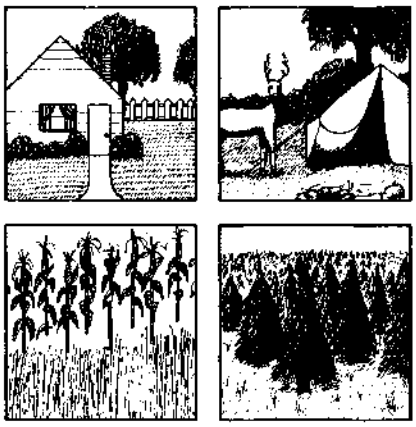

Soil Survey Reports

USING AVAILABLE INFORMATION

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Extension Bulletin E-1586, February 1982
COOPERATIVE EXTENSION SERVICE • MICHIGAN STATE UNIVERSITY

Introduction

The goal of this bulletin is to provide an instructional guide for using soil survey information in rural land use decision making. Soil surveys in Michigan are a cooperative venture of the Soil Conservation Service, Michigan Department of Agriculture, Michigan State University Experiment Station, Michigan Technological University and the United States Forest Service.

A soil survey report consists of three interactive sections: A narrative portion that describes the soil mapping units and soil series found in the survey area; an illustration and table section that provides information concerning the soil mapping units for many land uses; and the soil map sheets which delineate the soil mapping units on an air photo base.

The maps were prepared by soil scientists who walked the land digging holes to a depth of three to five feet at selected locations. An intensity of one observation per eight to ten acres is typical in Michigan. Soilscape properties such as soil texture, structure, drainage and horizonation, as well as slope gradient, length and shape, size of streams, and vegetation were considered in establishing the location of soil mapping unit boundaries. These field decisions are recorded on recent aerial photographs of the area.

The general properties of the major soil or soils in a mapping unit are recorded on the soil maps in the map section of the soil survey report. Properties of the minor soils found within the unit are defined in the narrative section of the soil survey report under "soil maps for detailed planning." Soil suitabilities for several land uses, soil engineering properties, and other technical data can be found in the illustration and tables section of the report. This information is assembled from laboratory analysis, field observations, reports and records.

The following is a detailed list of information found in each section of a soil survey report:

Narrative Section

General nature of the county
How this survey was made
General soil map for broad land use planning
Soil maps for detailed planning
Use and management of the soils
Soil properties
Classification of the soils
Formation of the soils
References
Glossary

Illustration and Tables Section

Block diagrams of some general soil areas
Photos of typical landscapes
Acreage and proportionate extent of the soils
Building site development
Capability classes and subclasses
Classification of the soil
Construction materials
Engineering properties and classifications
Freeze dates in spring and fall

