

SOILS OF SOUTHEASTERN WISCONSIN



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interpretive sections of the report and assisted in its compilation
by making timely reviews and comments.

Southeastern Wisconsin Regional Planning Commission
Land Use-Transportation Study

Old Courthouse
Waukesha, Wisconsin

Planning Report No. 8

SOILS OF SOUTHEASTERN WISCONSIN

The preparation of this publication was financed in part by the Soil Conservation Service and through a joint planning grant from the State Highway Commission of Wisconsin, the U.S. Department of Commerce, Bureau of Public Roads and the Housing and Home Finance Agency, under the provisions of the Federal Aid Highway Legislation and Section 701 of the Housing Act of 1954, as amended.

Soil names used in this report are tentative and subject to change upon correlation and publication of the regular series of U.S.D.A. Soil Survey Reports for the individual soil survey areas of the Southeastern Wisconsin Region.

June 1966

Inside Region \$5.00

Outside Region \$10.00

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SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

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June 6, 1966

STATEMENT OF THE CHAIRMAN

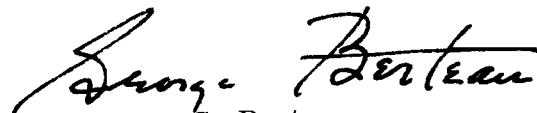
The detailed operational soil survey on which this report is based represents one of the most important work programs undertaken by your Commission. Unlike many planning reports, the data herein contained will be of lasting utility and value.

The completed soil survey constitutes a basic scientific inventory which is not only essential to the intelligent preparation of regional development plans but also of great value in making day-to-day development decisions within the Region. The detailed nature of the soil data obtained in the survey permits its application to both public and private development decisions on specific problems at all levels of community planning and development. Land developers, builders, engineers, planners, architects, farmers, conservationists, hydrologists, appraisers, and realtors, as well as individual home buyers, will find the information contained in this report a useful tool in making day-to-day development decisions.

This report was made possible only through the excellent cooperation of the U. S. Department of Agriculture, Soil Conservation Service, and the constituent counties comprising the Commission. It is illustrative of the core principle that much can be achieved toward the solution of areawide development problems through voluntary intergovernmental cooperation.

In accordance with the advisory role of the Commission, this report is being transmitted to local governmental unit members of the SEWRPC and to the citizens of the Region with the recommendation that immediate and full use be made of this heretofore unavailable detailed soils data in all phases of community development.

Respectfully submitted,



George C. Berteau
Chairman

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UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
4601 Hammersley Road
Madison, Wisconsin 53711

June 1, 1966

Kurt W. Bauer, Executive Director
Southeastern Wisconsin Regional
Planning Commission
916 North East Avenue
Waukesha, Wisconsin 53186

Dear Sir:

This report is hereby transmitted to the Southeastern Wisconsin Regional Planning Commission. We are confident that it will provide a sound basis for planning the use of soils in the Southeastern Wisconsin Region within their limitations and suitability and treatment according to their needs.

The need for efficient land use in rapidly expanding metropolitan areas as well as in rural, agricultural, woodland, and wildlife areas was recognized by the Southeastern Wisconsin Regional Planning Commission early in its work. The Commission realized that Standard Soil Surveys made in accordance with the standards and criteria of the National Cooperative Soil Surveys, USDA, would provide a sound basis for planning the best use of soils in southeastern Wisconsin. Soil surveys were accordingly undertaken for the seven-county Region consisting of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha counties. The surveys were completed in 1965. They were made by experienced, professional soil scientists, trained to identify, classify, and map soils and related land features.

This report presents the results of the surveys with principal emphasis upon interpretations for the more important land uses such as residential development, industrial buildings, transportation systems, and agricultural enterprises. Interpretations for these and other uses are presented in terms of degree and kind of limitations for the given land use. The suitability of soils for each use can be determined from the limitation ratings.

A regional summary of the soil interpretations and the approximate location of dominant soils can be used as a basis for broad regional planning. On a smaller, but more detailed scale, the surveys and interpretations can be used for county, town, city, village, or private land use planning. The best use can be determined for the soils of a given area or, conversely, the best soils can be selected for a specific use. The user can learn the kind and degree of problems related to a given use.

Although much of the work of making the soil surveys and interpreting them was done by the Soil Conservation Service, other agencies and individuals made valuable contributions to this report. The assistance of the Southeastern Wisconsin Regional Planning Commission staff, University of Wisconsin Extension Service and Soils Department, and of the Wisconsin Geologic and Natural History Survey is acknowledged.

We offer this report and the soil surveys as valuable tools for use of agencies, organizations and individuals who are concerned with efficient use of the natural resources of southeastern Wisconsin.

Respectfully submitted,



W. W. Russell
State Conservationist

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Chapter I

INTRODUCTION

The publication of this planning report marks the completion of a unique soil survey program. This program, conducted jointly by the Soil Conservation Service, U. S. Department of Agriculture, and the Southeastern Wisconsin Regional Planning Commission provides detailed operational soil surveys for the entire seven-county southeastern Wisconsin planning region. The program is not only unique with respect to the size of the area covered, but also with respect to the emphasis placed on providing interpretations for land use and public facilities planning. The program represents the first areawide, detailed, operational soil survey to be sponsored by a legally constituted comprehensive regional planning agency as an integral part of its work program.

THE NEED FOR REGIONAL PLANNING

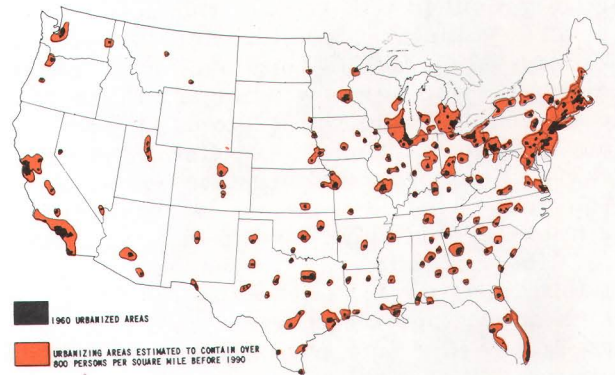
The need for regional planning has been brought about by unprecedented population growth and urbanization; greatly increased agricultural and industrial productivity; increased income levels and leisure time; mass recreational needs and pursuits; intensive use and consumption of natural resources; the use of private water supply and sewage disposal systems; the wide spread electric power and communication networks; the construction of limited access highways; and the increase in mass automotive transportation.

Under the impact of these changes, entire regions, such as Southeastern Wisconsin, are becoming mixed rural-urban areas. This is creating new and intensified areawide development problems of an unprecedented scale and complexity. Rural as well as urban people must be increasingly concerned with these problems or face irreparable damage to their communities and to their land and water resources.

The areawide problems which necessitate a regional planning effort in southeastern Wisconsin have their source in the rapid population growth and urbanization occurring in the Region. These areawide prob-

lems include drainage and flood control, water supply and pollution, sewerage and sewage disposal, park and open-space reservation, economic development, changing land use and transportation. These transcend the boundaries of any one municipality. Officials and other citizens have come to realize that these problems can only be resolved within the context of a comprehensive regional planning effort.

Map I
URBANIZING REGIONS OF THE UNITED STATES



The population of the United States is concentrating in approximately 200 large metropolitan regions, the 1960 urbanized areas of which are shown in the figure above. Yet within these metropolitan regions the urban population is decentralizing, spreading out across city, county, and state boundary lines. If existing trends continue, many of these urbanized areas will have merged before 1990 to form huge conurbations. Population densities in rural areas adjacent to these conurbations will have risen to such levels that these adjacent areas will no longer be truly rural, but rather social, economic, and physical urban complexes.

Source: U. S. Bureau of the Census; Map by Dr. Calvin L. Beale, "Population Onslaught," *The Furrow*, January-February 1965 (Moline: Deere & Company).

Sound regional planning must be relatively long range, looking well beyond the obvious needs of the moment and attendant expedient solutions. It must be comprehensive; that is, it must consider and weigh all aspects of regional development and relate all of these aspects to common unifying objectives. Only in this way can intelligent decisions be made about relative needs and resources applied effectively to the areas of greatest need. Finally, sound regional planning must coordinate all related plan-

ning activities within a given geographic area without regard to jurisdictional boundaries. Regional plans must, therefore, be developed cooperatively with all agencies and levels of government operating within a region and with private enterprise and must be capable of joint implementation.

THE REGIONAL PLANNING COMMISSION

The Southeastern Wisconsin Regional Planning Commission (SEWRPC) is providing such areawide planning services for one of the large urbanizing regions of the nation. The Commission was created in August 1960, under the provisions of Section 66.945 of the Wisconsin Statutes, to serve and assist the local, state, and federal units of government in planning the orderly and economic development of southeastern Wisconsin. The role of the Commission is entirely advisory; and participation by local units of government in the work of the Commission is on a voluntary, cooperative basis. The Commission itself is composed of 21 citizen members who serve without pay, three from each county within the Region. The powers, duties, and functions of the Commission are carefully set forth in the state enabling legislation. The Commission is authorized to employ experts and a staff, as necessary, for the execution of its responsibilities. Basic funds necessary to support Commission operations are provided by the member counties, the budget being proportioned among the several counties on the basis of relative equalized valuation. The Commission is authorized to request and accept aid in any form from all levels and agencies of government for the purpose of accomplishing its objectives and is authorized to deal directly with the state and federal governments for this purpose.

THE REGIONAL PLANNING CONCEPT IN SOUTHEASTERN WISCONSIN

Regional planning as conceived by the Commission, is not a substitute for, but a supplement to, local planning which necessarily exists to solve local development problems. Its objective is to aid in the solution of areawide development problems which cannot be properly resolved within the framework of a single municipality or a single county.

As such, regional planning has three principal functions:

1. Areawide research; that is, the collection, analysis, and dissemination of basic

planning and engineering data on a continuing, uniform, areawide basis so that, in light of such data, the various levels and agencies of government, private enterprise, and interested citizens within the Region can better make decisions concerning community development.

2. The preparation of a framework of long-range plans for the physical development of the Region. These plans are limited to those functional elements having areawide significance. To this end the Commission is charged by law with the function and duty of "making and adopting a master plan for the physical development of the Region." The permissible scope and content of this plan as outlined in the enabling legislation extends to all phases of regional development, implicitly emphasizing, however, the preparation of alternative spatial designs for the use of land and for the supporting transportation and utility facilities.

3. Provision of a center for the coordination of the many planning and plan implementation activities carried on by the various levels and agencies of government operating within the Region.

The work of the Commission is, therefore, visualized as a continuing planning process providing many outputs of use throughout the region--outputs of great value to the making of development decisions by public and private agencies and to the preparation of plans and plan implementation programs at the local, state, and federal levels. The work of the Commission emphasizes close cooperation between the governmental agencies and private enterprise responsible for the development and maintenance of land uses and for the design, construction, operation, and maintenance of their supporting public works facilities. All of the Commission work programs are intended to be carried out within the context of a continuing planning program which provides for the periodic reevaluation of the plans produced, as well as for the extension of planning information and advice necessary to convert the plans into action programs.

