HIGHWAY RESEARCH BOARD

*Bulletin No. 22*

# *Engineering Use of Agricultural Soil Maps*



1949

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## 1949

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# HIGHWAY RESEARCH BOARD

## Bulletin No. 22

# THE USE OF AGRICULTURAL SOIL MAPS AND THE STATUS OF AGRICULTURAL SOIL MAPPING IN THE UNITED STATES

*PRESENTED AT THE TWENTY-EIGHTH ANNUAL MEETING*

*1948*

HIGHWAY RESEARCH BOARD
DIVISION OF ENGINEERING AND INDUSTRIAL RESEARCH
NATIONAL RESEARCH COUNCIL

Washington 25, D. C

October, 1949

DEPARTMENT OF SOILS INVESTIGATIONS

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Public Roads Administration

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# REVIEW OF THE PROBLEM AND A SELECTED BIBLIOGRAPHY

FRANK R. OLMSTEAD, *Chairman*
Soils Engineer
Public Roads Administration

The application of topographic maps, airphotos, geologic maps and subsurface exploration to engineering appraisal of terrain was presented in a previous Highway Research Board Bulletin, "The Appraisal of Terrain Conditions for Highway Purposes". Although reference was made to the use of the soil profile method of identification and to the use of county agricultural soil maps, the committee felt that additional information was needed to point out the usefulness of this method and to indicate how county soil maps could be used for engineering purposes.

This system of terrain classification has been used to relate pavement behavior, design data and construction experience with soils. Several states have prepared soil manuals to assist in making surveys using this method. Other states use the county soil maps for making engineering appraisals, such as, the location of local sources of construction materials for secondary road planning or the preliminary selection of road alignment to avoid undesirable soil and drainage conditions

The soil profile method, known to agronomists as the pedological method of making surveys, is not new to the highway engineer. A. C. Rose, as early as 1924 pointed out the advantages of using county soil maps, soil keys, and significant soil profile characteristics for mapping soils in his study of pavement design in the Pacific Northwest. Michigan in 1925 was the first state highway department to use this method for a state-wide study of pavement behavior and in 1927 they initiated its use as a routine procedure for making soil surveys for design purposes. The Public Roads Administration recommended the use of this system for making soil surveys in 1931 and in 1934 and 1935 the AASHO and ASTM advocated its use as a soil survey method.

A nation-wide study of state soil survey practice in 1938 by Muir and Hughes indicates that Michigan and Missouri were using the Pedological method and Kansas and Nebraska were investigating its use for making engineering surveys. It is reported that both Michigan and Missouri felt that this method of making soil surveys fulfilled their present needs. A similar study made 8 years later by Shelburne indicated that 9 states were using the method and that 28 states were using the agricultural soil maps either to locate construction materials or to plan and organize soil survey work.

A definite trend toward the use of county soil maps and the profile method has developed in soil survey practice. This is a logical development because a large section of the United States has been mapped by this system of terrain classification and the nomenclature has been established on a nation-wide basis

This bulletin presents information which should enable the highway engineers to make use of this source of engineering data for soil survey work. L. D. Hicks points out how North Carolina uses the physiographic maps, the geologic map and

a soil key to simplify survey mapping by the pedological method Attention is called to his extensive use of county soil maps as engineering soil maps. This appears to be a practical approach to the solution of the problem of furnishing soil information for secondary road planning at a reasonable cost.

G. B. Bodman of the Division of Soils, University of California in his paper calls attention to the value of using county soil maps and other technical literature in making preliminary estimates of soil properties used by engineers for highway and airfield design studies.

This bulletin also contains a tabulation showing the present status of agricultural soil mapping in the United States. This tabulation was prepared by the Committee from information furnished by Dr. C. E. Kellogg and C. P. Barnes of the Division of Soil Survey, U. S. Department of Agriculture.

The tabulation includes a listing of all counties by States - the counties with maps show the year published and the map rating. In some instances reference numbers are indicated for counties. These refer to soil areas which include a part of the county. Counties listed as (IP) are in progress of either mapping or publication and will be available at some future date.

It is the intention of the committee to issue supplemental lists showing new mapping completed or in progress. It is suggested that this information be used to revise the county listing given in this bulletin.

It is recognized that one bulletin or paper will not furnish the engineer with all the answers to problems that arise during an investigation of this method of terrain appraisal. Therefore, it is suggested that the engineer interested in this method review the papers listed in the selected bibliography which follows, especially so, if he intends to further simplify the method beyond that used by North Carolina. It should be realized that simplification of any system of classification requires a fundamental understanding of all factors entering into its development. It is better to start with a complex system, which include additional factors than to expand a simplified system and later find its range of application restricted.

## SELECTED BIBLIOGRAPHY


(1) "Field Methods Used in Subgrade Surveys" by A. C. Rose, *Public Roads*, Vol. 6, No. 5, July 1925.

(2) "The Present Status of Subgrade Studies", by A. C. Rose, *Public Roads*, Vol. 6, No. 7, Sept. 1925.

(3) "Survey of Soils and Pavement Conditions in Progress in Michigan", by V. R. Burton, *Public Roads*, Vol. 7, No. 4, June 1926.

(4) "Subgrade Studies of the U. S. Bureau of Public Roads", by C A. Hogentogler, I. B. Mullis and A. C. Benkelman, *Proceedings*, Highway Research Board, Vol. 6, 1927.

(5) "The Soil Profile and the Subgrade Survey", by W. I. Watkins and Henry Aaron, *Public Roads*, Vol. 12, No. 7, Sept. 1931.

(6) "Soils and Men", *Yearbook of Agriculture*, 1938, U. S. Department of Agriculture.

(7) "Soil Survey Practice in the United States", by Levi Muir and William F. Hughes, *Proceedings*, Highway Research Board, Vol. 19, 1939.

(8) "State-wide Highway Planning Survey Soil Study", Bulletin No. 6, by Department of Roads and Irrigation Nebraska, 1939.

(9) "Soil Type as a Factor in Highway Engineering", by O. L. Stokstad, *Proceedings* of Purdue Conference on Soil Mechanics and Its Applications, Purdue University, July 1940.

(10) "Systematic Planning of Low Cost Roads", by Frank R. Olmstead, *Proceedings*, of Asphalt Paving Technologists, Vol. 12, 1940.

(11) "Field Manual of Soil Engineering", published by The Michigan State Highway Department, 1940, revised 1946.
(12) "Soils and Stabilization Manual", published by State Highway Commission of Kansas, 1941.
(13) "The Formation, Distribution and Engineering Characteristics of Soils", by D. J. Belcher, L. E. Gregg and K. B. Woods, *Research Series 87*, Engineering Experiment Station, Purdue University, Lafayette, Indiana, 1943.
(14) "Design of Flexible Surfaces in Michigan", by W. W. McLaughlin and O. L. Stokstad, *Proceedings*, Highway Research Board, Vol. 26, 1946.
(15) "Standard Method of Surveying and Sampling Soils for Highway Subgrades" ASTM Designation. D-420-45, ASTM Standards, Part II, 1946.
(16) "Report of Committee on Concrete Pavement Design, Subgrade Soil Practices", by T. E. Shelburne, *Technical Bulletin*, No. 121, 1947.
(17) "The Appraisal of Terrain Conditions for Highway Engineering Purposes", Bulletin No. 13, Highway Research Board, 1948.
(18) "Soils Manual", published by Missouri State Highway Commission, Jefferson City, Missouri, 1948.
(19) *Soil Science*, Vol. 67, No. 2, February, 1949. (Contains a series of 18 papers on soil classification.)

# STATUS OF COUNTY AGRICULTURAL SOIL MAPPING IN THE UNITED STATES

The Committee on "Surveying and Classifying Soils In-place for Engineering Purposes" prepared the following tabulation of county soil maps from information furnished by the Bureau of Plant Industry. It was the committees opinion that this information should be made available to the highway engineer since various State Highway Departments have indicated that they make use of county agricultural soil maps either to locate construction materials for subbases, bases or wearing courses or to plan and organize their detailed soil survey work.

This tabulation lists the counties for each state in alphabetical order and the counties which have been mapped are indicated by the year published and show the U.S.D.A. map ratings. In some instances reference numbers are indicated for counties. These numbers refer to soil areas mapped in the state which include part of the county. Counties listed (IP) are in progress of either mapping or publication and will be made available at a later date. It is the intention of this committee to issue supplemental lists when necessary, which will show additional mapping completed or in progress. It is suggested that this information be used to revise this bulletin so that it always will be a ready reference on the status of county soil-mapping in the United States.

Attention is called to the "Rating of Soil Surveys." These ratings were prepared by the Division of Soil Survey, Bureau of Plant Industry and for Illinois by the University of Illinois Agricultural Experiment Station.

It should be understood that a map rating from an agricultural viewpoint may not always reflect the value of the map for making engineering appraisals.

It should also be recognized that certain soil maps can be revised to conform to current soil nomenclature by referring to soil keys which show the interrelation of parent material, drainage and topography with the soil series and soil

profile descriptions.

It is recommended that engineers using county soil maps for the first time review the map with a representative of the local agricultural experiment station. A fundamental understanding of map units, the range of parent material, slope and drainage included within the map units, and the level of generalization used in the preparation of the county map, especially information concerning associated soil series or types included within map units, will assist the engineer in map interpretation and extend the usefulness of the county soil map for engineering appraisal purposes.

## RATING OF SOIL SURVEYS[1]

*Class 1 - (Most nearly adequate)*

Maps of this class show the distribution of soils accurately. There are, of course, small bodies of associated soils that are not shown and could not be shown without using map scales larger than practical for county unit maps.

These maps are prepared on an airphoto base or a base map prepared from plane table traverses at scales ranging from 2 to 4 inches per mile. Individual soil areas as small as 5 to 10 acres generally shown are on the soil maps and areas as small as 2 acres may be shown if they are in marked contrast to surrounding areas; as, for example, small areas of poorly drained soils, surrounded by well-drained soils.

A field mapping party usually covers 1/4 to 1½ square miles per day, depending upon the complexity of the terrain. The soils are defined so as to show differences in drainage and texture, as well as other important characteristics. The number of map units is adequate for most purposes and the nomenclature (soil type names) is generally in accordance with recent correlation.

*Class 2 - (Useful but less nearly adequate)*

Maps of this class have soil type names not always in accord with recent correlation. They probably were made without the use of an airphoto base map. Plane table traverses were used to prepare the base map, but in some areas topographic maps were used.

Soils valuable for crops are likely to be shown in more detail than other soils. The major soil boundaries are likely to be well defined but individual soil areas less than 10 acres are not apt to be differentiated. Mapping parties usually covered 1 to 3 square miles per day for this level of terrain generalization.

*Class 3 - (General, but of some value)*

Highly general; low degree of homogeneity; but still of some use when properly interpretated. Contains at least some significant boundaries which are accurately located.

Maps with this class show many important local differences, but also fail to show some, due to the generalized character of the work. Many of the soil names are not in accord with present nomenclature.

*Class 4 - (Of little value now)*

Mapping for the most part highly generalized; equivalent to what is now termed reconnaissance mapping. In addition, many boundaries are incorrectly drawn and the classification fails to recognize important differences among soils; mapping mostly done at an early period before an adequate system of soil classification had been developed.

*Reconnaissance Surveys*

Mapping more highly generalized than used in detailed soil surveys.

[1]Surveys rated by the Division of Soil Survey, Bureau of Plant Industry, and for Illinois by University of Illinois Agricultural Experiment Station.

ALABAMA

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Autauga | 1908 | 4 | |
| 2 | Baldwin | 1909 | 4 | 2 sheets |
| 3 | Barbour | 1914 | 3 | |
| 4 | Bibb | 1908 | 4 | |
| 5 | Blount | 1905 | 4 | |
| 6 | Bullock | 1913 | 3 | |
| 7 | Butler | 1907 | 4 | |
| 8 | Calhoun | 1908 | 4 | |
| 9 | Chambers | 1909 | 4 | |
| 10 | Cherokee | 1924 | 2 | |
| 11 | Chilton | 1911 | 3 | |
| 12 | Choctaw | 1921 | 2 | |
| 13 | Clarke | 1912 | 2 | |
| 14 | Clay | 1915 | 2 | |
| 15 | Cleburne | 1913 | 2 | |
| 16 | Coffee | 1909 | 2 | |
| 17 | Colbert | 1933 | 1 | |
| 18 | Conecuh | 1912 | 2 | |
| 19 | Coosa | 1929 | 3 | |
| 20 | Covington | 1912 | 2 | |
| 21 | Crenshaw | 1921 | 2 | |
| 22 | Cullman | 1908 | 3 | |
| 23 | Dale | 1910 | 3 | |
| 24 | Dallas | 1932 | 2 | |
| 25 | DeKalb | 1903 | 4 | |
| 26 | Elmore | 1939 | 1 | |
| 27 | Escambia | 1913 | 2 | |
| 28 | Etowah | 1908 | 4 | |
| 29 | Fayette | 1917 | 2 | |
| 30 | Franklin | 1927 | 2 | |
| 31 | Geneve | 1920 | 2 | |
| 32 | Greene | 1923 | 2 | |
| 33 | Hale | 1935 | 1 | |
| 34 | Henry | 1908 | 4 | |
| 35 | Houston | 1920 | 2 | |
| 36 | Jackson | 1941 | 1 | |
| 37 | Jefferson | 1908 | 3 | |
| 38 | Lamar | 1908 | 3 | |
| 39 | Lauderdale | 1931 | 1 | |
| 40 | Lawrence | 1914 | 3 | |
| 41 | Lee | 1938 | 1 | |
| 42 | Limestone | 1941 | 1 | |
| 43 | Lowndes | 1916 | 2 | |
| 44 | Macon | 1937 | 1 | |
| 45 | Madison | 1911 | 4 | |
| 46 | Marengo | 1920 | 2 | |
| 47 | Marion | 1907 | 4 | |
| 48 | Marshall | 1911 | 4 | |
| 49 | Mobile | 1930 | 1 | |

ALABAMA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 50 | Monroe | 1916 | 2 | |
| 51 | Montgomery | 1926 | 2 | |
| 52 | Morgan | 1918 | 2 | |
| 53 | Perry | 1930 | 1 | |
| 54 | Pickens | 1916 | 2 | |
| 55 | Pike | 1910 | 4 | |
| 56 | Randolph | 1911 | 2 | |
| 57 | Russell | 1913 | 2 | |
| 58 | St. Clair | 1917 | 2 | |
| 59 | Shelby | 1917 | 2 | |
| 60 | Sumter | 1935 | 1 | |
| 61 | Talladego | 1907 | 3 | |
| 62 | Tallapoosa | 1909 | 3 | |
| 63 | Tuscaloosa | 1911 | 2 | |
| 64 | Walker | 1915 | 2 | |
| 65 | Washington | 1915 | 2 | |
| 66 | Wilcox | 1932 | 2 | |
| 67 | Winston | 1932 | 2 | |

Libraries in Alabama in which complete sets of Soil Surveys and Reports may be found:

Athens, Athens College Library
Auburn, Alabama Agricultural Experiment Station Library
Auburn, Polytechnic Institute Library
Birmingham, Howard College Library
Birmingham, Public Library
Mobile, Association Public Library
Montgomery, Department of Archives and History of Alabama
Normal, A. & M. College for Negroes
Tuskegee Institute, Agricultural Experiment Station Library
Tuskegee Institute, Carnegie Library, Tuskegee Institute
University, University of Alabama Library
Wetumka, 5th District Agricultural Station

ARIZONA

Cross Index to Soil Areas Mapped

| Reference No. | County Name | Reference Numbers of Soil Areas Which Cover County or Parts of County |
|---|---|---|
| 1 | Apache | |
| 2 | Cochise | 6, 7, 21 |
| 3 | Coconino | 8 |
| 4 | Gila | |
| 5 | Graham | 3, 16 |
| 6 | Greenlee | 20 |
| 7 | Maricopa | 1, 5, 9, 10, 11, 12 |
| 8 | Mohave | 18 |
| 9 | Navajo | 8 |
| 10 | Pima | 15 |
| 11 | Pinal | 5, 17 |

ARIZONA (Continued)

| Reference No. | County Name | Reference Numbers of Soil Areas Which Cover County or Parts of County |
|---|---|---|
| 12 | Santa Cruz | 14 |
| 13 | Yavapai | |
| 14 | Yuma | 1, 4, 13, 19 |

ARIZONA (Soil Areas)

Index to Soil Areas Mapped

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Salt River Valley | 1900 | 3 | |
| 2 | Yuma | 1902 | 3 | |
| 3 | Solomonsville | 1903 | 3 | |
| 4 | Yuma, Ariz.-Calif. | 1904 | 3 | Also part of Imperial Co. Calif. |
| 5 | Middle Gila Valley | 1917 | 3 | |
| 6 | Benson | 1921 | 2 | |
| 7 | San Simon | 1921 | 2 | |
| 8 | Winslow | 1921 | 2 | |
| 9 | Salt River Valley | 1926 | 1 | |
| 10 | Buckeye-Beardsley | 1927 | 1 | |
| 11 | Gila Bend | 1928 | 1 | |
| 12 | Paradise-Verde | 1928 | 1 | |
| 13 | Yuma-Wellton, Ariz.-Calif. | 1929 | 1 | Also part of Imperial Co. Calif. |
| 14 | Nogales | 1930 | 2 | |
| 15 | Tucson | 1931 | 1 | |
| 16 | Upper Gila Valley | 1933 | 1 | |
| 17 | Casa Grande | 1936 | 1 | |
| 18 | Virgin River Valley, Ariz.-Utah | 1936 | 1 | Also part Washington Co., Utah |
| 19 | Yuma-Desert | 1938 | 1 | |
| 20 | Duncan | IP[1] | 1 | Also part of Hidalgo Co., N.M. |
| 21 | Sulphur Springs Valley | IP[1] | 1 | |

[1](IP) - Map or publication in progress.

Libraries in Arizona in which complete sets of Soil Surveys and Reports may be found:

Phoenix, Arizona State Library
Phoenix, Phoenix Public Library
Tucson, University of Arizona Library
Tucson, Agricultural Experiment Station Library
Tucson, Public Library

## ARKANSAS

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Arkansas | | | See Stuttgart Area |
| 2 | Ashley | 1913 | 2 | |
| 3 | Baxter | | | See Ozark Region |
| 4 | Benton | | | See Fayetteville Area |
| 5 | Boone | | | See Ozark Region |
| 6 | Bradley | 1925 | 1 | |
| 7 | Calhoun | | | |
| 8 | Carroll | | | See Ozark Region |
| 9 | Chicot | | | |
| 10 | Clark | | | |
| 11 | Clay | | | |
| 12 | Cleburn | | | See Ozark Region |
| 13 | Cleveland | | | |
| 14 | Columbia | 1914 | 2 | |
| 15 | Conway | 1907 | 2 | Also see Ozark Region |
| 16 | Craighead | 1916 | 2 | |
| 17 | Crawford | | | See Ozark Region |
| 18 | Crittenden | | | |
| 19 | Cross | | | |
| 20 | Dallas | | | |
| 21 | Desha | | | |
| 22 | Drew | 1917 | 2 | |
| 23 | Faulkner | 1917 | 2 | Also see Ozark Region |
| 24 | Franklin | | | See Ozark Region |
| 25 | Fulton | | | See Ozark Region |
| 26 | Garland | | | |
| 27 | Grant | | | |
| 28 | Greene | | | |
| 29 | Hempstead | 1916 | 2 | |
| 30 | Hot Spring | | | |
| 31 | Howard | 1917 | 2 | |
| 32 | Independence | | | See Ozark Region |
| 33 | Izard | | | See Ozark Region |
| 34 | Jackson | | | |
| 35 | Jefferson | 1915 | 2 | |
| 36 | Johnson | 1911 | 3 | See Ozark Region |
| 37 | Lafayette | | | |
| 38 | Lawrence | | | See Ozark Region |
| 39 | Lee | | | |
| 40 | Lincoln | | | |
| 41 | Little River | | | |
| 42 | Logan | | | |
| 43 | Lonoke | 1921 | 1 | Also see Ozark Region |
| 44 | Madison | | | See Ozark Region |
| 45 | Marion | | | See Ozark Region |
| 46 | Miller | 1903 | 3 | |
| 47 | Mississippi | 1914 | 2 | |
| 48 | Monroe | | | |
| 49 | Montgomery | | | |

ARKANSAS (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 50 | Nevada | 1925 | 2 | |
| 51 | Newton | | | See Ozark Region |
| 52 | Ouachita | | | |
| 53 | Perry | 1920 | 1 | |
| 54 | Phillips | | | |
| 55 | Pike | | | |
| 56 | Poinsett | | | |
| 57 | Polk | | | |
| 58 | Pope | 1913 | 2 | Also see Ozark Region |
| 59 | Prairie | 1906 | 3 | |
| 60 | Pulaski | 1922 | 1 | Also see Ozark Region |
| 61 | Randolph | | | See Ozark Region |
| 62 | St. Francis | | | |
| 63 | Saline | | | |
| 64 | Scott | | | |
| 65 | Searcy | | | See Ozark Region |
| 66 | Sebastian | | | |
| 67 | Sevier | | | |
| 68 | Sharp | | | See Ozark Region |
| 69 | Stone | | | See Ozark Region |
| 70 | Union | | | |
| 71 | Van Buren | | | See Ozark Region |
| 72 | Washington | 1906 | 3 | Also see Ozark Region |
| 73 | White | | | See Ozark Region |
| 74 | Woodruff | | | |
| 75 | Yell | 1915 | 2 | |

AREAS MAPPED

| | | |
|---|---|---|
| Stuttgart Area | 1902 | 3 |
| Fayetteville Area | 1906 | 3 |
| Ozark Region | 1911 | 3 |

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Stuttgart Area | 1902 | 3 | Part of Arkansas Co. |
| 2 | Fayetteville Area | 1906 | 3 | Parts of Benton & Wash. Cos. |
| 3 | Ozark Region | 1911 | 3 | Parts of Arkansas & Missouri |

ARKANSAS (Continued)

Libraries in the State of Arkansas in which complete sets of Soil Surveys and Reports may be found:

Conway, Hendrix College Library
Fayetteville, Arkansas Agricultural Experiment-Station Library
Fayetteville, University of Arkansas Library
Jonesboro, State Agricultural Schools Library
Little Rock, Arkansas State Library
Magnolia, State Agricultural School Library
Pine Bluff, Arkansas State College Library

CALIFORNIA

Cross Index to Soil Areas

| Reference No. | County Name | Reference Numbers of Soil Areas Which Cover County or Parts of County |
|---|---|---|
| 1 | Alameda | 27, 12, 92, 41, 33 |
| 2 | Alpine | |
| 3 | Amador | 31 |
| 4 | Butte | 65, 19, 67, 29, 31 |
| 5 | Calaveras | 95, 41 |
| 6 | Colusa | 19, 25, 67, 26, 31 |
| 7 | Contra Costa | 27, 85, 41, 31, 33 |
| 8 | Del Norte | |
| 9 | Eldorado | 69, 14 |
| 10 | Fresno | 1, 30, 3, 96, 41, 44, 47 |
| 11 | Glenn | 19, 67, 31 |
| 12 | Humbolt | 55 |
| 13 | Imperial | 54, 4, 10, 58, 16, 75 |
| 14 | Inyo | 63 |
| 15 | Kern | 13, 89, 57, 71, 88, 47 |
| 16 | Kings | 3, 90, 44, 47 |
| 17 | Lake | 68 |
| 18 | Lassen | 78, 53, 36 |
| 19 | Los Angeles | 42, 57, 11, 43, 37, 15, 40, 6, 48, 46 |
| 20 | Madera | 28, 41 |
| 21 | Marin | 33 |
| 22 | Mariposa | |
| 23 | Mendocino | 34, 51 |
| 24 | Merced | 93, 32, 41 |
| 25 | Modoc | 78, 53 |
| 26 | Mono | 63 |
| 27 | Monterey | 64, 5, 23, 66, 86, 7 |
| 28 | Napa | 83, 33 |
| 29 | Nevada | 62, 50 |
| 30 | Orange | 42, 73, 11, 2, 46, 39 |
| 31 | Placer | 62, 25, 14, 31 |
| 32 | Plumas | |
| 33 | Riverside | 59, 9, 58, 38, 15, 46, 39 |
| 34 | Sacramento | 25, 14, 97, 85, 31 |
| 35 | San Benito | 61, 66, 86 |

CALIFORNIA

Cross Index to Soil Areas (Continued)

| Reference No. | County Name | Reference Numbers of Soil Areas Which Cover County or Parts of County |
|---|---|---|
| 36 | San Bernardino | 42, 81, 37, 38, 15, 6, 56, 46 |
| 37 | San Diego | 73, 76, 74, 39 |
| 38 | San Francisco | 33 |
| 39 | San Joaquin | 80, 22, 85, 17, 95, 92, 41, 31, 33 |
| 40 | San Luis Obispo | 71, 72, 45, 47 |
| 41 | San Mateo | 33 |
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| 47 | Siskiyou | 18, 52, 21 |
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| 49 | Sonoma | 35, 33 |
| 50 | Stanislaus | 22, 91, 95, 41 |
| 51 | Sutter | 25, 14, 31 |
| 52 | Tehama | 19, 29, 31 |
| 53 | Trinity | |
| 54 | Tulare | 1, 84, 24, 87, 44, 47 |
| 55 | Tuolumne | 41 |
| 56 | Ventura | 8, 48 |
| 57 | Yolo | 79, 26, 31 |
| 58 | Yuba | 25, 31 |

CALIFORNIA

Index to Soil Areas Mapped

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Fresno | 1900 | 4 | |
| 2 | Santa Ana | 1900 | 4 | |
| 3 | Hanford | 1901 | 4 | |
| 4 | Imperial | 1901 | 4 | |
| 5 | Lower Salinas Valley | 1901 | 4 | |
| 6 | San Gabriel | 1901 | 4 | |
| 7 | Soledad | 1901 | 4 | |
| 8 | Ventura | 1901 | 4 | |
| 9 | Indio | 1903 | 4 | |
| 10 | Imperial | 1903 | 4 | |
| 11 | Los Angeles | 1903 | 4 | |
| 12 | San Jose | 1903 | 4 | |
| 13 | Bakersfield | 1904 | 4 | |
| 14 | Sacramento | 1904 | 4 | |
| 15 | San Bernardino | 1904 | 4 | |
| 16 | Yuma | 1904 | 4 | |
| 17 | Stockton | 1905 | 4 | |

CALIFORNIA

Index to Soil Areas Mapped (Continued)

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 18 | Butte Valley | 1907 | 4 | |
| 19 | Colusa | 1907 | 3 | |
| 20 | Redding | 1907 | 3 | |
| 21 | Klamath River | 1908 | 3 | Mostly Klamath Co. Oregon |
| 22 | Modesto-Turlock | 1908 | 3 | |
| 23 | Pajaro Valley | 1908 | 4 | |
| 24 | Potersville | 1908 | 4 | |
| 25 | Marysville | 1909 | 3 | |
| 26 | Woodland | 1909 | | |
| 27 | Livermore | 1910 | 3 | |
| 28 | Madera | 1910 | 3 | |
| 29 | Red Bluff | 1910 | 3 | |
| 30 | Fresno | 1912 | 3 | |
| 31 | Sacramento Valley | 1913 | 3 | |
| 32 | Merced | 1914 | 3 | |
| 33 | San Francisco Bay | 1914 | 3 | |
| 34 | Ukiah | 1914 | 2 | |
| 35 | Healdsburg | 1915 | 2 | |
| 36 | Honey Lake | 1915 | 2 | |
| 37 | Pasadena | 1915 | 2 | |
| 38 | Riverside | 1915 | 2 | |
| 39 | San Diego | 1915 | 3 | |
| 40 | San Fernando Valley | 1915 | 2 | |
| 41 | Lower San Joaquin Valley | 1915 | 3 | |
| 42 | Anaheim | 1916 | 2 | |
| 43 | Los Angeles | 1916 | 2 | |
| 44 | Middle San Joaquin | 1916 | 3 | |
| 45 | San Maria | 1916 | 2 | |
| 46 | Central Southern Calif. | 1917 | 3 | |
| 47 | Upper San Joaquin | 1917 | 3 | |
| 48 | Ventura | 1917 | 2 | |
| 49 | El Centro | 1918 | 2 | |
| 50 | Grass Valley | 1918 | 2 | |
| 51 | Willits | 1918 | 2 | |
| 52 | Shasta Valley | 1919 | 2 | |
| 53 | Big Valley | 1920 | 2 | |
| 54 | Brawley | 1920 | 2 | |
| 55 | Eureka | 1921 | 2 | |
| 56 | Victorville | 1921 | 2 | |
| 57 | Lancaster | 1922 | 2 | |
| 58 | Palo Verde | 1922 | 2 | |
| 59 | Coachella Valley | 1923 | 2 | |
| 60 | Gilroy | 1923 | 2 | |
| 61 | Hollister | 1923 | 2 | |
| 62 | Auburn | 1924 | 2 | |

CALIFORNIA

Index to Soil Areas Mapped (Continued)

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 63 | Bishop | 1924 | 2 | |
| 64 | King City | 1924 | 1 | No special grading |
| 65 | Chico | 1925 | 1 | |
| 66 | Salinas | 1925 | 1 | |
| 67 | Oroville | 1926 | 1 | |
| 68 | Clear Lake | 1927 | 1 | |
| 69 | Placerville | 1927 | 1 | |
| 70 | Santa Ynez | 1927 | 1 | |
| 71 | Paso Robles | 1928 | 1 | |
| 72 | San Luis Obispo | 1928 | 1 | |
| 73 | Capistrano | 1929 | 1 | |
| 74 | Oceanside | 1929 | 1 | |
| 75 | Yuma-Wellton | 1929 | 1 | Part of Yuma Co. Ariz. |
| 76 | El Cajon | 1930 | 1 | |
| 77 | Suisun | 1930 | 1 | |
| 78 | Alturas | 1931 | 1 | |
| 79 | Dixon | 1931 | 1 | |
| 80 | Lodi | 1932 | 1 | |
| 81 | Barstow | 1933 | 1 | |
| 82 | Contra Costa | 1933 | 2 | |
| 83 | Napa | 1933 | 1 | |
| 84 | Pixley | 1935 | 1 | |
| 85 | Sacramento | 1935 | 1 | San Joaquin Delta Area |
| 86 | Santa Cruz | 1935 | 1 | |
| 87 | Visalia | 1935 | 1 | |
| 88 | Wasco | 1936 | 1 | |
| 89 | Bakersfield | 1937 | 1 | |
| 90 | Kings County | 1938 | 1 | |
| 91 | Newman | 1938 | 1 | |
| 92 | Tracey | 1938 | 1 | |
| 93 | Los Banes | IP[2] | 1 | |
| 94 | Santa Clara | IP[2] | 1 | |
| 95 | Stockton | IP[2] | 1 | |
| 96 | Mendota | IP[2] | 1 | |
| 97 | Sacramento | IP[2] | 1 | |

[2]See Footnote 1, page 7.

Libraries in California in which complete sets of Soil Surveys and Reports may be found:

Alameda, Alameda Free Public Library
Alturas, Modoc County Public Library
Berkeley, Public Library
Berkeley, University of California Library
Berkeley, University of Calif., Division of Soil Technology
Berkeley, College of Agriculture Library
Berkeley, Calif. Agri. Experiment Station Library
Claremont, Library, Pomona College
Davis, University Farm, University of California
Eureka, Eureka Public Library
Fresno, Fresno County Free Library
Indio, U. S. Date Garden Library
Los Angeles, Public Library, Serials Division
Oakland, Public Library
Pomona, Pomona Public Library, Document Division
Riverside, Citrus Experiment Station Library
Sacramento, State Agri. Society Library
Sacramento, California State Library
Sacramento, Free Public Library
Salinas, Salinas Public Library
San Diego, Free Public Library
San Francisco, Mechanics Mercantile Library
San Francisco, San Francisco Public Library
San Luis Obispo, California Polytechnic School
Santa Barbara, Free Public Library
Santa Rosa, Free Public Library
Stanford University, Stanford University Library
Stockton, Free Public Library

## COLORADO

### Cross Index to Soil Areas Mapped

| Reference No. | County Name | Reference Numbers of Soil Areas Which Cover County or Parts of County |
|---|---|---|
| 1 | Adams | 9 |
| 2 | Alamosa | |
| 3 | Arapahoe | |
| 4 | Archuleta | |
| 5 | Baca | |
| 6 | Bent | 5 |
| 7 | Boulder | 9, 8 |
| 8 | Chaffee | |
| 9 | Cheyenne | |
| 10 | Clear Creek | |
| 11 | Conejos | 2 |
| 12 | Costilla | 2 |
| 13 | Crowley | 5 |
| 14 | Custer | |
| 15 | Delta | 4 |
| 16 | Denver | |
| 17 | Dolores | |
| 18 | Douglas | |
| 19 | Eagle | |
| 20 | Elbert | |
| 21 | El Paso | |
| 22 | Fremont | 5 |
| 23 | Garfield | |

COLORADO

Cross Index to Soil Areas Mapped (Continued)

| Reference No. | County Name | Reference Numbers of Soil Areas Which Cover County or Parts of County |
|---|---|---|
| 24 | Gilpen | |
| 25 | Grand | |
| 26 | Gunnison | |
| 27 | Hinsdale | |
| 28 | Huerfano | |
| 29 | Jackson | |
| 30 | Jefferson | 9 |
| 31 | Kiowa | |
| 32 | Kit Carson | |
| 33 | Lake | |
| 34 | La Plata | |
| 35 | Larimer | 1, 6 |
| 36 | Las Animas | |
| 37 | Lincoln | |
| 38 | Logan | |
| 39 | Mesa | 3 |
| 40 | Mineral | |
| 41 | Moffet | |
| 42 | Montezuma | |
| 43 | Montrose | 4 |
| 44 | Morgan | |
| 45 | Otero | 5 |
| 46 | Ouray | 4 |
| 47 | Park | |
| 48 | Phillips | |
| 49 | Pitkin | |
| 50 | Prowers | 5 |
| 51 | Pueblo | 5 |
| 52 | Rio Blanco | |
| 53 | Rio Grande | 2 |
| 54 | Routt | |
| 55 | Saguache | 2 |
| 56 | San Juan | |
| 57 | San Miguel | |
| 58 | Sedgwick | |
| 59 | Summit | |
| 60 | Teller | |
| 61 | Washington | 10 |
| 62 | Weld | 1, 6, 7, 8 |
| 63 | Yuma | |

COLORADO SOIL AREAS

Index to Soil Areas Mapped

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Cache La Poudre Valley | 1899 | 3 | |
| 2 | San Luis Valley | 1903 | 3 | |

COLORADO SOIL AREAS

Index to Soil Areas Mapped (Continued)

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 3 | Grand Junction | 1905 | 3 | |
| 4 | Uncompahgre Valley | 1910 | 3 | |
| 5 | Arkansas Valley | 1926 | 2 | |
| 6 | Fort Collins | 1927 | 2 | |
| 7 | Greeley | 1929 | 2 | |
| 8 | Longmont | 1930 | 2 | |
| 9 | Brighton | 1932 | 2 | |
| 10 | Akron | IP[3] | 1 | |

[3]See Footnote 1, page 7.

Libraries in Colorado in which complete sets of Soil Surveys and Reports may be found:

Boulder, University of Colorado Library
Colorado Springs, Colorado College, Coburn Library
Denver, College of Sacred Heart Library
Denver, Library State Historical and Natural History Society
Denver, Public Library
Denver, Colorado State Library
Denver, University of Denver Library
Ft. Collins, Ft. Collins Public Library
Ft. Collins, Agricultural College Library
Ft. Collins, Agricultural Experiment Station Library
Greeley, State Normal School Library
Greeley, State Teachers College Library
Pueblo, McClelland Public Library

CONNFCTICUT

Cross Index to Areas Mapped

| Reference No. | County Name | Reference Numbers for Soil Areas Which cover County or Part of County |
|---|---|---|
| 1 | Fairfield | |
| 2 | Hartford | 1, 2 |
| 3 | Litchfield | |
| 4 | Middlesex | |
| 5 | New Haven | |
| 6 | New London | 4 |
| 7 | Tolland | 2 |
| 8 | Windham | 3 |

CONNECTICUT

Index to Soil Areas Mapped

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Connecticut Valley | 1899 | 3 | |
| 2 | Connecticut Valley | 1903 | 3 | |
| 3 | Windham County | 1911 | 3 | |
| 4 | New London County | 1912 | 3 | |

Libraries in Connecticut in which complete sets of Soil Surveys and Reports may be found:

Bridgeport, Public Library
Hartford, State Library
Hartford, Trinity College Library
Middletown, Wesleyan University Library
New Haven, Agricultural Experiment Station Library
New Haven, Sheffield Scientific School, Yale University
New Haven, Yale University Library
New Haven, School of Forestry, Yale University
New Haven, Department of Geology, Yale University
New London, Connecticut Agricultural College Library
New London, Agricultural Experiment Station Library
Waterbury, Silas Bronson Library

DELAWARE

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Kent | 1918 | 2 | Also see Dover Area 1903(3) |
| 2 | New Castle | 1915 | 2 | |
| 3 | Sussex | 1920 | 2 | |

Libraries in Delaware in which complete sets of Soil Surveys and Reports may be found:

Dover, Delaware State Library
Dover, College for Colored Students Library
Newark, Delaware College Library
Newark, Agricultural Experiment Station Library
Wilmington, Wilmington Institute Free Library

FLORIDA

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Alachua | IP[4] | 1 | Also see Gainesville Area |
| 2 | Baker | | | |
| 3 | Bay | | | |
| 4 | Bradford | 1913 | 2 | Includes Union Co. |
| 5 | Brevard | | | See Indian River Area |
| 6 | Broward | | | |
| 7 | Calhoun | | | |
| 8 | Charlotta | | | |
| 9 | Citrus | | | See Ocala Area |
| 10 | Clay | | | |
| 11 | Collier | | | |
| 12 | Columbia | | | |
| 13 | Dade | 1921 | 2 | |
| 14 | De Soto | | | |
| 15 | Dixie | | | |
| 16 | Duval | | | |
| 17 | Escambia | 1906 | 3 | |
| 18 | Fagler | 1918 | 2 | |
| 19 | Franklin | 1915 | 3 | |
| 20 | Gadsden | 1903 | 4 | |
| 21 | Gilchrist | | | |
| 22 | Glades | | | |

FLORIDA

(Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 23 | Gulf | | | |
| 24 | Hamilton | | | |
| 25 | Hardee | | | |
| 26 | Hendry | | | |
| 27 | Hernando | 1914 | 2 | |
| 28 | Highlands | | | |
| 29 | Hillsborough | 1916 | 2 | |
| 30 | Holmes | | | |
| 31 | Indian River | | | |
| 32 | Jackson. | | | See Marianna Area |
| 33 | Jefferson | 1907 | 3 | |
| 34 | Lafayette | | | |
| 35 | Lake | 1923 | 1 | |
| 36 | Lee | | | |
| 37 | Leon | 1905 | 3 | |
| 38 | Levy | | | See Ocala Area, See Gainesville Area |
| 39 | Liberty | | | |
| 40 | Madison | | | |
| 41 | Manatee | | | |
| 42 | Marion | | | See Ocala Area, See Gainesville Area |
| 43 | Martin | | | |
| 44 | Monroe | | | |
| 45 | Nassau | | | |
| 46 | Okaloosa | | | |
| 47 | Okeechobee | | | |
| 48 | Orange | 1919 | 2 | |
| 49 | Osceola | | | |
| 50 | Palm Beach | | | See Indian River Area, See Fort Lauderdale Area |
| 51 | Pasco | | | |
| 52 | Pinellas | 1913 | 2 | |
| 53 | Polk | 1927 | 1 | |
| 54 | Putnam | 1914 | 2 | |
| 55 | Saint Johns | 1917 | 2 | |
| 56 | Saint Lucie | | | See Indian River Area |
| 57 | Santa Rosa | | | |
| 58 | Sarasota | | | |
| 59 | Seminole | | | |
| 60 | Sumter | | | See Ocala Area |
| 62 | Suwannee | | | |
| 62 | Taylor | | | |
| 63 | Union | | | |
| 64 | Volusia | | | |
| 65 | Wakulla | | | |
| 66 | Walton | | | |
| 67 | Washington | | | |

[4]See Footnote 1, page 7.