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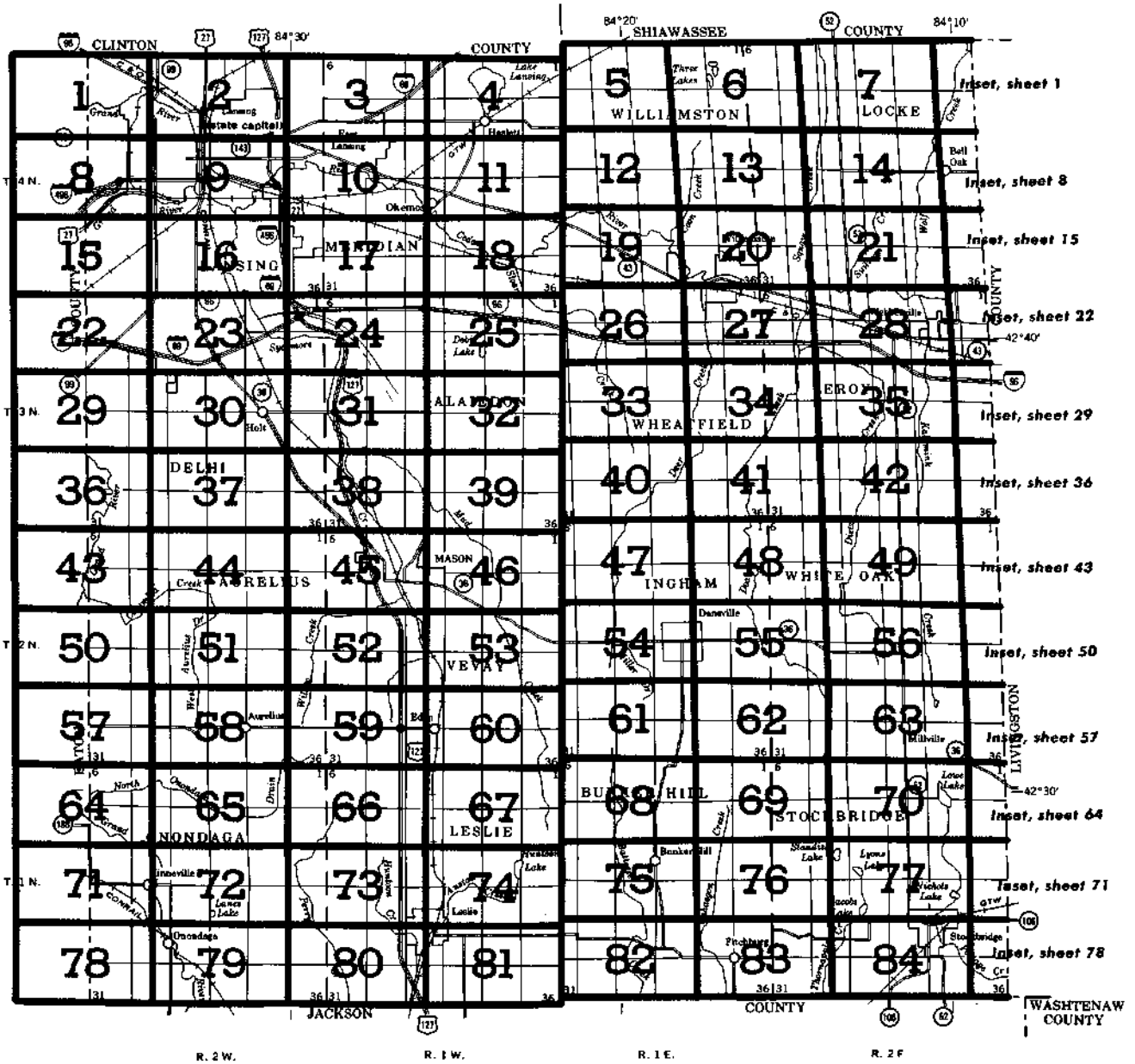

Fig. 1. Ingham County Soil Survey Report Index Map.

Growing season length
Physical and chemical properties of soil
Recreational development
Sanitary facilities
Soil and water features
Temperature and precipitation data
Water management
Wildlife habitat potentials
Windbreaks and environmental plantings
Woodland management and productivity
Yields per acre of crops and pasture

Soil Maps

General soil map
Index to map sheets
Soil legend
Conventional and special symbols legend
Soil map sheets

Use of the Soil Survey Report

The remainder of this bulletin is designed to assist you in using a soil survey report. Consult the glossary found in the soil survey report for definitions of unfamiliar technical terms. A sequence of examples will be used to simulate the steps necessary to locate desired information. We shall use as an example the NW 1/4 section 24, T4N, R1W located about two miles east of Okemos and one mile north of Highway 43 in Meridian Township. Figure

1 is a copy of the index map from the Ingham County report. If you prefer, you may choose your own example.

How Do I Locate an Area on the Soil Maps?

The first step in using a soil survey report is to locate the area of interest on the soil map.