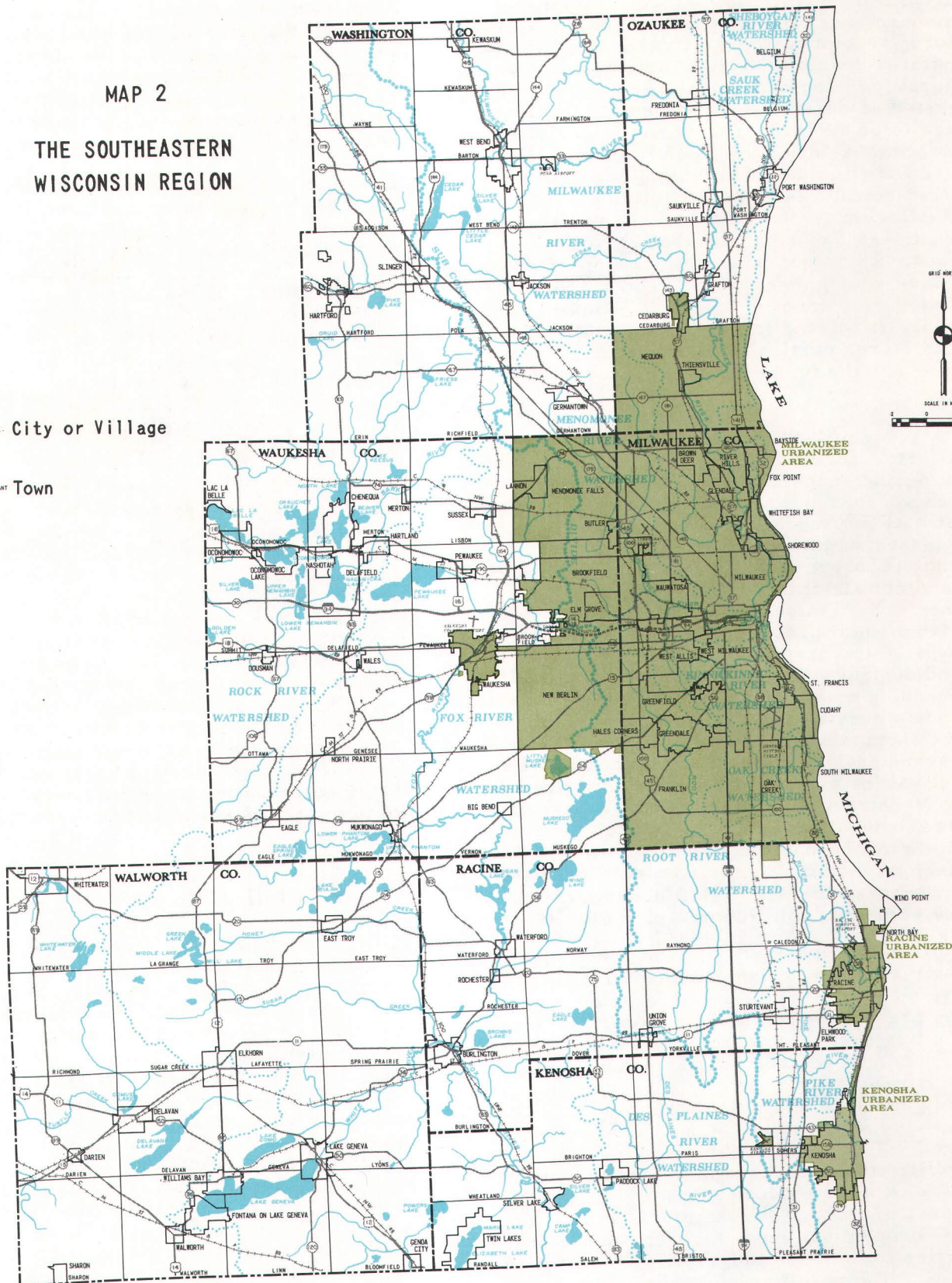
THE NEED FOR SOILS INFORMATION

The natural resources of an area are vital elements to its economic development and to its ability to provide a pleasant and habitable environment for human life. Moreover, natural resources not only condition but are conditioned by regional growth and

MAP 2
THE SOUTHEASTERN
WISCONSIN REGION

MILWAUKEE: City or Village

MT. PLEASANT: Town



The seven - county Southeastern Wisconsin Planning Region comprises only 5 percent of the total area of the state but contains over 40 percent of the state's population and over one-half of all the tangible wealth in the state.

urbanization. Any meaningful comprehensive regional planning effort must, therefore, recognize the existence of a limited natural resource base to which urban and rural development must be properly adjusted if serious environmental problems are to be avoided. This is particularly true in southeastern Wisconsin, where an increasing number of urbanites are becoming year-round residents of outlying areas of the Region, seeking not only the varied recreational opportunities that are offered by these areas but also the feeling of open space which these areas lend to residential development. A sound evaluation and analysis of the resource capabilities is, therefore, particularly important to planning for the future development of the Region.

It is significant, then, that an extensive effort to relate regional plans to the underlying and supporting natural resource base has been made an integral part of the SEWRPC program. Land and water resources within the Region are limited and subject to grave misuse through improper land use and transportation facility development. Such misuse may lead to severe environmental problems, which are very expensive to correct, and to the deterioration and destruction of the resource base itself. Planning must, therefore, be based in part upon a careful assessment of the effects on the supporting natural resource base. Such assessment requires the collection and analysis of a great deal more information concerning the natural resource base and its ability to sustain urban development than has ever been collected before within the Region, including definitive data on water resources, forests, wildlife habitat, and--the subject of this report--on soils.

Soil properties exert a strong influence on the manner in which man uses land. Soils are an irreplaceable resource, and mounting pressures upon land are constantly making this resource more and more valuable. A need, therefore, exists in any comprehensive planning program to examine not only how land and soils are presently used but also how they can be best used and managed. This requires an areawide soil suitability study which maps the geographic locations of the various kinds of soils; identifies their physical, chemical, and biological properties; and interprets these properties for land use and public facilities planning. The resulting comprehensive knowledge of the character and suitability of the

soils can be extremely valuable in every phase of the planning process. Soils information can comprise a prime input into the preparation of planning standards; the analysis of existing land uses; plan synthesis, test, and evaluation; and, perhaps most important of all, plan implementation.

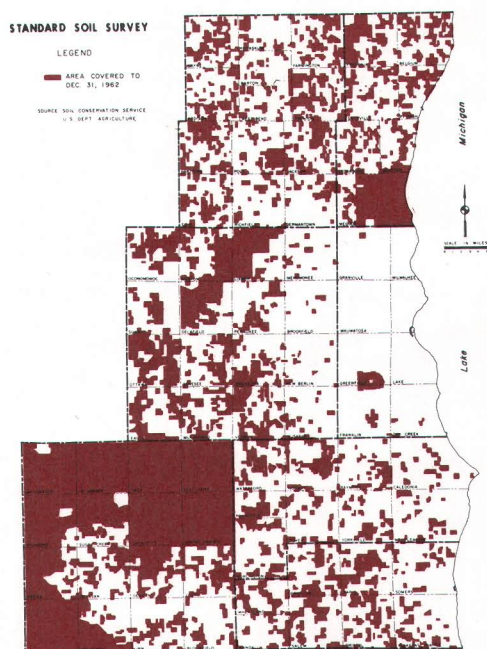
For planning application, the soils studies must be designed to permit careful assessment of engineering, agricultural and non-agricultural plant material properties of soils, and the relationship of wildlife population to soils. These assessments must be adapted to use in the development and selection of desirable spatial distribution patterns for residential, commercial, industrial, agricultural and recreational land use development and in the selection of highway, railroad, airport, pipeline, and other transportation facility locations.

The study of soils has been historically related to use for agriculture and forestry with little attention given to the ways in which soil properties might influence urban uses of land. At the time of the creation of the Southeastern Wisconsin Regional Planning Commission, therefore, a very limited amount of useful data on the soils of the Region was available. Soil Surveys accompanied by agricultural interpretations and covering approximately 38 percent of the Region had also been completed as a part of the preparation of basic conservation plans for farms. Careful review indicated that these existing soils data were inadequate for sound regional and local planning purposes.

THE SOIL SURVEY

In order to fulfill the soils data requirements of the regional planning program, a cooperative agreement was negotiated with the Soil Conservation Service for the completion of Soil Surveys of the entire Region, together with the provision of interpretations for planning purposes. Over 1 million acres of land within the Region required mapping. Field work on this truly massive undertaking was begun in July of 1963 and completed in September of 1965. This report presents much of the information necessary to utilize the now completed detailed soil surveys in plan preparation and implementation at both the regional and local level. Technicians who use this report and the accompanying soils maps will notice that regional soil survey is truly unique, not

Map 3



At the time of the creation of the Southeastern Wisconsin Regional Planning Commission, detailed soil surveys covering approximately 38 percent of the Region has been completed for farm planning purposes. These surveys were accompanied only by agricultural interpretations and were, therefore, inadequate for regional and local comprehensive planning purposes.

only with respect to the area covered, the range of soil properties and interpretations provided, but also with respect to the details of the mapping and the preparation of interpretative maps.

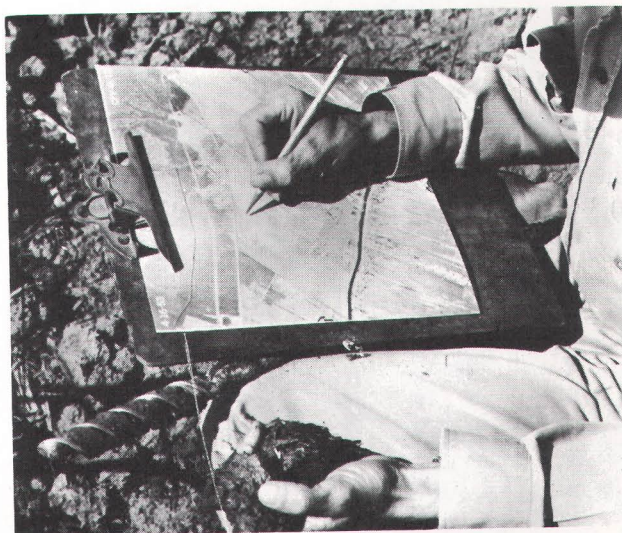
THE REPORT

FORMAT

Chapters I through IV of this report consist of background information essential to the proper understanding and utilization of the information collected in the soil survey. Included are descriptions of the geology, climate, and physiography of the Region; of soils as a source of sand and gravel, stone, and organic deposits; and a description of how soils were formed within the Region, how they are classified and of the important soil properties and characteristics.

Chapters V through X contain the actual results of the soil survey, including selected physical, chemical, and biological properties of the mapped soils and interpretations

of these properties for engineering, rural and urban land use planning, agricultural, resource conservation, and recreation planning and development applications. These interpretations are presented principally in tabular form. In some of the tables, the soils and their corresponding properties are listed individually. In other tables the soils are grouped according to characteristics important to the proposed uses.



In the conduct of the detailed soil surveys, the soils of the Region were mapped in the field on up-to-date aerial photographs by experienced soil scientists. During the mapping, soil samples were drawn from the various soil horizons and examined to establish the soil type and series according to the worldwide comprehensive classification system.

HOW TO USE THIS REPORT

To properly utilize this report, it is necessary to consult three sources of information: (1) the field sheets on which the soils have been mapped; (2) the soil series descriptions and (3) the interpretive tables.

It is first necessary to locate on the soil survey field sheets the land area for which the specific soils information is being sought. These field sheets consist of aerial photographs on which the boundaries of the soils have been delineated or mapped, prints of these sheets are available in the offices of the Southeastern Wisconsin Regional Planning Commission and the Soil Conservation Service. The identification of the proper

field sheets covering the land area in question can best be done by consulting the photo index sheets for the county in which the land is located. (See Maps 4 to 10, this chapter.) These index sheets are also available in the offices of the SEWRPC and SCS. A legal description or knowledge of the relation of the land area in question to landmarks, such as railroads, state trunk highways, county trunk highways, or cities and villages, will aid in selecting the correct soil survey field sheets. After the proper field sheets are selected, the land area in question can then be located on the field sheet (see Map 11).

