuscript that these tables will be referenced. NASIS reports will be formatted as tables and used in initial manuscripts. Local reports will be used for certain sections and are identified. Templates are available for the lab tables.

MO9 Manuscript Procedures for Initial and Update Soil Surveys

•Finish transects, complete pedon descriptions, gather lab data, etc.

•Populate NASIS following MO9 instructions

Use Check reports (includes MO9 validations, queries, and reports) to check your data

The following are some NASIS Check reports you may want to use:

- Chemical data
- Component surface fragments
- Geomorphic properties
- Sieves, AASHTO, Unified, RV only, normal sort

The following are some NASIS FOTG reports you may want to use:

- Generated nontechnical soils descriptions
- Hydric soils list(s) with natural conditions
- Official spreadsheet
- T factor validation check

The following are some NASIS UTIL reports you may want to use:

- RUSLE2
- Runoff data

•Generate the map units using the MO9 MUG. Populate blanks and edit fields.

•Print NASIS interpretations reports (tables) to check your data.

Save as MS Word document. If you make any edits to the generated map unit file, please track these changes.

•Compare detailed map unit descriptions (MUDs) to taxonomic unit descriptions (TUDs), or OSDs if you are using them.

Update Range in Characteristics in the TUDs/OSDs

•Compare TUDs to OSDs

Check and recheck classification of TUDs

Update OSDs and submit to SDQS for revisions

IF YOU HAVE ANY QUESTIONS OR CONCERNS, PLEASE CONTACT YOUR MO9 EDITORIAL STAFF.

Initial Manuscript Checklist

January 2007

Parts of the Manuscript:

_____Introduction

_____General Nature of the Area, which includes: history, agriculture, natural resources, transportation, climate (**all are optional in initials and updates except Climate**)

_____General Soil Map Units (**Optional in updates**)

_____Detailed Soil Map Units (for MO9 offices, use MO9 MUG)

_____Use and Management (Use sections only if they are relevant to your area. MLRA specific write-ups are preferred. County-wide write-ups are okay in initials.)

_____ Prime Farmland

_____ Crops and Pasture

_____ Rangeland

_____ Forestland

_____ Gardening and Landscaping

_____ Wildlife Habitat

_____ Urban Development

_____ Recreation

_____ Hydric Soils (provided by editors)

_____ Other sections

_____Taxonomic Unit Descriptions, or link to OSDs, if OSDs are your typifying pedons

_____Formation of the Soils

_____ Factors of Soil Formation (author written **or** editors can provide)

_____ Processes of Horizon Differentiation (**Optional**)

_____ Surface Geology (schedule with MO9 Geomorphologist)

_____Edited Prewritten Material (see **Original and Prewritten Material** information needed by MO9 editors)

_____General Soil Map (develop from digital data) (**Optional in updates**)

_____Block Diagrams (digital or hand drawn) (**Optional in updates**)

_____Photos of landscapes and profiles **with captions** (original slides/photos or scanned slides/photos or digital photos)

_____3-D Diagrams of map unit/landscape relationships (**Optional**)

_____References

Initial Manuscript Checklist—Continued
January 2007

_____Electronic NASIS tables (make choice from the national and some selected state manuscript tables; list is included in guidance)

_____Lab tables (use the Excel template included in guidance)

_____Climate tables (provided by editors)

_____Glossary (provided by editors)

_____Send electronic files and other materials to the MO office for technical and English edit. The manuscript text should be in Word (special formatting and coding is not necessary).

Update Manuscript Checklist

January 2007

Parts of the Manuscript:

_____Introduction

_____Climate section and tables (provided by editors)

_____General Soil Map Units (**Optional**)

_____Detailed Soil Map Units (for MO9 offices use MO9 MUG)

_____Use and Management (provide relevant MLRA sections for crops and pasture, rangeland, wildlife, woodland, urban development, etc.)