Index. An index to map sheets, found immediately before and after the map sheets, indicates on which map sheet the area of interest is found. Major roads and township names are given on the index. The corner sections of each township are numbered. The township numbers are found along the left side of the index map. The range numbers are found along the bottom of the index map. These numbers are part of the rectangular system of land description that is used in most of Michigan. In this system, the major north-south line is called a principal meridian. The major east-west line that is needed to define a location is called the base line. In Michigan, there is one principal meridian, the Michigan Principal Meridian (Fig. 2). The base line that is associated with it is located 48 miles north of the Indiana-Michigan state line and coincides with the county line between Ingham and Jackson Counties. The intersection of the principal meridian and a base line is called the initial point. Lines at six mile intervals parallel to the base line were established north and south of the base line. These lines are referred to as township lines or, more commonly, towns. Similarly, range lines were established at six mile intervals parallel to the principal meridian. Range lines are measured east and west of the principal meridian.

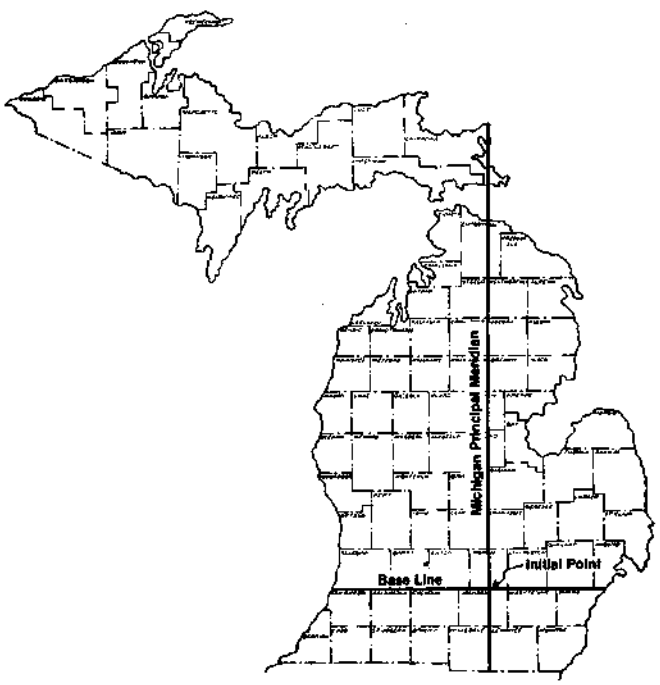

Fig. 2. Michigan Principal Meridian and associated base line.