FLORIDA (Continued)

Soil Areas

| Soil Area Name | Year | U.S.D.A. Rating |
|---|---|---|
| Gainesville | 1904 | 4 |
| Marianna | 1909 | 3 |
| Ocala | 1912 | 3 |
| Indian River | 1913 | 3 |
| Fort Lauderdale | 1915 | 3 |

Libraries in the State of Florida in which complete sets of Soil Surveys and Reports may be found:

Deland, John B. Stetson University Library
Gainesville, College of Agriculture Library
Gainesville, Agricultural Experiment Station Library
Jacksonville, Public Library
St. Augustine, St. Augustine Historical & Institute of Science
St. Petersburg, St. Petersburg Public Library
Tallahassee, Carnegie Library of the Florida State Normal and Industrial School
Tallahassee, Florida State Library
Tampa, Tampa Public Library
Winter Park, Rolling College Library

GEORGIA

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Appling | | | |
| 2 | Atkinson | | | |
| 3 | Bacon | | | |
| 4 | Baker | | | |
| 5 | Baldwin | | | |
| 6 | Banks | | | |
| 7 | Barrow | | | |
| 8 | Bartow | 1926 | 2 | |
| 9 | Ben Hill | 1912 | 3 | |
| 10 | Berrian | | | |
| 11 | Bibb | 1922 | 2 | |
| 12 | Bleckley | | | |
| 13 | Brantley | | | |
| 14 | Brooks | 1916 | 2 | |
| 15 | Bryan | | | |
| 16 | Bullock | 1910 | 3 | |
| 17 | Burke | 1917 | 2 | |
| 18 | Butts | 1919 | 2 | Includes Henry Co. |
| 19 | Calhoun | 1925 | 1 | |
| 20 | Camden | | | |
| 21 | Candler | IP[5] | 1 | |
| 22 | Carroll | 1921 | 2 | |
| 23 | Catousa | 1937 | 1 | |
| 24 | Charlton | | | |

[5]See Footnote 1, page 7.

GEORGIA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 25 | Chatham | 1911 | 4 | |
| 26 | Chattahoochee | 1924 | 2 | |
| 27 | Chattooga | 1912 | 3 | |
| 28 | Cherokee | | | |
| 29 | Clarke | 1927 | 2 | |
| 30 | Clay | 1914 | 3 | |
| 31 | Clayton | | | |
| 32 | Clinch | | | |
| 33 | Cobb | 1901 | 4 | |
| 34 | Coffee | | | |
| 35 | Colquitt | 1914 | 3 | |
| 36 | Columbia | 1911 | 4 | |
| 37 | Cook | 1928 | 1 | |
| 38 | Cowetta | 1919 | 2 | Includes Fayette Co. |
| 39 | Crawford | | | |
| 40 | Crisp | 1916 | 3 | |
| 41 | Dade | 1936 | 1 | |
| 42 | Dawson | | | |
| 43 | Decatur | 1933 | 1 | Also see Brainbridge Area |
| 44 | De Kalb | 1914 | 3 | |
| 45 | Dodge | 1904 | 4 | |
| 46 | Dooly | 1923 | 2 | |
| 47 | Dougherty | 1912 | 3 | |
| 48 | Douglas | | | |
| 49 | Early | 1918 | 2 | |
| 50 | Echols | | | |
| 51 | Effingham | | | |
| 52 | Elbert | 1928 | 2 | |
| 53 | Emanual | | | |
| 54 | Evans | | | See Bullock & Tattnall Cos. |
| 55 | Fannin | 1923 | 2 | |
| 56 | Fayette | 1919 | 2 | See Cowetta Co. |
| 57 | Floyd | 1917 | 3 | |
| 58 | Forsyth | | | |
| 59 | Franklin | 1909 | 4 | |
| 60 | Fulton | | | |
| 61 | Gilmer | | | |
| 62 | Glascock | | | |
| 63 | Glynn | 1911 | 3 | |
| 64 | Gordon | 1913 | 3 | |
| 65 | Grady | 1908 | 3 | |
| 66 | Greene[6] | 1919 | 2 | Includes Morgan, Putnam & Oconee Cos. |
| 67 | Gwinnett | | | |
| 68 | Habershan | 1913 | 3 | |
| 69 | Hall | 1937 | 2 | |
| 70 | Hancock | 1909 | 3 | |
| 71 | Haralson | | | |

[6]Oconee, Morgan, Greene and Putnam Counties mapped together.

GEORGIA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 72 | Harris | | | |
| 73 | Hart | 1929 | 2 | |
| 74 | Heard | | | |
| 75 | Henry | 1919 | 2 | Includes Butts Co. |
| 76 | Houston | | | See Fort Valley Area |
| 77 | Irwin | | | |
| 78 | Jackson | 1914 | 3 | |
| 79 | Jasper | 1916 | 3 | |
| 80 | Jeff Davis | 1913 | 3 | |
| 81 | Jefferson | 1930 | 1 | |
| 82 | Jenkins | 1923 | 2 | |
| 83 | Johnson | | | |
| 84 | Jones | 1913 | 3 | |
| 85 | Lamar | 1925 | 2 | |
| 86 | Lanier | | | |
| 87 | Laurens | 1915 | 3 | |
| 88 | Lee | 1927 | 1 | |
| 89 | Liberty | | | |
| 90 | Lincoln | | | |
| 91 | Long | | | |
| 92 | Lowndes | 1917 | 2 | |
| 93 | Lumpkin | | | |
| 94 | McDuffie | 1931 | 1 | |
| 95 | McIntosh | 1929 | 1 | |
| 96 | Macon | | | |
| 97 | Madison | 1918 | 2 | |
| 98 | Marion | | | |
| 99 | Meriwether | 1916 | 2 | |
| 100 | Miller | 1913 | 3 | |
| 101 | Mitchell | 1920 | 2 | |
| 102 | Monroe | 1920 | 2 | |
| 103 | Montgomery | | | |
| 104 | Morgan[7] | 1919 | 2 | Also see Covington Area |
| 105 | Murray | | | |
| 106 | Muscogee | 1922 | 2 | |
| 107 | Newton | | | |
| 108 | Oconee[7] | 1919 | 2 | |
| 109 | Oglethorpe | | | |
| 110 | Paulding | | | |
| 111 | Peach | | | |
| 112 | Pickens | | | |
| 113 | Pierce | 1918 | 2 | Also see Waycross Area |
| 114 | Pike | 1909 | 3 | |
| 115 | Polk | 1914 | 3 | |
| 116 | Pulaski | 1918 | | |
| 117 | Putnam[7] | 1919 | 2 | |
| 118 | Quitman | 1926 | 2 | |
| 119 | Rabun | | | |

[7]See Footnote 6, page 21.

GEORGIA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 120 | Randolph | 1924 | 2 | |
| 121 | Richmond | 1916 | 3 | |
| 122 | Rockdale | 1920 | 3 | Also see Covington Area |
| 123 | Schley | | | |
| 124 | Screven | 1920 | 3 | |
| 125 | Seminole | | | |
| 126 | Spalding | 1905 | 4 | |
| 127 | Stephens | | | |
| 128 | Stewart | 1913 | 3 | |
| 129 | Sumter | 1910 | 3 | |
| 130 | Talbot | 1913 | 3 | |
| 131 | Taliaferro | | | |
| 132 | Tattnall | 1914 | 3 | Also see reconnaissance 1912-3 |
| 133 | Taylor | | | |
| 134 | Telfair | | | |
| 135 | Terrell | 1914 | 3 | |
| 136 | Thomas | 1908 | 4 | |
| 137 | Tift | 1909 | 3 | |
| 138 | Toombs | 1935 | 1 | |
| 139 | Towns | IP[8] | 1 | |
| 140 | Treutlen | | | |
| 141 | Troup | 1912 | 3 | |
| 142 | Turner | 1915 | 3 | |
| 143 | Twiggs | | | |
| 144 | Union | IP[8] | 1 | |
| 145 | Upson | | | |
| 146 | Walker | 1910 | 4 | |
| 147 | Walton | | | |
| 148 | Ware | | | See Waycross Area |
| 149 | Warren | | | |
| 150 | Washington | 1915 | 2 | |
| 151 | Wayne | 1926 | 2 | |
| 152 | Webster | | | |
| 153 | Wheeler | | | |
| 154 | White | | | |
| 155 | Whitfield | | | |
| 156 | Wilcox | | | |
| 157 | Wilkes | 1915 | 4 | |
| 158 | Wilkinson | | | |
| 159 | Worth | 1929 | 2 | |

[8]See Footnote 1, page 7.

SOIL AREAS

| | | |
|---|---|---|
| Bainbridge Area | 1904 | 4 |
| Covington Area | 1901 | 4 |
| Fort Valley Area | 1903 | 4 |
| Way Cross Area | 1906 | 4 |

GEORGIA (Continued)

Libraries in Georgis in which complete sets of Soil Surveys and Reports may be found:

Athens, University of Georgia Library
Athens, Georgia State College of Agriculture
Atlanta, Carnegie Library
Atlanta, Georgia State Library
Atlanta, Morris Brown College Library
Atlanta, Public Library
Augusta, Young Men's Library Association
Dahlongea, North Georgia Agricultural College
Douglas, Georgia Normal College and Business Institute
Experiment, Agricultural Experiment Station Library
Industrial College, Georgia State Industrial College
Newman, Carnegie Library
Oxford, Emory College Library
Savannah, Public Library
Savannah, Georgia Historical Society Library
Tifton, Georgia Coastal Plains Experiment Station

IDAHO

| Reference No. | County Name | Year | U.S.D.A. Rating | Reference Numbers of Soil Areas Which Cover County or Parts of County |
|---|---|---|---|---|
| 1 | Ada | | | 1 |
| 2 | Adams | | | |
| 3 | Bannock | | | 7, 9 |
| 4 | Bear Lake | | | 10 |
| 5 | Benewah | 1930 | 1 | |
| 6 | Bingham | | | 14, 4 |
| 7 | Blaine | | | 12 |
| 8 | Boise | | | |
| 9 | Bonner | 1934 | 1 | |
| 10 | Bonneville | | | 5 |
| 11 | Boundary | | | |
| 12 | Butte | | | |
| 13 | Camas | | | |
| 14 | Canyon | | | 1 |
| 15 | Caribou | | | 9 |
| 16 | Cassia | | | 6, 12 |
| 17 | Clark | | | |
| 18 | Clearwater | | | |
| 19 | Custer | | | |
| 20 | Elmore | | | 13 |
| 21 | Franklin | | | |
| 22 | Fremont | | | 4 |
| 23 | Gem | | | |
| 24 | Gooding | | | 13 |
| 25 | Idaho | | | |
| 26 | Jefferson | | | |
| 27 | Jerome | | | 11 |
| 28 | Kootenai | 1919 | 2 | |
| 29 | Latah | 1915 | 3 | 3 |
| 30 | Lemhi | | | |

IDAHO (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Reference Numbers of Soil Areas Which Cover County or Parts of County |
|---|---|---|---|---|
| 31 | Lewis | 1917 | 2 | Includes Nez Perce Co. |
| 32 | Lincoln | | | 6, 12 |
| 33 | Madison | | | |
| 34 | Minidoka | 1927 | 1 | 12 |
| 35 | Nez Perce | 1917 | 2 | Includes Lewis Co., also see 3 |
| 36 | Oneida | | | |
| 37 | Owyhee | | | |
| 38 | Payette | | | |
| 39 | Power | | | |
| 40 | Shoshone | | | |
| 41 | Teuton | | | |
| 42 | Twin Falls | | | 8 |
| 43 | Valley | | | |
| 44 | Washington | | | |

SOIL AREAS

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating |
|---|---|---|---|
| 1 | Boise | 1901 | 4 |
| 2 | Caldwell | 1901 | |
| 3 | Lewiston | 1902 | 3 |
| 4 | Blackfoot | 1903 | 4 |
| 5 | Idaho Falls | 1903 | |
| 6 | Minidoka | 1907 | 3 |
| 7 | Portheuf | 1918 | 2 |
| 8 | Twin Falls | 1921 | 2 |
| 9 | Soda Springs-Bancroft | 1925 | 2 |
| 10 | Bear Lake Valley | 1926 | 2 |
| 11 | Jerome | 1927 | 1 |
| 12 | Minidoka | 1927 | 1 |
| 13 | Gooding | 1929 | 1 |
| 14 | Blackfoot-Aberdeen | 1937 | 1 |
| 15 | Idaho Falls | IP[9] | 1 |

[9]See Footnote 1, page 7.

Libraries in Idaho in which complete sets of Soil Surveys and Reports may be found:

Albion, Albion State Normal School Library
Boise, Idaho State Library
Lewiston, State Normal School Library
Moscow, University of Idaho Library
Moscow, Agricultural Experiment Station, Soil Technologist
Pocatello, Academy of Idaho Library
Pocatello, Southern Branch University of Idaho Library
Twin Falls, Public Library

County Soil Maps made and Published by the
University of Illinois Agricultural Experiment Station)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Adams | 1922 | 3 | |
| 2 | Alexander | 1934 | 2 | |
| 3 | Bond | 1913 | 3 | |
| 4 | Boone | 1939 | 1 | |
| 5 | Brown | | | |
| 6 | Bureau | 1921 | 3 | |
| 7 | Calhoun | 1932 | 2 | |
| 8 | Carroll | | | |
| 9 | Cass | 1947 | 1 | |
| 10 | Champaign | 1918 | 3 | |
| 11 | Christian | | 1 | |
| 12 | Clark | | | |
| 13 | Clay | 1911 | 3 | |
| 14 | Clinton | 1936 | 2 | |
| 15 | Coles | 1929 | 3 | |
| 16 | Cook | | | |
| 17 | Crawford | | 3 | |
| 18 | Cumberland | 1940 | 1 | |
| 19 | De Kalb | 1922 | 3 | |
| 20 | De Witt | 1940 | 1 | |
| 21 | Douglas | 1929 | 3 | |
| 22 | Du Page | 1917 | 3 | |
| 23 | Edgar | 1917 | 3 | |
| 24 | Edwards | 1930 | 3 | |
| 25 | Effingham | 1931 | 2 | |
| 26 | Fayette | 1932 | 2 | |
| 27 | Ford | 1941 | 2 | |
| 28 | Franklin | | 3 | |
| 29 | Fulton | 1932 | 2 | |
| 30 | Gallatin | | | |
| 31 | Greene | | | |
| 32 | Grundy | 1924 | 3 | |
| 33 | Hamilton | | | |
| 34 | Hancock | 1924 | 3 | |
| 35 | Hardin | 1912 | 3 | |
| 36 | Henderson | | 1 | |
| 37 | Henry | 1928 | 3 | |
| 38 | Iroquois | 1942 | 1 | |
| 39 | Jackson | 1933 | 2 | |
| 40 | Jasper | 1940 | 2 | |
| 41 | Jefferson | | | |
| 42 | Jersey | | | |
| 43 | Jo Daviess | | | |
| 44 | Johnson | 1925 | 3 | |
| 45 | Kane | 1917 | 3 | |
| 46 | Kankakee | 1916 | 2 | Also 1947 Supplement |
| 47 | Kendall | 1943 | 1 | |

ILLINOIS (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 48 | Knox | 1913 | 3 | |
| 49 | Lake | 1915 | 3 | |
| 50 | La Salle | 1913 | 3 | |
| 51 | Lawrence | IP[10] | 1 | |
| 52 | Lee | 1927 | 3 | |
| 53 | Livingston | 1940 | 1 | |
| 54 | Logan | 1927 | 3 | |
| 55 | McDonough | 1913 | 3 | |
| 56 | McHenry | 1921 | 3 | |
| 57 | McLean | 1915 | 3 | |
| 58 | Macon | 1929 | 3 | |
| 59 | Macoupin | 1932 | 2 | |
| 60 | Madison | | | |
| 61 | Marion | 1926 | 3 | |
| 62 | Marshall | 1937 | 1 | |
| 63 | Mason | 1924 | 3 | |
| 64 | Massac | | | |
| 65 | Menard | IP[10] | 1 | |
| 66 | Mercer | 1925 | 3 | |
| 67 | Monroe | 1912 | 3 | |
| 68 | Montgomery | | | |
| 69 | Morgan | 1929 | 3 | |
| 70 | Moultrie | 1911 | 3 | |
| 71 | Ogle | 1927 | 3 | |
| 72 | Peoria | 1937 | 3 | |
| 73 | Perry | | | |
| 74 | Piatt | 1930 | 2 | |
| 75 | Pike | 1915 | 3 | |
| 76 | Pope | | | |
| 77 | Pulaski | 1931 | 2 | |
| 78 | Putnam | 1937 | 1 | |
| 79 | Randolph | 1925 | 3 | |
| 80 | Richland | | | |
| 81 | Rock Island | 1925 | 3 | |
| 82 | Saint Clair | 1938 | 2 | |
| 83 | Saline | 1926 | 3 | |
| 84 | Sangamon | 1912 | 3 | |
| 85 | Schuyler | 1934 | 2 | |
| 86 | Scott | | | |
| 87 | Shelby | 1939 | 1 | |
| 88 | Stark | 1939 | 1 | |
| 89 | Stephenson | | | |
| 90 | Tazewell | 1916 | 3 | |
| 91 | Union | | | |
| 92 | Vermillion | 1938 | 2 | |
| 93 | Wabash | 1937 | 2 | |
| 94 | Warren | 1941 | 1 | |

[10]See Footnote 1, page 7.

ILLINOIS (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 95 | Washington | 1937 | 2 | |
| 96 | Wayne | 1931 | 2 | |
| 97 | White | | 3 | Map only |
| 98 | Whiteside | 1928 | 3 | |
| 99 | Will | IP[11] | 1 | See Survey 1926 |
| 100 | Williamson | | | |
| 101 | Winnebago | 1916 | 3 | |
| 102 | Woodford | 1927 | 3 | |

[11] See Footnote 1, page 7.

Complete sets of Soil Surveys and Reports may be found at the University of Illinois Agricultural Experiment Station.

INDIANA

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Adams | 1921 | 2 | |
| 2 | Allen | 1908 | 3 | |
| 3 | Bartholomew | 1936 | 1 | |
| 4 | Benton | 1916 | 3 | |
| 5 | Blackford | 1928 | 2 | |
| 6 | Boone | 1912 | 3 | |
| 7 | Brown | 1936 | 1 | |
| 8 | Carroll | | | |
| 9 | Cass | IP[12] | 1 | |
| 10 | Clarke | | | |
| 11 | Clay | 1922 | 2 | |
| 12 | Clinton | 1914 | 2 | |
| 13 | Crawford | | | |
| 14 | Daviess | | | |
| 15 | Dearborn | | | |
| 16 | Decatur | 1919 | 2 | |
| 17 | De Kalb | | | |
| 18 | Delaware | 1913 | 3 | |
| 19 | Du Bois | 1930 | 2 | |
| 20 | Elkhart | 1914 | 3 | |
| 21 | Fayette | | | |
| 22 | Floyd | | | |
| 23 | Fountain | | | |

[12] See Footnote 1, page 7.

INDIANA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 24 | Franklin | IP[13] | 1 | |
| 25 | Fulton | 1937 | 1 | |
| 26 | Gibson | 1922 | 2 | |
| 27 | Grant | 1915 | 2 | |
| 28 | Greene | 1906 | 4 | |
| 29 | Hamilton | 1912 | 2 | |
| 30 | Hancock | 1925 | 2 | |
| 31 | Harrison | | | |
| 32 | Hendricks | 1913 | 2 | |
| 33 | Henry | | | |
| 34 | Howard | | | |
| 35 | Huntington | | | |
| 36 | Jackson | | | |
| 37 | Jasper | | | |
| 38 | Jay | | | |
| 39 | Jefferson | | | |
| 40 | Jennings | 1932 | 2 | |
| 41 | Johnson | 1938 | 1 | |
| 42 | Knox | 1934 | 1 | |
| 43 | Kosciusko | 1922 | 2 | |
| 44 | Lagrange | | | |
| 45 | Lake | 1917 | 2 | |
| 46 | La Porte | 1934 | 1 | |
| 47 | Lawrence | 1922 | 2 | |
| 48 | Madison | 1903 | 4 | |
| 49 | Marion | 1907 | 3 | |
| 50 | Marshall | 1904 | 4 | |
| 51 | Martin | 1936 | 1 | |
| 52 | Miami | 1927 | 2 | |
| 53 | Monroe | 1922 | 2 | |
| 54 | Montgomery | 1912 | 3 | |
| 55 | Morgan | IP[13] | 1 | |
| 56 | Newton | 1905 | 4 | |
| 57 | Noble | IP[13] | 1 | |
| 58 | Ohio | 1930 | 2 | Also includes Switzerland Co. |
| 59 | Orange | | | |
| 60 | Owen | | | |
| 61 | Parke | | | |
| 62 | Perry | | | |
| 63 | Pike | 1930 | 2 | |
| 64 | Porter | 1916 | 2 | |
| 65 | Posey | 1902 | 3 | |
| 66 | Pulaski | | | |
| 67 | Putnam | 1925 | 2 | |
| 68 | Randolph | 1931 | 2 | |
| 69 | Ripley | | | |
| 70 | Rush | 1930 | 2 | |

[13]See Footnote 1, page 7.

INDIANA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 71 | Saint Joseph | IP[14] | 1 | |
| 72 | Scott | 1904 | 3 | |
| 73 | Selby | | | |
| 74 | Spencer | | | See Booneville Area |
| 75 | Starke | 1915 | 3 | |
| 76 | Steuben | 1933 | 2 | |
| 77 | Sullivan | | | |
| 78 | Switzerland | 1930 | 2 | See Ohio Co. |
| 79 | Tippecanoe | 1905 | 3 | |
| 80 | Tipton | 1912 | 3 | |
| 81 | Union | | | |
| 82 | Vanderburgh | 1939 | 1 | |
| 83 | Vermillion | 1930 | 2 | |
| 84 | Vigo | | | |
| 85 | Wabash | | | |
| 86 | Warren | 1914 | 3 | |
| 87 | Warrick | | | See Booneville Area |
| 88 | Washington | 1932 | 1 | |
| 89 | Wayne | 1925 | 2 | |
| 90 | Wells | 1915 | 2 | |
| 91 | White | 1915 | 3 | |
| 92 | Whitley | | | |

[14]See Footnote 1, page 7.

SOIL AREAS

| | | | |
|---|---|---|---|
| | Booneville Area | 1904 | 3 |

Libraries in Indiana in which complete sets of the Soil Surveys and Reports may be found:

Bloomington, Indiana University Library
Crawfordsville, Wabash College Library
Elkhart, Elkhart-Carnegie Public Library
Evansville, Willard Library
Fort Wayne, Public Library
French Lick, Public Library
Greencastle, DePauw University Library
Hanover, Hanover College Library
Huntington, City Free Library
Indianapolis, Indiana State Library
Indianapolis, Public Library
Indianapolis, State Department of Geology Library
Jasper, Jasper College Library
LaFayette, Purdue University Library
LaFayette, Agricultural Experiment Station Library
Laporte, Laporte Public Library
Merom, Union Christian College Library
Notre Dame, Lemonier University of Notre Dame
Pendleton, Carnegie Public Library
Richmond, Earlham College Library
Richmond, Morrison Reeves Library
Terre Haute, Indiana State Teachers College
Terre Haute, Emeline Fairbanks Memorial Library
Valparaiso, Valparaiso Univ. Library

IOWA

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Adair | 1919 | 2 | |
| 2 | Adams | | | |
| 3 | Allamakee | | | |
| 4 | Appanoose | 1923 | 2 | |
| 5 | Audubon | 1933 | 1 | |
| 6 | Benton | 1921 | 2 | |
| 7 | Black Hawk | 1917 | 3 | |
| 8 | Boone | 1920 | 2 | |
| 9 | Bremer | 1913 | 2 | |
| 10 | Buchanan | 1926 | 3 | |
| 11 | Buena Vista | 1917 | 3 | |
| 12 | Butler | 1928 | 2 | |
| 13 | Calhoun | 1930 | 2 | |
| 14 | Carroll | 1926 | 2 | |
| 15 | Cass | | | |
| 16 | Cedar | 1919 | 3 | |
| 17 | Cerro Gordo | 1935 | 2 | |
| 18 | Cherokee | 1924 | 1 | |
| 19 | Chickasaw | 1927 | 2 | |
| 20 | Clarke | 1923 | 2 | |
| 21 | Clay | 1916 | 2 | |
| 22 | Clayton | 1925 | 2 | |
| 23 | Clinton | 1915 | 3 | |
| 24 | Crawford | 1928 | 1 | |
| 25 | Dallas | 1920 | 2 | |
| 26 | Davis | 1933 | 2 | |
| 27 | Decatur | 1935 | 1 | |
| 28 | Delaware | 1922 | 2 | |
| 29 | Des Moines | 1921 | 2 | |
| 30 | Dickinson | 1920 | 2 | |
| 31 | Dubuque | 1920 | 2 | |
| 32 | Emmet | 1920 | 2 | |
| 33 | Fayette | 1919 | 1 | |
| 34 | Floyd | 1922 | 1 | |
| 35 | Franklin | 1932 | 1 | |
| 36 | Fremont | 1924 | 2 | |
| 37 | Greene | 1921 | 2 | |
| 38 | Grundy | 1921 | 2 | |
| 39 | Guthrie | 1929 | 2 | |
| 40 | Hamilton | 1917 | 2 | |
| 41 | Hancock | 1930 | 2 | |
| 42 | Hardin | 1920 | 2 | |
| 43 | Harrison | 1923 | 2 | |
| 44 | Henry | 1917 | 2 | |
| 45 | Howard | 1925 | 2 | |
| 46 | Humboldt | | | |
| 47 | Ida | 1933 | 2 | |
| 48 | Iowa | | | |
| 49 | Jackson | 1936 | 2 | |

IOWA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 50 | Jasper | 1921 | 2 | |
| 51 | Jefferson | 1922 | 2 | |
| 52 | Johnson | 1919 | 2 | |
| 53 | Jones | 1924 | 2 | |
| 54 | Keokuk | | | |
| 55 | Kossuth | 1925 | 2 | |
| 56 | Lee | 1914 | 2 | |
| 57 | Linn | 1917 | 2 | |
| 58 | Louisa | 1918 | 2 | |
| 59 | Lucas | | | |
| 60 | Lyon | 1927 | 2 | |
| 61 | Madison | 1918 | 2 | |
| 62 | Mahaska | 1919 | 2 | |
| 63 | Marion | 1932 | 2 | |
| 64 | Marshall | 1918 | 2 | |
| 65 | Mills | 1920 | 2 | |
| 66 | Mitchell | 1916 | 2 | |
| 67 | Monona | | | |
| 68 | Monroe | 1931 | 1 | |
| 69 | Montgomery | 1917 | 2 | |
| 70 | Muscatine | 1914 | 2 | |
| 71 | O'Brien | 1921 | 2 | |
| 72 | Osceola | 1934 | 1 | |
| 73 | Page | 1921 | 2 | |
| 74 | Palo Alto | 1918 | 2 | |
| 75 | Plymouth | 1923 | 2 | |
| 76 | Pocahontas | 1928 | 2 | |
| 77 | Polk | 1918 | 2 | |
| 78 | Pottawattamie | 1914 | 2 | |
| 79 | Poweshiek | 1929 | 1 | |
| 80 | Ringgold | 1916 | 2 | |
| 81 | Sac | 1928 | 2 | |
| 82 | Scott | 1915 | 2 | |
| 83 | Shelby | | | |
| 84 | Sioux | 1915 | 2 | |
| 85 | Story | 1936 | 1 | |
| 86 | Tama | IP[15] | 1 | |
| 87 | Taylor | IP[15] | 1 | |
| 88 | Union | 1927 | 2 | |
| 89 | Van Buren | 1915 | 2 | |
| 90 | Wapello | 1917 | 2 | |
| 91 | Warren | 1925 | 2 | |
| 92 | Washington | 1930 | 2 | |
| 93 | Wayne | 1918 | 2 | |
| 94 | Webster | 1914 | 2 | |
| 95 | Winnebago | 1918 | 2 | |
| 96 | Winneshiek | 1922 | 2 | |

[15]See Footnote 1, page 7.

IOWA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 97 | Woodbury | 1920 | 2 | |
| 98 | Worth | 1922 | 2 | |
| 99 | Wright | 1919 | 2 | |

Libraries in Iowa in which complete sets of Soil Surveys and Reports may be found:

Ames, Iowa State College Library
Ames, Agricultural Experiment Station Library
Boone, Ericson Free Public Library
Cedar Falls, Library, State Teachers College
Cedar Falls, Library, State Normal School
Council Bluffs, Free Public Library
Davenport, Academy Natural Sciences Library
Des Moines, Public Library
Dubuque, Carnegie Stout Free Public Library
Fairfield, Free Public Library
Fayette, Upper Iowa University Library
Grinnell, Iowa College Library
Iowa City, Iowa State University Library
Mount Pleasant, Iowa Wesleyan University Library
Mount Vernon, Cornell College Library
Sioux City, Public Library
Tabor, Tabor College Library

KANSAS

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Allen | 1935 | 2 | Also see 1904 map |
| 2 | Anderson | | | |
| 3 | Atchison | | | See Platte Co. Missouri |
| 4 | Barber | | | See Western Kansas reconn. |
| 5 | Barton | | | See Western Kansas reconn. |
| 6 | Bourbon | 1931 | 1 | |
| 7 | Brown | 1905 | 4 | |
| 8 | Butler | | | See Wichita Area |
| 9 | Chase | | | |
| 10 | Chautauqua | | | |
| 11 | Cherokee | 1912 | 3 | Also see Parsons Area |
| 12 | Cheyenne | | | See Western Kansas reconn. |
| 13 | Clark | | | See Western Kansas reconn. |
| 14 | Clay | 1926 | 2 | |
| 15 | Cloud | | | |
| 16 | Coffey | | | |
| 17 | Comanchee | | | See Western Kansas reconn. |
| 18 | Cowley | 1915 | 2 | |
| 19 | Crawford | 1928 | 2 | Also see Parsons Area |
| 20 | Decatur | | | See Western Kansas reconn. |
| 21 | Dickinson | | | |
| 22 | Doniphan | 1927 | 2 | |
| 23 | Douglas | | | |

KANSAS (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 24 | Edwards | | | See Western Kansas reconn. |
| 25 | Elk | | | |
| 26 | Ellis | | | See Western Kansas reconn. |
| 27 | Ellsworth | | | |
| 28 | Finney | | | See Western Kansas reconn. |
| | | | | See Garden City Area |
| 29 | Ford | | | See Western Kansas reconn. |
| 30 | Franklin | | | |
| 31 | Geary | | | |
| 32 | Gove | | | See Western Kansas reconn. |
| 33 | Graham | | | See Western Kansas reconn. |
| 34 | Grant | | | See Western Kansas reconn. |
| 35 | Gray | | | See Western Kansas reconn. |
| | | | | See Garden City Area |
| 36 | Greeley | | | See Western Kansas reconn. |
| 37 | Greenwood | 1912 | 3 | |
| 38 | Hamilton | | | See Western Kansas reconn. |
| 39 | Harper | | | |
| 40 | Harvey | | | |
| 41 | Haskell | | | See Western Kansas reconn. |
| 42 | Hodgeman | | | See Western Kansas reconn. |
| 43 | Jackson | | | |
| 44 | Jefferson | | | |
| 45 | Jewell | 1912 | 3 | |
| 46 | Johnson | 1928 | 2 | |
| 47 | Kearny | | | See Western Kansas reconn. |
| 48 | Kingman | 1932 | 2 | |
| 49 | Kiowa | | | See Western Kansas reconn. |
| 50 | Labette | 1926 | 1 | Also see Parsons Area |
| 51 | Lane | | | See Western Kansas reconn. |
| 52 | Leavenworth | 1919 | 2 | |
| 53 | Lincoln | | | |
| 54 | Linn | | | |
| 55 | Logan | | | See Western Kansas reconn. |
| 56 | Lyon | | | |
| 57 | McPherson | | | |
| 58 | Marion | 1930 | 1 | |
| 59 | Marshall | | | |
| 60 | Meade | | | See Western Kansas reconn. |
| 61 | Miami | | | |
| 62 | Mitchell | | | |
| 63 | Montgomery | 1913 | 2 | |
| 64 | Morris | | | |
| 65 | Morton | | | See Western Kansas reconn. |
| 66 | Nemaha | | | |
| 67 | Neosho | 1930 | 1 | |
| 68 | Ness | | | See Western Kansas reconn. |
| 69 | Norton | | | See Western Kansas reconn. |
| 70 | Osage | | | |

KANSAS(Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 71 | Osborne | | | See Western Kansas reconn. |
| 72 | Ottawa | | | |
| 73 | Pawanee | | | See Western Kansas reconn. |
| 74 | Phillips | | | See Western Kansas reconn. |
| 75 | Pottawatomie | | | |
| 76 | Pratt | | | See Western Kansas reconn. |
| 77 | Rawlins | | | See Western Kansas reconn. |
| 78 | Reno | 1911 | 3 | |
| 79 | Republic | | | |
| 80 | Rice | | | |
| 81 | Riley | 1916 | 3 | |
| 82 | Rooks | | | See Western Kansas reconn. |
| 83 | Rush | | | See Western Kansas reconn. |
| 84 | Russell | | | See Western Kansas reconn. |
| | | | | See Russell Area |
| 85 | Saline | | | |
| 86 | Scott | | | See Western Kansas reconn. |
| 87 | Sedgwick | | | See Wichita Area |
| 88 | Seward | | | See Western Kansas reconn. |
| 89 | Shawnee | 1911 | 3 | |
| 90 | Sheridan | | | See Western Kansas reconn. |
| 91 | Sherman | | | See Western Kansas reconn. |
| 92 | Smith | | | See Western Kansas reconn. |
| 93 | Stafford | | | See Western Kansas reconn. |
| 94 | Stanton | | | See Western Kansas reconn. |
| 95 | Stevens | | | See Western Kansas reconn. |
| 96 | Sumner | | | |
| 97 | Thomas | | | See Western Kansas reconn. |
| 98 | Trego | | | See Western Kansas reconn. |
| 99 | Wabaunsee | | | |
| 100 | Wallace | | | See Western Kansas reconn. |
| 101 | Washington | | | |
| 102 | Wichita | | | See Western Kansas reconn. |
| 103 | Wilson | 1927 | 1 | |
| 104 | Woodson | 1931 | 1 | |
| 105 | Wyandotte | | | |

SOIL AREAS

| | | |
|---|---|---|
| Wichita | 1902 | 4 |
| Parsons | 1903 | 4 |
| Russell | 1903 | 4 |
| Garden City | 1904 | 4 |
| Western Kansas Reconn. | 1910 | 3 |

KANSAS (Continued)

Libraries in Kansas in which complete sets of Soil Surveys and Reports may be found:

Baldwin, Baker University Library
Garden City, Kansas Substation Library
Emporia, State Normal School Library
Hays, U.S. Soil Conservation Service
Hays, Forsyth Library, Fort Hays Kansas State College
Hiawatha, Morrill Free Public Library
Lawrence, Library, University of Kansas
Manhattan, Agricultural Experiment Station Library
Manhattan, Kansas State Agricultural College Library
Peabody, Public Library
Pittsburg, Public Library
Sterling, Sterling College Library
Topeka, State Library
Topeka, State Historical Society Library
Wichita, Morrison Library, University of Wichita

KENTUCKY

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Adair | | | |
| 2 | Allen | | | |
| 3 | Anderson | | | |
| 4 | Ballard | | | |
| 5 | Barren | | | |
| 6 | Bath | | | |
| 7 | Bell | | | |
| 8 | Boone | | | |
| 9 | Bourbon | | | |
| 10 | Boyd | | | |
| 11 | Boyle | | | |
| 12 | Bracken | | | |
| 13 | Breathitt | | | |
| 14 | Breckinridge | | | |
| 15 | Bullitt | | | |
| 16 | Butler | | | |
| 17 | Caldwell | | | |
| 18 | Calloway | 1945 | 1 | |
| 19 | Campbell | | | |
| 20 | Carlisle | | | |
| 21 | Carroll | | | |
| 22 | Carter | | | |
| 23 | Casey | | | |
| 24 | Christian | 1912 | 3 | |
| 25 | Clark | | | |
| 26 | Clay | | | |
| 27 | Clinton | | | |
| 28 | Crittenden | | | |
| 29 | Cumberland | | | |

KENTUCKY (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 30 | Daviess | | | |
| 31 | Edmonson | | | |
| 32 | Elliott | | | |
| 33 | Estill | | | |
| 34 | Fayette | 1931 | 1 | |
| 35 | Fleming | | | |
| 36 | Floyd | | | |
| 37 | Franklin | | | |
| 38 | Fulton | | | |
| 39 | Gallatin | | | |
| 40 | Garrard | 1921 | 2 | |
| 41 | Grant | | | |
| 42 | Graves | IP[16] | 1 | |
| 43 | Grayson | | | |
| 44 | Green | | | |
| 45 | Greenup | | | |
| 46 | Hancock | | | |
| 47 | Hardin | | | |
| 48 | Harlan | | | |
| 49 | Harrison | | | |
| 50 | Hart | | | |
| 51 | Henderson | | | |
| 52 | Henry | | | |
| 53 | Hickman | | | |
| 54 | Hopkins | | | |
| 55 | Jackson | | | |
| 56 | Jefferson | | | |
| 57 | Jessamine | 1915 | 3 | |
| 58 | Johnson | | | |
| 59 | Kenton | | | |
| 60 | Knott | | | |
| 61 | Knox | | | |
| 62 | Larue | | | |
| 63 | Laurel | | | |
| 64 | Lawrence | | | |
| 65 | Lee | | | |
| 66 | Leslie | | | |
| 67 | Letcher | | | |
| 68 | Lewis | | | |
| 69 | Lincoln | | | |
| 70 | Livingston | | | |
| 71 | Logan | 1919 | 2 | |
| 72 | Lyon | | | |
| 73 | McCracken | 1905 | 4 | |
| 74 | McCreary | | | |
| 75 | McLean | | | |
| 76 | Madison | 1905 | 4 | |

[16]See Footnote 1, page 7.