The black lines on the field sheets represent the boundaries of the different soil areas. Within the soil boundaries are map symbols such as: 360-5-2, 360 or 360. These iden-

5-2 5
 2

tify the soil covering the land area in question. The first group of digits, that is, the number 360 in the example, is the symbol for the soil type. A numerical listing of the soil symbols used on soils maps in the Region, together with the corresponding soil type is given in the Soil Mapping Legend. For example, soil number 360 represents the symbol for Hochheim silt loam. The second group of digits of the map symbol, that is, the number 5 in the example, indicates the percent slope or fall per hundred feet or the difference in elevation between two points 100 feet apart on which the mapped soil occurs. The third and last group of digits, the number 2 in the example, indicated degree of erosion, as explained under The Soil Legend, Chapter IV. Thus the symbol 360-5-2 means Hochheim silt loam, 5 percent slopes, moderately eroded.

After the type or types of soil occurring on the land in question have been identified from examination of the field sheets, the general characteristics of the soils concerned can be obtained by reading the soil descriptions in Chapter IV. Each soil that was mapped within the Region is there described together with its general properties under its soil series name. The soil series are listed in alphabetical order. The interpretive grouping for each soil for agricultural use (Chapter VII) and woodland use (Chapter VII) necessary to identify soils for these uses are given at the end of each soil description. The limitations of soils for each of these uses are discussed in their respective sections.

All the interpretive information is presented in Chapters V through X. Information pertinent to engineering uses of soils is presented in Tables 4, 5, 6, 7, Chapter V. The soils are listed numerically by soil number. Table 4 contains measured and estimated data on physical and chemical properties of the soils. It includes the USDA, Unified and AASHO classification of soils, selected mechanical analysis data, maximum dry density in lbs. per cu. ft., the optimum moisture content, the liquid limit, the plasticity index, the bearing strength, the shrink-swell potential, susceptibility to erosion, the soil reaction, the percolation rate, the permeability rate, and the depth to the water table.

Table 5 includes interpretations and selected properties related to water management in soils. These are soil permeability, available water holding capacity, estimated minimum depth to the water table, susceptibility to frost action, flooding hazard, the irrigation potential, and limitations of soils for reservoir embankments and linings.

Table 6 presents interpretations for use of soils for road subgrade; foundations for low buildings; suitability of soils as a source of topsoil, sand, or gravel; the corrosion potential for metal and concrete conduits; and the depth of bedrock.

Table 8 contains the limitations of soils for selected urban and rural uses, including crops, pasture, and trees; residential development (with and without public sewage disposal systems); light industrial and commercial development; and highway, railroad, and airport development.

In addition to discussions of capability units and woodland suitability groups, Chapter VII has Table 9, Crop Yields and contains Table 11 which gives the estimated woodland yields. Soils are listed alphabetically in the yield tables. Irrigation and Drainage Guides for soils in various capability units appear in Tables 12 and 13. To find the appropriate information for a given soil, first, consult the soil description, then find the irrigation or drainage information for the capability unit shown.

Chapter VIII contains guides to herbaceous plantings for nonagricultural uses (Table 14, and text) and guides to vines and shrub planting (Table 15, and text). The information is given for capability units. One needs to know the capability unit of the individual soil

before attempting to find information in these tables. The guide to tree planting in the same chapter (Table 16, and text) is written for woodland suitability groups. The placement of soils in woodland suitability groups is in the soil descriptions.

In the discussion of recreation, Chapter IX, the limitations of soils are given for playgrounds, athletic fields, picnic areas, parks, bridle paths, nature trails, hiking trails, golf course fairways, cottages and service and utility buildings, and tent and camp trailer sites.

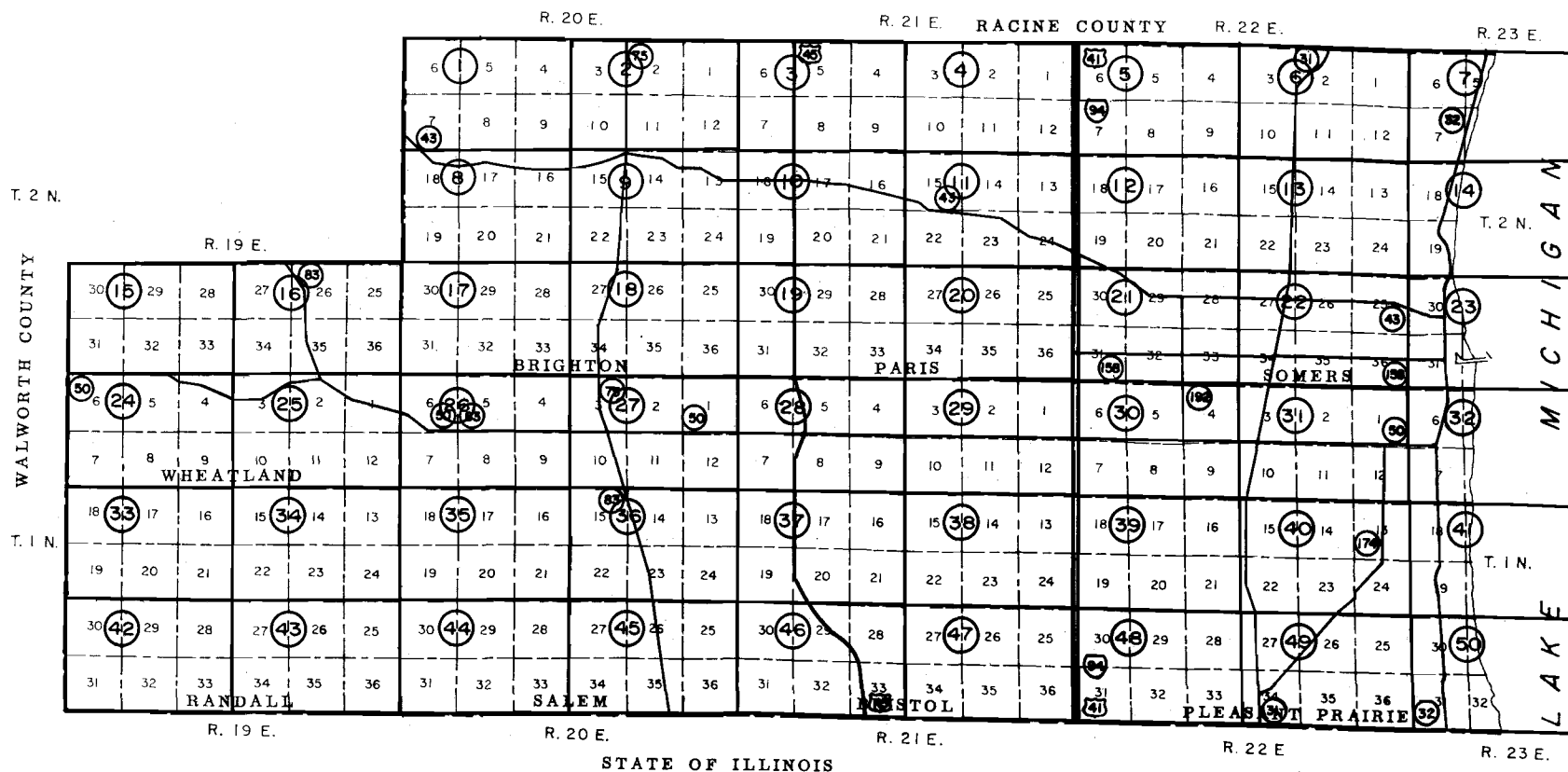
In Chapter X the suitability and limitations of soils for various kinds of wildlife are given. Soils are rated for migratory waterfowl, upland game birds, songbirds, small game, big game, and fur bearers. Soils are listed numerically in recreation and wildlife tables.

CONCLUSION

The Southeastern Wisconsin Regional Planning Commission's program represents a unique effort to relate the preparation of areawide development plans to the natural resource base so that future development problems and accompanying deterioration of the regional environment may be avoided. The regional Soil Survey is one of the most important tools through which this adjustment of the areawide development plans to

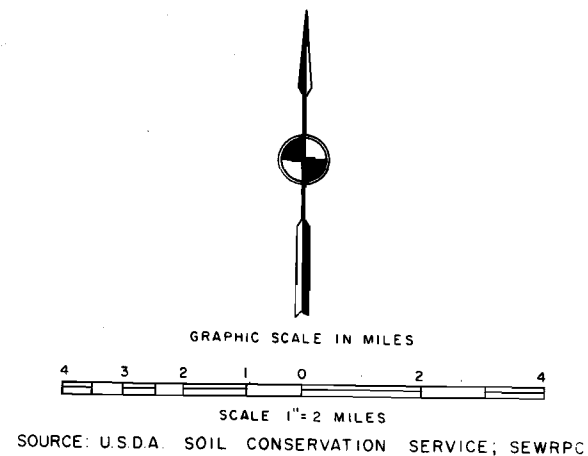
the supporting resource base will be accomplished. The resulting comprehensive knowledge of the character and suitability of the soils is extremely valuable in every phase of the planning process, at every level of government, and to private investors as well.