_____Taxonomic Unit Descriptions, or a link to the OSDs, if OSDs are your typifying pedons

_____Formation of the Soils

_____Factors of Soil Formation (author written or provided by editors)

_____Processes of Horizon Differentiation (**Optional)**

_____Surface Geology (schedule with MO9 Geomorphologist for an MLRA write-up)

_____Prewritten material (See **Original and Prewritten Material** information needed by MO9 editors)

_____Photos of landscapes and profiles **with captions** (original slides/photos or scanned slides/photos or digital photos)

_____3-D diagrams describing map unit relationships (**Optional**)

_____References

_____Electronic NASIS tables (make choices from the national and some selected local manuscript tables; list is included in guidance)

_____Lab tables (use the Excel template included in guidance)

_____Glossary (provided by editors)

_____Send electronic files and other materials to the MO office for technical and English edit. The manuscript text should be in Word (special formatting and coding is not necessary).

List of Manuscript Tables

January 2007

(Report names and choices are subject to change)

Not all tables listed are applicable to your survey. Most come from the named NASIS report and are highlighted in yellow. Local reports are in green. Those that are not NASIS derived are noted with an asterisk*. Those items in BOLD are titles of sections in the manuscript in which the tables are first referenced.

General Nature of the Survey Area
Climate
- *Temperature and Precipitation
- *Freeze Dates in Spring and Fall
- *Growing Season

Detailed Soil Map Units
- Acreage and Proportionate Extent of the Soils

Use and Management
Crops and Pasture
Yields per acre Choose one (whether it is by map unit or by component depends on where you populate these)
- Irrigated and Nonirrigated Yields by Map Unit
- Irrigated and Nonirrigated Yields by Map Unit Component
- Irrigated Yields by Map Unit
- Irrigated Yields by Map Unit Component
- Nonirrigated Yields by Map Unit
- Nonirrigated Yields by Map Unit Component

Prime Farmland
- Prime Farmland and other Important Farmlands (delete the reference to other important farmlands unless you populate them)

Agricultural waste management
- Agricultural Disposal of Manure, Food-Processing Waste, and Sewage Sludge
  - Application of manure and food-processing waste
  - Application of sewage sludge
- Agricultural Disposal of Wastewater by Irrigation and Overland Flow
  - Disposal of wastewater by irrigation
  - Overland flow of wastewater
- Agricultural Disposal of Wastewater by Rapid Infiltration and Slow Rate Treatment
  - Rapid infiltration of wastewater
  - Slow rate treatment of wastewater

Rangeland
- Rangeland Productivity

Forestland Productivity and Management
Forest Productivity
- Forestland Productivity

List of Manuscript Tables—Continued

January 2007

Forestland Management

- Damage by Fire and Seedling Mortality on Forestland
    - Potential for damage to soil by fire
    - Potential for seedling mortality
- Haul Roads, Log Landings, and Soil Rutting on Forestland
    - Limitations affecting construction of haul roads and log landings
    - Suitability for log landings
    - Soil rutting hazard
- Hazard of Erosion and Suitability for Roads on Forestland
    - Hazard of off-road or off-trail erosion
    - Hazard of erosion on roads and trails
    - Suitability for roads (natural surface)
- Forestland Planting and Harvesting
    - Suitability for hand planting
    - Suitability for mechanical planting
    - Suitability for use of harvesting equipment
- Forestland Site Preparation
    - Suitability for mechanical site preparation (surface)
    - Suitability for mechanical site preparation (deep)

Windbreaks and Environmental Plantings

- Windbreaks and Environmental Plantings

Recreational Development

- Camp Areas, Picnic Areas, and Playgrounds
    - Camp areas
    - Picnic areas
    - Playgrounds
- Paths, Trails, and Golf Fairways
    - Paths and trails
    - Off-road motorcycle trails
    - Golf fairways

Wildlife Habitat (use local reports for the wildlife tables)