KENTUCKY (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 77 | Magoffin | | | |
| 78 | Marion | | | |
| 79 | Marshall | IP[17] | 1 | |
| 80 | Martin | | | |
| 81 | Mason | 1903 | 4 | |
| 82 | Meade | | | |
| 83 | Menifee | | | |
| 84 | Mercer | 1930 | 1 | |
| 85 | Metcalfe | | | |
| 86 | Monroe | | | |
| 87 | Montgomery | | | |
| 88 | Morgan | | | |
| 89 | Muhlenberg | 1920 | 2 | |
| 90 | Nelson | | | |
| 91 | Nicholas | | | |
| 92 | Ohio | | | |
| 93 | Oldham | | | |
| 94 | Owen | | | |
| 95 | Owsley | | | |
| 96 | Pendleton | | | |
| 97 | Perry | | | |
| 98 | Pike | | | |
| 99 | Powell | | | |
| 100 | Pulaski | | | |
| 101 | Robertson | | | |
| 102 | Rockcastle | 1910 | 3 | |
| 103 | Rowan | | | |
| 104 | Russell | | | |
| 105 | Scott | 1903 | 4 | |
| 106 | Shelby | 1916 | 2 | |
| 107 | Simpson | | | |
| 108 | Spencer | | | |
| 109 | Taylor | | | |
| 110 | Todd | | | |
| 111 | Trigg | | | |
| 112 | Trimble | | | |
| 113 | Union | 1902 | 4 | |
| 114 | Warren | 1904 | 4 | |
| 115 | Washington | | | |
| 116 | Wayne | | | |
| 117 | Webster | | | |
| 118 | Whitley | | | |
| 119 | Wolfe | | | |
| 120 | Woodford | | | |

[17] See Footnote 1, page 7.

KENTUCKY (Continued)

Libraries in the State of Kentucky in which complete sets of Soil Surveys and Reports may be found.

Berea, Library, Berea College
Danville, Library, Center College
Frankfort, Kentucky State Library
Frankfort, Normal and Industrial School for Colored Persons
Henderson, Public Library
Lexington, College of Agriculture Library
Lexington, Public Library
Lexington, Agricultural Experiment Station Library
Lexington, College of Agriculture, University of Kentucky Library
Lexington, State University Library
Lincoln Ridge, Lincoln Institute of Kentucky Library
Louisville, Free Public Library
Portland, Library, Portland Society of Natural History
Simpsonville, Lincoln Institute of Kentucky Library
Somerset, Carnegie Public Library
Winchester, Kentucky Wesleyan College Library

LOUISIANA

| Reference No. | Parish Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Acadia | 1903 | 3 | |
| 2 | Allen | | | |
| 3 | Ascension | | | |
| 4 | Assumption | | | |
| 5 | Aboyelles | | | |
| 6 | Beauregard | 1928 | 2 | |
| 7 | Bienville | 1908 | 3 | |
| 8 | Bossier | | | |
| 9 | Caddo | 1906 | 4 | |
| 10 | Calcasieu | | | See Lake Charles Area |
| 11 | Caldwell | | | |
| 12 | Cameron | | | |
| 13 | Catahoula | | | |
| 14 | Claiborne | | | |
| 15 | Concordia | 1910 | 4 | |
| 16 | DeSoto | 1904 | 4 | |
| 17 | East Baton Rouge | 1906 | 4 | |
| 18 | East Carroll | 1908 | 3 | Includes West Carroll |
| 19 | East Feliciana | 1912 | 3 | |
| 20 | Evangeline | | | |
| 21 | Franklin | | | |
| 22 | Grant | | | |
| 23 | Iberia | 1911 | 3 | |
| 24 | Iberville | | | |
| 25 | Jackson | | | |
| 26 | Jefferson | | | See New Orleans Area |
| 27 | Jefferson Davis | | | |

LOUISIANA (Continued)

| Reference No. | Parish Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 28 | LaFayette | 1915 | 3 | |
| 29 | LaFourche | | | |
| 30 | LaSalle | 1918 | 3 | |
| 31 | Lincoln | 1909 | 4 | |
| 32 | Livingston | 1931 | 2 | |
| 33 | Madison | | | |
| 34 | Morehouse | | | |
| 35 | Natchitoches | 1921 | 2 | |
| 36 | Orleans | | | See New Orleans Area |
| 37 | Ouachita | 1903 | 4 | |
| 38 | Plaquemines | | | See New Orleans Area |
| 39 | Pointe Coupee | | | |
| 40 | Rapides | 1906 | 3 | |
| 41 | Red River | | | |
| 42 | Richland | | | |
| 43 | Sabine | 1919 | 3 | |
| 44 | Saint Bernard | | | |
| 45 | Saint Charles | | | See New Orleans Area |
| 46 | Saint Helena | | | |
| 47 | Saint James | | | |
| 48 | Saint John the Baptist | 1903 | 4 | See New Orleans Area |
| 49 | Saint Landry | | | |
| 50 | Saint Martin | 1917 | 3 | |
| 51 | Saint Marys | | | |
| 52 | Saint Tammany | | | |
| 53 | Tangipahoa | 1905 | 2 | |
| 54 | Tensas | | | |
| 55 | Terrebonne | | | |
| 56 | Union | | | |
| 57 | Vermillion | | | |
| 58 | Vernon | | | |
| 59 | Washington | 1922 | 2 | |
| 60 | Webster | 1914 | 3 | |
| 61 | West Baton Rouge | | | |
| 62 | West Carroll | 1908 | 3 | See East Carroll and Carroll Parish |
| 63 | West Feliciana | | | |
| 64 | Winn | 1907 | 4 | |
| | | Soil Areas | | |
| | New Orleans Area | 1903 | 4 | |

Libraries in the State of Louisiana in which complete sets of Soil Surveys and Reports may be found.

Baton Rouge, Agricultural Experiment Station Library
Baton Rouge, Hill Memorial Library
Baton Rouge, Southern University Library
Calhoun, Agricultural Experiment Station Library
Crowley, Agricultural Experiment Station Library
Nachitoches, State Normal School Library
New Orleans, New Orleans Public Library
New Orleans, Howard Memorial Library
New Orleans, Louisiana State Museum Library
New Orleans, Tulane University Library
Ruston, Industrial Institute Library

MAINE

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Androscoggin | | | |
| 2 | Aroostook | | | See Caribou Area<br>See Aroostook Area |
| 3 | Cumberland | 1915 | 2 | |
| 4 | Franklin | | | |
| 5 | Hancock | | | |
| 6 | Kennebec | | | |
| 7 | Knox | | | |
| 8 | Lincoln | | | |
| 9 | Oxford | | | |
| 10 | Penobscot | | | See Orono Area |
| 11 | Piscataquis | | | |
| 12 | Sagadahoc | | | |
| 13 | Somerset | | | |
| 14 | Waldo | IP[18] | 1 | |
| 15 | Washington | | | |
| 16 | York | IP[18] | 1 | |

[18] See Footnote 1, page 7.

Soil Areas

| | | |
|---|---|---|
| Caribou Area | 1908 | 3 |
| Orono Area | 1909 | 3 |
| Aroostook Area | 1917 | 3 |

Libraries in the State of Maine in which complete sets of Soil Surveys and Reports may be found.

Augusta, Maine State Library
Bangor, Public Library
Brunswick, Bowdoin College Library
Lewiston, Bates College Library
Orono, Agricultural Experiment Station Library
Orono, University of Maine Library
Portland, Portland Society of Natural History Library
Portland, Public Library
Saco, Dyer Library Association
Waterville, Colby College Library

MARYLAND

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Allegany | 1921 | 3 | |
| 2 | Anne Arundel | 1928 | 2 | |
| 3 | Baltimore | 1917 | 2 | |
| 4 | Calvert | 1928 | 2 | |
| 5 | Caroline | 1929 | 2 | |
| 6 | Carroll | 1919 | 2 | |
| 7 | Cecil | 1927 | 2 | |
| 8 | Charles | 1918 | 2 | |
| 9 | Dorchester | 1922 | 2 | |
| 10 | Frederick | 1919 | 2 | |
| 11 | Garrett | 1922 | 2 | |
| 12 | Harford | 1927 | 2 | |
| 13 | Howard | 1916 | 2 | |
| 14 | Kent | 1930 | 2 | |
| 15 | Montgomery | 1914 | 2 | |
| 16 | Prince Georges | 1925 | 2 | |
| 17 | Queen Annes | 1931 | 2 | |
| 18 | Saint Marys | 1923 | 2 | |
| 19 | Somerset | 1920 | 2 | |
| 20 | Talbot | 1929 | 2 | |
| 21 | Washington | 1917 | 2 | |
| 22 | Wicomico | 1921 | 2 | |
| 23 | Worcester | 1924 | 2 | |

Libraries in the State of Maryland in which complete sets of Soil Surveys and Reports may be found.

Annapolis, Maryland State Library
Baltimore, Abbe Meteorological Library, Johns Hopkins University
Baltimore, Enoch Pratt Free Library
Baltimore, Library, Johns Hopkins University
Baltimore, Public Library
Baltimore, Peabody Institute Library
Chestertown, Washington College Library
College Park, Agricultural Experiment Station Library
College Park, Maryland State College of Agriculture
College Park, Library Division of Entomology, College of Agriculture
Princess Anne, Princess Anne Academy Library
Westminster, Western Maryland College Library

MASSACHUSETTS

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Barnstable | 1920 | 2 | Includes Norfolk and Bristol Cos. |
| 2 | Berkshire | 1923 | 2 | |
| 3 | Bristol | 1920 | 2 | |
| 4 | Dukes | 1925 | 1 | Includes Nantucket Co. |

MASSACHUSETTS (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 5 | Essex | 1925 | 1 | |
| 6 | Franklin | | | See Connecticut Valley |
| 7 | Hampden | 1928 | 1 | Includes Hampshire Co. |
| 8 | Hampshire | 1928 | 1 | Includes Hampden Co. |
| 9 | Middlesex | 1924 | 1 | |
| 10 | Nantucket | 1925 | 1 | Includes Dukes Co. |
| 11 | Norfolk | 1920 | 2 | Includes Bristol and Barnstable Cos. See also Dukes Co. |
| 12 | Plymouth | 1911 | 2 | |
| 13 | Suffolk | | | |
| 14 | Worcester | 1922 | 1 | |
| | | Soil Areas | | |
| | Connecticut Valley | 1899 | 3 | |
| | Connecticut Valley | 1903 | 3 | |

Libraries in Massachusetts in which complete sets of the Field Soil Surveys and Reports may be found.

Amherst, Amherst College Library
Amherst, Agricultural Experiment Station Library
Amherst, Massachusetts Agricultural College Library
Boston, Boston Athenaeum Library
Boston, Boston Society Natural History Library
Boston, Massachusetts Horticultural Society Library
Boston, Public Library
Boston, State Library of Massachusetts
Boston, State Board of Agriculture
Cambridge, Harvard College Library
Cambridge, Massachusetts Institute of Technology
Dudley, Conant Library
Framingham, Public Library
Haverhill, Public Library
Jamaica Plains, Harvard University, Bussey Institute Library
Lawrence, Public Library
Lowell, City Library
Lynn, Public Library
New Bedford, Public Library
North Adams, Public Library
Northampton, Forbes Library
Salem, Essex Institute Library
South Hadley, Mount Holyoke College Library
Springfield, The City Library Association
Taunton, Public Library
Tufts College, Tufts College Library
Wellesley, Library Wellesley College
West Newbury, Natural History Club
Weymouth, Tufts Library
Williamstown, Williams College Library
Worcester, Clark University Library
Worcester, Holy Cross College Library
Worcester, Free Public Library
Worcester, American Antiquarian Society Library

MICHIGAN

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Alcona | | | |
| 2 | Alger | 1929 | 1 | |
| 3 | Allegan | 1901 | 4 | |
| 4 | Alpena | 1924 | 2 | |
| 5 | Antrim | 1923 | 2 | |
| 6 | Akenac | | | |
| 7 | Baraga | | | |
| 8 | Barry | 1924 | 2 | |
| 9 | Bay | 1931 | 2 | |
| 10 | Benzie | | | |
| 11 | Berrien | 1922 | 2 | |
| 12 | Branch | 1928 | 2 | |
| 13 | Calhoun | 1916 | 3 | |
| 14 | Cass | 1909 | 3 | |
| 15 | Charlevoix | | | |
| 16 | Cheboygan | 1934 | 1 | |
| 17 | Chippewa | 1927 | 1 | |
| 18 | Clare | | | |
| 19 | Clinton | 1936 | 1 | |
| 20 | Crawford | 1927 | 2 | |
| 21 | Delta | | | |
| 22 | Dickinson | | | |
| 23 | Eaton | 1930 | 2 | |
| 24 | Emmet | | | |
| 25 | Genesee | 1912 | 3 | |
| 26 | Gladwind | | | |
| 27 | Gogebic | | | |
| 28 | Grand Traverse | | | |
| 29 | Gratiot | | | See Alama Area |
| 30 | Hillsdale | 1924 | 2 | |
| 31 | Houghton | | | |
| 32 | Huron | | | See Saginaw Area |
| 33 | Ingham | 1933 | 2 | |
| 34 | Ionia | | | |
| 35 | Ipsco | | | |
| 36 | Iron | 1930 | 1 | |
| 37 | Isabella | 1923 | 2 | |
| 38 | Jackson | 1926 | 2 | |
| 39 | Kalamazoo | 1922 | 2 | |
| 40 | Kalkaska | 1927 | 2 | |
| 41 | Kent | 1926 | 2 | |
| 42 | Keweenaw | | | |
| 43 | Lake | | | |
| 44 | Lapeer | | | |
| 45 | Leelanau | | | |
| 46 | Lenawee | | | |
| 47 | Livingston | 1923 | 2 | |
| 48 | Luce | 1929 | 1 | |
| 49 | Mackinac | | | |

MICHIGAN (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 50 | Macomb | 1923 | 2 | |
| 51 | Manistee | 1922 | 2 | |
| 52 | Marquette | | | |
| 53 | Mason | 1936 | 1 | |
| 54 | Mecosta | 1927 | 2 | |
| 55 | Menominee | 1925 | 2 | |
| 56 | Midland | IP[19] | 1 | |
| 57 | Misaukee | | | |
| 58 | Monroe | | | See Toledo Area, Ohio |
| 59 | Montcalm | | | |
| 60 | Montmorency | 1930 | 1 | |
| 61 | Muskegon | 1924 | 2 | |
| 62 | Newago | IP[19] | 1 | |
| 63 | Oakland | | | See Pontiac Area and Oxford Area |
| 64 | Oceana | 1933 | 1 | |
| 65 | Ogemaw | 1923 | 2 | |
| 66 | Ontonagon | | | See Ontonagon reconn. |
| 67 | Osceola | | | |
| 68 | Oscoda | 1931 | 1 | |
| 69 | Otsego | | | |
| 70 | Ottawa | 1922 | 2 | |
| 71 | Presque Isle | | | |
| 72 | Roscommon | 1924 | 1 | |
| 73 | Saginaw | 1933 | 1 | |
| 74 | Saint Clair | 1929 | 2 | |
| 75 | Saint Joseph | 1921 | 2 | |
| 76 | Sanilac | | | |
| 77 | Schoolcraft | 1932 | 1 | |
| 78 | Shiawassee | | | See Owosso Area |
| 79 | Tuscola | 1926 | 2 | |
| 80 | Van Buren | 1922 | 2 | |
| 81 | Washtenaw | 1930 | 1 | |
| 82 | Wayne | | | |
| 83 | Wexford | 1908 | 3 | |
| | | Soil Areas | | |
| | Toledo Area Ohio | 1902 | 4 | |
| | Pontiac Area | 1903 | 3 | |
| | Alma Area | 1904 | 4 | |
| | Owosso Area | 1904 | 4 | |
| | Saginaw Area | 1904 | 3 | |
| | Oxford Area | 1905 | 3 | |
| | Ontonagon Co. Reconn. | 1921 | 3 | |

[19]See Footnote 1, page 7.

MICHIGAN (Continued)

Libraries in Michigan in which complete sets of Soil Surveys and Reports may be found.

Adrian, Public School Library
Albion, Library, Albion College
Ann Arbor, General Library, University of Michigan
Battle Creek, Public School Library
Bay City, Public Library
Benton Harbor, Benton Harbor Library
Detroit, Detroit College Library
Detroit, Public Library
East Lansing, Michigan State Agricultural College Library
East Lansing, Agricultural Experiment Station Library
Grand Rapids, Public Library
Houghton, Michigan College of Mining and Technology Library
Kalamazoo, Public Library
Lansing, Michigan State Library
Muskegon, Hackley Public Library
Orchard Lake, Polish Seminary Library
Olivet, Olivet College Library
Point Huron, Public Library
Saginaw, Hoyt Public Library
Ypsilanti, State Normal School

MINNESOTA

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Aitkin | | | |
| 2 | Anoka | 1916 | 2 | |
| 3 | Becker | | | |
| 4 | Beltrami | | | |
| 5 | Benton | | | |
| 6 | Big Stone | | | |
| 7 | Blue Earth | 1906 | 3 | |
| 8 | Brown | | | |
| 9 | Carlton | | | See Carlton Area |
| 10 | Carver | | | |
| 11 | Cass | | | |
| 12 | Chippewa | | | |
| 13 | Chisago | | | |
| 14 | Clay | | | See Red River Valley Area |
| 15 | Clearwater | | | |
| 16 | Cook | | | |
| 17 | Cottonwood | | | |
| 18 | Crow Wing | | | |
| 19 | Dakota | | | |
| 20 | Dodge | | | |
| 21 | Douglas | | | |
| 22 | Faribault | | | |
| 23 | Fillmore | | | |
| 24 | Freeburn | | | |
| 25 | Goodhue | 1913 | 2 | |
| 26 | Grant | | | |
| 27 | Hennepin | 1929 | 2 | |
| 28 | Houston | 1929 | 2 | |
| 29 | Hubbard | 1930 | 2 | |
| 30 | Isanti | | | |

MINNESOTA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 31 | Itasca | | | |
| 32 | Jackson | 1923 | 2 | |
| 33 | Kanabec | 1933 | 2 | |
| 34 | Kandiyohi | | | |
| 35 | Kittson | | | See Red River Valley Area |
| 36 | Koochiching | | | |
| 37 | Lac Qui Parle | 1924 | 2 | |
| 38 | Lake | | | |
| 39 | Lake of the Woods | 1926 | 2 | Reconnaissance |
| 40 | Le Sueur | | | |
| 41 | Lincoln | | | |
| 42 | Lyon | | | |
| 43 | McLeod | | | |
| 44 | Mahnomen | | | |
| 45 | Marshall | | | See Red River Valley Area |
| 46 | Martin | | | |
| 47 | Meeker | | | |
| 48 | Mille Lacs | 1927 | 2 | |
| 49 | Morrison | | | |
| 50 | Mower | | | |
| 51 | Murray | | | |
| 52 | Nicollet | | | |
| 53 | Nobles | | | |
| 54 | Norman | | | See Red River Valley Area |
| 55 | Olmsted | 1923 | 2 | |
| 56 | Otter Tail | | | |
| 57 | Pennington | 1914 | 2 | |
| 58 | Pine | 1935 | 2 | |
| 59 | Pipestone | | | |
| 60 | Polk | | | See Red River Valley Area |
| 61 | Pope | | | |
| 62 | Ramsey | 1914 | 3 | |
| 63 | Red Lake | | | See Red River Valley Area |
| 64 | Redwood | | | |
| 65 | Renville | | | |
| 66 | Rice | 1909 | 2 | |
| 67 | Rock | IP[20] | 1 | |
| 68 | Roseau | 1936 | 1 | |
| 69 | Saint Louis | | | See Carlton Area |
| 70 | Scott | | | |
| 71 | Sherburne | | | |
| 72 | Sibley | | | |
| 73 | Stearns | | | |
| 74 | Steele | | | |
| 75 | Stevens | 1919 | 2 | |
| 76 | Swift | | | |

[20]See Footnote 1, page 7.

MINNESOTA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 77 | Todd | | | |
| 78 | Travers | | | See Red River Valley Area |
| 79 | Wabasha | | | |
| 80 | Wadena | 1926 | 2 | |
| 81 | Waseca | | | |
| 82 | Washington | | | |
| 83 | Watonwan | | | |
| 84 | Wilkin | | | See Red River Valley Area |
| 85 | Winona | | | |
| 86 | Wright | | | |
| 87 | Yellow Medicine | | | |

Reconnaissance

| | | |
|---|---|---|
| Carlton Area | 1905 | 4 |
| Lake of the Woods Country | 1926 | 2 |
| Red River Valley Area | 1933 | 3 |

Libraries in Minnesota in which complete sets of Soil Surveys and Reports may be found.

Crookston, Northwest Experiment Station Library
Duluth, Public Library
Faribault, Public Library
Fergus Falls, High School Library
Grand Rapids, North Central School and Station Library
Minneapolis, Botanical Department, University of Minnesota
Minneapolis, Geography Department, University of Minnesota
Minneapolis, U. of Minnesota Library
Minneapolis, Public Library
Morris, West Central School of Agriculture
St. Paul, Agricultural Experiment Station, University Farms Library
St. Paul, Hamline University Library
St. Paul, James Jerome Hill Reference Library
St. Paul, Minnesota Historical Society Library
St. Paul, Minnesota State Library
St. Paul, College of Agriculture, University Farms
St. Paul, Division of Entomology, College of Agriculture
Stillwater, Public Library
Winona, State Normal School Library

MISSISSIPPI

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Adams | 1910 | 4 | |
| 2 | Alcorn | 1921 | 3 | |
| 3 | Amite | 1917 | 1 | |
| 4 | Attala | | | |
| 5 | Benton | | | |
| 6 | Bolivar | | | |
| 7 | Calhoun | | | |

MISSISSIPPI (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 8 | Carroll | | | |
| 9 | Chickasaw | 1915 | 3 | |
| 10 | Choctaw | 1920 | 2 | |
| 11 | Caliborne | 1926 | 3 | |
| 12 | Clarke | 1914 | 2 | |
| 13 | Clay | 1909 | 2 | |
| 14 | Coahoma | 1915 | 3 | |
| 15 | Copiah | 1905 | 3 | Also see Jackson and Crystal Spring Areas |
| 16 | Covington | 1917 | 2 | |
| 17 | De Soto | | | |
| 18 | Forrest | 1911 | 2 | |
| 19 | Franklin | | | |
| 20 | George | 1922 | 2 | |
| 21 | Greene | 1932 | 1 | |
| 22 | Grenada | 1915 | 2 | |
| 23 | Hancock | 1930 | 2 | Also see McNeill Area |
| 24 | Harrison | 1924 | 2 | Also see Biloxi Area |
| 25 | Hinds | 1916 | 2 | Also see Jackson Area |
| 26 | Holmes | 1908 | 4 | |
| 27 | Humphreys | | | |
| 28 | Issaguena | | | See Smedes, Yazoo Areas |
| 29 | Itawamba | | | |
| 30 | Jackson | 1927 | 2 | Also See Scranton Area |
| 31 | Jasper | 1907 | 4 | |
| 32 | Jefferson | | | |
| 33 | Jefferson Davis | 1915 | 2 | |
| 34 | Jones | 1913 | 3 | |
| 35 | Kemper | | | |
| 36 | Lafayette | 1912 | 2 | |
| 37 | Lamar | 1919 | 3 | |
| 38 | Lauderdale | 1910 | 4 | |
| 39 | Lawrence | | | |
| 40 | Leake | | | |
| 41 | Lee | 1916 | 3 | |
| 42 | Leflore | | | |
| 43 | Lincoln | 1912 | 3 | |
| 44 | Lowndes | 1911 | 3 | |
| 45 | Madison | 1917 | 2 | Also see Bentonia and Smedes Areas. |
| 46 | Marion | 1934 | 1 | |
| 47 | Marshall | | | |
| 48 | Monroe | 1908 | 3 | |
| 49 | Montgomery | 1906 | 4 | |
| 50 | Neshoba | | | |
| 51 | Newton | 1916 | 3 | |
| 52 | Noxubee | 1910 | 3 | |
| 53 | Oktibbeha | 1907 | 2 | |
| 54 | Panola | | | |

MISSISSIPPI (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 55 | Pearl River | 1918 | 3 | Also see McNeill Area |
| 56 | Perry | 1922 | 2 | |
| 57 | Pike | 1918 | 3 | |
| 58 | Pontotoc | 1906 | 4 | |
| 59 | Prentiss | 1907 | 4 | |
| 60 | Quitman | | | |
| 61 | Rankin | 1926 | 2 | Also see Jackson Area |
| 62 | Scott | | | |
| 63 | Sharkey | | | Also see Smedes and Yazoo Areas |
| 64 | Simpson | 1919 | 2 | See Crystal Springs and Johnson Areas |
| 65 | Smith | 1920 | 2 | |
| 66 | Stone | | | |
| 67 | Sunflower | | | |
| 68 | Tallahatchie | | | |
| 69 | Tate | | | |
| 70 | Tippah | | | |
| 71 | Tishomingo | 1937 | 1 | |
| 72 | Tunica | IP[21] | 1 | |
| 73 | Union | | | |
| 74 | Walterhall | | | |
| 75 | Warren | 1912 | 3 | |
| 76 | Washington | | | |
| 77 | Wayne | 1911 | 4 | |
| 78 | Webster | | | |
| 79 | Wilkinson | 1913 | 3 | |
| 80 | Winston | 1912 | 3 | |
| 81 | Yalobusha | | | |
| 82 | Yazoo | 1902 | 4 | Also see Smedes, Yazoo and Bentonia Areas |

[21]See Footnote 1, page 7.

| Reference No. | Soil Area Names | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Yazoo | 1901 | 4 | |
| 2 | Smedes | 1902 | 4 | |
| 3 | McNeill | 1903 | 4 | |
| 4 | Biloxi | 1904 | 3 | |
| 5 | Jackson | 1904 | 4 | |
| 6 | Crystal Springs | 1905 | 4 | |
| 7 | Scranton | 1909 | | Resurveyed see Jackson Co. |

MISSISSIPPI (Continued)

Libraries in the State of Mississippi in which complete sets of the Soil Surveys and Reports may be found.

Alcorn, Agricultural and Mechanical College Library
Brookhaven, Public Library
Greeneville, Public Library
Holly Springs, Branch Experiment Station Library
Jackson, Carnegie Millsaps Library
Jackson, Mississippi State Library
McNeill, Branch Experiment Station Library
Oxford, Mississippi State University Library
State College, Mississippi State College Library
State College, Experiment Station Library
Stoneville, Delta Branch Experiment Station Library

MISSOURI

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Adair | | | |
| 2 | Andrew | 1921 | 2 | |
| 3 | Atchison | 1909 | 3 | |
| 4 | Audrian | | | |
| 5 | Barry | 1916 | 2 | |
| 6 | Barton | 1912 | 3 | See Ozark Region |
| 7 | Bates | 1908 | 2 | |
| 8 | Benton | | | See Ozark Region |
| 9 | Bollinger | | | See Ozark Region |
| 10 | Boone | IP[22] | 1 | |
| 11 | Buchanan | 1915 | 2 | |
| 12 | Butler | | | See Ozark Region |
| 13 | Caldwell | 1921 | 2 | |
| 14 | Callaway | 1916 | 2 | |
| 15 | Camden | | | See Ozark Region |
| 16 | Cape Girardeau | 1910 | 4 | |
| 17 | Carroll | 1912 | 2 | |
| 18 | Carter | | | See Ozark Region |
| 19 | Cass | 1912 | 3 | |
| 20 | Cedar | 1909 | 4 | |
| 21 | Chariton | 1918 | 2 | |
| 22 | Christian | | | See Ozark Region |
| 23 | Clark | | | |
| 24 | Clay | | | |
| 25 | Clinton | | | |
| 26 | Cole | 1920 | 2 | |
| 27 | Cooper | 1909 | 2 | |
| 28 | Crawford | 1905 | 4 | |
| 29 | Dade | | | See Ozark Region |
| 30 | Dallas | | | See Ozark Region |

[22]See Footnote 1, page 7.

MISSOURI (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 31 | Daviess | | | |
| 32 | DeKalb | 1914 | 2 | |
| 33 | Dent | | | See Ozark Region |
| 34 | Douglas | | | See Ozark Region |
| 35 | Dunklin | 1914 | 2 | |
| 36 | Franklin | 1911 | 3 | |
| 37 | Casconade | | | See Ozark Region |
| 38 | Gentry | | | |
| 39 | Greene | 1913 | 2 | |
| 40 | Grundy | 1914 | 2 | |
| 41 | Harrison | 1914 | 2 | |
| 42 | Henry | | | |
| 43 | Hickory | | | See Ozark Region |
| 44 | Holt | IP[23] | 1 | |
| 45 | Howard | | | |
| 46 | Howell | 1902 | 4 | |
| 47 | Iron | | | See Ozark Region |
| 48 | Jackson | 1910 | 4 | |
| 49 | Jasper | | | See Ozark Region |
| 50 | Jefferson | | | See Ozark Region |
| 51 | Johnson | 1914 | 2 | |
| 52 | Knox | 1917 | 2 | |
| 53 | Laclede | 1911 | 3 | |
| 54 | Lafayette | 1920 | 2 | |
| 55 | Lawrence | 1923 | 2 | |
| 56 | Lewis | | | |
| 57 | Lincoln | 1917 | 2 | |
| 58 | Linn | 1938 | 2 | |
| 59 | Livingston | | | |
| 60 | McDonald | | | See Ozark Region |
| 61 | Macon | 1911 | 2 | |
| 62 | Madison | | | See Ozark Region |
| 63 | Maries | | | See Ozark Region |
| 64 | Marion | 1910 | 4 | |
| 65 | Mercer | | | |
| 66 | Miller | 1912 | 3 | |
| 67 | Mississippi | 1921 | 2 | |
| 68 | Moniteau | | | See Ozark Region |
| 69 | Monroe | | | |
| 70 | Montgomery | | | |
| 71 | Morgan | | | See Ozark Region |
| 72 | New Madrid | | | |
| 73 | Newton | 1915 | 2 | |
| 74 | Nodaway | 1913 | 2 | |
| 75 | Oregon | | | See Ozark Region |
| 76 | Osage | | | See Ozark Region |
| 77 | Ozark | | | See Ozark Region |

[23]See Footnote 1, page 7.

MISSOURI (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 78 | Pemiscot | 1910 | 3 | |
| 79 | Perry | 1913 | 4 | |
| 80 | Pettis | 1914 | 2 | |
| 81 | Phelps | | | See Ozark Region |
| 82 | Pike | 1912 | 2 | |
| 83 | Platte | 1911 | 2 | |
| 84 | Polk | 1926 | 2 | |
| 85 | Pulaski | | | See Ozark Region |
| 86 | Putnam | 1906 | 3 | |
| 87 | Ralls | 1913 | 2 | |
| 88 | Randolph | | | |
| 89 | Ray | 1922 | 2 | |
| 90 | Reynolds | 1918 | 3 | |
| 91 | Ripley | 1915 | 2 | |
| 92 | Saint Charles | | | See O'Fallon Area |
| 93 | Saint Clair | | | See Ozark Region |
| 94 | Sainte Genevieve | | | See Ozark Region |
| 95 | Saint Francois | 1918 | 2 | |
| 96 | Saint Louis | 1919 | 2 | Also see O'Fallon Area |
| 97 | Saline | 1904 | 4 | |
| 98 | Schuyler | | | |
| 99 | Scotland | 1905 | 3 | |
| 100 | Scott | | | |
| 101 | Shannon | | | See Ozark Region |
| 102 | Shelby | 1903 | 4 | |
| 103 | Stoddard | 1912 | 3 | |
| 104 | Stone | | | See Ozark Region |
| 105 | Sullivan | | | |
| 106 | Taney | | | See Ozark Region |
| 107 | Texas | 1917 | 2 | |
| 108 | Vernon | | | |
| 109 | Warren | | | See O'Fallon Area |
| 110 | Washington | | | See Ozark Region |
| 111 | Wayne | | | See Ozark Region |
| 112 | Webster | 1904 | 4 | |
| 113 | Worth | | | |
| 114 | Wright | | | See Ozark Region |

Soil Areas

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | O'Fallon | 1904 | 4 | Reconnaissance |
| 2 | Ozark Region | 1911 | 3 | Reconnaissance of Arkansas and Missouri |

MISSOURI (Continued)

Libraries in the State of Missouri in which complete sets of Field Soil Surveys and Reports may be found.

Cape Girardeau, St. Vincents College Library
Cape Girardeau, State Normal School
Carthage, Public School Library
Chillicothe, Hazelton Public School Library
Columbia, College of Agricultural and Mechanical Arts of Missouri University Library
Columbia, Agricultural Experiment Station Library
Fulton, Westminster College Library
Hannibal, Free Public Library
Jefferson City, Lincoln University Library
Jefferson City, Missouri State Library
Kansas City, Public Library
Kansas City, Rockhurst College Library
Liberty, William Jewell College Library
Mountain Grove, Missouri Fruit Station Library
Perryville, Public School Library
Rolla, Missouri School of Mines Library
St. Joseph, Free Public Library
St. Louis, Academy of Science Library
St. Louis, Christian Brothers Library
St. Louis, St. Louis University Library
St. Louis, Washington University Library
Springfield, Drury College Library
Springfield, State Teachers College
Warrenburg, State Normal School
2nd District

MONTANA

| Reference No. | County Name | Reference Numbers of Soil Areas Mapped which cover County or Parts of County |
|---|---|---|
| 1 | Beaverhead | |
| 2 | Big Horn | 10 |
| 3 | Blaine | 4, 6 |
| 4 | Broadwater | 12 |
| 5 | Carbon | |
| 6 | Carter | |
| 7 | Cascade | 12 |
| 8 | Chouteau | 6 |
| 9 | Custer | 9 |
| 10 | Daniels | 6 |
| 11 | Dawson | 8 |
| 12 | Deer Lodge | |
| 13 | Fallon | |
| 14 | Fergus | 12 |
| 15 | Flathead | |
| 16 | Gallatin | 2, 7 |
| 17 | Garfield | |
| 18 | Glacier | 6 |
| 19 | Golden Valley | 12 |
| 20 | Granite | |
| 21 | Hill | 4, 6 |
| 22 | Jefferson | |

MONTANA(Continued)

| Reference No. | County Name | Reference Numbers of Soil Areas Mapped which cover County or Parts of County |
|---|---|---|
| 23 | Judith Basin | 12 |
| 24 | Lake | 5 |
| 25 | Lewis and Clark | 12 |
| 26 | Liberty | 6 |
| 27 | Lincoln | |
| 28 | McCone | |
| 29 | Madison | |
| 30 | Meagher | 11, 12 |
| 31 | Mineral | |
| 32 | Missoula | 5, 3 |
| 33 | Musselshell | 12 |
| 34 | Park | |
| 35 | Petroleum | 12 |
| 36 | Phillips | 4, 6 |
| 37 | Pondera | 6 |
| 38 | Powder River | |
| 39 | Powell | |
| 40 | Prairie | 8 |
| 41 | Ravalli | 3 |
| 42 | Richland | 8 |
| 43 | Roosevelt | 6 |
| 44 | Rosebud | 9 |
| 45 | Sanders | 5 |
| 46 | Sheridan | 6 |
| 47 | Silver Bow | |
| 48 | Stillwater | 1 |
| 49 | Sweet Grass | |
| 50 | Teton | 6 |
| 51 | Toole | 6 |
| 52 | Treasure | 9, 10 |
| 53 | Valley | 4, 6 |
| 54 | Wheatland | 11, 12 |
| 55 | Wibaux | |
| 56 | Yellowstone | 1, 10 |

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Billings Area | 1902 | 3 | Reconnaissance |
| 2 | Gallatin Area | 1905 | 3 | Reconnaissance |
| 3 | Bitter Root Valley | 1914 | 2 | Reconnaissance |
| 4 | Milk River | 1928 | 2 | |
| 5 | Lower Flathead Valley | 1929 | 2 | |
| 6 | Northern Plains of Montana | 1929 | 3 | Reconnaissance |
| 7 | Gallatin Valley | 1931 | 2 | |
| 8 | Lower Yellowstone Valley | 1932 | 2 | Also part of McKenzie Co. N.D. |

MONTANA (Continued)

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 9 | Middle Yellowstone Valley | 1933 | 2 | |
| 10 | Big Horn Valley | 1938 | 1 | |
| 11 | Upper Musselshell Valley | 1939 | 1 | |
| 12 | Central Montana | 1940 | 3 | Reconnaissance |

Libraries in Montana in which complete sets of Soil Surveys and Reports may be found.