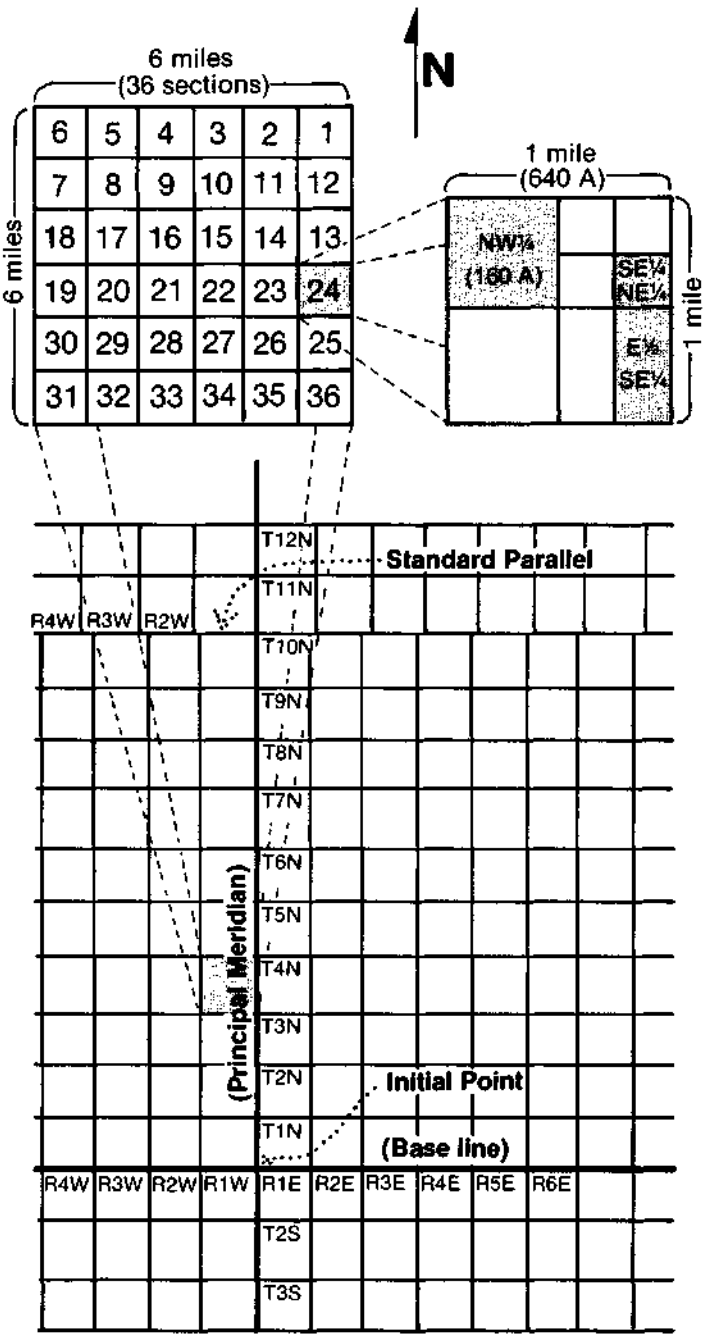

Fig. 3. Arrangement of township and range lines in relation to principal meridian and base line.

Figure 3 shows the arrangement of township lines and range lines in relation to a principal meridian and base line. The area included by the intersection of a town line and range line is called a congressional township. Townships are further subdivided into 36 sections, one square mile each. A sectionalized township is found in the lower right corner of the index map. It illustrates the

manner in which sections are numbered in a township.

A section can be further subdivided into quarters, and subsequently into smaller units, to more precisely describe a parcel of land. In Figure 3, section 24 of township T4N, R1W is enlarged. In a legal description the smallest unit is written first. A full section contains 640 acres and a quarter section has one fourth of 640 acres or 160 acres.

We want to locate the township formed by the intersection of Town 4 North and Range 1 West. Its corner sections are numbered and it is outlined in a heavy dashed line. The gray boxes found on the index map represent map sheets. The large gray numbers indicate on which map sheet that particular area is found. Section one of this township is found in the northeast corner of map sheet 4. Section 24 is found on map sheet 11 of the soil survey report.

Map Sheets. Each map sheet is numbered along the top. If you are using an Ingham County soil survey report, turn to map sheet 11. A copy of the portion of map sheet 11 that is of interest is shown on Figure 4. Section 24 is located in the lower right corner of map sheet 11. The roads in this area do not follow the section lines. The northeast corner of section 24 is marked by a short line that extends approximately 1/16 of an inch on either side of the dark heavy line that is labeled Meridian Road. This road forms the eastern boundary of section 24. The northwest corner of the section is located by a large plus sign (+). The southeastern corner is marked by a short line that extends upward into the map. The map scale found on each map sheet is helpful in delineating a section, generally one mile square. The NW 1/4 of section 24, T4N, R1W is outlined in Figure 4.

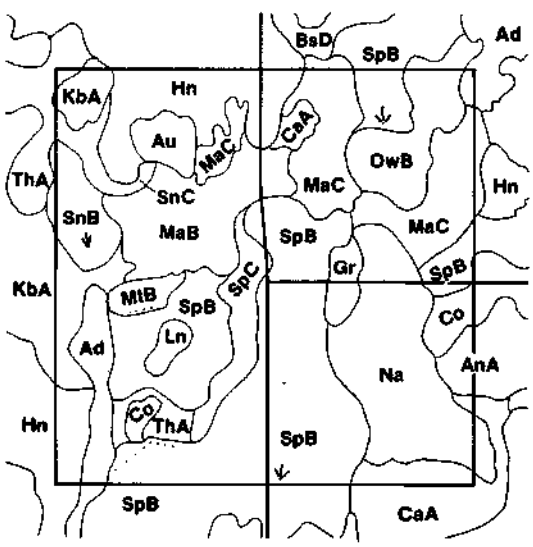

Fig. 4. NW ¼ of section 24, T4N, R1W.