- WLF-1—Wildlife habitat w/fuzzy rating
    - Grain and seed crops for food and cover
    - Domestic grasses and legumes for food and cover
    - Irrigated grain and seed crops for food and cover
- WLF-2—Wildlife habitat w/fuzzy rating
    - Irrigated domestic grasses and legumes for food and cover
    - Desertic herbaceous plants
    - Burrowing mammals and reptiles

List of Manuscript Tables—Continued

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List of Manuscript Tables—Continued
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Water Management
- Ponds and Embankments
  - Pond reservoir areas
  - Embankments, dikes, and levees
  - Aquifer-fed excavated ponds

Water Management (use the following local reports)
- WMS-2 Water Management w/fuzzy ratings
  - Constructing grassed waterways and surface drains
  - Constructing terraces and diversions
  - Tile drains and underground outlets
- WMS-3 Water Management w/fuzzy ratings
  - Irrigation, all application methods

Engineering Soil Properties
- Engineering Properties

Physical Soil Properties
- Physical Soil Properties with Permeability

Chemical Soil Properties
- Chemical Soil Properties

Water Features
- Water Features

Soil Features
- Soil Features

Physical and Chemical Analyses of Selected Soils (use the Excel template)
- *Physical Analyses of Selected Soils
- *Chemical Analyses of Selected Soils
- *Clay Mineralogy

Engineering Index Test Data (use the Excel template)
- *Engineering Index Test Data

Classification of the Soils
- Taxonomic Classification of the Soils

NOTE: Additional tables will be added when they are available

Original and Prewritten Material (Required)

The following is prewritten material provided by NCSS, the information is required in all manuscripts. Please fill in the blank spaces and submit with your manuscript.

Foreword

Major fieldwork for this soil survey was completed in (year)____. Soil names and descriptions were approved in (year)____. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in (year)____. This survey was made cooperatively by the Natural Resources Conservation Service and the Texas Agricultural Experiment Station. The survey is part of the technical assistance furnished to the ______________________________ Soil and Water Conservation District.

Introduction (Provide a detailed introduction. Other surveys can serve as examples.)

Soil Survey of ____________County, Texas

By

Fieldwork by

Crockett County is in the southwestern part of Texas. It is bounded on the west by the Pecos River, which separates it from Terrell and Pecos Counties. On the north, it borders Crane, Upton, Reagan, and Irion Counties. Schleicher and Sutton Counties are to the east, and Val Verde County borders it on the south. The county is semi-rectangular and measures about 85 miles from west to east and about 54 miles from north to south. It has an area of 2,808 square miles, or about 1,795,859 acres.

Crockett County is on the western edge of the Edwards Plateau Major Land Resource Area. The land surface consists of deep, narrow, steep-walled canyons and flat mesas in the southern and western areas and broad valleys and flat divides in the northern part. The northeastern part is a large flat divide separating the Colorado and Rio Grande River Basins. Elevations range from 1,824 to 3,958 feet above sea level.

The major drainage system of Crockett County is the Pecos River, which forms the western boundary. Johnson's Run and Howard Draw bisect the central part of the county before reaching the Devils and Pecos Rivers in Val Verde County to the south. Live Oak Creek, in the western part of the county, reaches the Pecos River at Ft. Lancaster. Buckhorn Draw in the northeastern part, flows into Sutton County and enters the Devils River.

The major land use in Crockett County is rangeland. Raising sheep, Angora goats, and cattle provides the majority of the range economy, which is supplemented by the oil and gas industry and hunting leases.

Soil Survey of ____________ Parish, Louisiana

By

Fieldwork by

Terrebonne Parish is in the southern part of Louisiana. It has a total area of 1,034,100 acres of which 875,100 acres is land and 159,000 acres is large water areas in the form of lakes, bays, and streams. The parish is bordered by Lafourche Parish on the north and east, the Gulf of Mexico on the south, and by Assumption and St. Mary Parishes on the west.