Billings, Parmly Billings Memorial Library
Butte, Montana State School of Mines Library
Butte, Butte Free Public Library
Bozeman, Montana Agricultural College Library
Bozeman, Agricultural Experiment Station Library
Helena, History and Miscellaneous Department of Montana State Library
Helena, Public Library
Missoula, University of Montana Library
Moccasin, Judith Basin Sub. Station Library

NEBRASKA

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Adams | 1923 | 2 | |
| 2 | Antelope | 1921 | 2 | |
| 3 | Arthur | | | |
| 4 | Banner | 1919 | 2 | |
| 5 | Blaine | IP[24] | 2 | |
| 6 | Boone | 1921 | 2 | |

[24]See Footnote 1, page 7.

NEBRASKA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 7 | Box Butte | 1916 | 2 | |
| 8 | Boyd | 1933 | 2 | |
| 9 | Brown | 1933 | 2 | |
| 10 | Buffalo | 1924 | 2 | |
| 11 | Burt | 1922 | 2 | |
| 12 | Butler | 1924 | 2 | |
| 13 | Cass | 1936 | 1 | |
| 14 | Cedar | 1928 | 2 | |
| 15 | Chase | 1917 | 2 | |
| 16 | Cherry | IP[25] | 2 | |
| 17 | Cheyenne | 1918 | 2 | |
| 18 | Clay | 1927 | 2 | |
| 19 | Colfax | 1930 | 2 | |
| 20 | Cuming | 1922 | 2 | |
| 21 | Custer | 1926 | 2 | |
| 22 | Dakota | 1919 | 2 | |
| 23 | Dawes | 1915 | 2 | |
| 24 | Dawson | 1922 | 2 | |
| 25 | Deuel | 1921 | 2 | |
| 26 | Dixon | 1929 | 2 | |
| 27 | Dodge | 1916 | 2 | |
| 28 | Douglas | 1913 | 2 | |
| 29 | Dundy | 1931 | 2 | |
| 30 | Fillmore | 1916 | 2 | |
| 31 | Franklin | 1926 | 2 | |
| 32 | Frontier | 1935 | 2 | |
| 33 | Furnas | 1930 | 2 | |
| 34 | Gage | 1914 | 2 | |
| 35 | Garden | 1924 | 2 | |
| 36 | Garfield | 1934 | 1 | |
| 37 | Gosper | 1934 | 1 | |
| 38 | Grant | | | See Western Neb. Reconnaissance |
| 39 | Greeley | 1933 | 1 | |
| 40 | Hall | 1916 | 2 | |
| 41 | Hamilton | 1927 | 2 | |
| 42 | Harlan | 1930 | 2 | |
| 43 | Hayes | 1934 | 1 | |
| 44 | Hitchcock | 1930 | 2 | |
| 45 | Holt | 1932 | 1 | |
| 46 | Hooker | | | See Western Neb. Reconnaissance |
| 47 | Howard | 1920 | 2 | |
| 48 | Jefferson | 1921 | 2 | |
| 49 | Johnson | 1920 | 2 | |
| 50 | Kearney | 1923 | 2 | |
| 51 | Keith | 1926 | 2 | |
| 52 | Keya Paha | 1933 | 1 | |

[25]See Footnote 1, page 7.

NEBRASKA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 53 | Kimball | 1916 | 2 | |
| 54 | Knox | 1930 | 2 | |
| 55 | Lancaster | 1938 | | |
| 56 | Lincoln | 1926 | 2 | |
| 57 | Logan | | | See Western Neb. Reconnaissance |
| 58 | Loup | 1934 | 1 | |
| 59 | McPherson | | | See Western Neb. Reconnaissance |
| 60 | Madison | 1920 | 2 | |
| 61 | Merrick | 1922 | 2 | |
| 62 | Morrill | 1917 | 2 | |
| 63 | Nance | 1922 | 2 | |
| 64 | Nemaha | 1914 | 2 | |
| 65 | Nuckolls | 1925 | 2 | |
| 66 | Otoe | IP[26] | 1 | Also see survey 1912 U.S.D.A. Rating 2 |
| 67 | Pawnee | 1920 | 2 | |
| 68 | Perkins | 1921 | 2 | |
| 69 | Phelps | 1917 | 2 | |
| 70 | Pierce | 1928 | 2 | |
| 71 | Platte | 1923 | 2 | |
| 72 | Polk | 1915 | 2 | |
| 73 | Red Willow | 1919 | 2 | |
| 74 | Richardson | 1915 | 2 | |
| 75 | Ruck | 1932 | 1 | |
| 76 | Saline | 1928 | 2 | |
| 77 | Sarpy | 1935 | 1 | |
| 78 | Saunders | 1913 | 2 | |
| 79 | Scotts Bluff | 1913 | 2 | |
| 80 | Seward | 1914 | 2 | |
| 81 | Sheridan | 1918 | 2 | |
| 82 | Sherman | 1931 | 2 | |
| 83 | Sioux | 1919 | 2 | |
| 84 | Stanton | 1929 | 2 | |
| 85 | Thayer | 1927 | 2 | |
| 86 | Thomas | | | See Western Neb. Reconnaissance |
| 87 | Thurston | 1914 | 3 | |
| 88 | Valley | 1932 | 2 | |
| 89 | Washington | 1915 | 3 | |
| 90 | Wayne | 1917 | 2 | |
| 91 | Webster | 1923 | 2 | |
| 92 | Wheeler | 1933 | 2 | |
| 93 | York | 1928 | 2 | |

[26]See Footnote 1, page 7.

NEBRASKA (Continued)

Reconnaissance Surveys

| | | |
|---|---|---|
| Western Nebraska Reconnaissance | 1911 | 3 |

Libraries in Nebraska in which complete sets of Soil Surveys and Reports may be found.

Franklin, Franklin High School Library
Fremont, Fremont Public Library
Grand Island, Carnegie Library
Kearney, Public Library
Lincoln, College of Agriculture, Station C, University of Nebraska Library
Lincoln, Conservation and Survey Division, University of Nebraska
Lincoln, Nebraska State Library
Lincoln, State Historical Society Library
Lincoln, Agricultural Experiment Station Library
Omaha, Creighton University Library
Omaha, Public Library
University Place, Nebraska Wesleyan University Library
Wahoo, Luther College Library

NEVADA

| Reference No. | County Name | Reference numbers of Soil Areas which cover County or Parts of County |
|---|---|---|
| 1 | Churchill | 1, |
| 2 | Clark | 2, 3 |
| 3 | Douglas | |
| 4 | Elko | |
| 5 | Esmeralda | |
| 6 | Eureka | |
| 7 | Humboldt | |
| 8 | Lander | |
| 9 | Lincoln | |
| 10 | Lyon | 1 |
| 11 | Mineral | |
| 12 | Nye | |
| 13 | Ormsby | |
| 14 | Pershing | |
| 15 | Storey | |
| 16 | Washoe | |
| 17 | White Pine | |

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Fallon | 1909 | 3 | |
| 2 | Las Vegas | 1923 | 2 | |
| 3 | Moapa Valley | 1923 | 2 | |

NEVADA (Continued)

Libraries in Nevada in which complete sets of Soil Surveys and Reports may be found.

Carson City, Nevada State Library
Reno, Agricultural Experiment Station Library
Reno, Univ. of Nevada Library

NEW HAMPSHIRE

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Belknap | | | |
| 2 | Carroll | | | |
| 3 | Cheshire | IP[27] | 1 | |
| 4 | Coos | 1937 | 1 | |
| 5 | Grafton | 1935 | 1 | |
| 6 | Hillsboro | IP[27] | 1 | |
| 7 | Merrimack | 1906 | 3 | |
| 8 | Rockingham | | | |
| 9 | Strafford | 1949 | 1 | |
| 10 | Sullivan | IP[27] | 1 | |

[27]See Footnote 1, page 7.

Libraries in New Hampshire in which complete sets of Soil Surveys and Reports may be found.

Concord, New Hampshire State Library
Dover, Public Library
Durham, Agricultural Experiment Station Library
Durham, Hamilton Smith Library, University of New Hampshire
Hanover, Dartmouth College Library
Laconia, Public Library
Manchester, City Library

NEW JERSEY

| Reference No. | County Name | Reference numbers of Soil Areas which cover County or Parts of County |
|---|---|---|
| 1 | Atlantic | 2, 4, 9 |
| 2 | Bergen | 8 |
| 3 | Burlington | 2, 6, 9 |
| 4 | Camden | 2, 9 |
| 5 | Cape May | 4 |
| 6 | Cumberland | 2, 4, 7, 9 |
| 7 | Essex | 8 |
| 8 | Glouster | 2, 4, 7, 9 |
| 9 | Hudson | 8 |
| 10 | Hunterton | 3, 5 |
| 11 | Mercer | 3, 6 |
| 12 | Middlesex | 5, 6, 8, 10 |
| 13 | Monmouth | 6, 10 |
| 14 | Morris | 1, 3, 5, 8 |
| 15 | Ocean | 6 |
| 16 | Passaic | 1, 8 |
| 17 | Salem | 2, 4, 7, 9 |
| 18 | Somerset | 3, 5, 6 |
| 19 | Sussex | 1, 3, 5 |
| 20 | Union | 5, 8 |
| 21 | Warren | 1, 3 |

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Sussex | 1911 | 2 | |
| 2 | Camden | 1915 | 2 | |
| 3 | Belvidere | 1917 | 2 | |
| 4 | Millville | 1917 | 2 | |
| 5 | Bernardsville | 1919 | 2 | |
| 6 | Chatsworth | 1919 | 2 | |
| 7 | Trenton | 1921 | 2 | |
| 8 | Salem | 1923 | 2 | |
| 9 | Bergen | 1925 | 2 | |
| 10 | Camden | 1926 | 2 | |
| 11 | Freehold | 1927 | 2 | |

## NEW JERSEY (Continued)

Libraries in New Jersey in which complete sets of Soil Surveys and Reports may be found.

Atlantic City, Free Public Library
Bayonne, Free Public Library
Camden, Free Public Library
Elizabeth, Public Library and Reading Room
Jersey City, Free Public Library
Newark, Public Library
Newark, New Jersey Historical Society Library
New Brunswick, Agricultural Experiment Station Library
New Brunswick, Rutgers College Library
New Brunswick, Free Public Library
Patterson, Free Public Library
Plainfield, Public Library
Princeton, Princeton University Library
Trenton, New Jersey State Library
Trenton, Free Public Library

## NEW MEXICO

| Reference No. | County Name | Reference numbers of Soil Areas which cover County or Parts of County |
|---|---|---|
| 1 | Bernadillo | 4 |
| 2 | Catron | |
| 3 | Chaves | 2, 10 |
| 4 | Colfax | |
| 5 | Curry | |
| 6 | De Baca | 7 |
| 7 | Dona Ana | 3, 8 |
| 8 | Eddy | 1, 2 |
| 9 | Grant | |
| 10 | Guadalupe | |
| 11 | Harding | |
| 12 | Hidalgo | |
| 13 | Lea | 10 |
| 14 | Lincoln | |
| 15 | Luna | 5 |
| 16 | McKinley | |
| 17 | Mora | |
| 18 | Otero | |
| 19 | Quay | |
| 20 | Rio Arriba | |
| 21 | Roosevelt | |
| 22 | Sandoval | 4 |
| 23 | San Juan | |
| 24 | San Miguel | |
| 25 | Santa Fe | |
| 26 | Sierra | 8 |
| 27 | Socorro | 4, 6 |
| 28 | Taos | |
| 29 | Torrance | |
| 30 | Union | |
| 31 | Valencia | 4 |

NEW MEXICO (Continued)

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Carlsbad | 1899 | 3 | |
| 2 | Pecos Valley | 1899 | 3 | |
| 3 | Mesilla Valley | 1912 | 3 | Includes Dona Ana Co., N.M. and El Paso Co., Texas |
| 4 | Middle Rio Grande Valley | 1912 | 3 | |
| 5 | Deming | 1928 | 1 | |
| 6 | Socorro and Rio Puerco | 1929 | 1 | |
| 7 | Fort Sumner | 1930 | 1 | |
| 8 | Rincon | 1930 | 1 | |
| 9 | Lovington | 1932 | 1 | |
| 10 | Roswell | 1933 | 1 | |

Libraries in New Mexico in which complete sets of Soil Surveys and Reports may be found.

Albuquerque, University of New Mexico Library
East Las Vegas, New Mexico Normal University Library
Santa Fe, Territorial Library
State College, General Library of New Mexico College of Agricultural and Mechanical Arts
State College, Experiment Station Library

NEW YORK

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Albany | 1936 | 1 | Includes Schenectady Co. |
| 2 | Allegany | IP[28] | 1 | |
| 3 | Bronx | | | |
| 4 | Broome | 1932 | 2 | |
| 5 | Cattaraugus | 1935 | 1 | |
| 6 | Cayuga | 1922 | 2 | |
| 7 | Chautauqua | 1914 | 3 | |
| 8 | Chemung | 1932 | 2 | |
| 9 | Chenango | 1918 | 3 | |
| 10 | Clinton | 1914 | 3 | |
| 11 | Columbia | 1923 | 2 | |
| 12 | Cortland | 1916 | 3 | |
| 13 | Delaware | 1930 | 1 | |
| 14 | Dutchess | IP[28] | 1 | |
| 15 | Erie | 1929 | 2 | |
| 16 | Essex | 1904 | 3 | |
| 17 | Franklin | | | |
| 18 | Fulton | | | |
| 19 | Genesee | 1922 | 2 | |

[28]See Footnote 1, page 7.

NEW YORK (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 20 | Greene | | | |
| 21 | Hamilton | | | |
| 22 | Herkimer | 1923 | 2 | |
| 23 | Jefferson | 1911 | 3 | |
| 24 | Kings | | | See Long Island Area |
| 25 | Lewis | | | |
| 26 | Livingston | IP[29] | 1 | |
| 27 | Madison | 1906 | 3 | |
| 28 | Monroe | 1933 | 1 | |
| 29 | Montgomery | 1908 | 3 | |
| 30 | Nassau | 1928 | 1 | Includes Suffolk Co. |
| 31 | New York | | | |
| 32 | Niagara | 1937 | 1 | |
| 33 | Oneida | 1913 | 2 | |
| 34 | Onondaga | 1934 | 1 | |
| 35 | Ontario | 1910 | 3 | |
| 36 | Orange | 1912 | 2 | |
| 37 | Orleans | 1932 | 1 | |
| 38 | Oswego | 1917 | 2 | |
| 39 | Otsego | 1934 | 1 | |
| 40 | Putnam | | | See White Plains Area |
| 41 | Queens | | | See Long Island Area |
| 42 | Rensselear | 1932 | 1 | |
| 43 | Richmond | | | |
| 44 | Rockland | | | See White Plains Area |
| 45 | Saint Lawrence | 1925 | 2 | |
| 46 | Saratoga | 1917 | 2 | |
| 47 | Schenectady | 1936 | 1 | Includes Albany Co. |
| 48 | Schoharie | 1915 | 2 | |
| 49 | Schuyler | IP[29] | | |
| 50 | Seneca | 1936 | 1 | |
| 51 | Steuben | 1931 | 1 | |
| 52 | Suffolk | 1928 | 1 | |
| 53 | Sullivan | 1938 | 1 | |
| 54 | Tioga | IP[29] | 1 | |
| 55 | Tompkins | 1920 | 2 | |
| 56 | Ulster | 1934 | 1 | |
| 57 | Warren | | | |
| 58 | Washington | 1909 | 2 | |
| 59 | Wayne | 1919 | 2 | |
| 60 | Westchester | | | See White Plains Area |
| 61 | Wyoming | 1933 | 1 | |
| 62 | Yates | 1916 | 2 | |
| | Soil Areas | | | |
| | Long Island Area | 1903 | 4 | |
| | White Plains Area | 1919 | 2 | |

[29]See Footnote 1, page 7.

NEW YORK (Continued)

Libraries in New York in which complete sets of Soil Surveys and Reports may be found.

Albany, New York State Library
Albion, Swan Library
Brooklyn, Brooklyn Institute of Arts and Sciences, Brooklyn Children's Museum, Brooklyn Avenue and Park Place
Brooklyn, Public Library
Brooklyn, Pratt Institute, Free Library
Buffalo, Buffalo Museum of Scientific Research Library
Buffalo, Medical Department Library, University of Buffalo
Buffalo, Public Library
Buffalo, The Grosvenor Library
Clinton, Hamilton College Library
Cold Spring Harbor, Lond Island Carnegie Institute of Washington
Farmingdale, New York State School of Agriculture
Geneva, Experiment Station Library
Geneva, Hobart College Library
Glenns Falls, Crandall Free Library
Gloversville, Public Library
Hamilton, Colgate University Library
Herkimer, Herkimer Public Library
Ithaca, Cornell University Library
Ithaca, Agricultural Experiment Station Library
Ithaca, New York State College of Agriculture Library
Keuka Park, Keuka College Public Library
Newburgh, Free Library
New York, Agricultural Index, H.W. Wilson Co., 950 University Avenue
New York, American Geographical Society, Broadway and 156th
New York, American Museum of Natural History Library
New York, College of the City of New York
New York, Columbia University Library
New York, Cooper Union for Advancement of Science and Art Library
New York, General Library of New York University
New York, New York Botanical Garden Library
New York, New York Academy of Medicine
New York, New York Law Institute Library
New York, New York Public Library, 42nd and 5th Avenue
Niagara Falls, Public Library
Plattsburgh, Public Library
Poughkeepsie, Ardriance Memorial Library
Poughkeepsie, Vassar College Library
Rochester, Rochester Public Library
Rochester, Rochester University Library
Schenectady, Union College Library
Syracuse, Syracuse University Library
Syracuse, New York State College of Forestry, Forest Library
Syracuse, Syracuse Public Library
Troy, Troy Public Library
Utica, Utica Public Library
West Point, U. S. Military Academy Library
White Plains, Supreme Court Library
Yonkers, Public Library
Yonkers, Boyce-Thompson Institute for Plant Research

NORTH CAROLINA

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Alamanac | 1901 | 4 | |
| 2 | Alexander | | | See Hickory Area |
| 3 | Alleghany | 1915 | 2 | |
| 4 | Anson | 1915 | 2 | |
| 5 | Ashe | 1912 | 2 | |
| 6 | Avery | | | |
| 7 | Beaufort | 1917 | 2 | |
| 8 | Bertie | 1918 | 2 | |
| 9 | Bladen | 1914 | 2 | |
| 10 | Brunswick | 1932 | 2 | |
| 11 | Buncombe | IP[30] | 1 | |
| 12 | Burke | 1926 | 2 | |
| 13 | Cabarrus | 1910 | 2 | |
| 14 | Caldwell | 1917 | 2 | |
| 15 | Camden | 1923 | 2 | Includes Currituck Co. |
| 16 | Carteret | 1935 | 2 | |
| 17 | Caswell | 1908 | 3 | |
| 18 | Catawba | | | See Hickory and Statesville Areas |
| 19 | Chatham | 1933 | 1 | |
| 20 | Cherokee | IP[30] | 1 | Also see 1921 map |
| 21 | Chowan | 1906 | 3 | |
| 22 | Clay | 1935 | 2 | |
| 23 | Cleveland | 1916 | 2 | |
| 24 | Columbus | 1915 | 2 | |
| 25 | Craven | 1929 | 2 | |
| 26 | Cumberland | 1922 | 2 | |
| 27 | Currituck | 1923 | 2 | Includes Camden Co. |
| 28 | Dare | | | |
| 29 | Davidson | 1915 | 2 | |
| 30 | Davie | 1927 | 1 | |
| 31 | Duplin | 1905 | 4 | |
| 32 | Durham | 1920 | 2 | |
| 33 | Edgecombe | 1907 | 3 | |
| 34 | Forsyth | 1913 | 2 | |
| 35 | Franklin | 1931 | 1 | |
| 36 | Gaston | 1909 | 2 | |
| 37 | Gates | 1929 | 2 | |
| 38 | Graham | | | |
| 39 | Granville | 1910 | 3 | |
| 40 | Greene | 1924 | 2 | |
| 41 | Guilford | 1920 | 2 | |
| 42 | Halifax | 1916 | 2 | |
| 43 | Harnett | 1916 | 2 | |
| 44 | Haywood | IP[30] | 1 | |
| 45 | Henderson | 1937 | 1 | |
| 46 | Hertford | 1916 | 2 | |

[30]See Footnote 1, page 7

NORTH CAROLINA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 47 | Hoke | 1918 | 2 | |
| 48 | Hyde | | | See Lake Mattamuskeet Area |
| 49 | Iredell | | | See Hickory and Statesville Areas |
| 50 | Jackson | IP[31] | 1 | |
| 51 | Johnston | 1911 | 2 | |
| 52 | Jones | 1934 | 1 | |
| 53 | Lee | 1933 | 2 | |
| 54 | Lenoir | 1927 | 2 | |
| 55 | Lincoln | 1914 | 3 | |
| 56 | McDowell | | | See Mt. Mitchell Area |
| 57 | Macon | 1929 | 2 | |
| 58 | Madison | 1936 | 1 | |
| 59 | Martin | 1928 | 2 | |
| 60 | Mecklenburg | 1910 | 2 | |
| 61 | Mitchell | IP[31] | 1 | |
| 62 | Montgomery | 1930 | 2 | |
| 63 | Moore | 1919 | 2 | |
| 64 | Nash | 1926 | 2 | |
| 65 | New Hanover | 1906 | 3 | |
| 66 | Northampton | 1925 | 2 | |
| 67 | Onslow | 1921 | 2 | |
| 68 | Orange | 1918 | 2 | |
| 69 | Pamlico | 1934 | 1 | |
| 70 | Pasquotank | 1905 | 4 | Includes Perquimans Co. |
| 71 | Pender | 1912 | 3 | |
| 72 | Perquimans | 1905 | 4 | Includes Pasquotank Co. |
| 73 | Person | 1928 | 2 | |
| 74 | Pitt | 1909 | 3 | Also see Craven Area |
| 75 | Polk | 1923 | 2 | |
| 76 | Randolph | 1913 | 2 | |
| 77 | Richmond | 1911 | 3 | |
| 78 | Robeson | 1908 | 3 | |
| 79 | Rockingham | 1926 | 1 | |
| 80 | Rowan | 1914 | 2 | |
| 81 | Rutherford | 1924 | 2 | |
| 82 | Sampson | 1923 | 2 | |
| 83 | Scotland | 1909 | 3 | |
| 84 | Stanly | 1916 | 2 | |
| 85 | Stokes | 1934 | 2 | |
| 86 | Surry | 1932 | 2 | |
| 87 | Swain | IP[31] | 1 | |
| 88 | Transylvania | IP[31] | 1 | |
| 89 | Tyrrell | 1920 | 2 | |
| 90 | Union | 1914 | 2 | |
| 91 | Vance | 1918 | 2 | |

[31]See Footnote 1, page 7.

NORTH CAROLINA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 92 | Wake | 1914 | 2 | |
| 93 | Warren | 1938 | 1 | |
| 94 | Washington | 1932 | 2 | |
| 95 | Watauga | 1928 | 1 | |
| 96 | Wayne | 1915 | 2 | |
| 97 | Wilkes | 1918 | 3 | |
| 98 | Wilson | 1925 | 2 | |
| 99 | Yadkin | 1924 | 2 | |
| 100 | Yancey | IP[32] | 1 | |

[32]See Footnote 1, page

Soil Areas

| | | |
|---|---|---|
| Statesville Area | 1901 | 4 |
| Hickory Area | 1902 | 4 |
| Mt. Mitchell Area | 1902 | 4 |
| Craven Area | 1903 | 4 |
| Lake Mattamuskeet Area | 1909 | |

Libraries in North Carolina in which complete sets of Soil Surveys and Reports may be found.

Boone, Appalachian State Teachers College Library
Buies Creek, Buies Creek Academy Library
Chapel Hill, University of North Carolina Library
Davidson, Union Library, Davidson College
Durham, Trinity College Library
Greensboro, Negro Agricultural and Technical College Library
Raleigh, North Carolina State Library
Raleigh, Agricultural Experiment Station Library
Red Springs, Experiment Farm
Salisbury, Catawba College Library
Wake Forest, Wake Forest College Library
Washington, Public Schools Library
West Raleigh, North Carolina College of Agriculture and Mechanical Arts, Department of Soils
West Raleigh, Agricultural Experiment Station Library

NORTH DAKOTA

| Reference | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Adams | | | See Morton Area |
| 2 | Barnes | 1912 | 2 | |
| 3 | Benson | | | |
| 4 | Billings | 1934 | 1 | |
| 5 | Bottineau | 1915 | 2 | |
| 6 | Bowman | | | See Western N.D. reconn. |
| 7 | Burke | | | See Western N.D. reconn. |
| 8 | Burleigh | | | See Western N.D. reconn. |
| 9 | Cass | 1924 | 2 | |
| 10 | Cavalier | | | |
| 11 | Dickey | 1914 | 2 | |
| 12 | Divide | | | See Western N.D. reconn. |
| 13 | Dunn | | | See Western N.D. reconn. |
| 14 | Eddy | | | |
| 15 | Emmons | | | See Western N.D. reconn. |
| 16 | Foster | | | See Carrington Area |
| 17 | Golden Valley | | | See Western N.D. reconn. |
| 18 | Grand Forks | | | See Grand Forks Area |
| 19 | Grant | | | |
| 20 | Griggs | | | See Carrington Area |
| 21 | Hettinger | | | See Morton Area |
| 22 | Kidder | | | |
| 23 | Lamoure | 1914 | 2 | |
| 24 | Logan | | | |
| 25 | McHenry | 1921 | 2 | See Western N.D. reconn. |
| 26 | McIntosh | | | |
| 27 | McKenzie | 1933 | 1 | See Western N.D. reconn. |
| 28 | McLean | | | |
| 29 | Mercer | | | |
| 30 | Morton | IP[33] | 1 | Also see Morton Area |
| 31 | Mountrail | | | |
| 32 | Nelson | | | |
| 33 | Oliver | | | |
| 34 | Pembina | | | |
| 35 | Pierce | | | |
| 36 | Ramsey | | | |
| 37 | Ransom | 1906 | 3 | |
| 38 | Renville | | | |
| 39 | Richland | 1908 | 3 | |
| 40 | Olette | | | |
| 41 | Sargent | 1917 | 2 | |
| 42 | Sheridan | | | |
| 43 | Sioux | | | |
| 44 | Slope | | | |
| 45 | Stark | | | See Western N.D. reconn. |
| 46 | Steele | | | |
| 47 | Stutsman | | | See Jamestown Area |

[33]See Footnote 1, page 7.

NORTH DAKOTA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 48 | Towner | | | See Cando Area |
| 49 | Traill | 1918 | 2 | |
| 50 | Walsh | | | |
| 51 | Ward | | | See Western N.D. reconn. |
| 52 | Wells | | | |
| 53 | Williams | | | See Western N.D. reconn.<br>See Williston Area |

Soil Areas

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Grand Forks | 1902 | 3 | Part of Grand Forks Co. |
| 2 | Fargo | 1903 | | Includes part of Cass Co. |
| 3 | Jamestown | 1903 | 3 | Part of Barnes and Stutsman Cos. |
| 4 | Cando | 1904 | 3 | Part of Towner Co. |
| 5 | Carrington | 1905 | 3 | Part of Foster and Griggs Cos. |
| 6 | Williston | 1906 | 3 | Part of Williams Co. |
| 7 | Morton | 1907 | 3 | *Part of Adams, Hettinger and Morton Cos. |
| 8 | Reconnaissance W. N. Dak. | 1908 | 3 | |

Libraries in North Dakota in which complete sets of Soil Surveys and Reports may be found.

Bismark, State Historical Society Library
Bismark, North Dakota State Library
Dickinson, Agricultural Substation Library
Fargo, State College Station, North Dakota Agricultural College Library
Fargo, State College Station, North Dakota Agricultural Experiment Station Library
Grand Forks, State University of North Dakota Library
Valley City, State Normal School Library

OHIO

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Adams | 1932 | 2 | |
| 2 | Allen | | | See state reconnaissance |
| 3 | Ashland | | | See state reconnaissance |
| 4 | Ashtabula | | | See state reconnaissance |
| 5 | Athens | 1932 | 1 | |
| 6 | Auglaize | 1909 | 3 | |
| 7 | Belmont | 1927 | 2 | |
| 8 | Brown | 1930 | 1 | |
| 9 | Butler | 1927 | 2 | |
| 10 | Carroll | | | |
| 11 | Clark | | | |
| 12 | Clermont | 1923 | 2 | |
| 13 | Clinton | | | |
| 14 | Columbiana | | | |
| 15 | Coshocton | 1904 | 4 | |
| 16 | Crawford | | | |
| 17 | Cuyahoga | | | Part in Cleveland Area |
| 18 | Drake | | | |
| 19 | Defiance | | | |
| 20 | Delaware | | | Part in Westerville Area |
| 21 | Erie | | | |
| 22 | Fairfield | | | Part in Columbus Area |
| 23 | Fayette | | | |
| 24 | Franklin | | | Part in Columbus and Westerville Area |
| 25 | Fulton | 1922 | 2 | |
| 26 | Gallia | | | |
| 27 | Geauga | 1915 | 2 | |
| 28 | Greene | | | See state reconnaissance |
| 29 | Guernsey | | | See state reconnaissance |
| 30 | Hamilton | 1915 | 2 | See state reconnaissance |
| 31 | Hancock | | | See state reconnaissance |
| 32 | Hardin | | | See state reconnaissance |
| 33 | Harrison | | | See state reconnaissance |
| 34 | Henry | | | See state reconnaissance |
| 35 | Highland | | | See state reconnaissance |
| 36 | Hocking | | | See state reconnaissance |
| 37 | Holmes | | | See state reconnaissance |
| 38 | Huron | | | See state reconnaissance |
| 39 | Jackson | | | See state reconnaissance |
| 40 | Jefferson | | | See state reconnaissance |
| 41 | Knox | | | See state reconnaissance |
| 42 | Lake | 1925 | 2 | |
| 43 | Lawrence | | | See state reconnaissance |
| 44 | Licking | 1930 | 2 | |
| 45 | Logan | 1933 | 2 | |
| 46 | Lorain | | | Part in Cleveland Area |
| 47 | Lucas | 1934 | 1 | |
| 48 | Madison | | | Part in Columbus and Westerville Areas |

OHIO (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 49 | Mahoning | 1917 | 2 | |
| 50 | Marion | 1916 | 2 | |
| 51 | Medina | | | Part in Cleveland and Wooster Areas |
| 52 | Meigs | 1906 | 3 | |
| 53 | Mercer | | | See state reconnaissance |
| 54 | Miami | 1916 | 2 | |
| 55 | Monroe | | | See state reconnaissance |
| 56 | Montgomery | 1900 | 3 | |
| 57 | Morgan | | | See state reconnaissance |
| 58 | Morrow | | | See state reconnaissance |
| 59 | Muskingum | 1925 | 2 | |
| 60 | Noble | | | See state reconnaissance |
| 61 | Ottawa | 1928 | 2 | |
| 62 | Paulding | 1914 | 3 | |
| 63 | Perry | | | See state reconnaissance |
| 64 | Pickaway | | | See Columbus Area |
| 65 | Pike | | | See state reconnaissance |
| 66 | Portage | 1914 | 3 | |
| 67 | Preble | | | See state reconnaissance |
| 68 | Putnam | 1930 | 2 | |
| 69 | Richland | | | See state reconnaissance |
| 70 | Ross | | | See state reconnaissance |
| 71 | Sandusky | 1917 | 2 | |
| 72 | Scioto | 1933 | 1 | |
| 73 | Seneca | | | See state reconnaissance |
| 74 | Shelby | | | See state reconnaissance |
| 75 | Stark | 1913 | 2 | |
| 76 | Summit | | | See state reconnaissance |
| 77 | Trumbull | 1914 | 2 | |
| 78 | Tuscarawas | IP[34] | 1 | |
| 79 | Union | | | Part in Westerville Area |
| 80 | Van Wert | | | See state reconnaissance |
| 81 | Vinton | 1933 | 1 | |
| 82 | Warren | | | See state reconnaissance |
| 83 | Washington | 1926 | 2 | |
| 84 | Wayne | | | Part in Wooster Area |
| 85 | Williams | | | See state reconnaissance |
| 86 | Wood | | | Part in Toledo Area |
| 87 | Wyandot | | | See state reconnaissance |

[34]See Footnote 1, page 7.

OHIO (Continued)

Soil Areas

| Name | Year | U.S.D.A. Rating |
|---|---|---|
| Columbus Area | 1902 | 3 |
| Toledo Area | 1902 | 4 |
| Astabula Area | 1903 | 4 |
| Wooster Area | 1904 | 4 |
| Cleveland Area | 1905 | 4 |
| Westerville Area | 1905 | 4 |
| Reconnaissance (Entire State) | 1912 | |

Libraries in the State of Ohio in which complete sets of Soil Surveys and Reports may be found.

Alliance, Mt. Union Society College Library
Athens, Carnegie Library
Bucyrus, Public Library
Chillicothe, Public Library
Cincinnati, Lloyd Library, 309 West Court Street
Cincinnati, Public Library
Cincinnati, University of Cincinnati Library
Cleveland, Public Library
Cleveland, Library of Adelbert College
Cleveland, Western Reserve University
Cleveland, Case Library
Columbus, College of Agriculture Library
Columbus, Ohio State University, Department of Soils Library
Columbus, Ohio State University Library
Columbus, Ohio State Library
Columbus, Public Library
Dayton, Public Library and Museum Library

OKLAHOMA

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Adair | | | |
| 2 | Alfalfa | 1933 | 1 | |
| 3 | Atoka | | | |
| 4 | Beaver | | | |
| 5 | Beckham | | | |
| 6 | Blaine | | | |
| 7 | Bryan | 1914 | 2 | Also see Tishomingo Area |
| 8 | Caddo | | | |
| 9 | Canadian | 1917 | 2 | |
| 10 | Carter | 1933 | 2 | |
| 11 | Cherokee | | | |
| 12 | Choctaw | 1937 | 1 | |
| 13 | Cimarron | | | |
| 14 | Cleveland | IP[35] | 1 | |

[35]See Footnote 1, page 7.

OKLAHOMA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 15 | Coal | | | |
| 16 | Comanche | | | |
| 17 | Cotton | | | |
| 18 | Craig | 1931 | 1 | |
| 19 | Creek | | | |
| 20 | Custer | | | |
| 21 | Delaware | | | |
| 22 | Dewey | | | |
| 23 | Ellis | | | |
| 24 | Garfield | 1935 | 1 | |
| 25 | Garvin | | | |
| 26 | Grady | | | |
| 27 | Grant | 1931 | 1 | |
| 28 | Greer | 1937 | 2 | |
| 29 | Harmon | | | |
| 30 | Harper | | | |
| 31 | Haskell | | | |
| 32 | Hughes | | | |
| 33 | Jackson | | | |
| 34 | Jefferson | | | |
| 35 | Johnston | | | See Tishomingo Area |
| 36 | Kay | 1915 | 2 | |
| 37 | Kingfisher | | | |
| 38 | Kiowa | 1931 | 2 | |
| 39 | Latimer | | | |
| 40 | Le Flore | 1931 | 2 | |
| 41 | Lincoln | | | |
| 42 | Logan | | | |
| 43 | Love | | | |
| 44 | McClain | | | |
| 45 | McCurtain | | | |
| 46 | McIntosh | 1933 | 2 | |
| 47 | Major | 1936 | 1 | |
| 48 | Marshall | | | See Tishomingo Area |
| 49 | Mayes | 1932 | 1 | |
| 50 | Murray | 1935 | 2 | |
| 51 | Muskogee | 1913 | 3 | |
| 52 | Noble | IP[36] | 1 | |
| 53 | Nowata | | | |
| 54 | Okfuskee | IP[36] | 1 | |
| 55 | Oklahoma | 1906 | 2 | |
| 56 | Okmulgee | | | |
| 57 | Osage | | | |
| 58 | Ottawa | | | |
| 59 | Pawnee | | | |
| 60 | Payne | 1916 | 4 | |
| 61 | Pittsburg | 1931 | 2 | |

[36]See Footnote 1, page 7.

OKLAHOMA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 62 | Pontotoc | 1936 | 2 | |
| 63 | Pottawatomie | | | |
| 64 | Pushmataha | | | |
| 65 | Roger Mills | 1914 | 3 | |
| 66 | Rogers | | | |
| 67 | Seminole | | | |
| 68 | Sequoyah | | | |
| 69 | Stephens | | | |
| 70 | Texas | 1930 | 2 | |
| 71 | Tillman | 1930 | 2 | |
| 72 | Tulsa | 1935 | 1 | |
| 73 | Wagoner | | | |
| 74 | Washington | | | |
| 75 | Washita | 1935 | 2 | |
| 76 | Woods | IP[37] | 1 | |
| 77 | Woodward | 1932 | 1 | |

[37]See Footnote 1, page 7.

Soil Areas

| | | | |
|---|---|---|---|
| | Tishomingo | 1906 | 4 |

Libraries in Oklahoma in which complete sets of Soil Surveys and Reports may be found.