Soil map units are outlined by the thin black lines found on the map sheets. Mapping unit symbols are located within each mapping unit delineation. Prepare a list of the mapping units found in the northwest quarter of section 24 and estimate the number of acres in each mapping unit delineation (Table 1-A). Construct a dot grid on a clear sheet of acetate to use in estimation of map unit acreage. Two special symbols are found in the northwest quarter. Record them along with the mapping unit symbols for future reference.

Table 1-A.

Mapping Unit Symbol	Acreage	Mapping Unit Symbol	Acreage
Ad	4.0	MtB	2.4
AnA	1.6		
Au	2.8	Na	19.6
CaA	4.0	OwB	9.2
Co	3.2	SnB	4.0
Gr	2.4	SnC	2.4
Hn	18.0	SpB	44.0
KbA	2.4	SpC	5.6
Ln	1.6	ThA	1.6
MaB	13.2		
MaC	18.0	....	

This quarter section is more complex than many areas but is typical of the soil variation common in many Michigan landscapes. Determine the mapping unit delineations and acreages for the area that you are using if you are following along with another example location (Table 1-B).

Table 1-B. Personal Example

Mapping Unit Symbol	Acreage	Mapping Unit Name

Soil Legend. The mapping unit symbols are defined in the soil legend that is located on the back side of the indices in the map section of soil survey reports. Turn to the soil legend. A copy of the Ingham County soil legend is found in Table 2. The first capital letter of the soil symbol is the initial one for the soil name. The lower case letter separates mapping units that have names that begin with the same letter with the exception of sloping or eroded phases. The second capital letter indicates the class of slope. Symbols without a slope letter indicate miscellaneous areas or soils with a slope range of less than two percent. A final number in the symbol indicates the severity of past erosion. Determine the name of the soil mapping units found in the example area as shown in Table 3. If you are following with a personal example, place the mapping unit names in Table 1-B.

Table 2. Soil Legend for Ingham County

Symbol	Name
Ad	Adrian muck
AnA	Aubbeenaubbee — Capac sandy loams, 0 to 3 percent slopes
Au	Aurelius muck
Bo	Boots muck
BrB	Boyer sandy loam, 0 to 6 percent slopes
BsD	Boyer-Spinks loamy sands, 12 to 18 percent slopes
BsE	Boyer-Spinks loamy sands, 18 to 30 percent slopes
ByA	Brady sandy loam, 0 to 3 percent slopes
CaA	Capac loam, 0 to 3 percent slopes
Ce	Ceresco fine sandy loam
Ch	Cohoctah silt loam
Co	Colwood-Brookston loams
Ed	Edwards muck
EvB	Eleva Variant channery sandy loam, 2 to 6 percent slopes
Gf	Gifford sandy loam
Gr	Granby loamy fine sand
Ha	Histosols and Aquents, ponded
Hn	Houghton muck
Ka	Keowns very fine sandy loam
KbA	Kibbie loam, 0 to 3 percent slopes
Ln	Lenawee silty clay loam
MaB	Marlette fine sandy loam, 2 to 6 percent slopes
MaC	Marlette fine sandy loam, 6 to 12 percent slopes
MeD2	Marlette loam, 12 to 18 percent slopes, eroded
MoE	Marlette-Boyer complex, 18 to 25 percent slopes
MrA	Matherton sandy loam, 0 to 3 percent slopes
MtB	Metea loamy sand, 2 to 6 percent slopes
MtC	Metea loamy sand, 6 to 12 percent slopes
Na	Napoleon muck
OsB	Oshtemo sandy loam, 0 to 6 percent slopes
OsC	Oshtemo sandy loam, 6 to 12 percent slopes
OtB	Oshtemo-Spinks loamy sands, 0 to 6 percent slopes
OtC	Oshtemo-Spinks loamy sands, 6 to 12 percent slopes
OwB	Owosso-Marlette sandy loams, 2 to 6 percent slopes
OwC	Owosso-Marlette sandy loams, 6 to 12 percent slopes
Pa	Palms muck
Pt	Pits
RdB	Riddles-Hillsdale sandy loams, 2 to 6 percent slopes
RdC	Riddles-Hillsdale sandy loams, 6 to 12 percent slopes
RdD	Riddles-Hillsdale sandy loams, 12 to 18 percent slopes
Sb	Sebewa loam
SnB	Sisson fine sandy loam, 2 to 6 percent slopes
SnC	Sisson fine sandy loam, 6 to 12 percent slopes
SpB	Spinks loamy sand, 0 to 6 percent slopes
SpC	Spinks loamy sand, 6 to 12 percent slopes
ThA	Thetford loamy sand, 0 to 3 percent slopes
Ud	Udorthents and Udipsamments
	Urban land-Boyer-Spinks complex, 0 to 10 percent slopes
	Urban land-Capac-Colwood complex, 0 to 4 percent slopes
UpA	
UtB	Urban land-Marlette complex, 2 to 12 percent slopes
Uu	Urban land-Fluvaquents complex