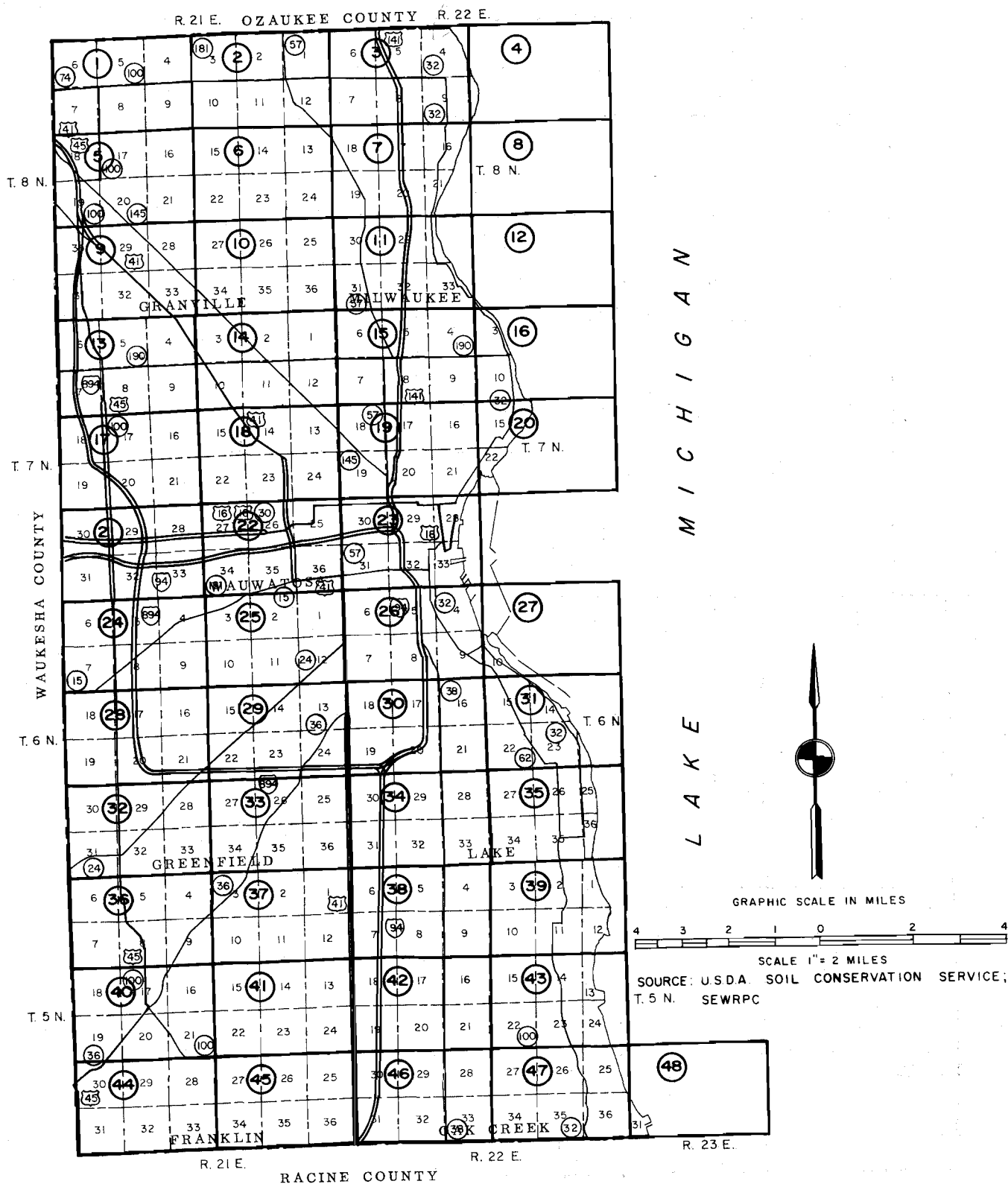
Detailed operational soil survey data can, if properly applied, provide the basis for many important day-to-day community development decisions by federal, state, and local units of government and by private investors. Definitive soils data are essential to intelligent zoning, subdivision control, and official mapping at the local level of government just as such data are essential to the preparation of a regional land use plan, a regional transportation plan, a comprehensive watershed plan, or an intelligent conservation plan for the farm. Since the detailed soil surveys represent a basic scientific inventory, they provide valuable information needed for planning, location, and design of highways, parks, land subdivisions, and sewage disposal facilities, as well as for agricultural and forest land use planning and management. If the soil properties as revealed by the detailed operational soil surveys are ignored during either general or detailed plan formulation, not only will expensive obstacles to plan implementation occur, but irreparable damage may be done to the land and water resources of the Region.