Ada, East Central State Teachers College Library
Altus, Public Library
Alva, Northwestern State Normal School Library
Enid, Carnegie Public Library
Guthrie, Oklahoma State Library
Langston, Colored Agricultural and Normal University Library
Muskogee, High School Library
Norman, University of Oklahoma Library
Oklahoma City, Oklahoma State Library
Stillwater, Oklahoma Agricultural and Mechanical College Library
Stillwater, Agricultural Experiment Station Library
Tishomingo, Murray State School of Agriculture Library

OREGON

| Reference No. | County Name | Year | U.S.D.A. Rating | Reference Numbers of Soil Areas which cover County or Parts of County |
|---|---|---|---|---|
| 1 | Baker | | | 9 |
| 2 | Benton | 1920 | 2 | |
| 3 | Clackamas | 1921 | 2 | |
| 4 | Clatsop | | | 1 |
| 5 | Columbia | 1929 | 2 | |
| 6 | Coos | | | 3 |
| 7 | Crook | | | |
| 8 | Curry | | | 3 |
| 9 | Deschutes | | | 10 |
| 10 | Douglas | | | |
| 11 | Gilliam | | | |
| 12 | Grant | | | |
| 13 | Harney | | | |
| 14 | Hood River | | | 5 |
| 15 | Jackson | | | 4 |
| 16 | Jefferson | | | |
| 17 | Josephine | 1919 | 2 | |
| 18 | Klamath | | | 2 |
| 19 | Lake | | | |
| 20 | Lane | | | 6 |
| 21 | Lincoln | | | |
| 22 | Linn | 1924 | 2 | |
| 23 | Malheur | | | |
| 24 | Marion | 1927 | 2 | 6, 1 |
| 25 | Morrow | | | |
| 26 | Multnomah | 1919 | 2 | |
| 27 | Polk | 1922 | 2 | 1 |
| 28 | Sherman | | | |
| 29 | Tillamook | | | |
| 30 | Umatilla | | | 11 |
| 31 | Union | | | 9, 7 |
| 32 | Wallowa | | | |
| 33 | Wasco | | | |
| 34 | Washington | 1919 | 2 | |
| 35 | Wheeler | | | |
| 36 | Yamhill | 1917 | 2 | |

Soil Areas

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Salem | 1903 | 3 | Parts of Marion and Polk Cos. |
| 2 | Kalamath Reclamation | 1908 | 3 | Parts of Kalamath Co. |
| 3 | Marshfield | 1909 | 3 | Parts of Coos and Curry Cos. |
| 4 | Medford | 1911 | 3 | Part of Jackson Co. |

OREGON (Continued)

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 4 | Medford | 1911 | 3 | Part of Jackson Co. |
| 5 | Hood River and White Salmon | 1912 | 3 | Part of Hood Co. |
| 6 | Eugene | 1925 | 2 | Part of Lane Co. |
| 7 | Grande Ronde Valley | 1926 | 2 | Part of Union Co. |
| 8 | Astoria | IP[38] | 1 | Part of Clatsop |
| 9 | Baker | IP[38] | 1 | Part of Baker and Union Cos. |
| 10 | Deschutes | IP[38] | 1 | Part of Deschutes Co. |
| 11 | Umatilla | IP[38] | 1 | Part of Umatilla Co. |

[38] See Footnote 1, page 7.

Libraries in the State of Oregon in which complete sets of Soil Surveys and Reports may be found.

Corvallis, Oregon Agricultural College Library
Corvallis, Agricultural Experiment Station Library
Eugene, University of Oregon Library
Forest Grove, Pacific University Library
Portland, Library Association
Portland, Reed College Library
Salem, Oregon State Library

PENNSYLVANIA

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Adams | 1904 | 3 | Also see S.C. reconn. |
| 2 | Allegheny | | | See S.W. reconn. |
| 3 | Armstrong | 1932 | 1 | Also see S.W. reconn. |
| 4 | Beaver | | | See S.W. reconn. |
| 5 | Bedford | | | See S.C. reconn. |
| 6 | Berks | 1909 | 3 | Also see S.E. reconn. |
| 7 | Blair | 1915 | 2 | See S.C. reconn. |
| 8 | Bradford | 1911 | 3 | Also see N.E. reconn. |
| 9 | Bucks | 1936 | 1 | Also see S.E. reconn. |
| 10 | Butler | | | See S.W. reconn. |
| 11 | Cambria | 1915 | 2 | Also see S.C. reconn. |
| 12 | Cameron | | | See N.W. reconn. |
| 13 | Carbon | | | See S.E. reconn. |
| 14 | Center | 1908 | 3 | Also see S.C. reconn. |
| 15 | Chester | 1905 | 3 | Also see S.E. reconn. |
| 16 | Clarion | | | See S.W. reconn. |
| 17 | Clearfield | 1916 | 2 | Also see S.C. reconn. |
| 18 | Clinton | | | See N.E. reconn. |
| 19 | Columbia | | | See S.E. reconn. |
| 20 | Crawford | IP[39] | 1 | Also see N.W. reconn. |
| 21 | Cumberland | | | See S.C. reconn. |
| 22 | Dauphin | | | See S.E. reconn. |
| 23 | Delaware | | | See S.E. reconn. |
| 24 | Elk | | | See N.W. reconn. |
| 25 | Erie | 1910 | 3 | Also see N.W. reconn. |
| 26 | Fayette | | | See S.W. reconn. |
| 27 | Forest | | | See N.W. reconn. |
| 28 | Franklin | 1932 | 1 | Also see S.C. reconn. |
| 29 | Fulton | | | See S.C. reconn. |
| 30 | Greene | 1921 | 2 | Also see S.W. reconn. |
| 31 | Huntingdon | 1934 | 1 | Also see S.C. reconn. |
| 32 | Indiana | 1931 | 1 | Also see S.W. reconn. |
| 33 | Jefferson | | | See S.W. reconn. |
| 34 | Juniata | | | See S.C. reconn. |
| 35 | Lackawanna | | | See N.E. reconn. |
| 36 | Lancaster | 1914 | 2 | Also see S.E. reconn. |
| 37 | Lawrence | | | See N.W. reconn. |
| 38 | Lebanon | | | See S.E. reconn. |
| 39 | Lehigh | 1912 | 2 | Also see S.E. reconn. |
| 40 | Luzerne | | | See S.E. reconn. |
| 41 | Lycoming | 1923 | 2 | Also see N.E. reconn. |
| 42 | McKean | | | See N.W. reconn. |
| 43 | Mercer | 1917 | 2 | Also see N.W. reconn. |
| 44 | Mifflin | | | See S.C. reconn. |
| 45 | Monroe | | | See S.E. reconn. |
| 46 | Montgomery | 1905 | 3 | Also see S.E. reconn. |
| 47 | Montour | | | See S.E. reconn. |

[39]See Footnote 1, page 7.

PENNSYLVANIA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 48 | Northampton | | | See S.E. reconn. |
| 49 | Northumberland | | | See S.E. reconn. |
| 50 | Perry | | | See S.C. reconn. |
| 51 | Philadelphia | | | See S.E. reconn. |
| 52 | Pike | | | See N.E. reconn. |
| 53 | Potter | | | See N.W. reconn. |
| 54 | Schuylkill | | | See S.E. reconn. |
| 55 | Snyder | | | See S.C. reconn. |
| 56 | Somerset | | | See S.C. reconn. |
| 57 | Sullivan | | | See N.E. reconn. |
| 58 | Susquehanna | | | See N.E. reconn. |
| 59 | Tioga | | | See N.E. reconn. |
| 60 | Union | 1940 | 1 | Also see S.C. reconn. |
| 61 | Vanango | | | See N.W. reconn. |
| 62 | Warren | | | See N.W. reconn. |
| 63 | Washington | 1910 | 3 | Also see S.W. reconn. |
| 64 | Wayne | 1932 | 1 | Also see N.E. reconn. |
| 65 | Westmoreland | | | See S.W. reconn. |
| 66 | Wyoming | 1929 | 1 | Also see N.E. reconn. |
| 67 | York | 1912 | 2 | See S.E. reconn. |

Soil Areas

| | | |
|---|---|---|
| North West Penna. Reconn. | 1908 | 3 |
| South West Penna. Reconn. | 1909 | 3 |
| S. Central Penna. Reconn. | 1910 | 3 |
| North East Penna. Reconn. | 1911 | 3 |
| South East Penna. Reconn. | 1912 | 3 |

Libraries in Pennsylvania in which complete sets of Soil Surveys and Reports may be found.

Bradford, Carnegie Public Library
Carlisle, The J. Herman Rosler Memorial Library
Erie, Public Library
Gettysburg, Gettysburg College Library
Harrisburg, Pennsylvania State Library
Haverford, Haverford College Library
Huntingdon, Juaniata College Library
Lancaster, Watts, Depeyster Library F. and M. College
Meadville, Allegheny College Library
Philadelphia, Free Library of Philadelphia, Middle City District Department of Public Documents
Philadelphia, Philadelphia Museum Library
Philadelphia, Historical Society of Pennsylvania
Philadelphia, The Academy of Natural Sciences
Philadelphia, University of Pennsylvania Library
Philadelphia, Mercantile Library of Philadelphia
Philadelphia, Wagner Free Institute of Science
Philadelphia, The Sullivan Memorial Library, Temple University
Philadelphia, Library Company of Philadelphia, Ridgeway Branch
Pittsburgh, Carnegie Library
Pittsburgh, Carnegie Museum, Carnegie Institute Library

PENNSYLVANIA (Continued)

Pittsburgh, University of Pittsburgh Library
Reading, Reading Public Library
Scranton, Public Library
South Bethlehem, Lehigh University Library
State College, Carnegie Library of State College of Pennsylvania
State College, Agricultural, Experiment Station Library
Warren, Public Library
Washington, Memorial Library, Washington and Jefferson College
Wilkes-Barre, Wyoming Historical and Geological Society Library

RHODE ISLAND

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Bristol | 1936 | 1 | Includes Newport Co. |
| 2 | Kent | 1934 | 1 | Includes Washington Co. |
| 3 | Newport | 1936 | 1 | Includes Bristol Co. |
| 4 | Providence | 1938 | 1 | |
| 5 | Washington | 1934 | 1 | Includes Kent Co. |

Libraries in Rhode Island in which complete sets of Soil Surveys and Reports may be found.

Bristol, Rogers Free Library
Newport, Redwood Library
Providence, Brown University Library
Providence, Brown University Library
Providence, Public Library
Providence, Rhode Island State Library
Providence, The Providence Athenaeum
Westerly, Public Library

SOUTH CAROLINA

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Abbeville | 1932 | 1 | Also Abbeville Area |
| 2 | Aiken | | | |
| 3 | Allendale | | | |
| 4 | Anderson | 1909 | 3 | |
| 5 | Bamberg | 1913 | 3 | |
| 6 | Barnwell | 1912 | 3 | |
| 7 | Beaufort | | | |
| 8 | Berkeley | 1916 | 3 | |
| 9 | Calhoun | | | See Orangeburg Area |
| 10 | Charleston | | | See Charleston Area |
| 11 | Cherokee | 1905 | 4 | |
| 12 | Chester | 1912 | 3 | |
| 13 | Chesterfield | 1914 | 3 | |
| 14 | Clarendon | 1910 | 3 | |

SOUTH CAROLINA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 15 | Colleton | | | See Charleston Area |
| 16 | Darlington | | | See Darlington Area |
| 17 | Dillon | 1931 | 2 | |
| 18 | Dorchester | 1915 | 3 | |
| 19 | Edgefield | 1935 | 1 | |
| 20 | Fairfield | 1911 | 3 | |
| 21 | Florence | 1914 | 3 | |
| 22 | Georgetown | 1911 | 4 | |
| 23 | Greenville | 1921 | 2 | |
| 24 | Greenwood | 1929 | 2 | |
| 25 | Hampton | 1915 | 3 | |
| 26 | Horry | 1918 | 3 | |
| 27 | Jasper | | | |
| 28 | Kershaw | 1919 | 2 | |
| 29 | Lancaster | 1904 | 4 | |
| 30 | Laurens | | | See Abbeville Area |
| 31 | Lee | 1907 | 4 | Also see Darlington Area |
| 32 | Lexington | 1922 | 2 | |
| 33 | McCormick | | | |
| 34 | Marion | | | |
| 35 | Marlboro | 1917 | 2 | |
| 36 | Newberry | 1918 | 2 | |
| 37 | Oconee | 1907 | 4 | |
| 38 | Orangeburg | 1913 | 3 | Also see Orangeburg Area |
| 39 | Pickens | 1937 | 1 | |
| 40 | Richland | 1916 | 3 | |
| 41 | Saluda | 1909 | 4 | |
| 42 | Spartanburg | 1921 | 2 | |
| 43 | Sumter | 1935 | 2 | |
| 44 | Union | 1913 | 3 | |
| 45 | Williamsburg | 1928 | 2 | |
| 46 | York | 1905 | 4 | |
| | **Soil Areas** | | | |
| | Abbeville Area | 1902 | 4 | |
| | Darlington Area | 1902 | 4 | |
| | Charleston Area | 1904 | 4 | |
| | Orangeburg Area | 1904 | 4 | |

SOUTH CAROLINA (Continued)

Libraries in South Carolina in which complete sets of Soil Surveys and Reports may be found.

Clemson, Clemson Agricultural College Library
Clinton, Library of Presbyterian College of South Carolina
Charleston, Charleston Library Society
Charleston, Charleston College Library
Columbia, South Carolina State Library
Columbia, University of South Carolina
Greenwood, Carnegie Public Library
Orangeburg, Colored Normal Industrial Agricultural and Mechanical College of South Carolina Library
Orangeburg, Chaflin University Library
Rock Hill, Winthrop Normal and Industrial College, Carnegie Library
Sumter, Public Library

SOUTH DAKOTA

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Armstrong | | | See Western S.D. reconn. |
| 2 | Aurora | | | |
| 3 | Beadle | 1920 | 2 | |
| 4 | Bennett | | | See Western S.D. reconn. |
| 5 | Bon Homme | | | |
| 6 | Brookings | | | See Brookings Area |
| 7 | Brown | 1925 | 2 | |
| 8 | Brule | | | |
| 9 | Buffalo | | | |
| 10 | Butte | | | See Bellefourche Area |
| 11 | Campbell | | | |
| 12 | Charles Mix | | | |
| 13 | Clark | | | |
| 14 | Clay | | | |
| 15 | Codington | | | |
| 16 | Corson | | | |
| 17 | Custer | | | See Western S.D. reconn. |
| 18 | Davidson | | | |
| 19 | Day | | | |
| 20 | Deuel | | | |
| 21 | Dewey | | | See Western S.D. reconn. |
| 22 | Douglas | 1932 | 2 | |
| 23 | Edmunds | | | |
| 24 | Fall River | | | See Western S.D. reconn. |
| 25 | Faulk | | | |
| 26 | Grant | 1922 | 2 | |
| 27 | Gregory | | | |
| 28 | Haakon | | | |
| 29 | Hamlin | | | |
| 30 | Hand | | | |
| 31 | Hanson | | | |
| 32 | Harding | | | |

SOUTH DAKOTA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 33 | Hughes | | | |
| 34 | Hutchinson | | | |
| 35 | Hyde | 1925 | 2 | |
| 36 | Jackson | | | |
| 37 | Jerauld | | | |
| 38 | Jones | | | |
| 39 | Kingsbury | | | |
| 40 | Lake | | | |
| 41 | Lawrence | | | |
| 42 | Lincoln | | | |
| 43 | Lymon | | | |
| 44 | McCook | 1921 | 2 | |
| 45 | McPherson | | | |
| 46 | Marshall | | | |
| 47 | Meade | | | See Bellefourche Area |
| 48 | Mellette | | | See Western S.D. reconn. |
| 49 | Miner | | | |
| 50 | Minnehaha | | | |
| 51 | Moody | 1926 | 2 | |
| 52 | Pennington | | | See Western S.D. reconn. |
| 53 | Perkins | | | See Western S.D. reconn. |
| 54 | Potter | | | |
| 55 | Roberts | | | |
| 56 | Sandborn | | | |
| 57 | Shannon | | | See Western S.D. reconn. |
| 58 | Spink | | | |
| 59 | Stanley | | | See Western S.D. reconn. |
| 60 | Sully | | | |
| 61 | Todd | | | See Western S.D. reconn. |
| 62 | Tripp | | | See Western S.D. reconn. |
| 63 | Turner | | | |
| 64 | Union | 1921 | 2 | |
| 65 | Walworth | 1923 | 2 | |
| 66 | Washabaugh | | | See Western S.D. reconn. |
| 67 | Washington | | | See Western S.D. reconn. |
| 68 | Yankton | | | |
| 69 | Ziebach | | | |
| | **Soil Areas** | | | |
| | Brookings | 1903 | 3 | |
| | Bellefourche | 1907 | 3 | |
| | Reconn. of Western S. D. | 1909 | 3 | |

SOUTH DAKOTA (Continued)

Libraries in State of South Dakota in which complete sets of Soil Surveys and Reports may be found.

Brookings, Agricultural Experiment Station Library
Brookings, South Dakota State College of Agriculture, Library
Mitchell, Dakota Wesleyan University Library
Pierre, South Dakota State Library
Sioux Falls, Carnegie Free Public Library
Vermillion, University of South Dakota Library
Yankton, Yankton College Library

TENNESSEE

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Anderson | | | |
| 2 | Bedford | 1938 | 1 | |
| 3 | Benton | IP[40] | 1 | |
| 4 | Bledsoe | | | See Pikeville Area |
| 5 | Blount | | | |
| 6 | Bradley | | | |
| 7 | Campbell | | | |
| 8 | Cannon | | | |
| 9 | Carroll | | | |
| 10 | Carter | IP[40] | 1 | |
| 11 | Cheatham | | | |
| 12 | Chester | | | |
| 13 | Claiborne | 1939 | 1 | |
| 14 | Clay | | | |
| 15 | Cocke | | | See Greeneville Area |
| 16 | Coffee | 1908 | 3 | |
| 17 | Crockett | | | |
| 18 | Cumberland | IP[40] | 1 | Also see Pikeville Area |
| 19 | Davidson | 1903 | 3 | |
| 20 | Decatur | IP[40] | 1 | |
| 21 | Dekalb | | | |
| 22 | Dickson | 1923 | 2 | |
| 23 | Dyer | | | |
| 24 | Fayette | | | |
| 25 | Fentress | | | |
| 26 | Franklin | | | |
| 27 | Gibson | | | |
| 28 | Giles | 1907 | 3 | |
| 29 | Grainger | 1948 | 1 | |
| 30 | Greene | | | See Greeneville Area |
| 31 | Grundy | | | |
| 32 | Hamblen | 1940 | 1 | |
| 33 | Hamilton | 1937 | 1 | |
| 34 | Hancock | | | |

[40]See Footnote 1, page 7.

TENNESSEE (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 35 | Hardeman | | | |
| 36 | Hardin | 1926 | 2 | |
| 37 | Hawkins | | | See Greeneville Area |
| 38 | Haywood | | | |
| 39 | Henderson | 1905 | 3 | |
| 40 | Henry | IP[41] | 1 | Also see 1922 map |
| 41 | Hickman | | | |
| 42 | Houston | | | |
| 43 | Humphreys | 1936 | 1 | |
| 44 | Jackson | 1913 | 3 | |
| 45 | Jefferson | 1935 | 1 | |
| 46 | Johnson | | | |
| 47 | Knox | IP[41] | 1 | |
| 48 | Lake | | | |
| 49 | Lauderdale | | | |
| 50 | Lawrence | 1904 | 3 | |
| 51 | Lewis | | | |
| 52 | Lincoln | 1937 | 1 | |
| 53 | Loudon | | | |
| 54 | McMinn | | | |
| 55 | McNairy | | | |
| 56 | Macon | | | |
| 57 | Madison | 1906 | 3 | |
| 58 | Marion | | | |
| 59 | Marshall | | | |
| 60 | Maury | 1923 | 2 | |
| 61 | Meiggs | 1919 | 2 | |
| 62 | Monroe | | | |
| 63 | Montgomery | 1901 | 3 | |
| 64 | Moore | | | |
| 65 | Morgan | | | |
| 66 | Obion | | | |
| 67 | Overton | 1908 | 3 | |
| 68 | Perry | IP[41] | 1 | |
| 69 | Pickett | | | |
| 70 | Polk | | | |
| 71 | Putnam | 1912 | 3 | |
| 72 | Rhea | 1940 | 1 | |
| 73 | Roane | 1936 | 1 | |
| 74 | Robertson | 1912 | 3 | |
| 75 | Rutherford | | | |
| 76 | Scott | | | |
| 77 | Sequatchie | | | |
| 78 | Sevier | | | |
| 79 | Shelby | 1916 | 2 | |
| 80 | Smith | | | |

[41]See Footnote 1, page 7.

TENNESSEE (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 81 | Stewart | IP[42] | 1 | |
| 82 | Sullivan | IP[42] | 1 | Also see Greeneville Area |
| 83 | Sumner | 1909 | 3 | |
| 84 | Tipton | | | |
| 85 | Trousdale | | | |
| 86 | Unicoi | | | |
| 87 | Union | | | |
| 88 | Van Buren | | | See Pikeville Area |
| 89 | Warren | | | |
| 90 | Washington | | | |
| 91 | Wayne | | | |
| 92 | Weakley | | | |
| 93 | White | | | |
| 94 | Williamson | | | |
| 95 | Wilson | | | |

Soil Areas

| | | |
|---|---|---|
| Pikeville Area | 1903 | 3 |
| Greeneville Area | 1904 | 3 |
| Norris Area | IP[42] | 1 |

[42]See Footnote 1, page 7

Libraries in Tennessee in which complete sets of Soil Surveys and Reports may be found.

Chattanooga, Public Library
Cookeville, Tennessee Polytechnic Institute Library
Knoxville, University of Tennessee Library
Knoxville, Agricultural Experiment Station Library
Knoxville, Tennessee Valley Authority Library
Memphis, Cossitt Library
Murfreesboro, Middle Tennessee State Normal Library
Nashville, Tennessee State Library
Nashville, Agricultural and Industrial State College
Nashville, Fisk University Library
Nashville, Carnegie Library
Nashville, Vanderbilt University Library
Nashville, George Peabody College for Teachers
Sewanee, University of the South Library

TEXAS

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Anderson | 1904 | 3 | |
| 2 | Andrews | | | See West Central Texas reconn. |
| 3 | Angelina | | | See Lufkin Area |
| 4 | Aransas | | | See Central Gulf Coast reconn. |
| 5 | Archer | 1912 | 3 | |
| 6 | Armstrong | | | See Panhandle Texas reconn. |
| 7 | Atascosa | | | See Southwest Texas reconn. |
| 8 | Austin | | | |
| 9 | Bailey | | | See Northwest Texas reconn. |
| 10 | Bandera | | | See South Central Texas reconn. |
| 11 | Bastrop | 1907 | 2 | Also see Austin and San Marcos Areas |
| 12 | Baylor | | | |
| 13 | Bee | 1932 | 1 | |
| 14 | Bell | 1916 | 2 | |
| 15 | Bexar | | | See Southwest Texas reconn. See San Antonio Area |
| 16 | Blanco | | | See South Central Texas reconn. |
| 17 | Borden | | | See West Central Texas reconn. |
| 18 | Bosque | | | See Waco Area |
| 19 | Bowie | 1918 | 2 | |
| 20 | Brazoria | | | See Central Gulf Coast reconn. See Brazoria area for part of county |
| 21 | Brazos | 1914 | 3 | |
| 22 | Brewster | | | See Trans-Pecos Area |
| 23 | Briscoe | | | See Panhandle Texas reconn. |
| 24 | Brooks | | | |
| 25 | Brown | 1939 | 1 | |
| 26 | Burleson | | | |
| 27 | Burnet | | | See South Central Texas reconn. |
| 28 | Caldwell | | | See Austin and San Marcos Areas |
| 29 | Calhoun | | | See Central Gulf Coast reconn. |
| 30 | Callahan | | | |
| 31 | Cameron | 1923 | 1 | Also see South Texas reconn. |
| 32 | Camp | 1908 | 3 | |

TEXAS (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 33 | Carson | | | See Panhandle Texas reconn. |
| 34 | Cass | 1933 | 2 | |
| 35 | Castro | | | See Panhandle Texas reconn. |
| 36 | Chambers | | | |
| 37 | Cherokee | | | See Jacksonville Area |
| 38 | Childress | | | See Panhandle Texas reconn. |
| 39 | Clay | | | |
| 40 | Cochran | | | See Northwest Texas reconn. |
| 41 | Coke | | | See West Central Texas reconn. |
| 42 | Coleman | 1922 | 2 | |
| 43 | Collin | 1930 | 2 | |
| 44 | Collingsworth | | | See Panhandle Texas reconn. |
| 45 | Colorado | | | |
| 46 | Comal | | | See South Central Texas reconn. |
| 47 | Comanche | | | |
| 48 | Concho | | | See West Central Texas reconn. |
| 49 | Cooke | | | |
| 50 | Coryell | | | |
| 51 | Cottle | | | See Northwest Texas reconn. |
| 52 | Crane | | | See West Central Texas reconn. |
| 53 | Crockett | | | See South Central Texas reconn. |
| 54 | Crosby | | | See Northwest Texas reconn. |
| 55 | Culberson | | | See Trans-Pecos Area |
| 56 | Dallam | | | See Panhandle Texas reconn. |
| 57 | Dallas | 1920 | 2 | |
| 58 | Dawson | | | See West Central Texas reconn. |
| 59 | Deaf Smith | | | See Panhandle Texas reconn. |
| 60 | Delta | | | See Cooper Area |
| 61 | Denton | 1918 | 2 | |
| 62 | DeWitt | | | See Central Gulf Coast reconn. |
| 63 | Dickens | 1922 | 1 | Also see Northwest Texas reconn. |
| 64 | Dimmit | 1938 | 1 | Also see Southwest Texas reconn. |
| 65 | Donley | | | See Panhandle Texas reconn. |
| 66 | Duval | | | See South Texas reconn. |
| 67 | Eastland | 1916 | 3 | |
| 68 | Ector | | | See West Central Texas reconn. |
| 69 | Edwards | | | See South Central Texas reconn. |
| 70 | Ellis | | | |

TEXAS (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 71 | El Paso | | | See Mesilla Valley Area, N.M., See Trans-Pecos Area |
| 72 | Erath | 1920 | 2 | |
| 73 | Falls | 1932 | 2 | |
| 74 | Fannin | 1938 | 1 | |
| 75 | Fayette | | | |
| 76 | Fisher | | | See West Central Texas reconn. |
| 77 | Floyd | | | See Northwest Texas reconn. |
| 78 | Foard | | | See Northwest Texas reconn. |
| 79 | Fort Bend | | | |
| 80 | Franklin | 1908 | 3 | |
| 81 | Freestone | 1918 | 2 | |
| 82 | Frio | 1929 | 1 | Also see Southwest Texas reconn. |
| 83 | Gaines | | | See West Central Texas reconn. |
| 84 | Galveston | 1930 | 1 | |
| 85 | Garza | | | See Northwest Texas reconn. |
| 86 | Gillespie | | | See South Central Texas reconn. |
| 87 | Glasscock | | | See West Central Texas reconn. |
| 88 | Goliad | | | See Central Gulf Coast recon |
| 89 | Gonzales | | | |
| 90 | Gray | | | See Panhandle Texas reconn. |
| 91 | Grayson | 1909 | 3 | |
| 92 | Gregg | | | |
| 93 | Grimes | | | |
| 94 | Guadalupe | | | See San Marcos Area |
| 95 | Hale | | | See Northwest Texas reconn. |
| 96 | Hall | | | See Panhandle Texas reconn. |
| 97 | Hamilton | | | |
| 98 | Hansford | | | See Panhandle Texas reconn. |
| 99 | Hardeman | 1932 | 1 | Also see Northwest Texas reconn. |
| 100 | Hardin | | | |
| 101 | Harris | 1922 | 1 | |
| 102 | Harrison | 1912 | 3 | |
| 103 | Hartley | | | See Panhandle Texas reconn. |
| 104 | Haskell | | | See Northwest Texas reconn. |
| 105 | Hays | | | See Austin and San Marcos Areas |
| 106 | Hamphill | | | See Panhandle Texas reconn. |
| 107 | Henderson | 1923 | 2 | |
| 108 | Hidalgo | 1925 | 1 | Also see South Texas reconn. |
| 109 | Hill | | | |
| 110 | Hockley | | | See Northwest Texas reconn. |

TEXAS (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 111 | Hood | | | |
| 112 | Hopkins | | | |
| 113 | Houston | 1905 | 3 | |
| 114 | Howard | | | See West Central Texas reconn. |
| 115 | Hudspeth | | | See Trans-Pecos Area |
| 116 | Hunt | 1934 | 1 | |
| 117 | Hutchinson | | | See Panhandle Texas reconn. |
| 118 | Irion | | | See West Central Texas reconn. |
| 119 | Jack | | | |
| 120 | Jackson | | | See Central Gulf Coast reconn. |
| 121 | Jasper | | | |
| 122 | Jeff Davis | | | See Trans-Pecos Area |
| 123 | Jefferson | 1913 | 2 | |
| 124 | Jim Hogg | | | |
| 125 | Jim Wells | | | |
| 126 | Johnson | | | |
| 127 | Jones | | | See West Central Texas reconn. |
| 128 | Karnes | | | See Central Gulf Coast reconn. |
| 129 | Kaufman | 1936 | 1 | |
| 130 | Kendall | | | See South Central Texas reconn. |
| 131 | Kenedy | | | |
| 132 | Kent | | | See Northwest Texas reconn. |
| 133 | Kerr | | | See South Central Texas reconn. |
| 134 | Kimble | | | See South Central Texas reconn. |
| 135 | King | | | See Northwest Texas reconn. |
| 136 | Kinney | | | See Southwest Texas reconn. |
| 137 | Kleberg | | | |
| 138 | Knox | | | See Northwest Texas reconn. |
| 139 | Lamar | | | See Cooper and Paris Areas |
| 140 | Lamb | | | |
| 141 | Lampasas | | | |
| 142 | LaSalle | | | See Southwest Texas reconn. |
| 143 | Lavaca | 1905 | 3 | |
| 144 | Lee | 1905 | 3 | |
| 145 | Leon | | | |
| 146 | Liberty | | | |
| 147 | Limestone | | | |
| 148 | Lipscomb | | | See Panhandle Texas reconn. |
| 149 | Live Oak | | | See Southwest Texas reconn. |
| 150 | Llano | | | See South Central Texas reconn. |

TEXAS (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 151 | Loving | | | See West Central Texas reconn. |
| 152 | Lubbock | 1917 | 2 | |
| 153 | Lynn | | | |
| 154 | McCulloch | | | |
| 155 | McLennan | | | See Waco Area |
| 156 | McMullen | | | See Southwest Texas reconn. |
| 157 | Madison | | | |
| 158 | Marion | | | |
| 159 | Martin | | | See West Central Texas reconn. |
| 160 | Mason | | | See South Central Texas reconn. |
| 161 | Matagorda | | | See Central Gulf Coast reconn. |
| 162 | Maverick | 1936 | 1 | Also see Southwest Texas reconn. |
| 163 | Medina | | | See Southwest Texas reconn. |
| 164 | Menard | | | See South Central Texas reconn. |
| 165 | Midland | 1928 | 1 | Also see west Central Texas reconn. |
| 166 | Milam | 1925 | 1 | |
| 167 | Mills | | | |
| 168 | Mitchell | | | See West Central Texas reconn. |
| 169 | Montague | | | |
| 170 | Montgomery | | | See Willis Area |
| 171 | Moore | | | See Panhandle Texas reconn. |
| 172 | Morris | 1909 | 3 | |
| 173 | Motley | | | |
| 174 | Nacogdoches | 1925 | 2 | Also see Nacogdoches Area |
| 175 | Navarro | 1926 | 2 | |
| 176 | Newton | | | |
| 177 | Nolan | | | See West Central Texas reconn. |
| 178 | Nueces | | | See South Texas reconn. See Corpus Christi Area |
| 179 | Ochiltree | | | See Panhandle Texas reconn. |
| 180 | Oldham | | | See Panhandle Texas reconn. |
| 181 | Orange | | | |
| 182 | Palo Pinto | | | |
| 183 | Panola | | | |
| 184 | Parker | | | |
| 185 | Parmer | | | See Panhandle Texas reconn. |
| 186 | Pecos | | | See Trans-Pecos Area |
| 187 | Polk | 1930 | 1 | |
| 188 | Potter | 1929 | 1 | Also see Panhandle Texas reconn. |

TEXAS (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 189 | Presidio | | | See Trans-Pecos Area |
| 190 | Rains | | | |
| 191 | Randall | 1930 | 1 | Also see Panhandle Texas reconn. |
| 192 | Reagan | | | See West Central Texas reconn. |
| 193 | Real | | | Part in South Central Texas reconn. |
| 194 | Red River | 1919 | 2 | |
| 195 | Reeves | 1922 | 2 | Also see Trans-Pecos Area |
| 196 | Refugio | | | See Central Gulf Coast reconn. |
| 197 | Roberts | | | See Panhandle Texas reconn. |
| 198 | Robertson | 1907 | 3 | |
| 199 | Rockwall | 1923 | 1 | |
| 200 | Runnels | | | See West Central Texas reconn. |
| 201 | Rusk | | | See Henderson Area |
| 202 | Sabine | | | |
| 203 | San Augustine | | | |
| 204 | San Jacinto | | | |
| 205 | San Patricio | | | See South Texas reconn. |
| 206 | San Saba | 1916 | 2 | |
| 207 | Schleicher | | | See South Central Texas reconn. |
| 208 | Scurry | 1931 | 1 | Also see West Central Texas reconn. |
| 209 | Shackelford | | | |
| 210 | Shelby | | | |
| 211 | Sherman | | | See Panhandle Texas reconn. |
| 212 | Smith | | | |
| 213 | Somervell | | | |
| 214 | Starr | | | See South Texas reconn. |
| 215 | Stephens | | | |
| 216 | Sterling | | | See West Central Texas reconn. |
| 217 | Stonewall | | | See Northwest Texas reconn. |
| 218 | Sutton | | | See South Central Texas reconn. |
| 219 | Swisher | | | See Panhandle Texas reconn. |
| 220 | Tarrant | 1920 | 2 | |
| 221 | Taylor | 1915 | 3 | Also see West Central Texas reconn. |
| 222 | Terrell | | | See Trans-Pecos Area |
| 223 | Terry | | | See Northwest Texas reconn. |
| 224 | Throckmorton | | | |
| 225 | Titus | | | |
| 226 | Tom Green | | | See West Central Texas reconn. |

TEXAS (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 227 | Travis | | | See South Central Texas reconn. See Austin Area |
| 228 | Trinity | | | |
| 229 | Tyler | | | See Woodville Area |
| 230 | Upshur | | | |
| 231 | Upton | | | See West Central Texas reconn. |
| 232 | Uvalde | | | See Southwest Texas reconn. |
| 233 | Val Verde | | | See South Central Texas reconn. |
| 234 | Van Zandt | 1928 | 1 | |
| 235 | Victoria | 1927 | 1 | Also see Central Gulf Coast reconn. |
| 236 | Walker | | | |
| 237 | Waller | | | |
| 238 | Ward | | | See West Central Texas reconn. |
| 239 | Washington | 1913 | 3 | |
| 240 | Webb | | | See South Texas reconn. See Laredo Area |
| 241 | Wharton | | | See Central Gulf Coast reconn. |
| 242 | Wheeler | 1932 | 2 | Also see Panhandle Texas reconn. |
| 243 | Wichita | 1924 | 2 | |
| 244 | Wilbarger | | | See Vernon Area |
| 245 | Willacy | 1926 | 1 | |
| 246 | Williamson | 1934 | 1 | Also see Austin Area |
| 247 | Wilson | 1907 | 4 | Also see Southwest Texas reconn. |
| 248 | Winkler | | | See West Central Texas reconn. |
| 249 | Wise | | | |
| 250 | Wood | | | |
| 251 | Yoakum | | | See Northwest Texas reconn. |
| 252 | Young | | | |
| 253 | Zapata | | | See South Texas reconn. |
| 254 | Zavala | 1934 | 1 | Also see Southwest Texas reconn. |

Soil Areas

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating |
|---|---|---|---|
| 1 | Willis | 1901 | 4 |
| 2 | Brazoria | 1902 | 4 |
| 3 | Vernon | 1902 | 4 |

TEXAS (Continued)

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating |
|---|---|---|---|
| 4 | Jacksonville | 1903 | 4 |
| 5 | Lufkin | 1903 | 4 |
| 6 | Nacogdoches | 1903 | 4 |
| 7 | Paris | 1903 | 3 |
| 8 | Austin | 1904 | 4 |
| 9 | San Antonio | 1904 | 4 |
| 10 | Waco | 1905 | 4 |
| 11 | Henderson | 1906 | 4 |
| 12 | Laredo | 1906 | 4 |
| 13 | San Marcos | 1906 | 4 |
| 14 | Cooper | 1907 | 3 |
| 15 | Corpus Christi | 1908 | 4 |
| 16 | Trans-Pecos | 1928 | 2 |
| | Reconnaissance | | |
| | South Texas | 1909 | 3 |
| | Central Gulf Coast of Texas | 1910 | 3 |
| | Panhandle Texas | 1910 | 3 |
| | Southwest Texas | 1911 | 3 |
| | South Central Texas | 1913 | 3 |
| | Northwest Texas | 1919 | 3 |
| | West Central Texas | 1922 | 3 |

TEXAS (Continued)

Libraries in Texas in which complete sets of Soil Surveys and Reports may be found.

Austin, Texas State Library
Austin, University of Texas Library
Bureau of Economic Geology
Bryan, Allen Academy
College Station, Texas Agricultural Experiment Station Library
College Station, Agricultural and Mechanical College of Texas Library
El Paso, Public Library
Fort Worth, Texas Christian University Library
Fort Worth, Carnegie Library
Galveston, Rosenburg Library
Georgetown, South West University Library
Houston, Houston Public Library
Jasper, Southeast Texas College Library
Prairie View, Normal and Industrial College
San Antonio, Carnegie Library
Tyler, Carnegie Public Library
Waco, Raylor Library

UTAH

| Reference No. | County Name | Reference Numbers of Soil Areas which cover County or Parts of County |
|---|---|---|
| 1 | Beaver | |
| 2 | Box Elder | 5 |
| 3 | Cache | 1, 6 |
| 4 | Carbon | 10 |
| 5 | Daggett | |
| 6 | Davis | 3 |
| 7 | Duchesne | |
| 8 | Emery | |
| 9 | Garfield | |
| 10 | Grant | |
| 11 | Iron | |
| 12 | Juab | |
| 13 | Kane | |
| 14 | Millard | 7 |
| 15 | Morgan | |
| 16 | Piute | |
| 17 | Rich | |
| 18 | Salt Lake | 11 |
| 19 | San Juan | |
| 20 | Sanpete | 1, 2 |
| 21 | Sevier | 2 |
| 22 | Summit | |
| 23 | Tooele | |
| 24 | Vintah | 8, 9 |
| 25 | Utah | 1, 4 |
| 26 | Wasatch | |
| 27 | Washington | 12 |
| 28 | Wayne | |
| 29 | Weber | 3 |

UTAH (Continued)

| Reference No. | Soil Area Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Reconn. of Utah | 1899 | 4 | Sanpete, Cache and Utah Cos. |
| 2 | Sevier Valley | 1900 | 3 | |
| 3 | Weber | 1900 | 3 | |
| 4 | Provo | 1903 | 3 | |
| 5 | Bear River | 1904 | 3 | |
| 6 | Cache Valley | 1913 | 3 | |
| 7 | Delta | 1919 | 3 | |
| 8 | Ashley Valley | 1920 | 2 | |
| 9 | Vinta River Valley | 1921 | 2 | |
| 10 | Price | 1934 | 1 | |
| 11 | Salt Lake | 1936 | 1 | |
| 12 | Virgin River Valley | 1936 | 1 | |

Libraries in Utah in which complete sets of Soil Surveys and Reports may be found.