Houma is the parish seat and is located about 40 miles southeast of New Orleans. The 2000 population of Terrebonne Parish totaled 104,503 and is mostly centered along Bayou Terrebonne and Grand Caillou Bayou. The parish is chiefly rural and extends into the broad, coastal marshes of the Gulf of Mexico. Presently, urban development is expanding, and areas of the marshes and swamps are decreasing.

Terrebonne Parish lies entirely within the south-central region of the Mississippi River Delta Plain. It is made up of two Major Land Resource Areas (MLRA's). MLRA 131, the Southern Mississippi Valley Alluvium, makes up about 24 percent of the area. MLRA 151, the Gulf Coast Marsh, makes up the remaining 76 percent of the parish. The soils of the natural levees formed in sediments deposited by former channels of the Mississippi River and its distributaries on the Atchafalaya and Lafourche Delta Complex. Loamy soils are dominant on the high and intermediate parts of the natural levees, and clayey soils are dominant on the lower parts of the natural levees and in backswamps. The loamy soils, and the clayey soils that rarely flood, make up about 9 percent of the total land area of the parish. They are used mainly for cropland and urban and industrial purposes. A few areas are in pasture and woodland. The clayey soils on the lowest parts of the landscape are subject to occasional or frequent flooding and make up about 6 percent of the total land area of the parish. They are used mainly for timber production, pasture, recreation, and wildlife habitat. Some narrow, loamy, natural levee ridges in the southeastern and east-central parts of the parish extend south into the Gulf Coast Marsh. These areas are subject to occasional flooding during tropical storms and are used mainly as camps, homesites, and for activities associated with the seafood industry.

The remaining 85 percent of the land area of Terrebonne Parish consists mainly of ponded, frequently flooded, and very frequently flooded, mucky and clayey, fluid soils in marshes and swamps. These areas are used mainly as habitat for wetland wildlife and for recreation. Some acreage of former marshes and swamps have been protected, pumped-off, and drained and are used as pasture or for urban use. Elevations range from about 14 feet above mean sea level along the natural levee of Bayou Terrebonne in the northern part of the parish, to about 5 feet below sea level in the former marshes and swamps that have been drained.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

This soil survey updates the survey of Terrebonne Parish, Louisiana, published in February, 1960 (USDA, 1960). This survey provides more detailed soil survey maps and contains more interpretative information.

How This Survey Was Made (If this fits your survey, we will use it. If it does not adequately explain your procedures, provide additional information under the title “Survey Procedures” as seen in examples below.)

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Survey Procedures—____________ County, TX

Before fieldwork for this soil survey began, preliminary boundaries of slopes and landforms were plotted stereoscopically on aerial photographs. Soil scientists studied U.S. Geological Survey topographic maps and photographs, relating land and image features.

The soil scientists made traverses by truck on the existing network of roads and trails. Where there were no roads or trails, traverses were made on foot. Soil examinations along the traverses were made about 50 to 1,000 yards apart, depending on the landscape and soil pattern. The soil was examined with the aid of a hand auger, spade, or power probe to a depth of 5 to 7 feet or to bedrock within a depth of 7 feet. Many typical pedons were observed and studied in small pits that were dug by hand. Observations of landforms, geology, vegetation, road cuts, excavations, and animal burrows were made continuously without regard to spacing. Soil boundaries were determined on the basis of soil examinations, observations, and photo interpretation.

The soil scientists transected some of the map units to determine the composition of the units and record the kind of vegetation. They chose at least three delineations of each transected map unit to be representative of the unit. At least 10 observations 40 to 300 feet apart were made for most transects.

Samples for most of the engineering index test data in table 17 were taken from the sites of typical pedons of the major soils in the county. The analyses in table 17 were made by the Texas State Department of Highways and Public Transportation, Austin, Texas.