Table 3.

Symbol	Acreage	Mapping Unit Name
Ad	4.0	Adrian muck
AnA	1.6	Aubbeenaubee — Capac sandy loam, 0 to 3 percent slopes
Au	2.8	Aurelius muck
CaA	4.0	Capac loam, 0 to 3 percent slopes
Co	3.2	Colwood-Brookston loams
Gr	2.4	Granby loamy fine sand
Hn	18.0	Houghton muck
KbA	2.4	Kibbie loam, 0 to 3 percent slopes
Ln	1.6	Lenawee silty clay loam
MaB	13.2	Marlette fine sandy loam, 2 to 6 percent slopes
MaC	18.0	Marlette fine sandy loam, 6 to 12 percent slopes
MtB	2.4	Metea loamy sand, 2 to 6 percent slopes
Na	19.6	Napoleon muck
OwB	9.2	Owosso-Marlette sandy loams, 2 to 6 percent slopes
SnB	4.0	Sisson fine sandy loam, 2 to 6 percent slopes
SnC	2.4	Sisson fine sandy loam, 6 to 12 percent slopes
SpB	44.0	Spinks loamy sand, 0 to 6 percent slopes
SpC	5.6	Spinks loamy sand, 6 to 12 percent slopes
ThA	1.6	Thetford loamy sand, 0 to 3 percent slopes

Special symbols are defined on the conventional and special symbols legend found on the same page as the soil legend in soil survey report. The dotted line (. . . .) and the crow's foot (⍦) represent a short steep slope and wet spot, respectively. A spot symbol is used when the area is too small to delineate on the map, usually less than three acres in size.

What are the Soil Mapping Units Like?

Mapping Unit Description. The mapping units are defined under "soil maps for detailed planning" in the narrative section of the soil survey report. This section describes the characteristics of the mapping units in every day terminology. Described in this section are: Natural drainage class, topography of the area, general soil characteristics, other soils which may be found within the area, permeability, available water-holding capacity, runoff, present land use, limitations for various uses, capability subclass, and Michigan soil management group. Morphological characteristics of soils in each of the natural drainage classes are identified in Figure 5. The magnitude of water table fluctuation common in each of the natural drainage classes is also shown in Figure 5. Look up the description of

the mapping units in your example area.

Soil Series and Morphology. Detailed descriptions of representative profiles are found under "Soil series and morphology" in the "Formation of the soils" section of each soil survey report. This section is more technical but is valuable to the user who requires detailed information beyond what is given in the previously discussed sections of the report. Locate a soil series that is found in your example in this section of the report.

You have now determined what soils are found on a parcel of land and, in general terms, what they are like. Other bulletins explaining more specialized soil survey information are also available. These bulletins are based on the introductory information found in this bulletin.

