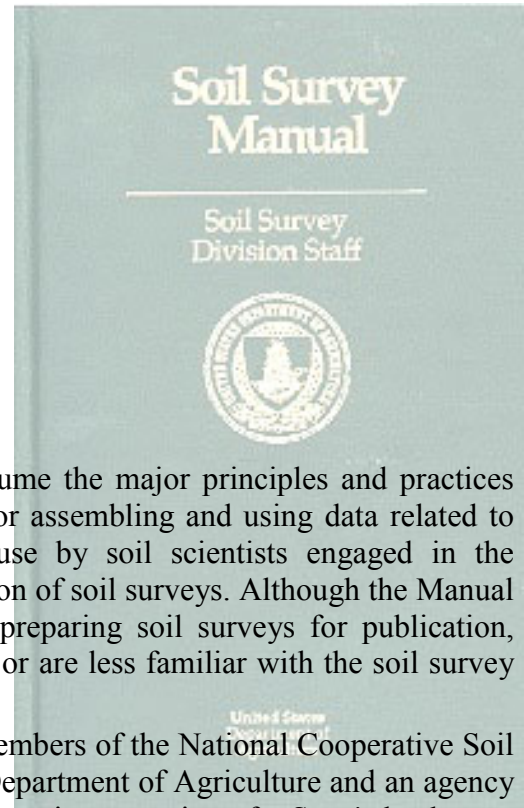


# Soil Survey Manual

## Introduction



**T**he Soil Survey Manual provides in a single volume the major principles and practices needed for making and using soil surveys and for assembling and using data related to them. The Manual is intended primarily for use by soil scientists engaged in the classification and mapping of soils and in the interpretation of soil surveys. Although the Manual is oriented to the needs of those actively engaged in preparing soil surveys for publication, workers and students who have limited soils experience or are less familiar with the soil survey process also will be able to use the information.

The Manual focuses on the major concerns of the members of the National Cooperative Soil Survey, a cooperative undertaking of the United States Department of Agriculture and an agency of each of the States: commonly, the State agricultural experiment station of a State's land-grant university. Other agencies—local, State, or Federal—cooperate under special agreements. The original Federal authority for the soil survey of the United States is contained in the record of the 53rd Congress, chapter 169, Agricultural Appropriations Act of 1896. The authority was elaborated in Public Law 74-46, The Soil Conservation Act of April 27, 1936, and again in Public Law 89-560, Soil Surveys for Resource Planning and Development, September 7, 1966. The Manual is the primary reference on principles and technical detail for local, State, and Federal contributions to soil surveys authorized under these acts. The term "the Soil Survey" is used in the Manual to refer to the National Cooperative Soil Survey.

It is hoped this third edition of the Manual will be as universally useful as were the first and second editions. Many professional people engaged in other aspects of soil science and in other disciplines have used earlier editions of the Manual as a reference. Soil Scientists concerned with soil surveys in other countries have used them as well. Teachers have used the earlier editions both as texts and as references for students. This third edition retains those attributes of the Manual that have made it useful to many groups without deviating significantly from its primary purpose of serving the needs of soil scientists in the field.

Except for isolated passages, this edition of the Manual has been rewritten. Since the second edition (1951) was printed, a new soil taxonomy has been prepared and adopted. New and more intensive uses of soils have dictated changes, and advances in soil science as well as in related disciplines have provided new and more refined concepts and techniques. The increased use of soils for purposes other than farming has prompted new interpretations, more collaboration with professional people of other disciplines, and more adaptation of soil surveys to the concepts of other disciplines. These and other changes of two decades of work have made major revision of the Manual essential. This edition retains the practice of defining terms and concepts within the context of the explanatory text. A glossary is not included; to find definitions, explanations, and uses of specific terms, refer to subject listings in the index.

Although this edition reflects the results of experience mainly in the United States, it also reports the experiences of people in other countries. Studies similar to those that preceded the earlier editions were continued, or intensified, for this third edition, especially in the areas of classification of soils and the interpretations of soil surveys. In addition, many soil scientists in the United States and abroad tested the definitions, concepts, and techniques before they were printed in this current edition.

The chapters of the Manual are arranged in the approximate chronological order in which the work required for a published soil survey is done. As background for the chapters that follow, the [first chapter](#) defines the concepts of soils and the nature of soils as geographic bodies, and the [second chapter](#) describes the nature and uses of soil surveys, the kinds of soil surveys, and the map units.

The succeeding chapters describe procedures and conventions of soil surveys from the start of a survey to its publication. [Chapter 3](#) deals with the attributes of bodies of soil that are mapped and the details of their internal properties. The [fourth chapter](#) tells how to prepare a mapping legend and the descriptive legend, which contains the technical instructions for mapping soils and related activities. Only after these facts are known can the units to be mapped be defined and identified consistently. [fourth chapter](#) also describes the supplies, equipment, and mapping bases required for conducting a soil survey. Data are accumulating during all of these activities. [Chapter 5](#) describes the ways in which data are recorded, stored, and retrieved.

After the mapping is completed and related data about the soils are gathered, the information must be provided to those who use it in forms they can understand. [Chapter 6](#), therefore, discusses interpretations of soil surveys. The final product is the published soil survey. [Chapter 7](#) describes the publication of the soil survey map, the accompanying text, and other publications based on the findings of soil surveys.

All serious users of the Manual will benefit from complementary reading in the classification and genesis of soils, geology, climatology, engineering, forestry, hydrology, and urban and country planning.

Many dedicated SCS staffers have made significant contributions to the information published in this edition of *Soil Survey Manual*. Work on the *Manual* was started by Marlin G. Cline, Professor Emeritus, Cornell University, Ithaca, New York. It was completed at the National Soil Survey Center, Lincoln, Nebraska, by Richard W. Fenwick, retired soil scientist, and Robert B. Grossman, research soil scientist. Robert J. Ahrens and Robert J. Engel, soil scientists at the National Soil Survey Center, updated this edition of the *Manual* in 1993.

A soil survey describes the characteristics of the soils in a given area, classifies the soils according to a standard system of classification, plots the boundaries of the soils on a map, and makes predictions about the behavior of soils. The different uses of the soils and how the response of management affects them are considered. The information collected in a soil survey helps in the development of land-use plans and evaluates and predicts the effects of land use on the environment.

Soil surveys were first authorized in the United States in 1896. Although extensive writings on husbandry by L.J.M. Columella were published in the first century A.D., practical experience was the teacher of most farmers until the advent of agricultural chemistry in the nineteenth century. By the end of the nineteenth century, agricultural chemistry, biology, and geology grew into a unified concept of the soil itself.