After completion of the soil mapping, map unit delineations were transferred by hand to high-altitude aerial photographs at a scale of 1:24,000. Surface drainage and cultural features were transferred from 7 1/2-minute U.S. Geological Survey topographic maps and were recorded from visual observations in the field. Data on soil interpretations were assembled from a variety of sources, such as research, farm records, field experience, laboratory data, and consultation with state and local specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from the results of consultation with local farmers and field or plot experiments. After the soils had been described, delineated, named, analyzed, and interpreted, the information was organized so that it can be used by farmers, ranch managers, engineers, planners, developers, builders, homebuyers, and others.

Survey Procedures—___________ County, Texas

Careful study of the original soil survey of Lynn County was made along with many field observations, before major fieldwork for this soil survey began. From these field observations soil scientists were able to determine where map units in the original survey would remain unchanged, which map units should be eliminated, and which new map units should be added to the update of the Lynn County Soil Survey. Soil scientists studied U.S. Geological Survey topographic maps and aerial photographs, relating land and image features. Then the soil scientists made preliminary boundaries of slopes and landforms by stereoscopically plotting the boundaries on aerial photographs.

The soil scientists made traverses by truck on the existing network of roads and trails. Where there were no roads or trails, traverses were made on foot. Soil examinations along the traverses were made every 50 to 1,000 yards, depending on the landscape and soil pattern (8). The soil was examined with the aid of a hand auger, spade, or power probe to a depth of 5 to 7 feet. Many typical pedons were observed and studied in small pits that were dug by hand. Observations of landforms, surface geology, vegetation, road-cuts, excavations, and animal burrows were made continuously without regard to spacing. Soil boundaries were determined based on soil examinations and photo interpretation.

The soil scientists transected some of the map units to determine their composition and recorded the vegetation. They chose at least three delineations of each transected map unit to be representative of the unit. At least 10 observations 50 to 100 feet apart were made for most transects.

Samples for some of the engineering index test data (table 23) were taken from the sites of typical pedons of the major soils in the county. The National Soil Survey Laboratory, Lincoln, Nebraska, performed the analyses.

After completion of the field mapping, map unit delineations were transferred by hand to high-altitude aerial photographs at a scale of 1:24,000. Surface drainage and cultural features were transferred from 7½-minute U.S. Geological Survey topographic maps and were recorded from visual observations in the field.

Lab Tables (Fill in the blank space. Edit the lab procedures and codes to fit your data.)

Physical and Chemical Analyses of Selected Soils

The results of analyses of several typical pedons in the survey area are given in the tables "Physical Analyses of Selected Soils" and "Chemical Analyses of Selected Soils." The data are for soils sampled at carefully selected sites. Unless otherwise indicated, the pedons are typical of the series. They are described in the section "Soil Series and Their Morphology." Soil samples were analyzed by ____.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to methods published in Soil Survey Investigations Report 42 (USDA, 1996 and 2004).

Coarse materials--(2- to 75-millimeter fraction) weight estimates of the percentages of all material less than 75 millimeters (3A2a).

Coarse materials--(2- to 250-millimeter fraction) volume estimates of the percentages of all material greater than 2 millimeters (3A2b).

Sand--(0.05- to 2.0-millimeter fraction) weight percentages of material less than 2 millimeters (3A1).

Silt--(0.002- to 0.05-millimeter fraction) pipette extraction, weight percentages of all material less than 2 millimeters (3A1).

Clay--(fraction less than 0.002 millimeters) pipette extraction, weight percentages of material less than 2 millimeters (3A1).

Carbonate clay--(fraction less than 0.002 millimeters) pipette extraction, weight percentages of material less than 2 millimeters (3A1).

Water retained--pressure extraction, percentage of ovendry weight of less than 2-millimeter material; 1/3 or 1/10 bar (3C1), 15 bars (3C2).

Water-retention difference--between 1/3 bar and 15 bars for whole soil (3D5a).

Water-retention difference--between 1/10 bar and 15 bars for whole soil (3D5b).