Logan, Agricultural Experiment Station Library
Logan, Agricultural College Library
Manti, High School Library
Ogden, Carnegie Free Library
Provo, Brigham Young University Lib.
Salt Lake City, University of Utah Library

VERMONT

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Addison | | | See Vermont reconn. and Vergeneese Area |
| 2 | Bennington | | | See Vermont reconn. |
| 3 | Caledonia | | | See Vermont reconn. |
| 4 | Chittenden | | | See Vermont reconn. |
| 5 | Essex | | | See Vermont reconn. |
| 6 | Franklin | | | See Vermont reconn. |
| 7 | Grand Isle | | | See Vermont reconn. |
| 8 | Lamoille | | | See Vermont reconn. |
| 9 | Orange | | | See Vermont reconn. |
| 10 | Orleans | | | See Vermont reconn. |
| 11 | Rutland | | | See Vermont reconn. |
| 12 | Washington | | | See Vermont reconn. |
| 13 | Windham | | | See Vermont reconn. |
| 14 | Windsor | 1930 | 2 | Also see Vermont reconn. |
| | Soil Areas | | | |
| | Vergeneese Area | 1904 | 3 | |
| | Vermont Reconn. | 1930 | 2 | |

Libraries in the State of Vermont in which complete sets of Soil Surveys and Reports may be found.

Burlington, Agricultural Experiment Station Library
Burlington, University of Vermont Library
Middlebury, Middlebury College Library
Montpelier, Vermont State Library
Northfield, Norwich University Library

VIRGINIA

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Accomac | 1917 | 2 | |
| 2 | Albermarle | 1935 | 2 | Also see Albermarle Area |
| 3 | Alleghany | | | |
| 4 | Amelia | | | See Prince Edward Area |
| 5 | Amherst | | | |
| 6 | Appomattox | 1904 | 3 | |
| 7 | Arlington | 1915 | 2 | Included with Fairfax Co. |
| 8 | Augusta | 1932 | 2 | |
| 9 | Bath | | | |
| 10 | Bedford | | | See Bedford Area |

VIRGINIA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 11 | Bland | IP[43] | 1 | |
| 12 | Botetourt | | | See Bedford Area |
| 13 | Brunswick | | | |
| 14 | Buchanan | | | |
| 15 | Buckingham | | | See Albemarle Area |
| 16 | Campbell | 1909 | 3 | |
| 17 | Caroline | | | |
| 18 | Carroll | | | |
| 19 | Charles City | | | |
| 20 | Charlotte | | | See Prince Edward Area |
| 21 | Chesterfield | 1906 | 3 | |
| 22 | Clarke | | | |
| 23 | Craig | | | |
| 24 | Culpepper | IP[43] | 1 | |
| 25 | Cumberland | | | |
| 26 | Dickinson | | | |
| 27 | Dinwidde | | | |
| 28 | Elizabeth City | | | See Yorktown Area |
| 29 | Essex | | | |
| 30 | Fairfax | 1915 | 2 | Includes Alexandria and Arlington |
| 31 | Fauquier | IP[43] | 1 | |
| 32 | Floyd | | | |
| 33 | Fluvanna | | | |
| 34 | Franklin | | | See Bedford Area |
| 35 | Frederick | 1914 | 2 | |
| 36 | Giles | | | |
| 37 | Glouster | | | See Yorktown Area |
| 38 | Goochland | | | |
| 39 | Grayson | 1930 | 2 | |
| 40 | Greene | | | See Albemarle Area |
| 41 | Greensville | | | |
| 42 | Halifax | 1934 | 2 | |
| 43 | Hanover | 1905 | 3 | |
| 44 | Henrico | 1914 | 3 | |
| 45 | Henry | | | |
| 46 | Highland | | | |
| 47 | Isle of Wight | | | |
| 48 | James City | | | See Yorktown Area |
| 49 | King and Queen | | | |
| 50 | King George | | | |
| 51 | King William | | | |
| 52 | Lancaster | | | |
| 53 | Lee | IP[43] | 1 | |
| 54 | Loudoun | | | See Leesburg Area |
| 55 | Louisa | 1905 | 3 | |
| 56 | Lunenburg | | | See Prince Edward Area |
| 57 | Madison | | | |

[43]See Footnote 1, page 7.

VIRGINIA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 58 | Mathews | | | |
| 59 | Mecklenburg | | | |
| 60 | Middlesex | | | |
| 61 | Montgomery | 1907 | 3 | |
| 62 | Nansemond | 1932 | 2 | |
| 63 | Nelson | | | See Albemarle Area |
| 64 | New Kent | | | |
| 65 | Norfolk | | | See Norfolk Area |
| 66 | Northampton | 1917 | 2 | Includes Accomac Co. |
| 67 | Northumberland | | | |
| 68 | Nottoway | | | See Prince Edward Area |
| 69 | Orange | 1927 | 2 | |
| 70 | Page | | | See Albemarle Area |
| 71 | Patrick | | | |
| 72 | Pittsylvania | 1918 | 2 | |
| 73 | Powhatan | | | |
| 74 | Prince Edward | | | See Prince Edward Area |
| 75 | Prince George | | | |
| 76 | Prince William | | | |
| 77 | Princess Anne | 1939 | 2 | |
| 78 | Pulaski | | | |
| 79 | Rappahannock | | | |
| 80 | Richmond | | | |
| 81 | Roanoke | | | See Bedford Area |
| 82 | Rockbridge | 1931 | 2 | |
| 83 | Rockingham | | | See Albemarle Area |
| 84 | Russell | 1936 | 1 | |
| 85 | Scott | IP[44] | 1 | |
| 86 | Shenandoah | | | |
| 87 | Smyth | 1938 | 1 | |
| 88 | Southampton | 1933 | 2 | |
| 89 | Spotsylvania | | | |
| 90 | Stafford | | | |
| 91 | Surry | | | |
| 92 | Sussex | | | |
| 93 | Tazewell | 1938 | 1 | |
| 94 | Warren | | | |
| 95 | Warwick | | | See Yorktown Area |
| 96 | Washington | 1937 | 1 | |
| 97 | Westmoreland | | | |
| 98 | Wise | IP[44] | 1 | |
| 99 | Wythe | | | |
| 100 | York | | | See Yorktown Area |

[44]See Footnote 1, page 7.

VIRGINIA (Continued)

Soil Areas

| Soil Area Name | Year | U.S.D.A. Rating |
|---|---|---|
| Albemarle Area | 1902 | 3 |
| Bedford Area | 1901 | 3 |
| Leesburg Area | 1903 | 3 |
| Norfolk Area | 1903 | 3 |
| Prince Edward Area | 1901 | 3 |
| Yorktown Area | 1905 | 3 |

Libraries in Virginia in which complete sets of Soil Surveys and Reports may be found.

Blacksburg, Agricultural Experiment Station Library
Blacksburg, Virginia Agricultural and Mechanical College and Polytechnic Library
Bridgewater, Bridgewater College Library
Emory, Emory and Henry College Library
Lexington, Virginia Military Institute Library
Lexington, Washington and Lee University Library
Norfolk, Public Library
Norfolk, Virginia Truck Experiment Station Library
Richmond, Virginia State Library
Richmond, Richmond College Library
Salem, Roanoke College Library
University, Virginia University Library
Williamsburg, William and Mary College
Winchester, Handley Library

WASHINGTON

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Adams | | | See Columbia Basin Area reconn. |
| 2 | Asotin | | | |
| 3 | Benton | 1916 | 2 | |
| 4 | Chelan | | | See Wenatches Area |
| 5 | Clallam | IP[45] | 1 | |
| 6 | Clark | | | See S.W. Wash. reconn. |
| 7 | Columbia | | | |
| 8 | Cowlitz | | | See S.W. Wash. reconn. |
| 9 | Douglas | | | |
| 10 | Ferry | | | |
| 11 | Franklin | 1914 | 2 | See Columbia Basin Area reconn. |
| 12 | Garfield | | | |
| 13 | Grant | | | See Columbia Basin Area<br>See Quincy Area |
| 14 | Grays Harbor | | | |
| 15 | Island | 1905 | 3 | Also see W. Puget Sound reconn. |

[45] See Footnote 1, page 7.

WASHINGTON (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 16 | Jefferson | | | |
| 17 | King | IP[46] | 1 | Also see East Puget Sound reconn. |
| 18 | Kitsap | 1934 | 1 | |
| 19 | Kittitas | 1937 | 1 | |
| 20 | Klickitat | | | See Hood River Area |
| 21 | Lewis | IP[46] | 1 | |
| 22 | Lincoln | | | See Columbia Basin Area reconn. |
| 23 | Mason | | | See W. Puget Sound reconn. |
| 24 | Okanogan | | | |
| 25 | Pacific | | | See S.W. Wash. reconn. |
| 26 | Pend Oreille | | | |
| 27 | Pierce | IP[46] | 1 | |
| 28 | San Juan | | | See W. Puget Sound reconn. |
| 29 | Skagit | | | |
| 30 | Skamania | | | See W. Puget Sound reconn. See Hood River Area |
| 31 | Snohomish | 1937 | 1 | |
| 32 | Spokane | 1917 | 2 | |
| 33 | Stevens | 1913 | 2 | |
| 34 | Thurston | | | See W. Puget Sound reconn. |
| 35 | Wiahkiakum | | | See S.W. Wash. reconn. |
| 36 | Walla Walla | | | See Columbia Basin Area reconn. See Walla Walla Area |
| 37 | Whatcom | IP[46] | 1 | See Columbia Basin reconn. See Bellingham Area |
| 38 | Whitman | | | |
| 39 | Yakima | IP[46] | 1 | Also see Yakima Area |

[46]See Footnote 1, page 7

Soil Areas

| | | |
|---|---|---|
| Yakima | 1901 | 4 |
| Walla Walla | 1902 | 4 |
| Everett | 1905 | 3 |
| Bellingham | 1907 | 3 |
| Quincy | 1911 | 2 |
| Hood River-White Salmon | 1912 | 2 |
| Wenatchee | 1918 | 2 |

WASHINGTON (Continued)

Reconnaissance

| | | |
|---|---|---|
| Eastern Part of Puget Sound Basin | 1909 | 3 |
| Western Part of Puget Sound Basin | 1910 | 3 |
| Southwestern Washington | 1911 | 3 |
| Columbia Basin Area | 1929 | 2 |

Libraries in Washington in which complete sets of Soil Surveys and Reports may be found.

Everett, Public Library
Olympia, Washington State Library
Pullman, State College of Washington Library
Pullman, Agricultural Experiment Station Library
Puyaullup, Western Washington Agricultural Experiment Station Library
Seattle, Public Library
Seattle, University of Washington Library
Spokane, Spokane Public Library
Tacoma, Tacoma Public Library

WEST VIRGINIA

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Barbour | 1917 | 2 | Includes Upshur Co. |
| 2 | Berkeley | 1916 | 2 | See Jefferson, Berkeley and Morgan Cos. |
| 3 | Boone | 1913 | 3 | |
| 4 | Braxton | 1918 | 2 | Includes Clay Co. |
| 5 | Brooke | | | See Wheeling Area |
| 6 | Cabell | | | See Huntington Area |
| 7 | Calhoun | | | See Spenser Area |
| 8 | Clay | 1918 | 2 | Includes Braxton Co. |
| 9 | Doddridge | | | See Clarksburg Area |
| 10 | Fayette | 1919 | 2 | |
| 11 | Gilmer | 1915 | 2 | Includes Lewis Co. |
| 12 | Grant | 1922 | 2 | Includes Mineral Co. |
| 13 | Greenbrier | 1937 | 1 | |
| 14 | Hampshire | 1927 | 2 | |
| 15 | Hancock | | | See Wheeling Area |
| 16 | Hardy | 1930 | 2 | Includes Pendleton Co. |
| 17 | Harrison | | | See Clarksburg Area |
| 18 | Jackson | | | See Point Pleasant Area |
| 19 | Jefferson | 1916 | 2 | Also see Point Pleasant Area |
| 20 | Kanawha | 1912 | 2 | |
| 21 | Lewis | 1915 | 2 | Includes Gilmer Co. |
| 22 | Lincoln | | | See Huntington Area |
| 23 | Logan | 1913 | 3 | Includes Mingo Co. |
| 24 | McDowell | 1914 | 3 | Includes Wyoming Co. |
| 25 | Marion | | | See Morgantown Area |
| 26 | Marshall | | | See Middlebourne and Wheeling Areas |

WEST VIRGINIA (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 27 | Mason | | | See Point Pleasant Area |
| 28 | Mercer | 1923 | 2 | |
| 29 | Mineral | 1922 | 2 | Includes Grant Co. |
| 30 | Mingo | 1913 | 3 | Includes Logan Co. |
| 31 | Monongalia | | | See Morgantown Area |
| 32 | Monroe | 1925 | 2 | |
| 33 | Morgan | 1916 | 2 | Includes Jefferson and Barbour Cos. |
| 34 | Nicholas | 1920 | 2 | |
| 35 | Ohio | | | See Wheeling Area |
| 36 | Pendleton | 1930 | 2 | Includes Hardy Co. |
| 37 | Pleasants | | | See Parkersburg Area |
| 38 | Pocahontas | 1933 | 1 | |
| 39 | Preston | 1912 | 2 | |
| 40 | Putnam | | | See Point Pleasant Area |
| 41 | Raleigh | 1914 | 2 | |
| 42 | Randolph | 1931 | 2 | |
| 43 | Ritchie | | | See Parkersburg Area |
| 44 | Roane | | | See Spenser Area |
| 45 | Summers | 1924 | 2 | |
| 46 | Taylor | | | See Morgantown Area |
| 47 | Tucker | 1921 | 2 | |
| 48 | Tyler | | | See Middlebourne Area |
| 49 | Upshur | 1917 | 2 | Includes Barbour Co. |
| 50 | Wayne | | | See Huntington Area |
| 51 | Webster | 1918 | 3 | |
| 52 | Wetzel | | | See Middlebourne Area |
| 53 | Wirt | | | See Spenser Area |
| 54 | Wood | | | See Parkersburg Area |
| 55 | Wyoming | 1914 | 3 | Includes McDowell Co. |

Soil Areas

| | | | |
|---|---|---|---|
| | Wheeling | 1906 | 3 |
| | Middlebourne | 1907 | 3 |
| | Parkersburg | 1908 | 4 |
| | Spenser | 1909 | 3 |
| | Clarksburg | 1910 | 3 |
| | Point Pleasant | 1910 | 2 |
| | Huntington | 1911 | 3 |
| | Morgantown | 1911 | 2 |

WEST VIRGINIA (Continued)

Libraries in West Virginia in which complete sets of Soil Surveys and Reports may be found.

Charleston, Department of Archives and History, State Library
Charleston, State Department of Agriculture
Elkins, Davis and Elkins College Library
Fairmont, Fairmont State Teachers College Library
Institute, West Virginia Colored Institute Library
Keyser, Preparatory Branch, West Virginia University
Morgantown, West Virginia University Library
Morgantown, Agricultural Experiment Station Library
Parkersburg, Carnegie Library

WISCONSIN

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 1 | Adams | 1920 | 2 | |
| 2 | Ashland | | | See N. part of N. Central Wis. reconn. See Bayfield area |
| 3 | Barron | | | |
| 4 | Bayfield | | | See Bayfield Area |
| 5 | Brown | 1929 | 2 | |
| 6 | Buffalo | 1913 | 2 | |
| 7 | Burnett | | | |
| 8 | Calumet | 1925 | 2 | |
| 9 | Chippewa | | | |
| 10 | Clark | | | See S. part of N. Central Wis. reconn. |
| 11 | Columbia | 1911 | 2 | |
| 12 | Crawford | 1930 | 2 | |
| 13 | Dane | 1913 | 2 | |
| 14 | Dodge | | | |
| 15 | Door | 1916 | 2 | |
| 16 | Douglas | | | See Superior Area Wis. and Carlton Area Minn. |
| 17 | Dunn | | | |
| 18 | Eau Claire | | | |
| 19 | Florence | | | See N.E. Wis. reconn. |
| 20 | Fond du Lac | 1911 | 2 | |
| 21 | Forest | | | |
| 22 | Grant | | | |
| 23 | Greene | 1922 | 2 | |
| 24 | Green Lake | 1922 | 2 | |
| 25 | Iowa | 1910 | 3 | |
| 26 | Iron | | | See N. part of N. Central reconn. |
| 27 | Jackson | 1918 | 3 | |
| 28 | Jefferson | 1912 | 2 | |

WISCONSIN (Continued)

| Reference No. | County Name | Year | U.S.D.A. Rating | Remarks |
|---|---|---|---|---|
| 29 | Juneau | 1911 | 3 | |
| 30 | Kenosha | 1919 | 2 | Includes Racine Co. |
| 31 | Kewaunee | 1911 | 3 | |
| 32 | La Crosse | 1911 | 2 | |
| 33 | Lafayette | | | |
| 34 | Langlade | | | See N.E. Wis. reconn. |
| 35 | Lincoln | | | See S. part of N. Central Wis. reconn. |
| 36 | Manitowoc | 1926 | 2 | |
| 37 | Marathon | | | See S. part of N. Central Wis. reconn. |
| 38 | Marinette | 1909 | 3 | Reconnaissance |
| 39 | Marquette | | | |
| 40 | Milwaukee | 1916 | 3 | |
| 41 | Monroe | 1923 | 2 | |
| 42 | Oconto | | | See N.E. Wis. reconn. |
| 43 | Oneida | | | See N part of N. Central reconn. |
| 44 | Outagamie | 1918 | 2 | |
| 45 | Ozaukee | 1921 | 2 | Includes Washington Co. |
| 46 | Pepin | | | |
| 47 | Pierce | 1923 | 2 | |
| 48 | Polk | | | |
| 49 | Portage | 1915 | 2 | |
| 50 | Price | | | See N. part of N. Central reconn. |
| 51 | Racine | 1919 | 2 | Includes Kenosha Co. |
| 52 | Richland | | | |
| 53 | Rock | 1917 | 2 | |
| 54 | Rusk | | | See N. part of N. Central Wis. reconn. |
| 55 | Saint Croix | | | |
| 56 | Sauk | 1925 | 2 | |
| 57 | Sawyer | | | |
| 58 | Shawano | | | See N.E. Wis. reconn. |
| 59 | Sheboygan | 1924 | 2 | |
| 60 | Taylor | | | See S. part of N. Central Wis. reconn. |
| 61 | Trempealeau | 1927 | 2 | |
| 62 | Vernon | 1928 | 2 | |
| 63 | Vilas | | | See N. part of N. Central reconn. |
| 64 | Walworth | 1920 | 2 | |
| 65 | Washburn | | | |
| 66 | Washington | 1921 | 2 | |
| 67 | Waukesha | 1910 | 3 | |
| 68 | Waupaca | 1917 | 2 | |
| 69 | Waushara | 1909 | 3 | |
| 70 | Winnebago | 1927 | 2 | |
| 71 | Wood | 1915 | 2 | |

WISCONSIN (Continued)

Reconnaissance

| | | |
|---|---|---|
| Marinette Co. | 1909 | 3 |
| N. E. Wisconsin | 1913 | 3 |
| N. Part of N. Central Wis. | 1914 | 3 |
| S. Part of N. Central Wis. | 1915 | 3 |

Libraries in Wisconsin in which complete sets of Soil Surveys and Reports may be found.

Appleton, Lawrence University Library
Beloit, Beloit College Library
Eau Claire, Public Library
Fond du Lac, Public Library
Janesville, Public Library
La Crosse, Public Library
Madison, Agricultural Association of Wisconsin
Madison, State Historical Society Library
Madison, College of Agriculture, University of Wisconsin
Madison, State Department of Agriculture State Capitol
Madison, State Library
Madison, Experiment Station Library
Milwaukee, Public Library
Milwaukee, Public Museum Library
Racine, Public Library
Superior, Public Library

WYOMING

| Reference No. | County Name | Reference Numbers of Soil Areas Which cover County or Parts of County |
|---|---|---|
| 1 | Albany | 1 |
| 2 | Big Horn | 4, 5 |
| 3 | Campbell | 9 (county mapped) |
| 4 | Carbon | |
| 5 | Converse | |
| 6 | Crook | |
| 7 | Fremont | |
| 8 | Goshen | 2 |
| 9 | Hot Springs | |
| 10 | Johnson | 7 (county mapped) |
| 11 | Laramie | |
| 12 | Lincoln | |
| 13 | Natrona | |
| 14 | Niobrara | |
| 15 | Park | 4, 5 |
| 16 | Platte | 3 |
| 17 | Sheridan | 6 (county mapped) |
| 18 | Sublette | |
| 19 | Sweetwater | |
| 20 | Teton | |
| 21 | Unita | 8 (county mapped) |

WYOMING (Continued)

| Reference No. | County Name | Reference Numbers of Soil Areas which cover County or Parts of County |
|---|---|---|
| 22 | Washakie | 5 |
| 23 | Weston | |
| 24 | Yellowstone National Park | |

Soil Areas

| Reference No. | Soil Area or County Name | Year | U.S.D.A. Rating |
|---|---|---|---|
| 1 | Laramie Area | 1903 | 3 |
| 2 | Fort Laramie Area | 1917 | 2 |
| 3 | Wheatland Area | 1926 | 2 |
| 4 | Shoshone Area | 1927 | 2 |
| 5 | Basin Area | 1928 | 1 |
| 6 | Sheridan County | 1932 | 2 |
| 7 | Johnson County | 1933 | 2 |
| 8 | Uinta County | 1934 | 2 |
| 9 | Campbell County | 1939 | 2 |

Libraries in Wyoming in which complete sets of Soil Surveys and Reports may be found.

Cheyenne, Wyoming State Library
Laramie, University of Wyoming Library
Laramie, Agricultural Experiment Station Library
Sheridan, Carnegie Public Library

# USE OF AGRICULTURAL SOIL MAPS IN MAKING SOIL SURVEYS

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Publ Works Commission

SYNOPSIS

Soil surveys are made to obtain information relative to the type, extent of occurrence, and characteristics of the soils in a given area. The use of the pedological system of classification permits easy identification of the soils as to type, and knowledge of the characteristics of various soil types and previous experience with them can be utilized in planning and design.

A large portion of many states has been surveyed by the Department of Agriculture and maps are available showing the location of the various soil types. These maps may be used as guides in making soil surveys, and in many instances they contain all of the information desired.

When agricultural soil maps are not available or when extreme accuracy is necessary, a soil survey must be made. The pedological system of classification can be used in making the survey by anyone with some knowledge of the system, assisted by a soil identification "key".

This paper describes the use of agricultural soil maps by the North Carolina State Highway Department and a soil identification key used in making soil surveys is included. The use of the key is described.

The first soil surveys in the United States were made in 1899 by the Department of Agriculture for agricultural purposes. In the past decade soil surveys have been conducted by other organizations for engineering purposes. The soil surveys conducted by the Department of Agriculture are surficial, extending to a depth of three feet, and consist of classifying soils according to color, structure, texture, physical constitution, chemical composition, biological characteristics, and morphology, while surveys conducted for engineering purposes consist of exploring soil profiles to specified depths in which the strata of the different materials encountered are located as to position and extent of occurrence and the materials described and tested. The Department of Agriculture publishes reports of their surveys in which the different soils are described in detail and their suitability for various crops given. Included in each report is a map of the area surveyed, usually a county, showing the various types of soils that occur. The typing of the soils follows a system of classification known as the pedological system which is based on the features of the soils themselves, including that of the parent materials. Soil surveys for engineering purposes are made for some specific project and cover only a limited area. Such surveys are not published and their value is restricted to the particular project for which they are made.

Much of the work expended in making engineering soil surveys for highway purposes can be eliminated by intelligent use of agricultural soil maps. Some knowledge of the pedological system of classification is necessary and characteristics of the various types of soils must be known. Each type of soil, as classi-

fied, has characteristics peculiar to itself which will be practically the same wherever that type of soil is encountered.

## THE PEDOLOGICAL SYSTEM OF CLASSIFICATION

Briefly, the pedological system of classification, as developed by the Department of Agriculture consists of separating soils into units, each unit representing soils having the same texture, color, structure, physical constitution, chemical composition, biological characteristics, and morphology.

Soil is the result of the disintegration, a mechanical process, and the decomposition, a chemical process, of rock. Some of the rock minerals, such as quartz and mica, are quite stable, and remain unchanged by chemical action as soil particles visible to the eye, while other minerals, such as feldspar, hornblend, etc., are changed by chemical action into secondary minerals of minute size which are discernible only with the aid of a microscope.

The movement of water from the surface of the soil, downward, carries the finer particles and deposits them at some level below the surface. The depth of this leaching action depends upon the amount of water, the permeability of the soil, and the length of time the process has gone on. This action produces layers of soil that are quite different. The surface layer has been divested of its fine material, with the coarser particles remaining as the predominant constituent. The sub-surface layer has accumulated the fine material leached from the surface layer, and contains more fine material than it originally possessed. The soil beneath the layers, where no water movement has taken place, remains unchanged. These layers are called "horizons" and are designated as "A", "B", and "C", respectively.

One of the requirements in soil classification is texture. Texture, when applied to soils, denotes particle size range. Particles of definite size are placed in size classes which are: gravel or stone, particles larger than 2 mm. in diameter; fine gravel, particles with diameters between 1 and 2 mm.; sand, particles with diameters between 0.05 and 1 mm., silt, particles with diameters between 0.005 and 0.05 mm., and clay, particles smaller than 0.005 mm. in diameter. Sand is subdivided into coarse sand, particles ranging in diameter between 0.5 and 1 mm.; medium sand, particles ranging in diameter between 0.25 and 0.5 mm., fine sand, particles ranging in diameter between 0.1 and 0.25 mm.; and very fine sand, particles ranging in diameter between 0.05 and 0.1 mm.

Textural classification of soils consists of grouping them according to particle size range. Particle size range grouping is based on the amounts of particles belonging to certain size classes present in the soil. The particle size range groups used in textural classification of soils by the Bureau of Chemistry and Soils are defined as follows.

*Sands,* soils containing less than 20 percent silt and clay, the rest of the material being sand. Sands are classed as coarse, medium, fine, and very fine. Coarse sand contains 35 percent or more of fine gravel and coarse sand and less than 50 percent of other grades of sand. Medium sand contains 35 percent or more of fine gravel, coarse and medium sand and less than 50 percent of fine or very fine sand. Fine sand include 50 percent or more of fine and very fine sand. Very fine sand contains 50 percent or more of very fine sand.

*Sandy Loams,* soils containing from 20 percent to 50 percent of silt and clay. They are designated as coarse, medium, fine, and very fine in accordance with the predominant sand class group present.

*Loams,* soils containing 20 percent or less of clay, from 30 to 50 percent of silt, and from 30 to 50 percent of sand.

*Silt Loams,* soils containing 20 percent or less of clay, 50 percent or more of silt, and 30 percent or less of other classes.

*Clay Loams,* soils containing from 20 to 30 percent of clay, from 20 to 50 percent of silt, and from 20 to 50 percent of sand.

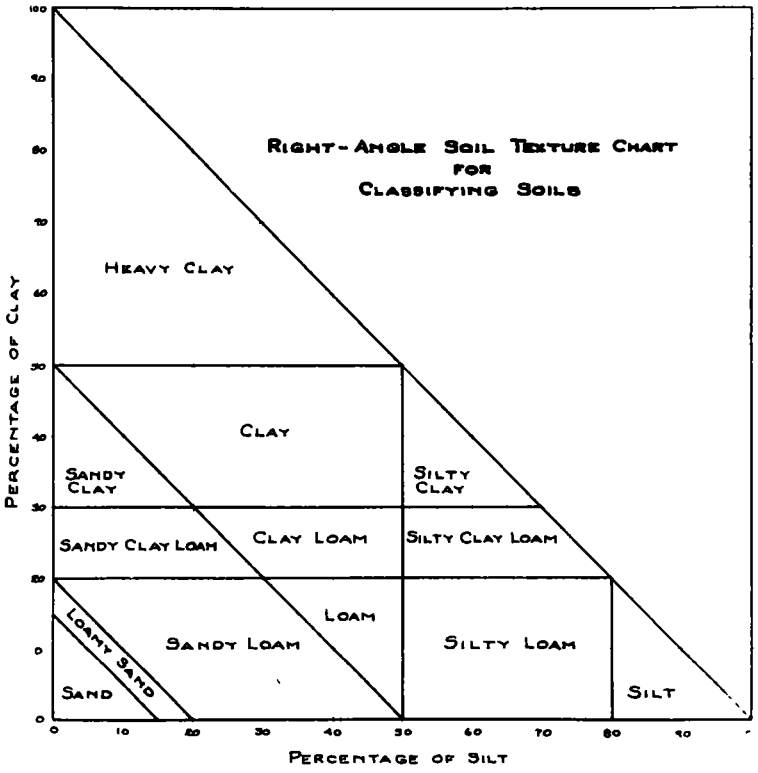


Figure 1.

*Clays*, soils containing 30 percent or more of clay and 70 percent or less of other classes.

Soils containing gravel or stone are designated as ' 'gravelly" or "stony".

Since the passage of water from the surface of the soil carries the fine particles from the surface layer and deposits them in a lower layer, it is obvious that the textural classification of the soils in the various layers of a soil profile will be widely different. For this reason the textural classification of a soil type, as classified by the Bureau of Chemistry and Soils, refers to the texture of the surface layer only. When classifying soils for engineering purposes, however, it is necessary to give the textural classification of the soils in the various layers of the profile. Figure 1 is a chart that may be used in classifying soils according to texture. It will be noted that this chart contains more groups than used by the Bureau of Chemistry and Soils, which makes it more applicable to the textural classification of the soils in an entire soil profile.

As stated before, the textural classification of a soil as used by the Bureau of Chemistry and Soils refers to the material in the surface layer or "A" horizon. This alone is not of much value to any one interested in the soils in the entire profile; however, when the textural classification is given in combination with the soil series, one has information on the texture of the surface layer and the color, structure, physical constitution, chemical composition, biological characteristics and morphology of the lower layers. A soil classified in this manner is called a soil "type" which is the smallest unit in soil classification. An example of a soil type is Cecil sandy loam. "Cecil" designates the soil series and "sandy loam", the texture of the surface soil. Soils belonging to a particular soil type are alike in all features, including the parent material, so if a soil survey shows the existence of only three types of soils,

one needs test data only on three samples representing these three types. If this test data is available from another survey, it will be applicable, unless considerable detail and extreme accuracy is required.

Except in cases when a soil material of a certain quality and texture is sought, as in highway work when a soil type base, sub-base, or surface is to be constructed, the classification of a soil as to type is unnecessary. The series classification, which gives all of the features of the soil profile, including the parent material, except the texture of the surface soil, is important. A knowledge of the characteristics and reputation of soils belonging to certain soil series and the possession of their test data eliminates the necessity of much sampling and testing on the average highway project. About all of the information necessary on the average soil survey is the location of various soil series that occur, however, in some instances soundings are made to determine the elevation of rock, certain types of soils, and water table.

In the foregoing, reference has been made to the soil type as being the unit of soil classification. Soil types are grouped into several categories that denote certain common features. For instance, a certain physiographical or geological area may produce certain soil types, or certain areas that are exposed to very different climatic conditions may produce other soil types. This grouping of soils in categories facilitates their identification and study.

Soils of the world are placed into two Great Divisions, Pedocals and Pedalfers. Figure 2 shows their distribution in the United States. Soils of the Pedocal Division are soils that have developed under arid conditions which permitted the accumulation of calcium in their profiles. Soils of the Pedalfer Division are soils that have developed under humid conditions and have had their soluble salts removed by leaching. Their profiles contain high percentages of silica, iron, and aluminum.

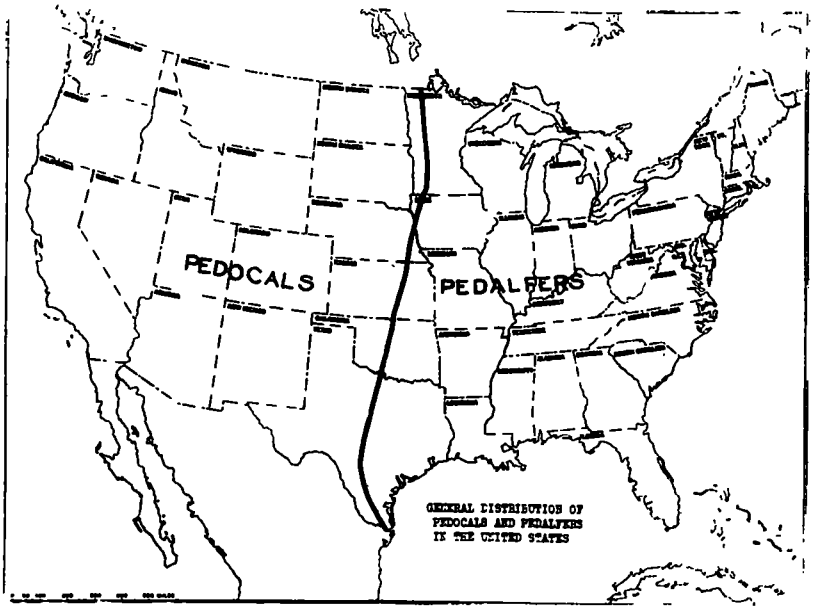


Figure 2.

The two Great Divisions of soils may each be sub-divided into other groups whose features have been affected by development under variations in rainfall within the arid and semi-arid regions, in the case of the Pedocals, and by variations in temperature in the humid regions, in

the case of the Pedalfers. The following is a list of the Great Soil Groups in each of the Great Divisions.

1. Pedocals. (Soils of arid regions and semi-arid regions containing accumulations of lime).

| Great Soil Group | Climate |
|---|---|
| 1. Tschernozem soils | Semi-arid |
| 2. Chesnut Brown soils | Semi-arid (less rainfall than above) |
| 3. Brown Grassland soils | Semi-arid (less rainfall than above) |
| 4. Gray Desert soils | Arid |

II. Pedalfers. (Soils of humid regions containing accumulations of iron and aluminum.)

| Great Soil Group | Climate |
|---|---|
| 1. Tundra soils | Frigid to sub-frigid |
| 2. Podzol soils | Cold temperate |
| 3. Brown forest soils | Temperate with forest |
| 4. Prairie soils | Temperate with tall grasses |
| 5. Red and Yellow soils | Warm temperate |
| 6. Laterites | Sub-tropical to tropical |

Brown Forest soils due to development under lower temperatures, characteristic of the high altitudes. In this State the soils are grouped into four soil provinces, the Atlantic Coastal Plain, the Piedmont Plateau, the Appalachian Mountains, and the River Flood Plains. Divisions or sub-provinces are also recognized within these provinces. Figure 3 shows the physiographic provinces of the State and Figure 4 shows the soil provinces and their sub-divisions. With the "Key" to the identification of North Carolina soils is a geologic map showing the geological divisions of the State. (Note: The appendix, "Key to the Identification of North Carolina Soils", will be found folded in at the back of this bulletin.) Figure 5 is a map of the State showing the normal annual precipitation.

Soil surveys have been made and reports and soil maps prepared by the Department of Agriculture for 90 of the 100 counties in North Carolina. Figure 6 is a map of the State showing the counties that have not been mapped. Figures 7 and 8 are photographic copies of sections of soil maps of two counties in the State and are typical of the other maps. On the original maps soil types are shown in different colors with letter symbols designating the types of soils.

Agricultural soil maps are of inestimable value to the Soils Department of the

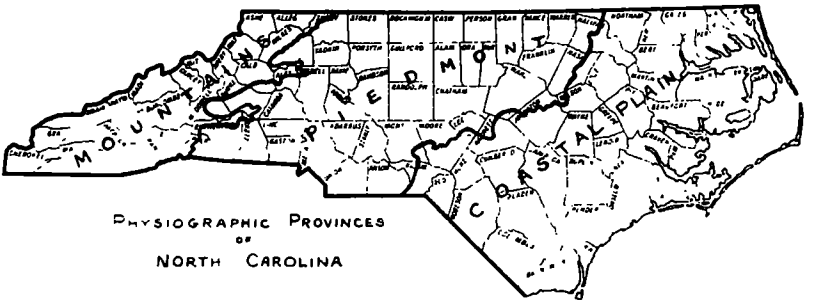


Figure 3.

## NORTH CAROLINA SOILS

With the exception of the true mountain soils, the soils of North Carolina belong to the Red and Yellow Great Soil Group. The true mountain soils belong to the

North Carolina State Highway and Public Works Commission. Many soil problems are solved by locating the proposed road on the soils map and noting the type and (or) series of the soils that are traversed by the road. Certain soil types are known

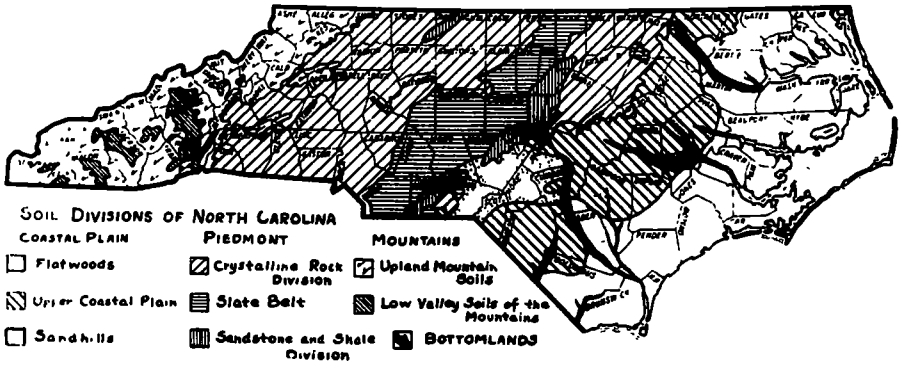


Figure 4.

to be satisfactory materials for soil type base or surface construction, and if they are shown on the maps, this information is of great assistance to the material investigator sent to the project to locate these types of materials. Sand deposits for sand asphalt pavements are also often located in this manner. Soils belonging to certain soil series are known to make poor subgrades and their presence or absence can be ascertained by an examination of the soils map. Greater detail, cement requirement for soils belonging to the most common series in the State, it having been discovered several years ago that the cement requirement for a definite horizon of a definite soil series was the same regardless of where the soil was located.