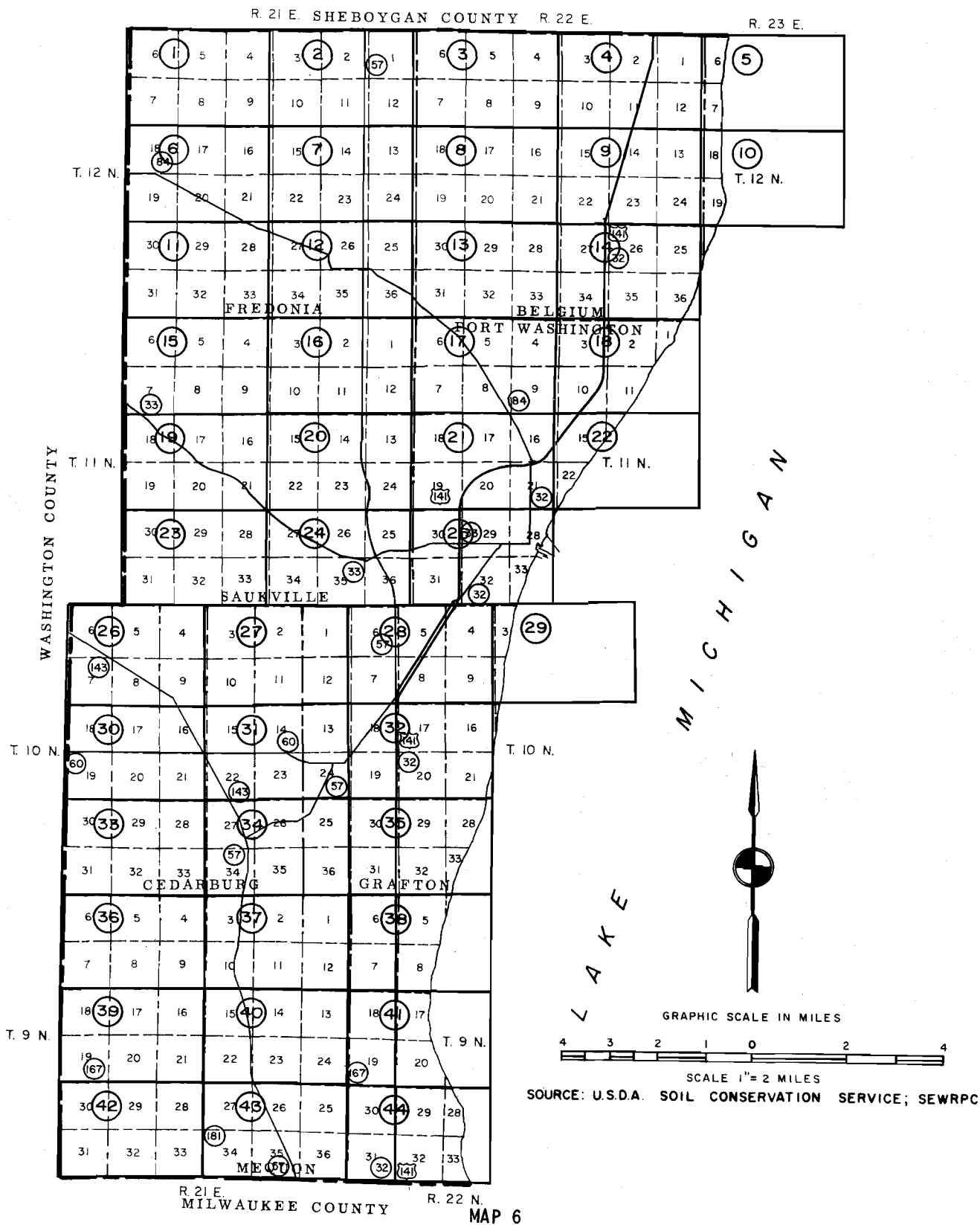
MAP 4

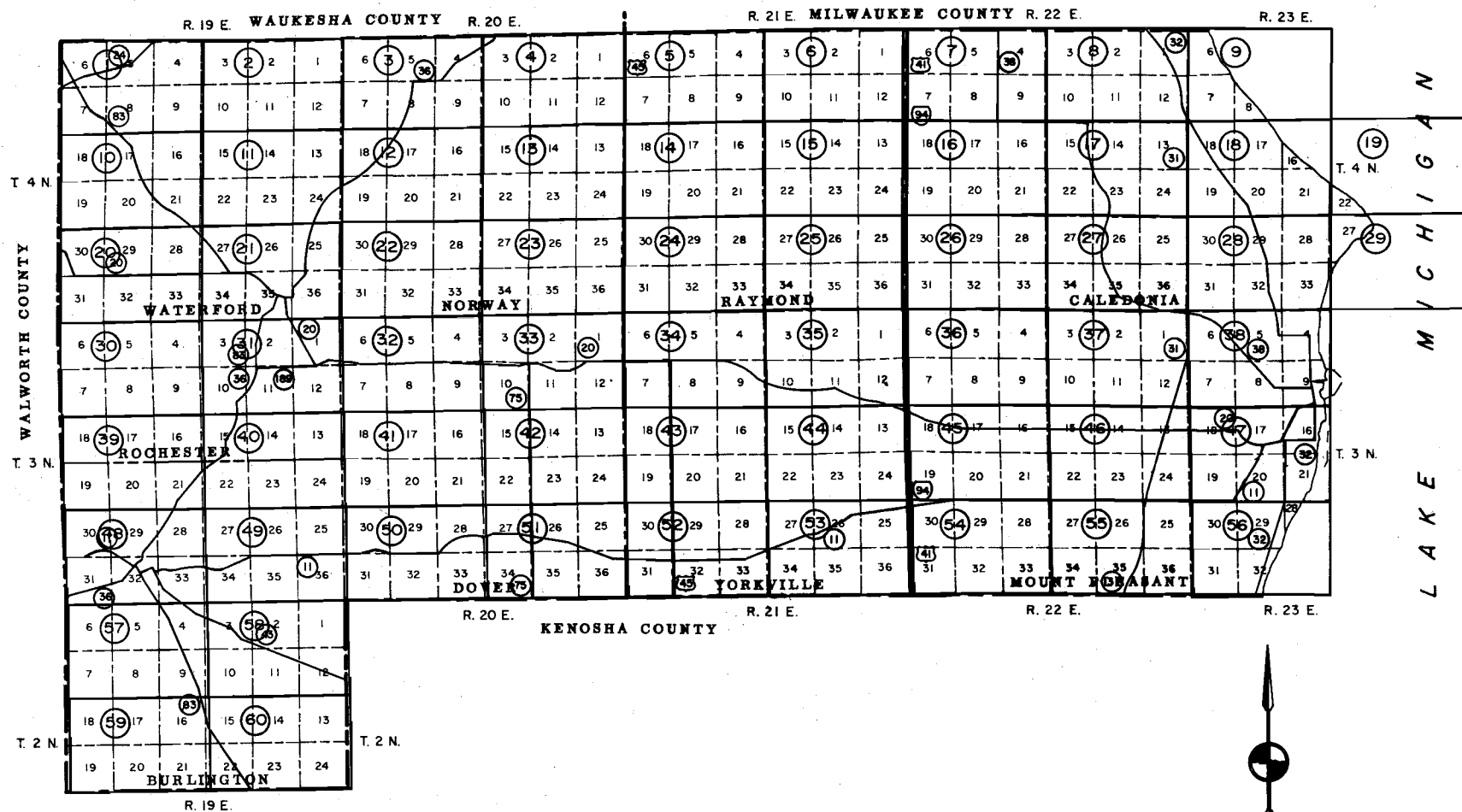
KENOSHA COUNTY SOIL FIELD SHEET INDEX





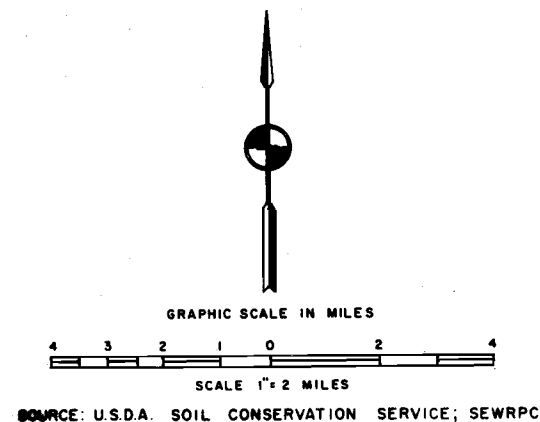
MILWAUKEE COUNTY SOIL FIELD SHEET INDEX

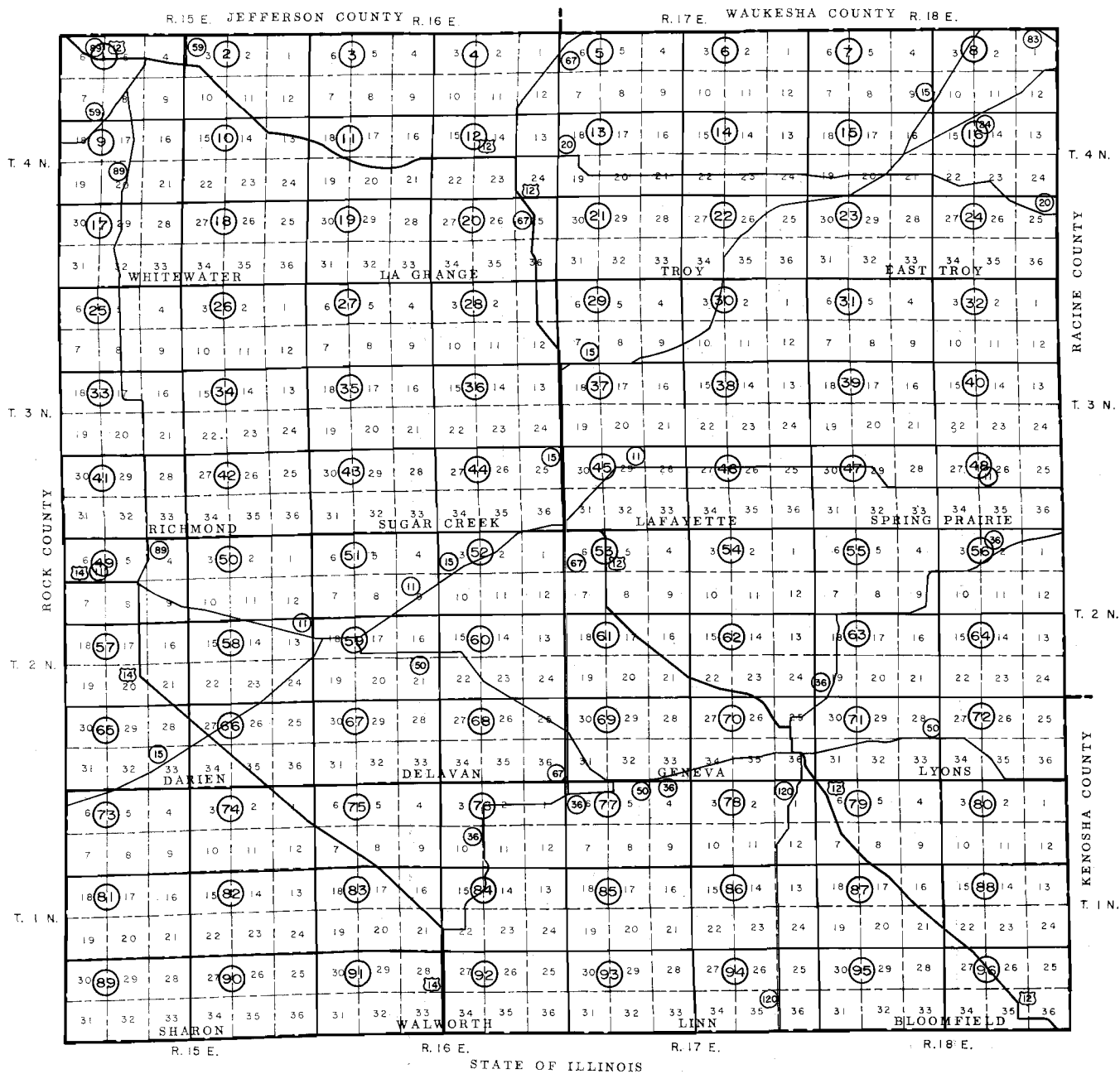


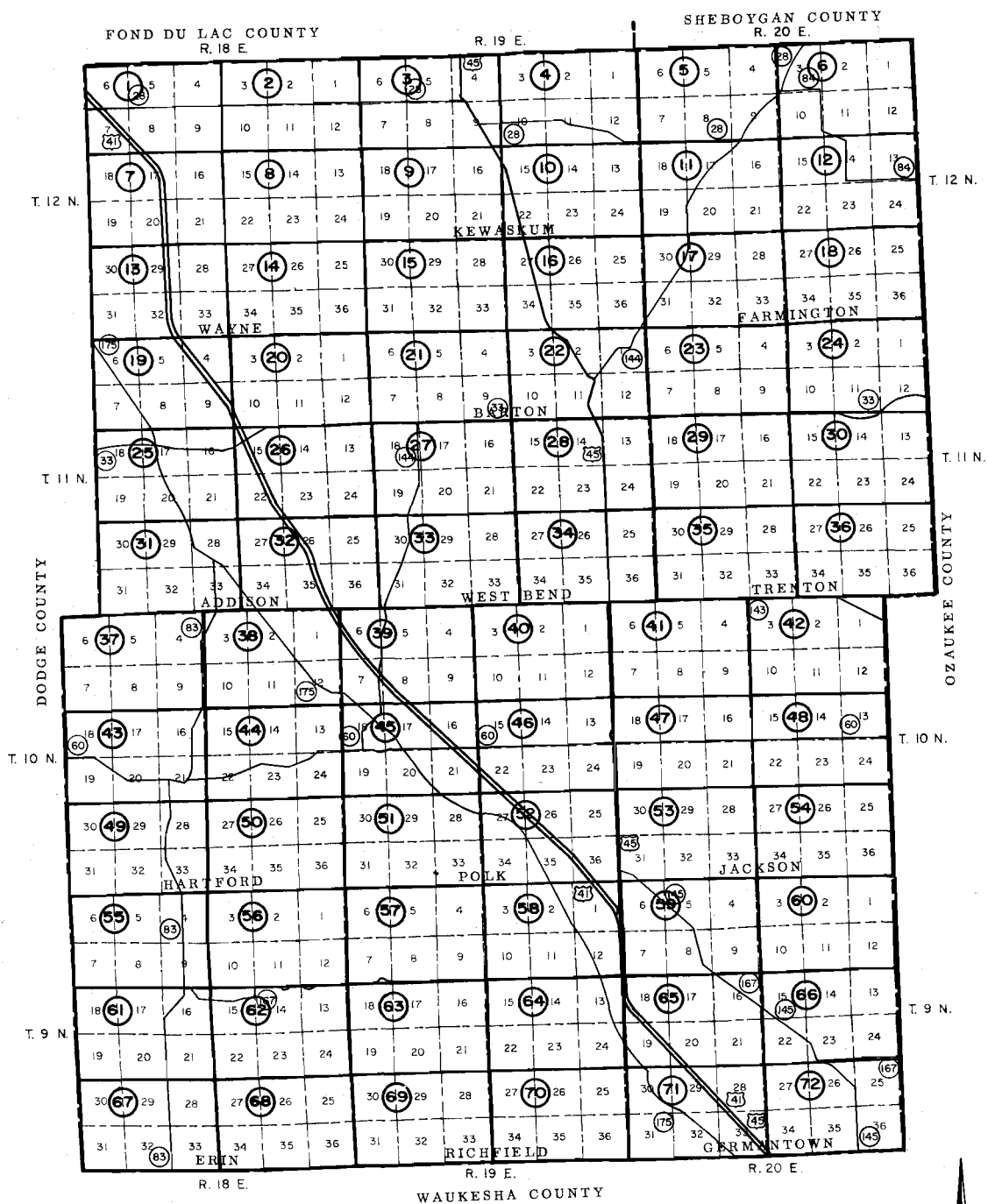


MAP 7

RACINE COUNTY SOIL FIELD SHEET INDEX







MAP 9

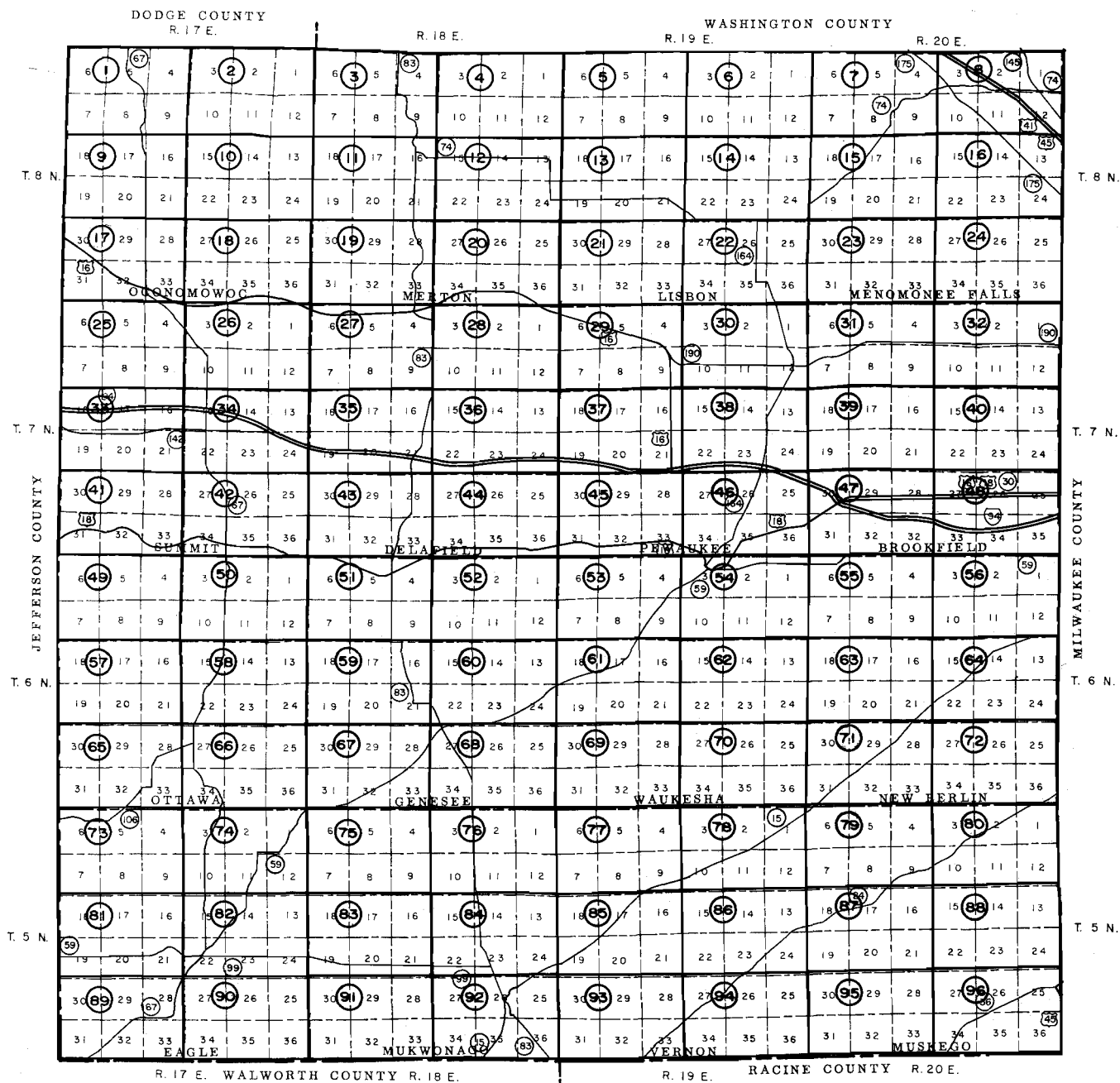
WASHINGTON COUNTY SOIL FIELD SHEET INDEX