Bulk density--of less than 2-millimeter material, saran-coated clods field moist (3B1a), 1/3 bar (3B1b), ovendry (3B1c).

Moist bulk density--of less than 2-millimeter material, cores (3B6).

Moist bulk density--of less than 2-millimeter material, compliant cavity (3B3a).

Coefficient of linear extensibility--change in clod dimension based on whole soil (3D4).

Extractable acidity--barium chloride-triethanolamine IV (4B2a1a1, 4B2b1a1).

Cation-exchange capacity--sum of cations (4B4b1).

Effective cation-exchange capacity--sum of extractable cations plus aluminum (4B4b2a).

Base saturation--ammonium acetate, pH 7.0 (4B4c1).

Base saturation--sum of cations, TEA, pH 8.2 (4B4c3).

Reaction (pH)--1:1 water dilution (4C1a2a1).

Reaction (pH)--saturated paste (4C1a1a2).

Reaction (pH)--potassium chloride (4C1a2a3).

Reaction (pH)--sodium fluoride (4C1a1a1).

Reaction (pH)--calcium chloride (4C1a2a2).

Aluminum--potassium chloride extraction (4B3a1a1).

Aluminum--acid oxalate extraction (4G2a1a1).

Iron--acid oxalate extraction (4G2a1a2).

Silica--acid oxalate extraction (4G2a1a5).

Sesquioxides--dithionate-citrate extract; aluminum (4G1a1), iron (4G1a2), manganese (4G1a3).

Soil resistivity--saturated paste (4F2b2).

Total soluble salts--estimate from conductivity (4F3c).

Carbonate as calcium carbonate--(fraction less than 2 millimeters [80 mesh]) manometric (4E1a1a1a1).

Carbonate as calcium carbonate--(fraction less than 20 millimeter) manometric (4E1a1a1a2).

Gypsum--precipitation in acetone (4E2a1a).

Soluble ions--acid titration, saturated paste; carbonate (4F2c1c1a1), bicarbonate (4F2c1c1a2).

Electrical conductivity--saturation extract (4F2b1).

Sodium adsorption ratio (4F3b).

Extractable phosphorus--Bray P-1 (4D3a1).

Coarse materials--(2- to 75-millimeter fraction) weight estimates of the percentages of all material less than 75 millimeters (3B1).

Coarse materials--(2- to 250-millimeter fraction) volume estimates of the percentages of all material greater than 2 millimeters (3B2).

Sand--(0.05- to 2.0-millimeter fraction) weight percentages of material less than 2 millimeters (3A1).

Silt--(0.002- to 0.05-millimeter fraction) pipette extraction, weight percentages of all material less than 2 millimeters (3A1).

Clay--(fraction less than 0.002 millimeters) pipette extraction, weight percentages of material less than 2 millimeters (3A1).

Carbonate clay--(fraction less than 0.002 millimeters) pipette extraction, weight percentages of material less than 2 millimeters (3A1d).

Water retained--pressure extraction, percentage of ovendry weight of less than 2-millimeter material; 1/3 or 1/10 bar (4B1), 15 bars (4B2).
Water-retention difference--between 1/3 bar and 15 bars for whole soil (4C1).

Water-retention difference--between 1/10 bar and 15 bars for whole soil (4C2).

Bulk density--of less than 2-millimeter material, saran-coated clods field moist (4A1a), 1/3 bar (4A1d), ovendry (4A1h).

Moist bulk density--of less than 2-millimeter material, cores (4A3).

Moist bulk density--of less than 2-millimeter material, compliant cavity (4A5).

Coefficient of linear extensibility--change in clod dimension based on whole soil (4D).

Organic carbon--wet combustion. Walkley-Black modified acid-dichromate, ferric sulfate titration (6A1c, obsolete).

Total carbon--dry combustion (6A2d, obsolete).

Total nitrogen--Kjeldahl (6B3, obsolete).