Many other uses are made of agricultural soil maps in North Carolina, among them being the determination of the need for pervious sub-bases to act as blotter courses beneath concrete pavements for the

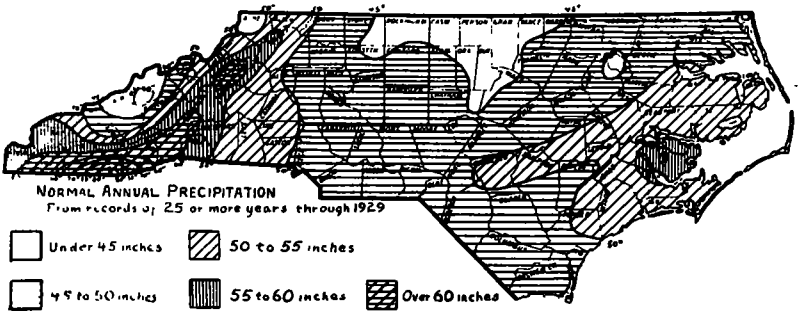


Figure 5.

if required, must be obtained in the field, but the soils map may be used as a guide.

Much cement stabilization has been done in North Carolina, and practically all of the preliminary estimates of the cement required have been determined from soil maps. The exact disposition of the cement required was determined in the field after grading operations were complete by a trained soils man capable of identifying soils by their series group. This procedure is possible because the Soils Department has previously determined the prevention of the detrimental effects of pumping action. It is believed from experience that all subgrade soils that are not granular type soils will eventually cause trouble by permitting detrimental pumping to occur. (Granular type soils are considered those soils belonging to the PRA Subgrade Groups below A-4). A knowledge of the subgrade groups to which the soils in the profiles of the various soils series that occur in the State belong permits a quick determination of the need of a sub-base beneath a concrete

pavement.

When an agricultural soil map of a county is not available or when more accuracy and detail are required than furnished by a map, it is necessary to make a soil survey. Surveys of this type are made by men trained to identify soils by their series group. Soil identification keys have been prepared for this purpose and one will be found in the Appendix to this article following the last paper in this Bulletin.

to drainage, such as drainage well established, fairly well established, and poorly established. The organic soils division is sub-divided into two groups, fibrous, partially decayed organic matter and well decayed organic matter. Some of the sub-divisions are further grouped according to the color of the "A" horizon material.

The soils series of the Piedmont Plateau provinces are grouped into three divisions, the crystalline rock division, the

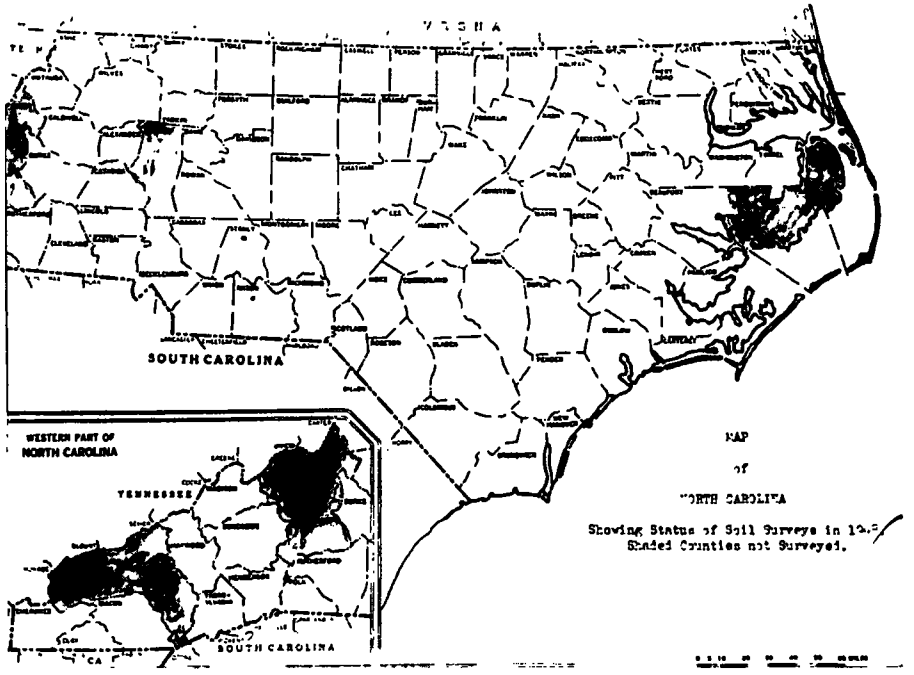


Figure 6.

This key consists of a geologic map of the State and a detailed description of all of the soil series groups found in the four soil provinces of the State. The manner of describing the soils and their arrangement in groups, having certain features in common, permits easy identification.

The soil series groups of the Coastal Plain Province are divided into sands, soils with friable "B" horizons, soils with plastic "B" horizons, organic soils, and miscellaneous soils materials. These divisions, with the exception of the organic soils, are sub-divided according

slate belt division, and the sandstone and shale division. The crystalline rock division is subdivided into soils series derived from acid crystalline, basic crystalline, mixed acid and basic rocks, and mica and quartz mica schist. The slate belt division is sub-divided into two divisions, soils series derived from slates and fine grained volcanic rocks and mixed slates and basic rocks.

The soils series of the Appalachian Mountain Province are grouped into four divisions, high mountain soils, low mountain soils, old high terrace soils, and miscellaneous soils. The high mountain

Figure 7.

soils division is sub-divided into soils series derived from acid crystalline rocks, basic crystalline rocks, mica schists, slates and schists, schists and acid crystalline rocks, and from sandstone, shale and quartzite. The low mountain soils division is sub-divided into soils series groups derived from acid crystalline rocks, basic crystalline rocks, schists, from sandstone, shales, slates, and quartzite, and from limestone.

The soils series of the River Flood Plains Province, sometimes called Bottomlands, are separated into divisions, first bottoms or soils subject to frequent inundation by floods, and second bottoms or older deposits from floods that are rarely inundated. The soils series of these two divisions are further separated according to drainage and origin of the parent material.

The procedure for identifying a soil as to series using the soil identification key follows certain orderly steps which finally eliminates all other soils except the one to which the soil in question belongs. First, the soil province and subprovince in which the soil occurs is determined by use of the geologic map with the key or the map of the soil provinces in Figure 4. Second, if the soils in the sub-province are separated according to parent material, drainage, or both, or color of the "A" horizon material, the separation fitting the soil in question must be determined. This procedure finally eliminates all soils series groups except a few and the exact identification is made from the detailed description of the color, arrangement, texture, and structure of the soils in the profile.

Sometimes it may be difficult to determine the location of the River Flood Plains Province, but the proximity, size, and flood area of the streams will determine its boundaries.

*Example of Identifying a Soil as to Series Group* - A soil is located in the south-central portion of Caswell County. According to the geologic map it is located in the crystalline rock division of the Piedmont Plateau Province. (The symbol Cg designates the rocks to be carboniferous granite which are acid crystalline. Intrusions of basic rocks may occur, but

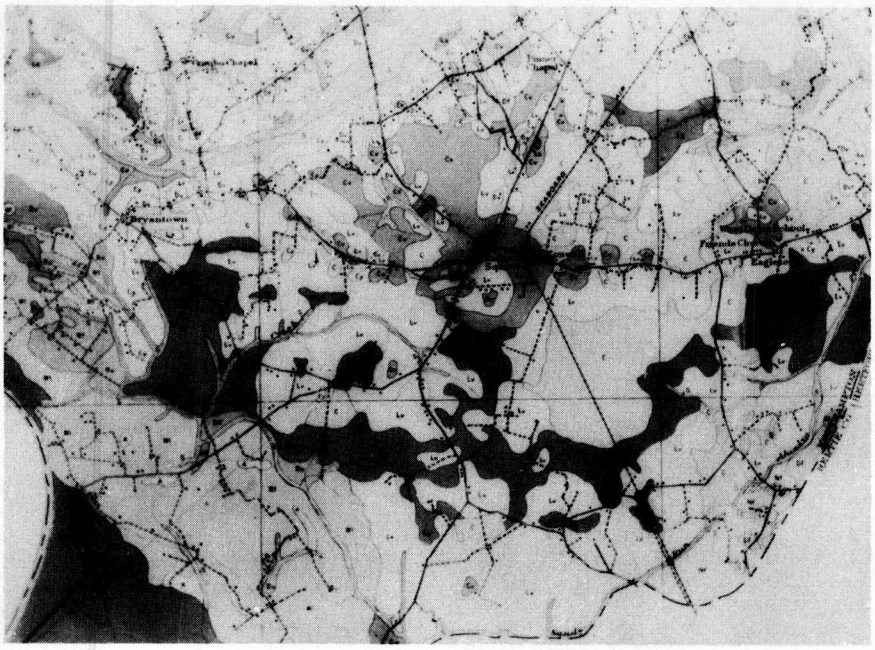

Figure 8.

an examination of the rocks in the area will check the type of rock as acid crystalline rocks are light colored, while basic crystalline rocks are dark to green in color.) The topsoil or "A" horizon material is a brownish-grey sandy loam and the sub-soil is a stiff, but brittle, red clay with mica flakes and free quartz. This soil belongs to the Cecil series. The type classification is Cecil sandy loam.

A discussion of the characteristics, uses, and treatments of the various soils occurring in this State is not within the scope of this article. This is material for a Soils Manual which is being prepared by the Soils Department. The amount of work and data necessary for such a manual is large and its preparation requires a considerable expenditure of time, however, when it is completed, it will contain valuable information on the soils of North Carolina from an engineering standpoint.

This paper covers the subject of how agricultural soil maps may be used in conducting soil surveys for engineering purposes. The methods described have been used by the Soils Department of the North Carolina State Highway and Public Works Commission since 1938 with success, and the data accumulated and experience gained so far are used constantly. Additional data and experience through the years will enable the Soils Department to solve soils problems quickly and economically by the use of agricultural soils maps and the pedological system of classification of soils.

The author has drawn freely from the "Atlas of American Agriculture", Part III, and Bulletin No. 293 of the Agricultural Experiment Station of the North Carolina State College of Agriculture and Engineering for the description of the pedological system of classifying soils.

# SIGNIFICANCE OF THE SOIL SURVEY REPORT IN THE SELECTION AND PRELIMINARY ASSESSMENT OF SITES FOR AIRPLANE LANDING STRIPS[1]

GOEFFREY B BODMAN[2], *Professor of Soil Physics*
University of California

Most of the writer's time was spent, during 1943, 1944 and 1945 while on leave of absence from the University of California, with the Military Geology Unit of the U. S. Geological Survey, in preparing soils information for the Office of the Chief Engineer in Washington and for the Chief Engineer, Southwest Pacific Area, in that theater The soils information was used, together with much other information of a geological, hydrological and general engineering character, in strategical and operational engineering reports. Advance knowledge of soil conditions before, during and after combat was, of course, of much importance in a variety of ways, including utilization for troop and equipment movement and in road and airfield construction. Wherever they existed, the value of soil survey reports for this kind of intelligence was conspicuous. They were of great help also in airplane photo interpretations.

It is the writer's belief that engineers who use soil as a construction material will find, in soil survey reports, much of value in the preliminary assessment of areas for many construction operations. It is for this reason that comparisons were made between conditions predicted from independent interpretation of soil survey reports and actual engineering experience, for five airplane landing strips in California.

The use of soil as a construction material was very greatly extended during the years 1939 to 1945, primarily as the result of the acute military need for roads and airfields. The need, commonly, was so urgent that site selections had to be made hurriedly. Accordingly, in territory occupied by ourselves and Allies, there were instances in which there was little opportunity for deliberate study of all available published material dealing with the areas under consideration.

During military operations overseas, particularly in the Asiatic-Pacific Theater, the problem was largely one of planning the use of unimproved, or but slightly improved, ground in enemy-occupied territory prior to its invasion. Any existing reports by geologists and soil scientists were found to be of much value in assessing ground conditions. In a large number of instances the invaded territory was entirely unexplored on the ground in advance

[1]Contribution from the Division of Soils, University of California, Berkeley, California. Acknowledgement is made to the War Department, Corps of Engineers, Office of the District Engineer, Sacramento District, for kind permission to use experimental data obtained by the members of the U. S. Engineer Laboratory, Sacramento, under the direction of Mr. Wilson Davis, Head, Materials and Laboratory Section.

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of our landings. Selection of construction sites in such cases was mainly dependent upon aerial photographs. A preliminary report of the methods used in terrain analysis by intelligence units working in Washington and overseas has recently been published by the Military Geology Unit of the United States Geological Survey *(18)*[3].

Sources of information helpful to the engineer in the actual selection of airfield sites and roadway routes will obviously differ from place to place and may be non-existent. In the absence of reports based on more or less detailed studies on the ground, stereopairs of recent, large-scale, vertical aerial photographs are invaluable and even though actual ground studies have been made, such photographs provide useful supplementary information for estimates of conditions affecting many kinds of engineering operations. Where, however, ground conditions have been explored, particularly in a great number of agricultural regions in this country, probably the most valuable sources for the construction engineer who must make extensive use of the soil as a subgrade or base course material, are those provided by modern soil survey reports as developed by the United States Department of Agriculture and the State agricultural experiment stations.

It is unnecessary to point out to students in the field of soil science that soil surveys mark the first step in any kind of comprehensive investigation on soils of a given area, although this fact may not be so clear to many engineers. There are many examples of the way in which engineers have put soil survey data and methods to use (see, for example, reference 2, and also *11*, p. 116) but it appears that soil scientists and soil engineers have not always realized the full extent of the usefulness of these reports. As a matter of fact, the general information sought by the engineer in his choice of an airfield site agrees surprisingly closely with that desired by the prospective farmer and others whose interest in land areas and their soils is primarily due to agriculture. The soil survey report is, of course, designed to include information useful to the farmer and the agricultural community. Apart from the soil maps and soil profile descriptions contained in soil survey reports, therefore, the treatment which the reports give to such matters as topography, ground surface conditions, obstructions to movement on the ground, natural vegetation, its clearing requirements and value for construction, size of farms, land utilization, farm practice and cropping systems, meteorological data, drainage, flood danger, irrigation, water supply and quality, nearness to towns, roads and railroads, electric power and so forth, is of the greatest value in the preliminary selection of airfield sites.

The detailed discussions and maps, concerning soil types, their profile characteristics and their areal extent, may be expected to provide information, as they actually do, which will considerably extend the engineer's knowledge of the ground as a prospective site for construction and facilitate his successful advance planning.

It is of particular interest to the soil physicist to consider the fact that highway and airfield construction engineers often seek to create in earth structures many conditions which the farmer dislikes in soils used for crop production. Whereas the engineer desires high apparent densities, low porosities and high bearing strength, the creation of those conditions in agricultural soils is avoided under good agricultural practice since, in general, they are associated with an undesirable "structural" state, poor tilth, low permeability to water and obstruction to root growth. Although their objectives diverge, however, agricultural soil research workers and soil engineers commonly find themselves confronted with problems requiring the same or similar methods of attack and solution so that the efforts of both groups may be expected to provide mutual stimulation in research.

An attempt is made in this paper to interpret, for the use of the engineer whose construction material is soil, ex-

[3]Italicized figures in parentheses refer to the list of references at the end of paper.

isting soils information contained in a few soil survey reports which embrace areas later chosen for airfield sites. Following the interpretations there is included a discussion of their correctness, made in the light of construction experience and laboratory examinations undertaken, with the soil types concerned, by the Materials and Testing Section, U. S. Engineer Office, Sacramento, California. It is hoped in this way to bring to the construction engineer a realization of the value of the soil survey report in the preliminary assessment of soil conditions at proposed sites for airplane landing strips.

## PROCEDURE

It was considered necessary that the soils of the particular localities chosen for examination fulfill these requirements:

(a) they must have been included in soil surveys (made according to the methods used by the Division of Soil Survey, U. S. Department of Agriculture) for which maps and descriptive reports exist, preferably in the published form,

(b) they must be sufficiently representative of a range of differences in soil properties that they will provide a reasonably significant sample for consideration,

(c) they must have been used as the actual materials of subgrade construction for airplane runways,

(d) they must have been subjected to quantative physical examination and testing in an engineering laboratory for the purpose of guiding construction design.

## SOILS AND CONSTRUCTION SITES CONSIDERED

Five localities were selected within, or immediately adjacent to, the Sacramento and San Joaquin Valleys of California. The localities and airstrip names are listed, from north to south, in Table 1, in which reference also is made to the soils of each area and the soil survey report concerned. The most northern field, at Orland, lies about 190 miles northwest of the most southern, at Merced. The position of each strip with respect to land boundaries (Mount Diablo base line and meridian) soil types and topography is shown in the maps and diagrams of Figure 1, the data for which were obtained from the soil survey reports *(6, 7, 10, 12, 13)* Geological Survey topographical sheets *(17)* and from airfield location and runway dimension maps as prepared by the U. S. Engineer Office, Sacramento.

The characteristics and agricultural utilization of the soil types at the five locations upon which airplane runways have been constructed, are tabulated in Table 2. In the table, the soil type names, soil utilization, parent material, relief, surface drainage, and average depth range of horizons are all summaries directly dependent upon the reports of soil surveys made several years before construction of the runways was undertaken. A key to the soil series of California *(16)* was also consulted. The summaries refer, for each area, to the soil type as a whole -- unless local segregations were actually made in the report -- that is to say, the descriptions generally are not based upon examination of the soils only as they occur in the position of the runways before construction but upon the types as they occur in the entire area covered by soil survey.

It may be pointed out that "soil type" names, as used by soil surveyors when making an agricultural soil survey, are a combination of a "soil series" name (e.g. in the case of soil 11, Tables 2, 3 and 4, the series name is 'Elder'; soil 71 has the series name 'Stockton') and a "textural class" name (soils 11 and 71 have respectively, the textural class names 'gravelly loam' and 'clay'). Much information concerning the soil may be obtained from the series name. A soil series comprises a group of soils, all members of which are similar with respect to the characteristics of the undisturbed soil profile, with a single exception of the texture of the surface soil. Members of the same soil series have a similar geologic origin and also have similar external characteristics and environmental conditions such as relief, drainage,

TABLE 1. LANDING STRIP NAMES, LOCATIONS AND SOIL TYPE NUMBERS

| Name | Location | Soil Survey Area | Soil Type Number (See Table 2 and Figure 1) |
|---|---|---|---|
| Orland Auxiliary Field A-1 | 3 miles ESE of Orland | Sacramento Valley Reconnoissance (10) | 11, 12 |
| Fairflied-Suisun Airport (NE-SW Runway No. 2) | 7 miles ENE of Fairfield | Suisun Area (6) | 21, 22, 31, 41, 51 |
| Kingsbury Auxiliary Field A-1 | 5½ miles SW of Lodi | Lodi Area (7) | 61 |
| Stockton Field, Mat "B" | 3½ miles SSE of Stockton | Lower San Joaquin Valley Reconnoissance (12) and Stockton Area (13) | 71 |
| Merced Army Airfield (NW-SE Runway) | 6½ miles NW of Merced | Lower San Joaquin Valley Reconnoissance (12) | 81, 91 |

vegetative cover, kind of climate, and others. The textural class name, as used in the soil type name, refers to texture, that is fineness of grain, or particle size distribution, in the surface soil only. Knowledge of the texture, degree of compaction, presence or absence of hardpan and of rock, lithology of the parent material and many other physical, as well as some chemical, qualities of the subsoil and/or deeper parts of the soil profile, can be gained from the soil series name, which is described with regard to these properties, in the soil survey report.

## METHODS OF INTERPRETATION

The three columns of Table 2, under the heading, "Engineering Classification", contain interpretations of the soil survey descriptions into terms and abbreviation symbols adopted by engineers and those in the field of soil mechanics *(19, 21)*. In the interpretation, reference was made, where possible, to mechanical analyses published in the soil survey reports for the different types and their horizons. In addition, descriptions and size distribution curves accompanying the Corps of Engineers and Public Roads Administration Symbols *(21, 19)* were given consideration.

Entries made in the columns under the general heading, "Estimated Soil Properties", depend partly upon other considerations. The estimates of volume changes (expansion and shrinkage) and permeability

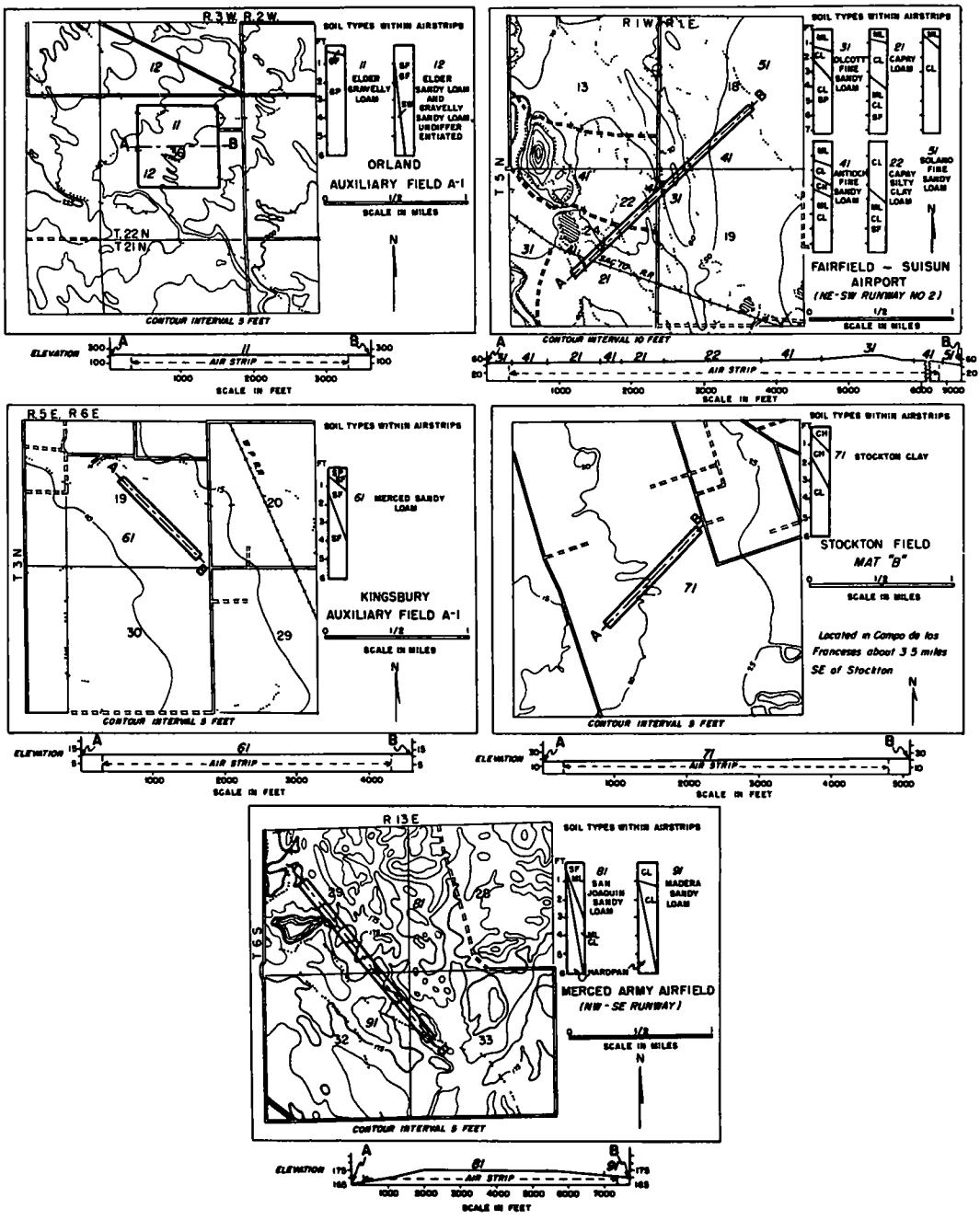


Figure 1. Positions of finished landing strips in relation to soil types and local topography. Soil boundaries are shown by dotted lines, contours by unbroken lines. Symbols used in soil profile diagrams are defined in Table 2, footnote 1. Consult Table 1 for sources of soil survey information.

TABLE 2. NAMES, UTILIZATION, CHARACTERISTICS AND ESTIMATED ENGINEERING PROPERTIES OF SOILS UPON WHICH LANDING STRIPS HAVE BEEN CONSTRUCTED

| Locality | No. | Soil Type Name and Utilization | Parent Material | Condition in Undisturbed State: Relief | Surface Drainage | Average Depth Range of Horizon, Inches | Texture Class Name | Equivalent Engineering Classification: Engineering Name | Engineering Group Symbol[1] | Public Roads Administration Class Symbol[2] | Estimated Soil Properties: Before Modification by Construction Operations: Expansion and Shrinkage | Relative Permeability | Average Range in: Plastic Limit Percent | Plasticity Index Percent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Orland Field | 11. | Elder gravelly loam (grazing) | Alluvial fans of unconsolidated sediments from metamorphic rocks | Irregular, low relief with small intermittent streamways | Fair to poor | 0-5 | Gravelly loam | Gravel with fines | GF | A-2 | Slight to none | High | Very slightly plastic to non-plastic | |
| | | | | | | 5-72+ | Gravelly loam, Gravelly sand. | Poorly graded gravel; sand mixture | GP | A-3 | | Very High | | |
| | 12. | Elder Sandy loam and gravelly sandy loam undifferentiated (grazing) | Alluvial fans of unconsolidated sediments from metamorphic rocks | Irregular, low relief with small intermittent streamways | Fair to Poor | 0-18 | Sandy loam; gravelly sandy loam | Chiefly sand with fines | SF some GF | A-2 | Slight to none | High | Very slightly plastic to non-plastic | |
| | | | | | | 18-72+ | Gravelly sandy loam | Gravelly sand | SW | A-3 | | High | | |
| Fairfield-Suisun Airport | 21. | Capay loam (grain; grazing; some fruit trees) | Mixed, unconsolidated sediments of low plains | Low relief | Fair to poor | 0-11 | Loam | Silty and Clayey fine sand | ML | A-4 | Medium | Low | 15<25 | 5<15 |
| | | | | | | 11-45 | Clay loam | Silty and sandy clays of medium plasticity | CL | A-6 | Medium | Low | 15<25 | 10<20 |
| | | | | | | 45-72+ | See footnote 3 | See footnote 3 | ML, CL, some SF | A-4, A-6, some A-2 | ---- | Medium to low | 15<25 | <20 |
| | 22. | Capay silty clay loam (grazing; some grain) | Mixed, unconsolidated sediments of low plains | Low relief | Very poor | 0-45 | Silty clay loam | Plastic inorganic silty clay | CL | A-7 | High | Very low | 15<25 | 10<25 |
| | | | | | | 45-72+ | See footnote 3 | See footnote 3 | ML, CL, some SF | A-4, A-6, some A-2 | ---- | Medium to low | 15<25 | <20 |
| | 31. | Olcott fine sandy loam (grazing; grain; some fruit) | Mixed, commonly unconsolidated or weakly consolidated sediments of low, dissected terraces | Low hills or slightly raised plains | Good | 0-17 | Fine sandy loam | Clayey fine sand | ML | A-4 | Medium | Low | 18<25 | <10 |
| | | | | | | 17-33 | Sandy clay; clay | Plastic sandy clay, or clay | CL | A-6, A-7 | Medium | Very low | 20<28 | 15<25 |
| | | | | | | 33-72+ | Semi-consolidated clay and sand | Interbedded, semi-consolidated clay and sand | CL, SP Interbedded | A-6, A-3 | ---- | Medium to low | 15<25 | <15 |
| | 41. | Antioch fine sandy loam (grazing; grain) | Mixed, unconsolidated sediments of old alluvial fans and terraces | Flat to gently undulating or sloping | Fair to poor | 0-18 | Fine sandy loam | Clayey fine sand | ML | A-4, A-6 | Medium | Low | 12<20 | 5<15 |
| | | | | | | 18-33 | Clay; silty clay | Plastic clay | CL, CH | A-7 | High | Very low | 16<24 | 15<25 |
| | | | | | | 33-43 | | Silty, sandy clay | CL | A-6 | Medium | Low | 15<22 | 5<20 |
| | | | | | | 43-72+ | Fine sandy loam | Clayey sand to sandy clay | ML, CL | A-4, A-6 | Medium | Low | 15<25 | <20 |
| | 51. | Solano fine sandy loam (grazing) | Mixed, unconsolidated sediments of old alluvial fans and terraces | Hummocks and depressions form low micro-relief | Fair to poor | 0-12 | Fine sandy loam | Clayey fine sand | ML | A-4 | Medium | Low | 12<18 | <10 |
| | | | | | | 12-72+ | Sandy clay; clay | Sandy clay and clay | CL | A-4, A-6 | High | Low | 16<20 | 10<25 |
| Kingsbury | 61. | Merced sandy loam[4] (grazing; some grain) | Mixed, unconsolidated sediments of valley plain | Nearly flat with few minor irregularities | Fair to poor | 0-11 | Sandy loam | poorly graded sand and sand with fines | SP, SF | A-3, A-2 | Low | High | Very slightly plastic to non plastic | |
| | | | | | | 11-33 | Sandy loam; loam | Sands with fines, compact | SF | A-2 | Low | Low | | |
| | | | | | | 33-72+ | Sandy loam | Sand with fines | SF | A-2 | Low | High | | |
| Stockton Field | 71. | Stockton clay (grain; some fruit; grazing) | Largely basic sediments of valley plain (profile has calcareous hardpan) | Flat | Very poor | 0-11 | Clay | Highly plastic clay | CH | A-7 | Very High | Very Low | 16<24 | 20<35 |
| | | | | | | 11-30 | Clay | Highly plastic clay | CH | A-7 | Very High | Very Low | 20<30 | 25<40 |
| | | | | | | 30-72+ | Clay; sandy clay | Silty and sandy clay | CL | A-6, A-7 | High | Low | 15<25 | 10<20 |
| Merced | 81. | San Joaquin sandy loam (grain; grazing; some fruit where irrigated) | Acid-igneous sediments of old terraces (profile has non-calcareous hardpan) | Low relief, commonly with many mounds and depressions | Fair | 0-20 | Sandy loam | Fairly well graded sand; clay mixtures | SF, ML | A-2, A-4 | Low | High | 10<18 | <8 |
| | | | | | | 20-38 | Sandy clay; clay | Sandy clay and clay | ML, CL | A-4, A-6 | Medium | Low | 15<25 | 5<15 |
| | | | | | | 38-72+ | (Hardpan) | Hardpan | -- | --- | --- | Very low | --- | --- |
| | 91. | Madera sandy loam (grain; grazing; some fruit and truck crops where irrigated) | Acid-igneous sediments of old terraces (profile has hardpan) | Low relief on level to sloping surface | Fair to good | 0-8 | Sandy loam | Clayey sand | CL | A-4 | Low | High | 10<18 | <5 |
| | | | | | | 8-42 | Sandy clay loam | Silty and clayey fine sand | CL | A-4 | Medium | Medium | 12<20 | 5<15 |
| | | | | | | 42-72+ | (Hardpan) | Hardpan | -- | --- | --- | Very low | --- | --- |

[1] *Corps of Engineers Group Symbols:* These symbols are used in the Corps of Engineers Soil Classification Table published in War Department Technical Manual TM 5-255 (15 April 1944) Table V, pages 84, 85. The letters have the following meanings: G=gravel; S=sand; F=fines (material <0.1 mm.); M=very fine sand, silt; C=clay; L=low to medium compressibility; H=high compressibility; P=poorly graded; W=well-graded (i.e. a wide range of particle size distribution.)

[2] *Public Roads Administration Class Symbols:* These symbols are described in numerous publications of the U. S. Public Roads Administration (e.g. Principles of Highway Construction, June, 1943). See also C. A. Hogentogler *(9)* and others. The approximate equivalence of the Corps of Engineers and Public Roads Administration symbols may be obtained from the War Department Manual TM 5-255.

[3] Soil Material estimated to show wide difference in character in this depth range.

[4] May contain alkali salts.

depend primarily upon texture descriptions and a few specific discussions in the survey reports, combined with some knowledge of the properties of the soil clays, and experience in field and laboratory. In some instances laboratory experiments had been conducted at an earlier time with samples of the actual soil types concerned, but not from these localities and entirely unconnected with landing strip construction. It is believed that any experienced worker in the field of soil mechanics, who is fully familiar with soil survey methods, would, after a careful study of the soil survey reports, arrive at essentially the same estimates of these properties as those given in Table 2.

Soil engineers regard the arbitrary measurements of plasticity constants, viz. plastic limit (rolling-out limit) liquid limit, plasticity index and impact number-moisture content curves of manipulated soil, as indicators of soil behavior under stress, and of the moisture content at which marked changes in behavior take place. These values are, therefore, given a certain amount of critical significance in engineering design. For these reasons, although no plasticity determinations had been made for these particular soils, it was considered worthwhile to discover the extent to which useful approximations to the rolling-out limit and the plasticity index could be made from the soil survey data. The estimates, in Table 2, of the ranges in plasticity values are the result of the translation of the soil texture terms as they were used at the time of the soil surveys, into the numerical and graphical data of mechanical analyses *(8, 19, 4)* and thence, by means of published correlation data *(3, 4, 9, 14, 15, 19)* into plastic limits and plasticity indices. The technical manual for aviation engineers *(21)* was also used in the plasticity estimates. The latitude, with respect to particle size distribution, which is permitted in soil texture-class names and in engineering texture-class symbols, the limited amount of exact knowledge which is possessed concerning the physics and physical chemistry of plasticity phenomena in soils, and the arbitrary nature of the measurements, combine to produce complicated and imperfect correlations between soil series and soil texture names, and plasticity 'constants'. Since, also soil types as mapped necessarily include a range of differences in profile properties, it is only possible to estimate plasticity values to within broad ranges. It is such ranges which are included in Table 2. It is not suggested that these, or any other estimates given in this paper, can replace detailed, direct measurements for the soils concerned, which must necessarily follow site selection and precede actual design.

The California bearing ratio (CBR) is used to determine the quality of the base course and subgrade materials. It is also a most important means of evaluating the structural qualities of the soils at the site, the need for replacement by, or mixing with, gravel or crushed rock ('aggregate' material) and the thickness and other design features of the base course. The measurement of the ratio is made on the undisturbed soil, and also on soil material previously compacted to its maximum density and then saturated with water. Apparent density tests of field soil and compacted specimens in the laboratory are made concurrently with CBR tests. In addition to a background of experience in actual performance of the test, estimates of the CBR depend upon the correct interpretation of soil texture-class names into engineering class symbols and the correctness of the numerical values for the bearing ratio percentages which the soil mechanics workers with the Corps of Engineers have assigned to those symbols *(21,* Table V*)*. Estimates of CBR were made for all soil types, by soil horizons, but have not been included in Tables 2 and 4. The estimates are, however, discussed later. If desired, soil apparent densities ('unit' densities) at 'optimum' compaction and corresponding void ratios can be estimated by reference to the same source, intermediate values for the latter being obtainable by nomograms *(5)* or by calculation.

TABLE 3 ESTIMATED CONSTRUCTION PROBLEMS ON SOIL TYPES

| Soil No | Name | General Soil Conditions and Their Improvement |
|---|---|---|
| | **Orland Auxiliary Field, A-1** | |
| 11 | Elder gravelly loam | Low lying areas may cause local drainage problems Hummocks and low ridges need levelling Compaction likely to be more successful with loaded hauling equipment and tractors than with sheepsfoot roller |
| 12 | Elder sandy loam, and gravelly sandy loam, undifferentiated | |
| | **Fairfield-Suisun Airport** | |
| 21 | Capay loam | Drainage, and elevation of grade line necessary Clayey, plastic subsoil interferes with drainage and forms inferior subgrade Insulation of base course against upward water movement is desirable |
| 22 | Capay silty clay | Natural drainage of this soil type is poor and soil quality for subgrade use is distinctly inferior Soil requires drainage, grade line should be raised, and stripping and replacement with suitable aggregate are desirable for heavy loading |
| 31 | Olcott fine sandy loam | Surface drainage is fair to good but low permeability of plastic clay horizons seriously restricts internal drainage May require levelling followed by removal of the clay horizon where exposed in cut |
| 41 | Antioch fine sandy loam | Fine-textured, clay-rich horizon in second and third foot commonly causes a boggy, muddy condition during rainy season Adequate side drainage of strip is essential, stripping and replacement of upper 3 feet may be necessary Grade line elevation is desirable |
| 51 | Solano fine sandy loam | Drainage conditions are very poor and problems of improvement for construction are similar to those given for the Antioch fine sandy loam |
| | **Kingsbury Auxiliary Field, A-1** | |
| 61 | Merced Sandy loam | Land is low-lying and requires drainage, water penetration is retarded by compact horizon at depth of about one foot from surface, which may cause local ponding of water Grade elevation is desirable High sand content may interfere with efficiency of sheepsfoot roller |
| | **Stockton Field, Mat "B"** | |
| 71 | Stockton clay | The low-lying, poorly drained and flat position occupied by this soil type makes it an undesirable one for construction Very little drainage is possible owing to low elevation Compaction of subgrade, essential in order to improve bearing ratio, would probably be best accomplished at end of rainy season Grade line requires raising A good quality aggregate should be used in the construction of base course to provide insulation against upward water movement during period of high water table level |
| | **Merced Army Airfield** | |
| 81 | San Joaquin sandy loam | Levelling requirements are light, except locally owing possibly to micro-relief which may be conspicuous on the San Joaquin sandy loam Clayey subsoil layer should be stripped, particularly where intersected by grade line Hardpan, found at depth of 3 to 5 feet, in places deeper, seriously interferes with free underdrainage during wet season, and may require blasting for ditches and before grading |
| 91 | Madera sandy loam | |

Table 3, based on series and type descriptions in the soil survey reports, states what construction problems may be expected at each of the airfield sites. The statements are the result of interpretations of ground conditions as influenced by topography and soil profile characteristics.

## EXAMINATION OF RESULTS

Whereas standard engineering soil tests made according to accepted A.S.T.N. and A.A.S.H.O. methods in the U. S. Engineer Sacramento District Laboratory, and construction experience gained by engineers in the field, provide the criteria of reliability for the estimates in Tables 2 and 3, Table 4 has been prepared as an aid to comparison between these estimates (part A) and actual determinations (part B) and as a basis for criticism of the interpretations.

Examination of Table 4 leads to these conclusions:

(a) Soil profile descriptions with respect to depth, thickness and textural characteristics of horizons as contained in the soil survey reports were, on the whole, confirmed by the samplings later made in greater numbers by the engineers during their field collection of test samples. Those differences which were observed can probably be attributed to soil heterogeneity within the type which, owing to scale limitations, could not be shown on the published soil survey maps. Where unmapped soil differences do occur it is evident that the estimated soil properties may be in disagreement with those actually discovered by the engineering study. Some such instances were found in the present study.