GRAPHIC SCALE IN MILES

4 3 2 1 0 2 4

SCALE 1" = 2 MILES

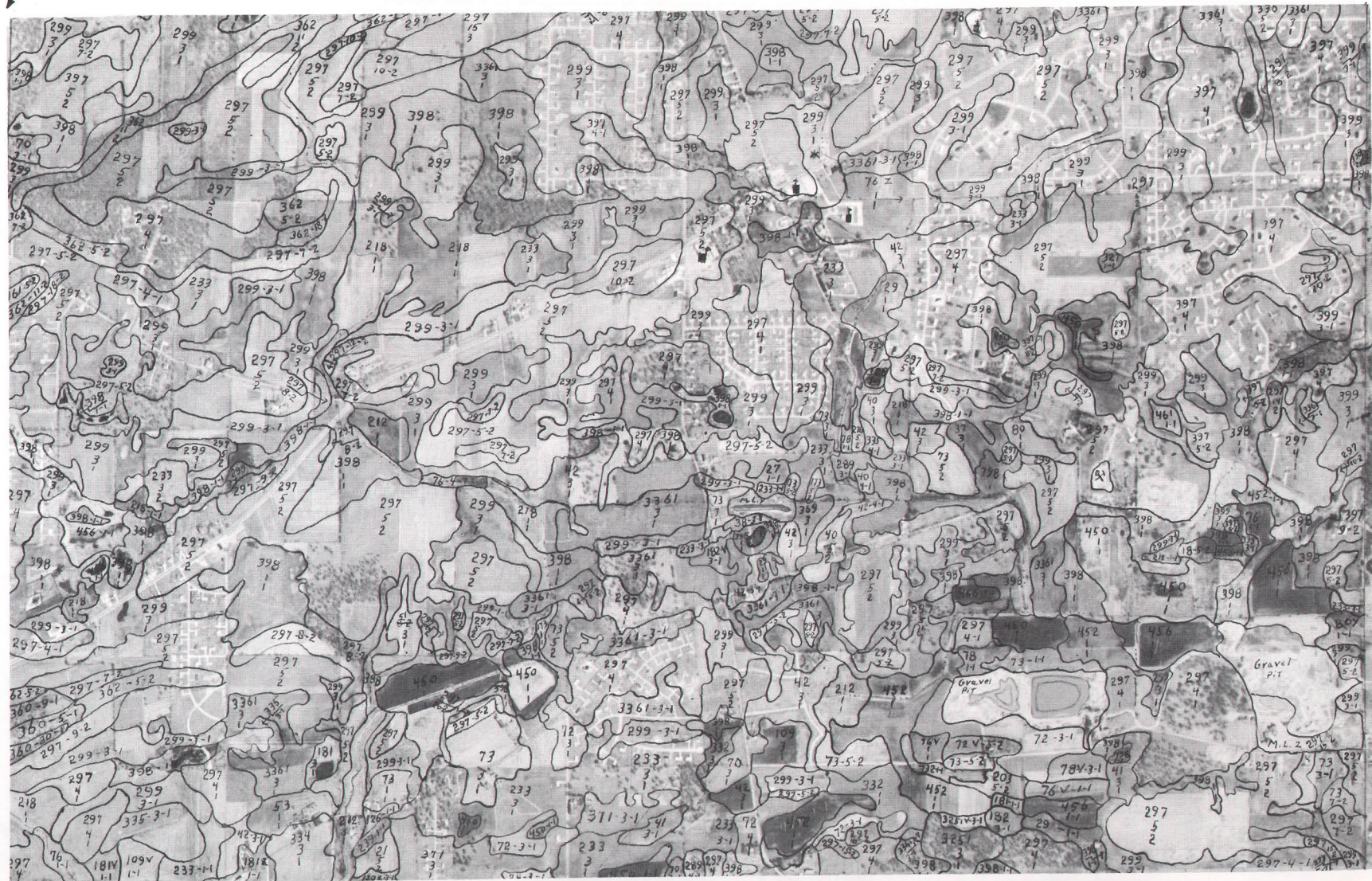
SOURCE: U.S.D.A. SOIL CONSERVATION SERVICE, SEWRPC



MAP 10

WAUKESHA COUNTY SOIL FIELD SHEET INDEX

GRAPHIC SCALE IN MILES
 4 3 2 1 0 2 4
 SCALE 1" = 2 MILES
 SOURCE: U.S.D.A. SOIL CONSERVATION SERVICE; SEWRPC



The mapping of soil characteristics is accomplished in the field utilizing copies of up-to-date aerial photographs, each of which encompasses an area of six square miles (6 U.S. Public Land Survey Sections). Boundaries of each soil type are determined and drawn on the photo copy and each such area is given a three number symbol identifying the soil type, percent slope, and the degree of erosion present.

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Chapter II

DESCRIPTION OF THE REGION

PHYSIOGRAPHY AND RELIEF

The Region is located entirely within the glaciated part of Wisconsin and owes much of its present physiography to glacial action. This glacial activity began about one million years ago when extensive parts of Wisconsin and North America as well as other parts of the world were covered by glaciers.

There is evidence that four major stages of glaciation covered southeastern Wisconsin. Each stage was followed by an interglacial period when climates were warmer than they are today. The final major stage of glaciation, known as the Wisconsin stage, probably began about 30,000 years ago and ended about 11,000 years ago. It was during the Wisconsin stage that most of the present physiographic features of southeastern Wisconsin were formed. The advancing and retreating of various lobes and substages of the Wisconsin glacier left an extremely variable land surface (Map 12). Elevations range from less than 600 feet above sea level near Lake Michigan to more than 1200 feet in parts of Washington County. The Green Bay and Lake Michigan lobes, two prominent glacial lobes of the Gary substage of the Wisconsin glaciation, are responsible for the land features in most of southeastern Wisconsin. An area several miles wide, roughly parallel to Lake Michigan in Ozaukee County and northern Milwaukee County, was affected by a more recent substage of the Wisconsin glaciation known as the Valders substage. The land surface of southwestern Walworth County may have been affected by the older glacial stage known as the Illinoian which preceded the Wisconsin stage of glaciation.

The interlobate moraine, drumlins, kames, kettles, eskers and crevasse fillings are prominent land features in the Region. Other features such as ground moraine, recessional moraines, pitted and unpitted outwash terraces or plains, and lacustrine basins are also evident. The kettle interlobate moraine is perhaps the most outstand-

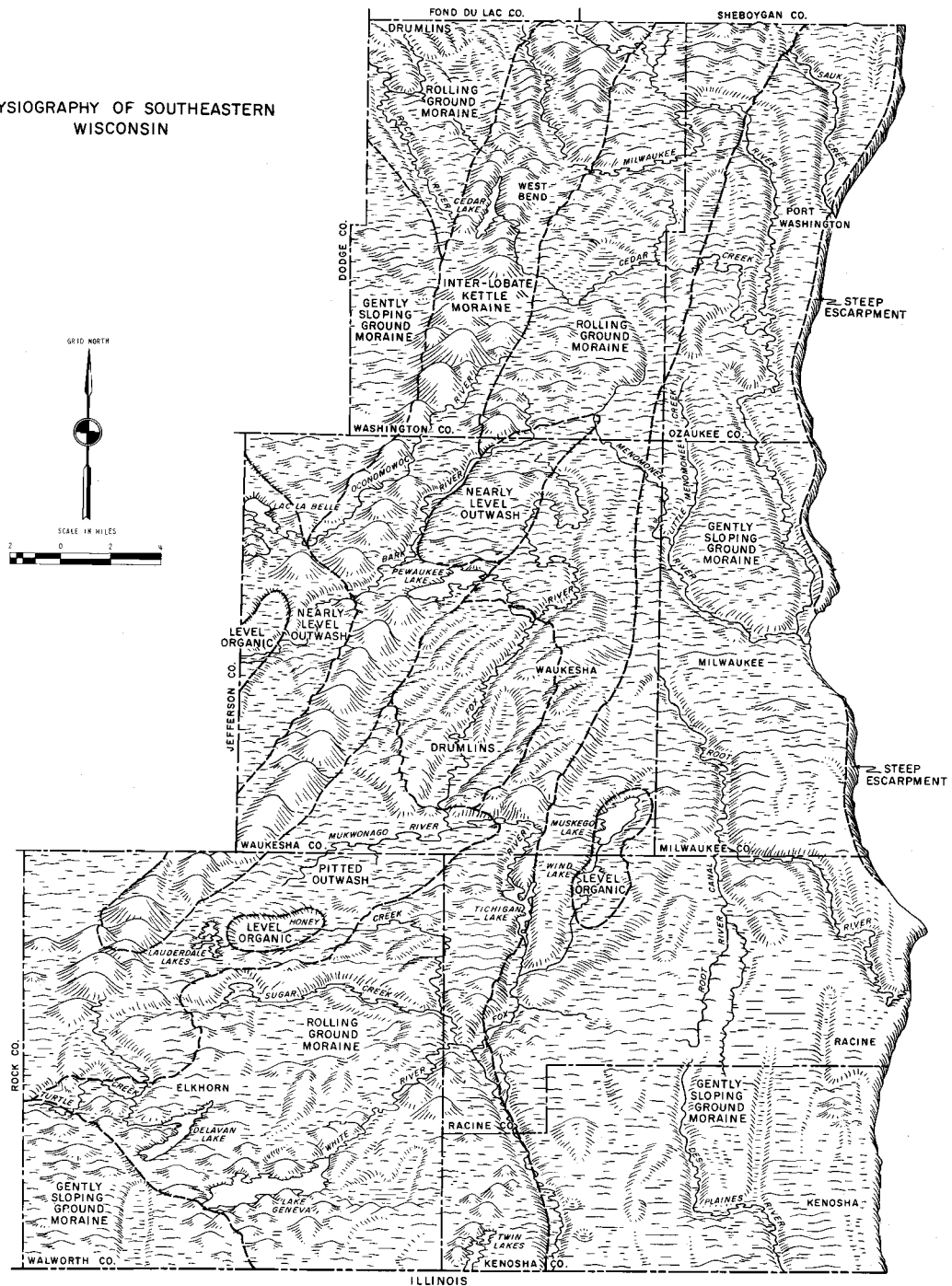
ing land feature in the Region. This prominent system of kames, kettle holes, steep ridges and drainageways was built along the line of junction between the two adjacent glaciers of the Green Bay and Lake Michigan lobes. In places it has a relative relief of more than 200 feet. The kettle interlobate moraine follows a northeasterly to southwesterly pattern in the landscape. In the Region, the kettle interlobate moraine enters northern Washington County midway between the east and west boundaries and crosses the county in a southwesterly direction. It is interrupted by the Bark River before continuing southwesterly into the northwestern part of Walworth County. Less extensive noncontiguous areas of kettle moraine land surface are scattered throughout much of the Region. Some of these scattered areas occur in the southern part of Walworth County and in the western extremities of Racine and Kenosha counties.

Other land features in the Region resulting from glaciation are the streamlined, elongated hills called drumlins. They occur mainly in the northwestern part of Washington County and in the southcentral part of Waukesha County. They range in length from a few hundred feet to over 2000 feet long. Nearly level to steep pitted outwash terraces occur sporadically throughout much of the Region but are less frequent in the counties bordering Lake Michigan. The large areas of nearly level outwash plains occur in the western and southern parts of Walworth County. Nearly level ground moraines are scattered throughout the seven-county Region but are most extensive in eastern Racine and Kenosha counties. Some nearly level to sloping ground moraines occur in Ozaukee and Milwaukee counties.

Many small areas of lake and outwash plains as well as end moraine features occur throughout the entire area but are especially common within the interlobate moraine and along its frontal edges.

Map 12

PHYSIOGRAPHY OF SOUTHEASTERN
WISCONSIN



5,0-21,570

The physiography of the Region has been entirely controlled by glaciation. The Interlobate Kettle Moraine acts as the focal area for ground moraines and outwash deposits throughout.