Extractable cations--ammonium acetate pH 7.0, ICP; calcium (6N2e, 6N2f), magnesium (6O2d, 6O2e), sodium (6P2b, 6P2c), potassium (6Q2b, 6Q2c).

Extractable cations--ammonium acetate pH 7.0, EDTA-alcohol separation; calcium (6N2a, obsolete), magnesium (6O2a, obsolete); flame photometry; sodium (6P2a, obsolete), potassium (6Q2a, obsolete).

Extractable acidity--barium chloride-triethanolamine IV (6H5a).

Cation-exchange capacity--ammonium acetate, pH 7.0, steam distillation (5A8c, obsolete).

Cation-exchange capacity--sum of cations (5A3a).

Effective cation-exchange capacity--sum of extractable cations plus aluminum (5A3b).

Base saturation--ammonium acetate, pH 7.0 (5C1).

Base saturation--sum of cations, TEA, pH 8.2 (5C3).

Reaction (pH)--1:1 water dilution (8C1f).

Reaction (pH)--saturated paste (8C1b).

Reaction (pH)--potassium chloride (8C1g).

Reaction (pH)--sodium fluoride (8C1d).

Reaction (pH)--calcium chloride (8C1f).

Aluminum--potassium chloride extraction (6G9c).

Aluminum--acid oxalate extraction (6G12b).

Iron--acid oxalate extraction (6C9b).

Silica--acid oxalate extraction (6V2b).

Sesquioxides--dithionate-citrate extract; iron (6C2h), aluminum (6G7b), manganese (6D2g).

Soil resistivity--saturated paste (8E1).

Total soluble salts--estimate from resistivity (8A2, obsolete).

Total soluble salts--estimate from conductivity (8D5).

Carbonate as calcium carbonate--(fraction less than 2 millimeters [80 mesh]) manometric (6E1g).

Carbonate as calcium carbonate--(fraction less than 20 millimeter) manometric (6E4).

Gypsum--precipitation in acetone (6F1a).

Soluble ions--acid titration, saturated paste; carbonate (6I1b), bicarbonate (6J1b).

Soluble ions--anion chromatograph, saturated paste; chloride (6K1d), sulfate (6L1d), nitrate (6M1d); fluoride (6U1d); nitrite (6W1d).

Electrical conductivity--saturation extract (8A3a).

Sodium adsorption ratio (5E).

Extractable phosphorus--Bray P-1 (6S3).

Example Lab Tables (This is an example of the three Lab Data tables available. These tables are in Excel and can be modified for your use. If you have another template, send it to the MO9 editor for approval.)

Table .--Physical Analyses of Selected Soils--Continued

(The abbreviation "COLE" means coefficient of linear extensibility. Analysis by the Soil Characteristics Laboratory, Texas Agricultural Experiment Station, College Station, Texas. Dashes indicate that data were not available.)

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2.0-1.0 mm)	Coarse (1.0-0.5mm)	Medium (0.5-0.25mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.02 mm)	Water content 1/3 bar	Bulk density 1/3 bar	COLE
	In		---------------------------- Pct ----------------------------									g/cc	Cm/Cm

Table .--Chemical Analyses of Selected Soils

(Dashes indicate that analyses were not made)

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Mg	K	Na	Base saturation	Organic carbon	pH 1:1 (soil: water)	Electric Conductivity	Sodium adsorption ratio (SAR)	Exchangeable sodium (ESP)	Calcium carbonate equivalent
	In		-----------				Pct	Pct	pH	(mmhos/cm)		Pct	Pct

Table .--Clay Mineralogy of Selected Soils

(Analysis by Soil Characteristics Laboratory, Texas Agricultural Experiment Station, College Station, Texas. Dashes indicate that none of the mineral was detected)

Soil name and sample number	Depth	Horizon	Percentage of clay minerals: Smectite	Mica	Kaolinite	Quartz
	Cm					