Engineering practice differs in the use of names descriptive of the 'grain size' properties of soil material. The engineers' and the soil surveyors' terminologies are not always so similar as might be suggested by comparing the names in the soil type column (part A) and the engineering name column (part B) of Table 4.

(b) Close agreement was obtained between estimates of classification symbols and their determination based on engineering laboratory measurements.

(c) Comparisons of estimated and determined numerical ranges in plastic limits and plasticity indices, respectively, show good agreement.

(d) Estimated values of bearing ratios at optimum compaction were, except for the soils of the Stockton and Kinsbury landing strips, much lower than those obtained in the engineering laboratory.

The discrepancies may be explained in part by the fact that lower bearing ratio magnitudes have been assigned to the various engineer soil categories in the technical manual of the aviation engineers *(21)* than have been observed to prevail in many of the medium and coarser grained California soils, and also to the use of a slight modification in procedure in the more recent bearing ratio tests. It is most significant, however, that soils that appeared to be the most suitable subgrade materials as judged by the estimated CBR values were actually found to be the most suitable materials for this use when considered on the basis of values determined in the engineering laboratory.

(e) The conditions and predicted construction problems, arranged in Table 3 by soil types and airfields, were well supported by experience at the time of runway construction in all cases but one. An unpredicted condition was found at the Merced runway where on the soil survey map only one soil type, San Joaquin sandy loam, was shown. In places a complex of two types was actually found to exist, consisting of the San Joaquin sandy loam in close association with included, small bodies of a clay-rich soil type occupying shallow depressions. The surface of this included soil that had to be removed during construction owing to its low bearing ratio. Because of their small size the areas of the depression type could not have been shown on the reconnaissance soil map.

## SUMMARY AND CONCLUSIONS

In order to determine the value of soil survey reports in the selection and pre-

TABLE 4 COMPARISON OF ESTIMATED AND DETERMINED ENGINEERING PROPERTIES OF SOILS AT LANDING STRIP SITES

| Locality | Part A. Estimated Values | | | | | | | Part B. Values Determined in U. S. E. D. Laboratory[3] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Soil Type Name | Average Depth Range of Horizon, Inches | Engineering Name | Engineering Group Symbol[1] | Public Roads Administration Class Symbol[2] | Average Range in Plasticity Index Percent | Average Range in Plastic Limit Percent | Average Depth Range of Horizon, Inches | Engineering Name | Engineering Group Symbol[1] | Public Roads Administration Class symbol[2] | Average Range in Plasticity Index, Percent | Plastic Limit Percent | Bearing Ratio at Optimum Compaction[4] |
| Orland Field | 11 | Elder gravelly loam | 0-5 | Gravel with fines | GF | A-2 | Very slightly plastic to non-plastic | | 0-72+ | Gravelly sandy loam | GF to GW | A-1 to A-2 | 0-7 | Non-plastic to 15 | Very High |
| | | | 5-72+ | Poorly graded gravel sand mixture | GP | A-3 | | | | | | | | | |
| | 12 | Elder sandy loam and gravelly sandy loam undif ferentiated | 0-18 | Chiefly sand with fines | SF some GF | A-2 | Very slightly plastic to non-plastic | | 0-18 | Gravelly sandy loam | GW | A-1 to A-2 | 0 | Non-plastic | Very High |
| | | | 18-72+ | Gravelly sand | SW | A-3 | | | 18-72+ | Gravelly sandy loam | GW | A-1 to A-2 | 0-6 | Non-plastic to 14 | Very High |
| Fairfield-Suisun Airport | 21 | Capay loam | 0-11 | Silty and clayey fine sand | ML | A-4 | 5-15 | 15-25 | 0-18 | Clay loam | CL | A-4 | 10 | 16 | High |
| | | | 11-45 | Silty and sandy clays of medium plasticity | CL | A-6 | 10-20 | 15-25 | 18-38 | Clay loam to sandy clay loam | CL | A-6 | 19-21 | 16 | Not Tested |
| | | | 45-72+ | See footnote 5 | ML, CL some SF | A-4, A-6 some A-2 | <20 | 15-25 | 38-72+ | Clay | - - - | - - - - - | Not Tested | - - | - - - - |
| | 22 | Capay silty clay loam | 0-45 | Plastic inorganic silty clay | CL | A-7 | 10-25 | 15-25 | 0-18 | Clay loam | CL | A-4 | 10 | 14 | Medium |
| | | | 45-72+ | See footnote 5 | ML, CL some SF | A-4 A-6 some A-2 | <20 | 15-25 | 18-84 | Clay | CL | A-6 | 25-32 | 20-21 | Medium |
| | 31 | Clcott fine sandy loam | 0-17 | Clayey fine sand | ML | A-4 | <10 | 18-25 | 0-16 | Sandy clay | - - - | - - | Not Tested | - - - | - - - - |
| | | | 17-33 | Plastic sandy clay or clay | CL | A-6, A-7 | 15-25 | 20-28 | 16-80 | Sandy loam | ML | A-2 | 0 | Non-plastic | High |
| | | | 33-72+ | Interbedded semi-con solidated clay and sand | CL, SP inter-bedded | A-6, A-3 | <15 | 15-25 | | | | | | | |
| | 41 | Antioch fine sandy loam | 0-18 | Clayey fine sand | ML | A-4, A-6 | 5-15 | 12-20 | 0-8 | Sandy loam to loam | SF | A-2 | 3-4 | 15-17 | Very High |
| | | | 18-33 | Plastic clay | CL, CH | A-7 | 15-25 | 16-24 | 8-34 | Clay | CL | A-7 | 24-30 | 18-19 | Medium |
| | | | 33-43 | Silty sandy clay | CL | A-6 | 5-20 | 15-22 | 34-54 | Loamy sand | ML | A-2 | 0 | Non-plastic | Not Tested |
| | | | 43-72+ | Clayey sand to sandy clay | ML, CL | A-4 A-6 | <20 | 15-25 | 54-96 | Sandy loam to loam | CL | A-4 | 12-15 | 17-21 | Very low to medium |
| | 51 | Solano fine sandy loam | 0-12 | Clayey fine sand | ML | A-4 | <10 | 12-18 | - - - | - - - - | - - | - - - - - | Not Sampled | - - | - - - - |
| | | | 12-72+ | Sandy clay and clay | CL | A-4, A-6 | 10-25 | 16-20 | - - | - - | | | | | |
| Kingsbury | 61 | Merced Sandy loam | 0-11 | Poorly graded sand and sand with fines | SP, SF | A-3 A-2 | Very slightly plastic to non-plastic | | 0-8 | Sandy loam | SF | A-2 | 0 | Non-plastic | Medium to high |
| | | | 11-33 | Sand with fines, compact | SF | A-2 | | | 8-47 | Sandy loam to sandy clay loam | SF | A-2 | 0-3 | Non-plastic to 15 | Medium to high |
| | | | 33-72+ | Sand with fines | SF | A-2 | | | - - - | - - - - | - - - | - - - - - | Not Sampled | - - - | - - - - |
| Stockton Field | 71 | Stockton clay | 0-11 | Highly plastic clay | CH | A-7 | 20-35 | 16-24 | 0-12 | Black adobe | CH | A-7 | 28-37 | 16-25 | Very low |
| | | | 11-30 | Highly plastic clay | CH | A-7 | 25-40 | 20-30 | 12-36 | Black adobe | CH | A-7 | 37-46 | 17-22 | Very low |
| | | | 30-72+ | Silty and sandy clay | CL | A-6 A-7 | 10-20 | 15-25 | 36-60 | Clay to clay loam | CL | A-7 | 10-22 | 21-29 | Very low to medium |
| Merced | 81 | San Joaquin sandy loam | 0-20 | Poorly graded sand clay mixtures | SF, ML | A-2 A-4 | <8 | 10-18 | 0-42 | Sandy loam | SC | A-2 | 0-6 | Non-plastic to 11 | High to very high |
| | | | 20-38 | Sandy clay and clay | ML, CL | A-4 A-6 | 5-15 | 15-25 | 42-48 | - - - - - | - - | - - - | Not sampled | - - - | - - - |
| | | | 38-72+ | Hardpan | - - | - - - | - | - - | 48-60 | Sandy Hardpan | - - - | - - | 0 | Non-plastic | - - - - |
| | 91 | Madera sandy loam | 0-8 | Clayey sand | CL | A-4 | <5 | 10-18 | - - - | - - - - - | - - - | - - - - | Not sampled | - - - | - - - - |
| | | | 8-42 | Silty and Clayey fine sand | CL | A-4 | 5-15 | 12-20 | | | | | | | |
| | | | 42-72+ | Hardpan | - - | - - - | - | - - | | | | | | | |

[1] See footnote 1, Table 2
[2] See footnote 2, Table 2
[3] Data taken from the files of the Materials and Laboratory Section of the U S Engineer Office, Sacramento District
[4] Adjectives refer to quality for subgrade
[5] Soil material estimated to show wide differences in character in this depth range

liminary assessment of airfield sites, estimates were made of the engineering properties and construction problems of certain soil types in central California, upon which airfield runways had been constructed for Army use.

The estimates were undertaken without knowledge of the results of tests made upon the soils in the U. S. Engineer Laboratory and depended entirely upon published U. S. Department of Agriculture and University of California soil survey reports, U. S. Geological Survey topographic maps, and literature in the fields of soil physics and mechanics. The engineering laboratory results, classification categories and construction experience were then examined for the purpose of comparing them with, and evaluating, the independent interpretations and estimates which had been made.

The estimates and laboratory examinations included engineers' classification categories as used by the Corps of Engineers and the Public Roads Administration, expansion, shrinkage and permeability. Numerical estimates were made only for ranges in values of plastic limit, plasticity index and bearing ratio, for which three properties, as well as for expansion and shrinkage, quantitative measurements had been made in the engineering laboratory.

Agreement between estimates and determinations was close for all properties except ranges in bearing ratio but, despite discrepancies in magnitude, the relative positions of the soils with respect to their bearing ratios were similar and conclusions concerning the suitability of the soils for subgrade material were the same whether based upon estimated or laboratory values. There was also found to be close agreement between the estimated and experienced field construction problems.

It is concluded that the proper interpretation of the information contained in agricultural soil survey reports can be used to excellent advantage in the selection and preliminary assessment of sites prior to engineering construction. It is evident that the best that can at present be expected in the estimate of engineering properties of soils is a qualitative expression or, for certain properties, a correct range in numerical values. There is no substitute for a detailed engineering survey of the selected site and appropriate sampling, with due regard to existing soil maps, soil types and known conditions, followed by engineering laboratory measurements and investigations aimed at rational design.

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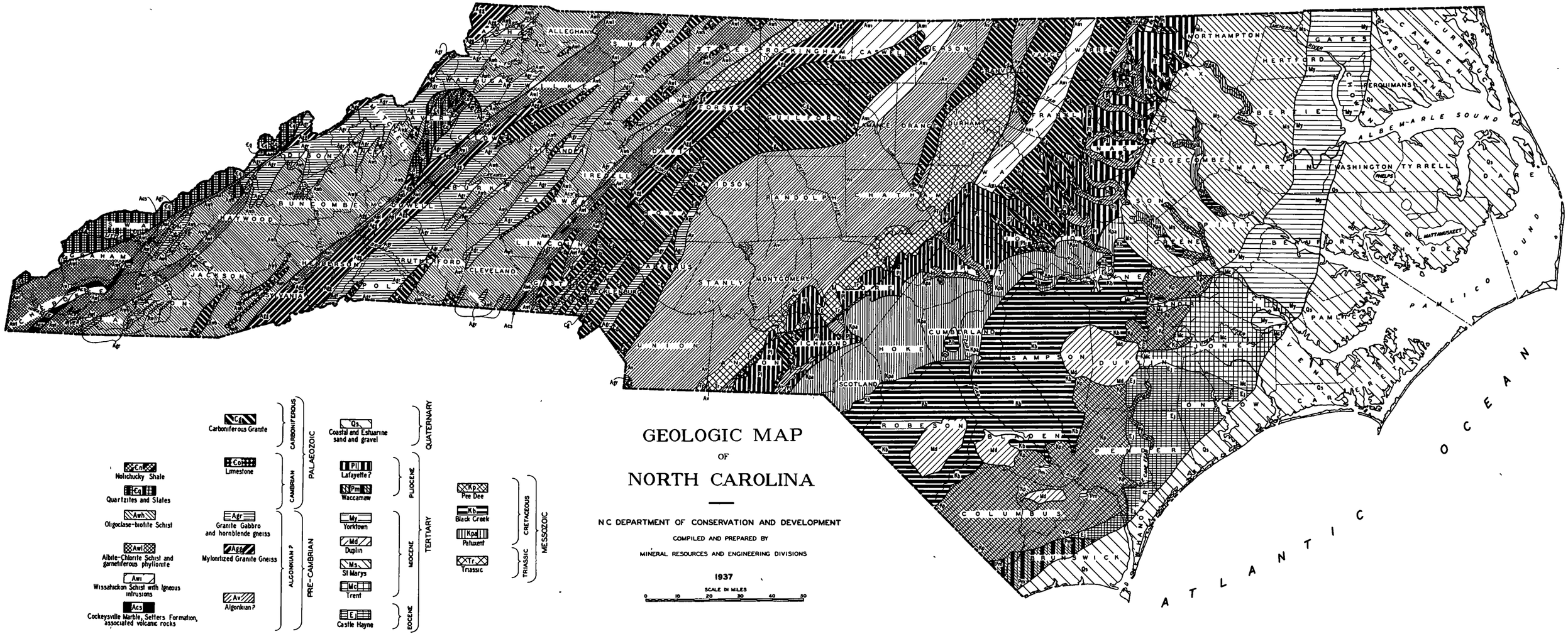
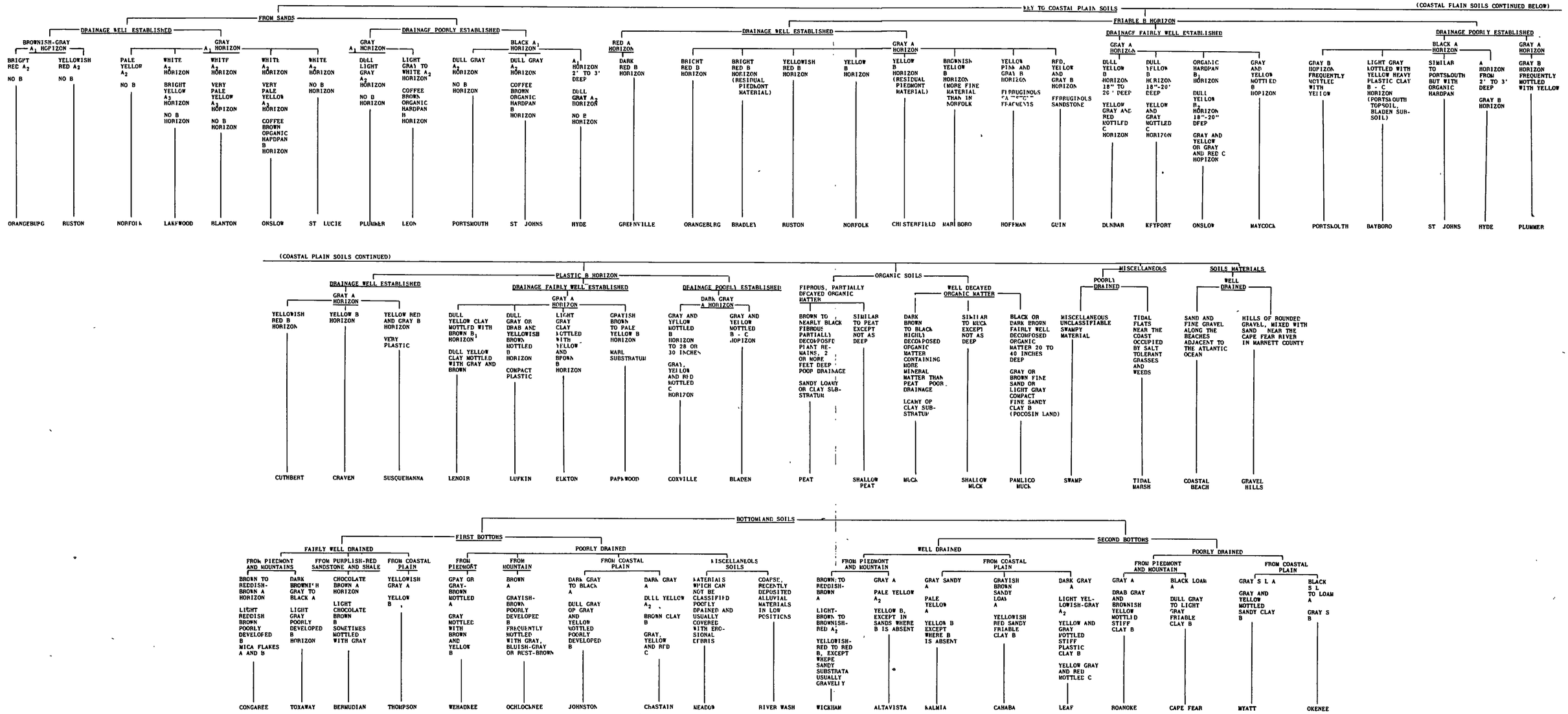

GEOLOGIC MAP
OF
NORTH CAROLINA
NC DEPARTMENT OF CONSERVATION AND DEVELOPMENT
COMPILED AND PREPARED BY
MINERAL RESOURCES AND ENGINEERING DIVISIONS
1937
SCALE IN MILES
0 10 20 30 40 50
ATLANTIC OCEAN
Carboniferous Granite
Limestone
Granite Gabbro and hornblende gneiss
Mylonitized Granite Gneiss
Algonkian?
Nolichucky Shale
Quartzites and Slates
Oligoclase-biotite Schist
Albite-Chlorite Schist and garnetiferous phyllonite
Wissahickon Schist with igneous intrusions
Cockeysville Marble, Setters Formation, associated volcanic rocks
Coastal and Estuarine sand and gravel
Lafayette?
Waccamaw
Yorktown
Duplin
St Marys
Trent
Castle Hayne
Pee Dee
Black Creek
Pahuxent
Triassic
QUATERNARY
PLIOCENE
MIOCENE
EOCENE
TERTIARY
CRETACEOUS
TRIASSIC
MESSOZOIC
CARBONIFEROUS
CAMBRIAN
PALAEOZOIC
ALGONKIAN?
PRE-CAMBRIAN

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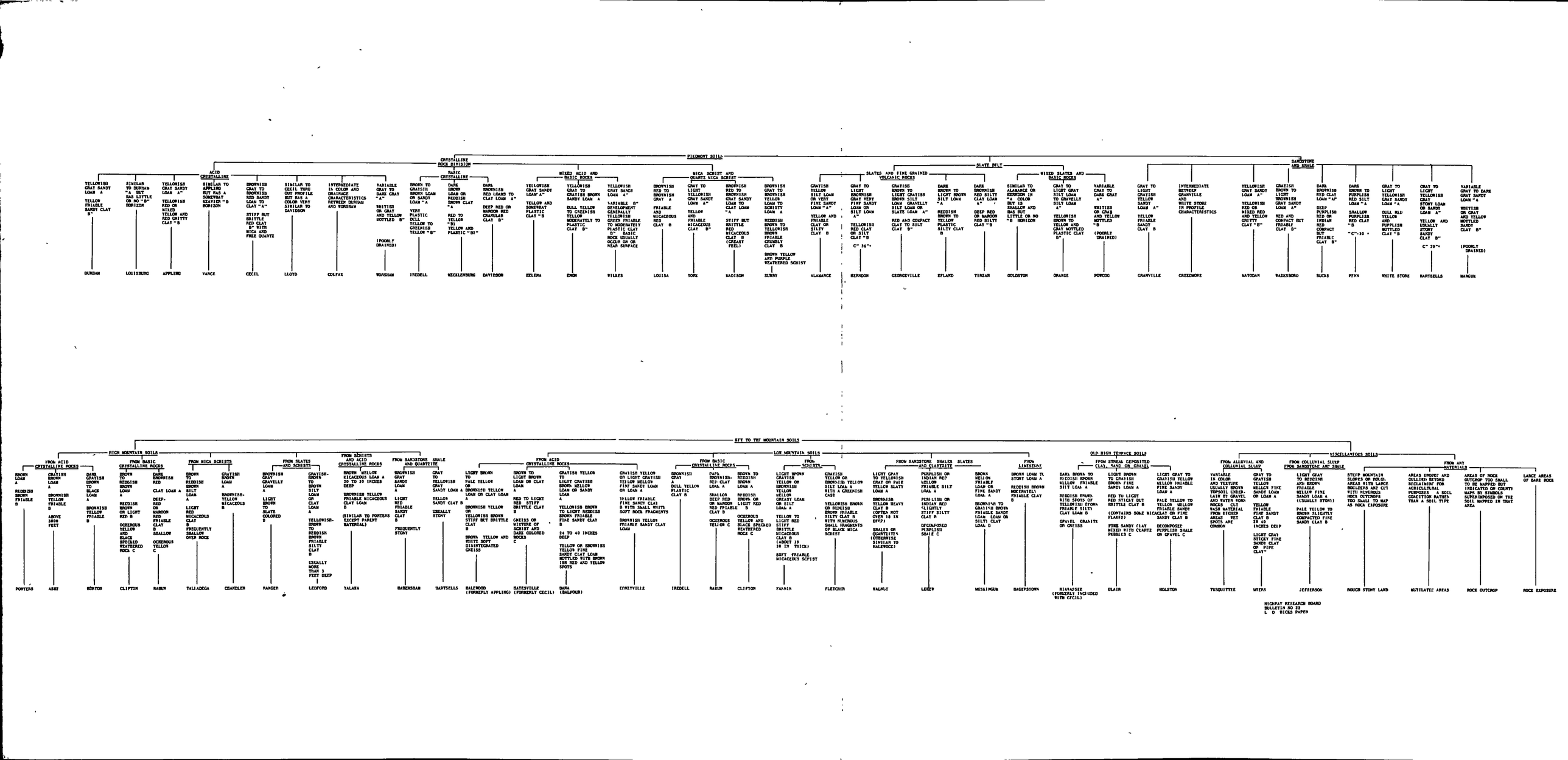
PIEDMONT SOILS
CRYSTALLINE ROCK DIVISION
ACID CRYSTALLINE
YELLOWISH GRAY SANDY LOAM A
YELLOW FRIABLE SANDY CLAY B"
DURHAM
SIMILAR TO DURHAM "A" BUT HAS LITTLE OR NO "B" HORIZON
LOUISBURG
YELLOWISH GRAY SANDY LOAM A"
YELLOWISH RED OR MIXED YELLOW AND RED GRITTY CLAY "B
APPLING
SIMILAR TO APPLING BUT HAS A SOMEWHAT HEAVIER "B HORIZON
VANCE
BROWNISH GRAY TO BROWNISH RED SANDY LOAM TO CLAY "A"
STIFF BUT BRITTLE RED CLAY B" WITH MICA AND FREE QUARTZ
CECIL
SIMILAR TO CECIL TRU OUT PROFILE BUT HAS A COLOR VERY SIMILAR TO DAVIDSON
LLOYD
INTERMEDIATE IN COLOR AND DRAINAGE CHARACTERISTICS BETWEEN DURHAM AND WORSHAM
COLFAX
VARIABLE GRAY TO DARK GRAY "A"
WHITISH OR GRAY AND YELLOW MOTTLED B"
(POORLY DRAINED)
WORSHAM
BASIC CRYSTALLINE
BROWN TO GRAYISH BROWN LOAM OR SANDY LOAM "A
VERY PLASTIC OLIVE YELLOW TO GREENISH YELLOW "B"
IREDELL
DARK BROWN LOAM OR REDDISH BROWN CLAY "A"
RED TO YELLOW "B1 YELLOW AND PLASTIC "B1"
MECKLENBURG
DARK BROWNISH RED LOAMS TO CLAY LOAM A"
DEEP RED OR MAROON RED GRANULAR CLAY B"
DAVIDSON
MIXED ACID AND BASIC ROCKS
YELLOWISH GRAY SANDY LOAM A"
YELLOW AND SOMEWHAT PLASTIC CLAY "B
ELIENA
YELLOWISH GRAY TO GRAYISH BROWN SANDY LOAM A
DULL YELLOW TO GREENISH YELLOW MODERATELY TO PLASTIC CLAY B"
EMON
YELLOWISH GRAY SANCY LOAM A"
VARIABLE B" DEVELOPMENT GENERALLY YELLOWISH GREEN FRIABLE TO MODERATELY PLASTIC CLAY B". BASIC ROCK USUALLY OCCUR OR NEAR SURFACE
WILKES
MICA SCHIST AND QUARTZ MICA SCHIST
BROWNISH RED TO BROWNISH GRAY A
FRIABLE AND MICACEOUS RED CLAY B
LOUISA
GRAY TO LIGHT YELLOWISH GRAY SANDY LOAM A"
YELLOW AND FRIABLE MICACEOUS CLAY B"
YORK
BROWNISH RED TO BROWNISH GRAY SANDY LOAM TO CLAY LOAM "A
STIFF BUT BRITTLE RED MICACEOUS CLAY B (GREASY FEEL)
MADISON
BROWNISH GRAY TO BROWNISH YELLOW LOAM TO SCHISTY LOAM A
REDDISH BROWN TO YELLOWISH BROWN FRIABLE CRUMBLY CLAY B
BROWN YELLOW AND PURPLE WEATHERED SCHIST
SURRY
SLATE BELT
SLATES AND FINE GRAINED VOLCANIC ROCKS
GRAYISH YELLOW SILT LOAM OR VERY FINE SANDY LOAM "A"
YELLOW AND FRIABLE CLAY OR SILTY CLAY B
ALAMANCE
GRAY TO LIGHT BROWNISH GRAY VERY FINE SANDY LOAM OR SILT LOAM A"
YELLOWISH RED CLAY OR SILT CLAY "B
C" 36"+
HERNDON
GRAYISH BROWN TO LIGHT GRAYISH BROWN SILT LOAM GRAVELLY SILT LOAM OR SLATE LOAM A"
RED AND COMPACT CLAY TO SILT CLAY B"
GEORGEVILLE
DARK BROWN TO LIGHT BROWN SILT LOAM "A
REDDISH BROWN TO YELLOW PLASTIC SILTY CLAY B
EPLAND
DARK BROWNISH RED SILTY CLAY LOAM A" - /
DEEP RED OR MAROON RED SILTY CLAY "B
TIRZAH
WIXED SLATES AND BASIC ROCKS
SIMILAR TO ALAMANCE OR HERNDON IN "A COLOR BUT IS SHALLOW AND HAS BUT LITTLE OR NO "B HORIZON
GOLDSTON
GRAY TO LIGHT GRAY SILT LOAM TO GRAVELLY SILT LOAM A"
YELLOWISH BROWN TO YELLOW AND GRAY MOTTLED PLASTIC CLAY B"
ORANGE
VARIABLE GRAY TO DARK GRAY A"
WHITISH OR GRAY AND YELLOW MOTTLED "B
(POORLY DRAINED)
POYCOG
SANDSTONE AND SHALE
GRAY TO LIGHT GRAYISH YELLOW SANDY LOAM A"
YELLOW FRIABLE SANDY CLAY B
GRANVILLE
INTERMEDIATE BETWEEN GRANVILLE AND WHITE STORE IN PROFILE CHARACTERISTICS
CREEDMORE
YELLOWISH GRAY SANDY LOAM A"
YELLOWISH RED OR MIXED RED AND YELLOW GRITTY CLAY "B"
MAYODAN
GRAYISH BROWN TO LIGHT BROWNISH GRAY SANDY LOAM A"
RED AND COMPACT BUT FRIABLE CLAY B"
WADESBORO
DARK BROWNISH RED CLAY LOAM "A"
DEEP PURPLISH RED OR INDIAN RED COMPACT BUT FRIABLE CLAY B"
BUCKS
DARK BROWN TO PURPLISH RED SILT LOAM "A
SHALLOW PURPLISH RED CLAY "B
"C"-36 +
PFNN
GRAY TO LIGHT YELLOWISH GRAY SANDY LOAM "A
DULL RED YELLOW AND PURPLISH MOTTLED CLAY "B
WHITE STORE
GRAY TO LIGHT YELLOWISH GRAY STONY LOAM OR SANDY LOAM A"
YELLOW AND USUALLY STONY SANDY CLAY B"
C" 20"+
HARTSELLS
VARIABLE GRAY TO DARK GRAY SANDY LOAM "A
WHITISH OR GRAY AND YELLOW MOTTLED SANDY CLAY B"
(POORLY DRAINED)
MANCUR
KEY TO THE MOUNTAIN SOILS
HIGH MOUNTAIN SOILS
FROM ACID CRYSTALLINE ROCKS
BROWN LOAM A
REDDISH BROWN FRIABLE B
PONTOTOC
GRAYISH BROWN LOAM A
BROWNISH YELLOW FRIABLE B
ABOVE 3000 FEET
ASHE
DARK GRAYISH BROWN TO BLACK LOAM A
BROWNISH YELLOW FRIABLE B
BORTON
FROM BASIC CRYSTALLINE ROCKS
BROWN TO REDDISH BROWN LOAM A
REDDISH BROWN OR LIGHT RED B
OCHEROUS YELLOW AND BLACK SPECKLED WEATHERED ROCK C
CLIFTON
DARK BROWNISH RED
CLAY LOAM A
DEEP-RED OR MAROON RED FRIABLE CLAY B
OCHEROUS YELLOW C
RABUN
FROM MICA SCHISTS
BROWN TO REDDISH BROWN SILTY LOAM A
LIGHT RED MICACEOUS CLAY B
FREQUENTLY SHALLOW OVER ROCK
TALLADEGA
GRAYISH BROWN LOAM A
BROWNISH-YELLOW MICACEOUS B
CHANDLER
FROM SLATES AND SCHISTS
BROWNISH GRAY GRAVELLY LOAM A
LIGHT BROWN TO LIGHT COLORED B
RANGER
GRAYISH-BROWN TO BROWN SILTY LOAM OR CLAY LOAM A
YELLOWISH-BROWN TO REDDISH BROWN FRIABLE SILTY CLAY B
USUALLY MORE THAN 3 FEET DEEP
LEDFORD
FROM SCHISTS AND ACID CRYSTALLINE ROCKS
BROWN MELLOW MICACEOUS LOAM A 20 TO 30 INCHES DEEP
BROWNISH YELLOW FRIABLE MICACEOUS CLAY LOAM B
(SIMILAR TO PORTERS EXCEPT PARENT MATERIAL)
YALAHA
FROM SANDSTONE SHALE AND QUARTZITE
BROWNISH GRAY SANDY LOAM A
LIGHT RED FRIABLE SANDY CLAY B
FREQUENTLY STONY
HABERSHAM
GRAY TO YELLOWISH GRAY SANDY LOAM A
YELLOW SANDY CLAY B
USUALLY STONY
HARTSELLS
LOW MOUNTAIN SOILS
FROM ACID CRYSTALLINE ROCKS
LIGHT BROWN TO PALE YELLOW OR CLAY LOAM A
BROWNISH YELLOW OR STIFF BUT BRITTLE CLAY B
BROWN YELLOW AND WHITE SOFT DISINTEGRATED GNEISS
HALEWOOD (FORMERLY APPLING)
BROWN TO LIGHT BROWN LOAM OR CLAY LOAM A
RED TO LIGHT RED STIFF BRITTLE CLAY B
GNEISS OR WITSTONE OF SCHIST AND DARK COLORED ROCKS C
HAYESVILLE (FORMERLY CECIL)
GRAYISH YELLOW TO LIGHT GRAYISH BROWN MELLOW LOAM OR SANDY LOAM A
YELLOWISH BROWN TO LIGHT REDDISH BROWN FRIABLE FINE SANDY CLAY B
24 TO 40 INCHES DEEP
YELLOW OR BROWNISH YELLOW FINE SANDY CLAY LOAM MOTTLED WITH BROWN 108 RED AND YELLOW SPOTS
DANA (BALFOUR)
GRAYISH YELLOW OR LIGHT GRAYISH YELLOW MELLOW FINE SANDY LOAM OR LOAM A
YELLOW FRIABLE FINE SANDY CLAY B WITH SMALL WHITE SOFT ROCK FRAGMENTS
BROWNISH YELLOW FRIABLE SANDY CLAY LOAM
EDNEYVILLE
FROM BASIC CRYSTALLINE ROCKS
BROWNISH GRAY A
DULL YELLOW PLASTIC CLAY B
IREDELL
DARK BROWNISH-RED CLAY LOAM A
SHALOW DEEP RED OR MAROON RED FRIABLE CLAY B
OCCENOUS YELLOW C
RABUN
BROWN TO REDDISH BROWN LOAM A
REDDISH BROWN OR LIGHT RED B
OCCHEOUS YELLOW AND BLACK SPECKED WEATHERED ROCK C
CLIFTON
FROM SCHISTS
LIGHT BROWN GRAYISH YELLOW OR BROWNISH YELLOW MELLOW GREASY LOAM OR SILT LOAM A
YELLOW TO LIGHT RED STIFF BRITTLE MICACEOUS CLAY B (ABOUT 19 30 IN THICK)
SOFT FRIABLE MICACEOUS SCHIST
FANNIN
GRAYISH YELLOW OR BROWNISH YELLOW SILT LOAM A WITH A GREENISH CAST
YELLOWISH BROWN OR REDDISH BROWN FRIABLE SILTY CLAY B WITH NUMEROUS SMALL FRAGMENTS OF BLACK MICA SCHIST
FLETCHER
FROM SANDSTONE SHALES AND QUARTZITE
LIGHT GRAY TO YELLOWISH GRAY OR PALE YELLOW SLATY LOAM A
BROWNISH YELLOW HEAVY CLAY B (OFTEN NOT OVER 18 IN DPTH)
SHALES OR QUARTZITE (OTHERWISE SIMILAR TO HALEWOOD)
WALNUT
PURPLISH OR INDIAN RED MELLOW FRIABLE SILT LOAM A
PURPLISH OR INDIAN RED SLIGHTLY SILTY CLAY B
DECOMPOSED PURPLISH SHALE C
LEDGER
BROWN MELLOW FRIABLE LOAM OR FINE SANDY LOAM A
BROWNISH TO GRAYISH BROWN FRIABLE SANDY LOAM LOAM OR SILTY CLAY LOAM B
MUSKINGUM
FROM LIMESTONE
BROWN LOAM TO STONY LOAM A
REDDISH BROWN MOCERATELY FRIABLE CLAY B
HAGERSTOWN
OLD HIGH TERRACE SOILS
FROM STREAM DEPOSITED CLAY, SAND OR GRAVEL
DARK BROWN TO REDDISH BROWN MELLOW FRIABLE SILT LOAM A
REDDISH BROWN FRIABLE SILTY CLAY LOAM B
GRAVEL, GRANITE OR GNEISS
BIBAKOBEE (FORMERLY INCLUDED WITH CECIL)
LIGHT BROWN TO GRAYISH BROWN FINE SANDY LOAM A
RED TO LIGHT RED STICKY BUT BRITTLE CLAY B
(CONTAINS SOME MICA FLAKES)
FINE SANDY CLAY MIXED WITH QUARTZ PEBBLES C
BLAIR
LIGHT GRAY TO GRAYISH YELLOW MELLOW FINE SANDY LOAM A
PALE YELLOW TO YELLOW MELLOW FRIABLE SANDY CLAY LOAM B
DECOMPOSED PURPLISH SHALE OR GRAVEL C
HOLSTON
FROM COLLUVIAL SLUSP FROM SANDSTONE ANC SHALE
LIGHT GRAY TO REDDISH AND BROWN FRIABLE MELLOW FINE SANDY LOAM A (USUALLY STONY)
PALE YELLOW TO BROWN SLIGHTLY COMPACTED FINE SANDY CLAY B
JEFFERSON
MISCELLANEOUS SOILS
FROM ALLUVIAL AND COLLUVIAL SLUSP
VARIABLE IN COLOR AND TEXTURE USUALLY BROWN TOPSOIL LOOSE-LAIN BY GRAVEL AND WATER WORN ROCKS CLT WASH MATERIAL FROM HIGHER AREAS WET SPOTS ARE COMMON
TUSQUITTEE
GRAY TO GRAYISH YELLOW MELLOW FINE SANDY LOAM OR LOAM A
YELLOW FRIABLE FINE SANDY CLAY B 28 40 INCHES DEEP
LIGHT GRAY STICKY FINE SANDY CLAY OR PIPE CLAY"
MYERS
FROM ANY MATERIALS
STEEP MOUNTAIN SLOPES OR ROLG. AREAS WITH LARGE BOULDERS AND CUT WITH NUMEROUS ROCK OUTCROPS TOO SMALL TO MAP AS ROCK EXPOSURE
ROUGH STONY LAND
AREAS ERODED AND GULLIED BEYOND RECLAIMING FOR AGRICULTURAL PURPOSES A SOIL COMBINATION RATHER THAN A SOIL TYPE
MISCELLANEOUS AREAS
AREAS OF ROCK OUTCROP TOO SMALL TO BE MAPPED BUT INDICATED ON COUNTY MAPS BY SYMBOLS SUPERIMPOSED ON THE SOIL MAPPED IN THAT AREA
ROCK OUTCROP
LARGE AREAS OF BARE ROCK
ROCK EXPOSURE
HIGHWAY RESEARCH BOARD BULLETIN NO 22 L D HICKS PAPER

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## BULLETINS

Papers and progress reports on highway research of immediate interest.
Illustrated, paper binding.

No. 1 Silicate of Soda as a Soil Stabilizing Agent, by W. Derby Laws and J. B. Page (1946) 21 pp. . . . . $0.15

No. 2 R An Analysis of General State Enabling Legislation Dealing with Automobile Parking Facilities, by David R. Levin (1947) 104 pp. (temporarily out-of-print) . . . . . .60

No. 3 Report of Committee on Highway Organization and Administration including Aims and Activities and Special Papers (1947) 23 pp. . . . . .30

No. 4 Report of Committee on Land Acquisition and Control of Highway Access and Adjacent Areas and Special Papers (1947) 42 pp. . . . . .45

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No. 22 Agricultural Soil Maps, Review of the Problem, Tabulation of Status, Bibliography, and Two Papers, (1949) 137 pp. . . . . 1.80