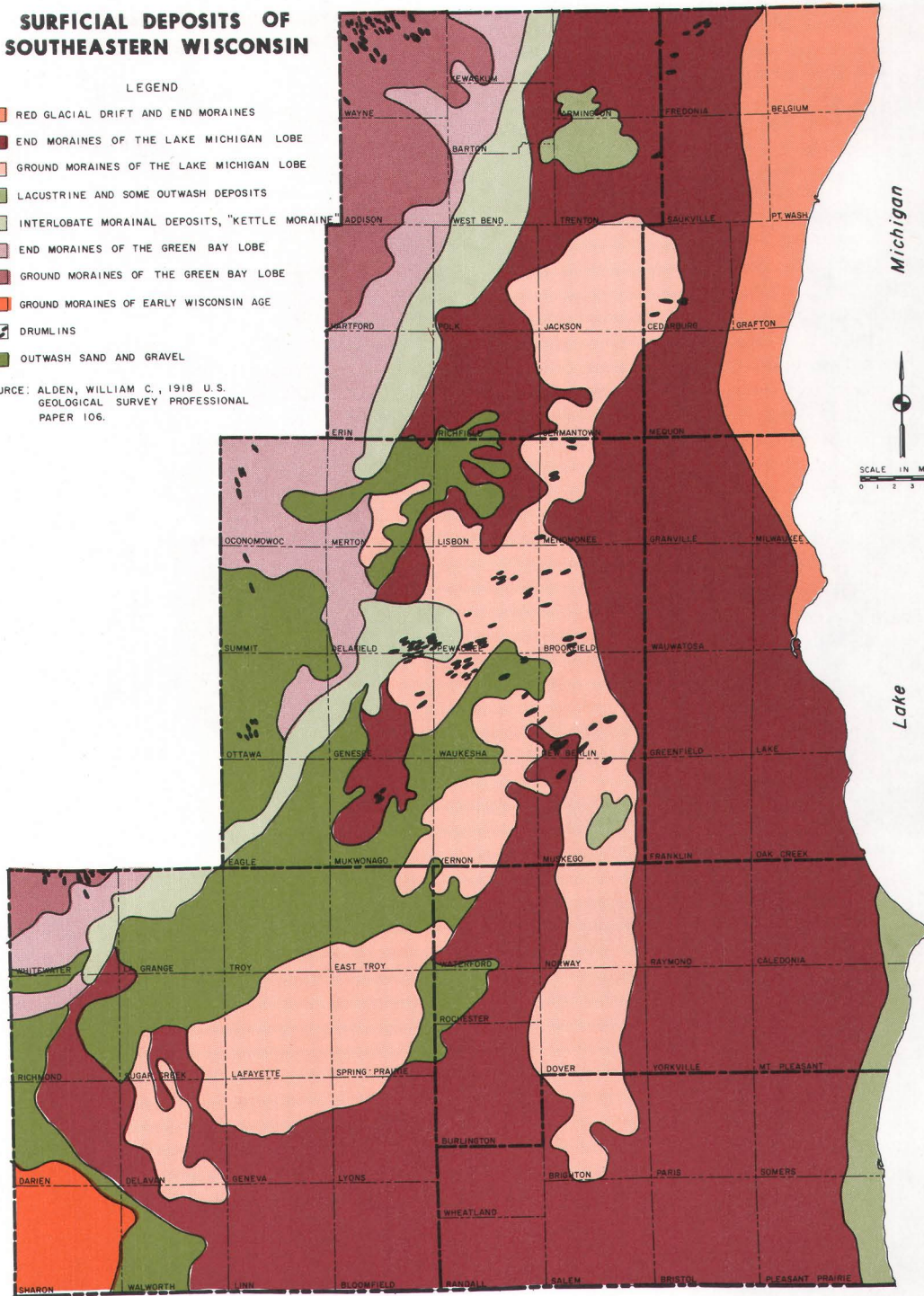
Map 13

SURFICIAL DEPOSITS OF SOUTHEASTERN WISCONSIN

LEGEND

- RED GLACIAL DRIFT AND END MORAINES
- END MORAINES OF THE LAKE MICHIGAN LOBE
- GROUND MORAINES OF THE LAKE MICHIGAN LOBE
- LACUSTRINE AND SOME OUTWASH DEPOSITS
- INTERLOBATE MORAINAL DEPOSITS, "KETTLE MORAINES"
- END MORAINES OF THE GREEN BAY LOBE
- GROUND MORAINES OF THE GREEN BAY LOBE
- GROUND MORAINES OF EARLY WISCONSIN AGE
- DRUMLINS
- OUTWASH SAND AND GRAVEL

SOURCE: ALDEN, WILLIAM C., 1918 U.S.
GEOLOGICAL SURVEY PROFESSIONAL
PAPER 106.



The parent materials and topography of the Region result almost entirely from deposits left by the meltwaters and ice associated with two glacial lobes of continental ice, one lobe pushing downward from the Green Bay area and one lobe occupying the Lake Michigan basin. The Kettle Moraine, an area of complex topography composed of gravelly hills and pocket valleys was formed in the western part of the Region between separate ice sheets.

Source: Alden, William C., 1918, U.S. Geological Survey professional paper 106.

GEOLOGY

SURFACE GEOLOGY

The surface topography of the Region has been primarily determined by glaciation. The Lake Michigan and Green Bay lobes of the continental glacier were the principal contributing factors to formation of the present landscape.

The Lake Michigan glacier covered most of the Region. The western parts of Waukesha and Washington counties were affected by the Green Bay glacier. Between these main lobes of the glacier, interlobate deposits were pushed into an irregular, almost continuous series of steep, high ridges. These ridges, known as the Kettle Moraine, lie in a northeast-southwest direction across the western tier of counties. The receding glaciers left the undulating topography generally associated with ground moraines and the rolling topography generally associated with terminal moraines. The cigar shaped ridges, known as drumlins, are associated with ground moraines and are prominent in the western part of the southeastern Wisconsin landscape.



Drumlins such as this are a part of the landscape near the Kettle Moraine.

Adjacent to and between the moraines are large nearly level to gently sloping areas of outwash materials. These are thick sand and gravel deposits that were moved from the moraines to their present location by water from the melting glaciers. In these areas and in the moraines are concave basins and large "flats" where trapped water has formed lakes, marshes or bogs. Run-off water from surrounding soil areas has transported soil materials into some of the basins and near the shores of Lake Michigan. There they were deposited as lacustrine or outwash.

Thus modern land forms and the kinds of materials above the bedrock in the Region are almost entirely the result of movement of the ice sheets, the materials and conformation left by the receding glaciers and the action of water from the melting glaciers.

BEDROCK GEOLOGY

The bedrock in the southeastern Wisconsin Region is almost all buried by glacial deposits up to 200 feet thick. In local areas the bedrock is exposed at the ground surface. The soils of the Region are all formed in glacial till or glacial outwash and bedrock has had little or no direct influence on their characteristics.

Table 1 shows the stratigraphy of the bedrock that is exposed in southeastern Wisconsin. The formations generally dip to the east. The older formations such as the Galena are exposed geographically in Walworth County. The younger Milwaukee formation is exposed geographically in eastern Milwaukee County and Ozaukee County near the Lake Michigan shoreline. All other formations in the stratigraphic column are exposed geographically at various points between the western and eastern parts of the Region.

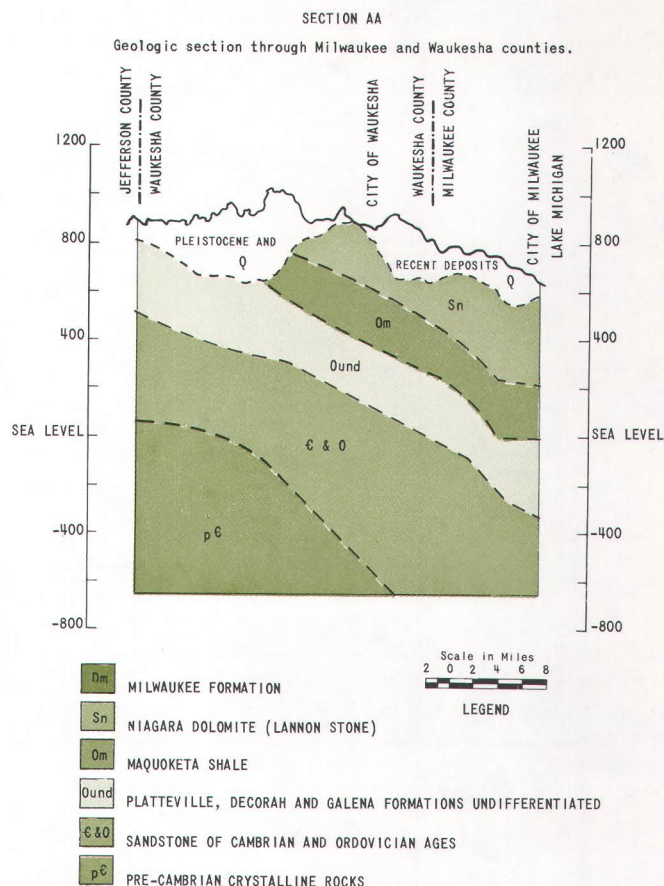
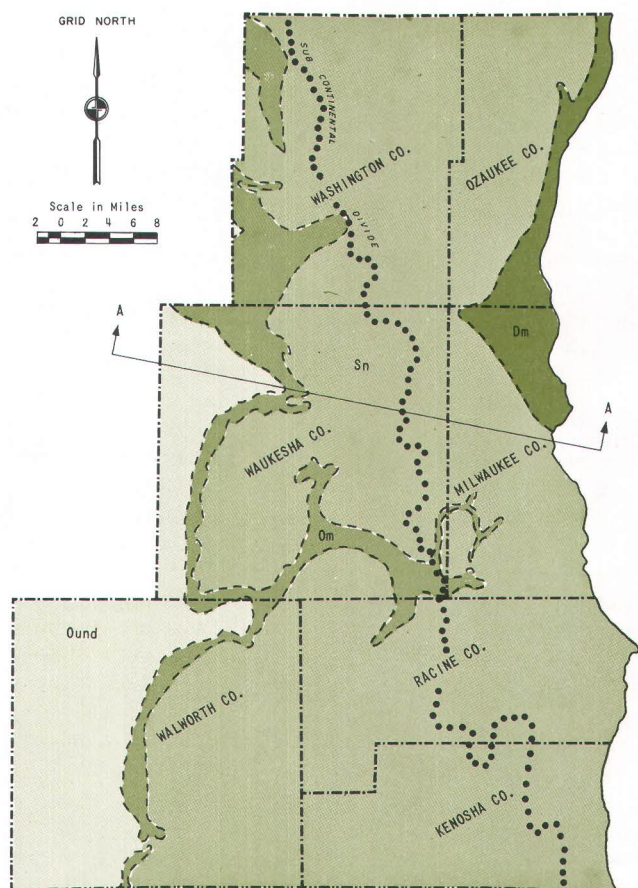
TABLE 1