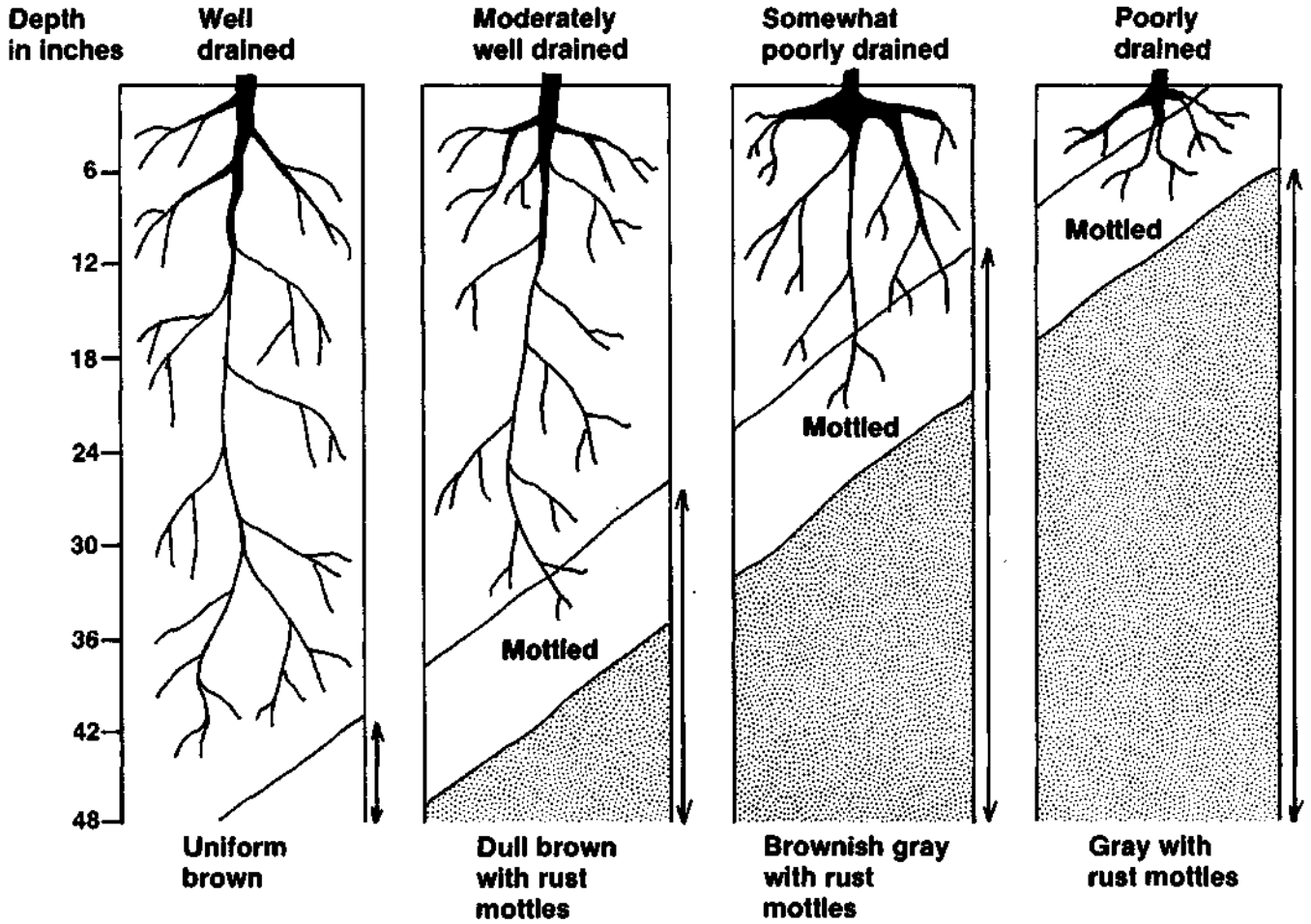

Fig. 5. Morphological characteristics of soils in each of the natural drainage classes.

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Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8, and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Gordon E. Guyer, Director, Cooperative Extension Service, Michigan State University, E. Lansing, MI 48824.

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