STRATIGRAPHIC COLUMN - SOUTHEASTERN WISCONSIN

System	Series	Formation	Lithologic Description
QUA- TER- NARY		Recent deposits	Soils, muck, peat, alluvium, beach sand and gravel. 0 to 5 feet thick.
		Pleistocene Deposits	Till and outwash sand and gravel. 0 to 430 feet thick.
		KENWOOD	Shale, black, carbonaceous. Fossiliferous. No outcrops. Found in City of Milwaukee intake tunnel - Lake Michigan. Approximately 55 feet thick.
DEVONIAN	Middle Erian	MILWAUKEE	Shale, shaly limestone; lower 1/3 dolomite. Fossiliferous. Approximately 130 feet thick.
		THIENSVILLE	Dolomite, thick to thin-bedded. Some fossils. Small amounts of bitumen. Approximately 65 feet thick.
		LAKE CHURCH	Dolomite, thick to thin-bedded. Fossiliferous. Pyritic in places. Approximately 27 feet thick.
SILLURIAN	Cayugan	WAUBAKEE	Dolomite, thin-bedded, hard and brittle. Fossils scarce. Approximately 30 feet thick.
	Niagaran	RACINE	Dolomite, fine to coarsely crystalline. Thick to thin-bedded. Barren to fossiliferous. Approximately 100 feet thick.
		MANISTIQUE	Dolomite - lower part thin-bedded. Fossils. Upper - fairly thin-bedded, cherty. Many corals. Approximately 150 feet thick.
		BURNT BLUFF	Dolomite, thick bedded or thin-bedded. Lower part, a few fossils. Upper part, semilithographic. No fossils. Approximately 110 feet thick.
	Alexandrian	MAYVILLE	Dolomite, thick bedded, compact to coarsely crystalline. Brecciated in places, cherty, many reef structures. Approximately 175 feet thick.
ORDOVICIAN	Cincinnatian	NEDA	Red-brown oölitic iron ore and nonoölitic ore. Missing in Racine, Milwaukee, Ozaukee, Door and Dodge counties. In lenses up to approximately 55 feet thick.
		MAQUOKETA	Shale, dolomitic and beds of dolomite. Fossiliferous. 90 to 225 feet thick.
	Champlainian	GALENA	Dolomite, thick to thin-bedded, fine to coarsely crystalline. Cherty. Shaly and sandy in places; some fossils. Approximately 225 feet thick.

R. N. Cheetham, Geologist, WWPP
3/22/65

Figure 1 SUBSURFACE GEOLOGIC MAP AND CROSS SECTION OF THE REGION



DEPTH TO BEDROCK

The delineations of Map 14 showing depth to bedrock indicate the approximate location of areas in the Region underlain by bedrock less than 20 feet below the surface. In all other areas the bedrock is more than 20 feet below the surface. This information was gathered by soil scientists while making soil surveys in the Region. The lines delineating areas with bedrock less than 20 feet deep and areas with bedrock more than 20 feet deep are drawn as accurately as possible with the information available, but within the delineations there are undetected areas that do not fit the prescribed limits of the bedrock depths or areas that are too small to delineate at the mapping scale. Within the delineations indicating bedrock occurring less than 20 feet deep there are

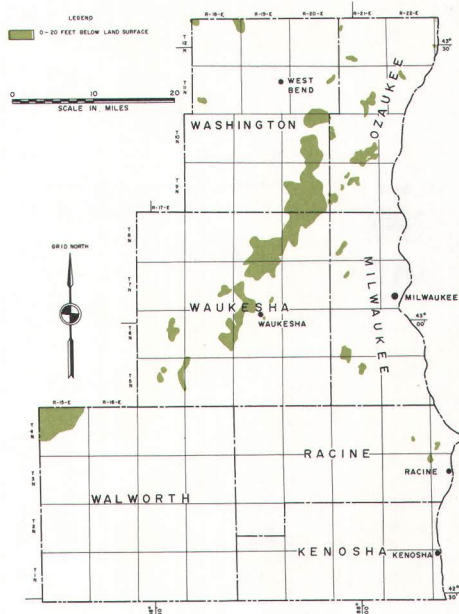
small areas with bedrock more than 20 feet deep and some bedrock outcrops. Within the delineation indicating the area with bedrock more than 20 feet deep there are small areas with bedrock less than 20 feet deep.

In general, the areas of shallow bedrock are parallel to the kettle interlobate moraine in Washington and Waukesha counties. Small areas of shallow (less than 20 feet deep) bedrock are scattered through the south and central parts of Ozaukee County roughly in a northeast-southwest direction.

There are small scattered areas of shallow or exposed bedrock in Milwaukee, Walworth and Racine counties. These areas have no definite pattern. There is no evidence that bedrock is less than 20 feet deep in any part of Kenosha County.

Map 14

SHALLOW BEDROCK WITHIN SOUTHEASTERN WISCONSIN



Dolomite rocks lie within twenty feet of the surface in areas totaling about 150 square miles in the Region. The northeasterly pattern of the rock outcrop areas indicate the presence of a pre-glacial ridge of bedrock which is an important consideration in planning for the development of water supplies, septic tank, or public sewage disposal systems, and public works projects involving trenching and excavation.

CLIMATE ¹

The climate of southeastern Wisconsin is continental with some modification by Lake Michigan. The lake effect is most pronounced in spring and early summer when prevailing winds are east to west, off the lake, and least in winter when prevailing winds are west to east off land. These effects are greatest within the first few miles, but on shore, winds caused by general circulation can noticeably modify weather 15 to 20 miles inland. The most important influence on the climate of the southeastern area is the succession of high and low pressure systems that move southeastward from Canada and from those moving northeastward from the southwestern states. The

passage of these pressure systems over the area results in alternate periods of warm and cold and wet and dry weather. Day-length is about 15 hours and 22 minutes during the longest day of the year in late June and 9 hours during the shortest day in late December.

Winters are relatively cloudy, cold and snowy, usually beginning in November and lasting through March. November and March can be considered transitional. The streams and lakes of the area are generally frozen over from late November or early December to early April. Changes in weather can be expected every two or three days from late fall through mid-spring.

Spring is often a mixture of both summer and winter. The relatively cold waters of Lake Michigan delay spring near the shoreline and is a week or ten days later than the area 15 miles inland. Early spring is the time when low temperatures of winter are moderated rather than high temperatures becoming more frequent. Snow cover disappears under increasing solar radiation, less frequent snowfall, fewer cold polar air outbreaks and more frequent occurrences of warm southern air.

Summers are fully developed and warm with several short, hot and humid periods. Frequent lake breezes from Lake Michigan cool the first two or three miles inland. Predominantly southerly air flow brings in warm moist air from the Gulf of Mexico and, at times, the Caribbean Sea. Highest maximum temperatures occur in strongly subsiding dry air which originates over the southwestern deserts. Markedly cool periods may occur during any summer month. Dew forms on the majority of the warm season mornings and is often heavy and does not evaporate until several hours after sunrise.

Fall often arrives suddenly and usually lingers on into late November. In contrast to spring, nighttime temperatures near Lake Michigan are higher than inland temperatures. Nearly every fall there are one or more periods of Indian summer when days are abnormally warm, skies are generally cloudless but hazy and nights are cool. The change from fall to winter is often as abrupt as the change from summer to fall.

¹ Prepared by Marvin W. Burley, U.S. Department of Commerce Weather Bureau, formerly State Climatologist for Wisconsin.

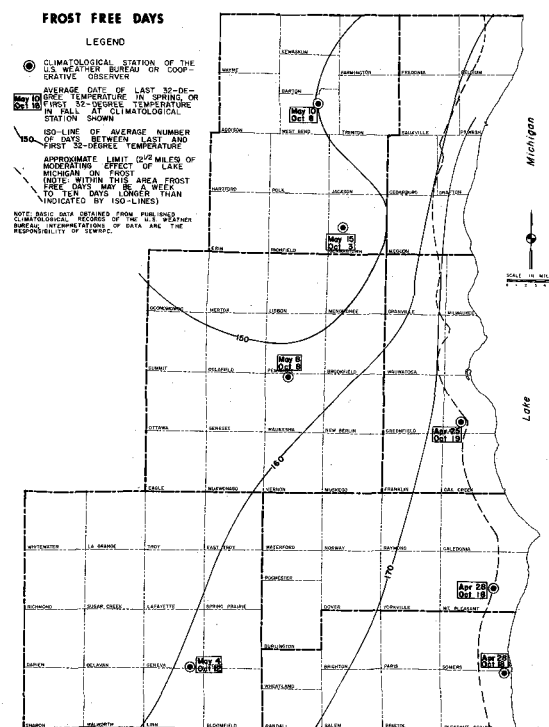
TEMPERATURE²

There are frequent daily temperature changes, large variations from season to season, and often variations from year to year. Air temperatures lag about three weeks behind the solstices, resulting in January being the coldest month and July the warmest month. In spring and early summer when wind direction shifts to an east to west direction near Lake Michigan, daytime temperatures frequently drag 10 to 15 degrees for the first 2 or 3 miles inland. Lake Michigan has little influence on winter's cold waves moving across the state from Canada, because the cold air does not contact the lake until after passing over the state. The average temperature range in January is 1 to 2 degrees less near Lake Michigan than in western sections of the area due mainly to higher minimum temperatures. The average daily temperature range in July is from 3 to 4 degrees less near Lake Michigan because maximum temperatures are lower. Temperature variations are less during the summer than in any other season. This is due to less variation in the temperatures of summer air masses rather than lack of air mass change. The number of days in a year with 90 degrees or higher has averaged 10 along Lake Michigan and 20 inland; individual years range from none to more than 30 along the shore to less than 6 to more than 60 inland. Days with 0 degrees or lower in a year average from 12 to 15 with individual years ranging from less than 5 to more than 40. One year in ten has had temperatures 100 degrees or higher along the shoreline as compared to three years in ten inland. One year in ten minimum temperatures are 20 degrees or lower along the lake; whereas two years in ten, inland minimum temperatures are -25 degrees or lower.

The growing season is defined as the number of days between the last 32 degree freeze in spring and the first 32 degree freeze in fall. The average growing season is 170 to 175 days along the shoreline of Kenosha, Racine and Milwaukee counties, 140 to 150 days in the northwest half of Washington County and 150 to 170 days elsewhere in the area. The average date of the last 32 degree freeze in spring ranges from April 28 along the southeast shoreline to May 10 in Washington County; the first 32 degree freeze in fall ranges from October 19 along the southeastern shoreline to October 8 in Washing-

ton County. Because of cold air pooling, minimum temperatures are generally lower in the valleys than on hilltops. This observable phenomenon results in longer average freeze-free seasons on the hilltops than in the valleys.

Map 15



The growing season of frost free days within the Region is considerably longer near Lake Michigan because of the moderating effect of this large, open water body upon the prevailing northwesterly winds which sweep polar air into the Region during winter and spring.

Growing degree days are based on the concept that plant growth and insect development begin at certain critical temperatures and the amount of growth or development is roughly proportional to accumulated degree days. They are computed by subtracting daily average temperatures from a chosen threshold. The most common temperature thresholds used are 40 to 50 degrees. For example, a mean temperature of 60 degrees is 20 degrees above a base of 40 degrees, 15 above a base of 45 degrees and 10 above a base of 50 degrees. Days with averages at or below the threshold are counted zero. Average growing degree days for the freeze free season near Lake Michigan will approx-

² All temperatures are given in the Fahrenheit scale.

imate 3700 to a base 40 degrees, 3000 to a base 45 degrees, 2300 to a base 50 degrees, while inland they average 4300 to a base 40 degrees, 3500 to a base 45 degrees, and 2700 to a base 50 degrees.

The depth of frost penetration into the soil varies considerably from season to season. Frost penetration is relatively shallow during winters when soils are covered continuously with at least 10 inches of loose snow and when not frozen before the snow cover falls. Frost penetrations have exceeded 36 inches in Ozaukee, Milwaukee, Racine, Kenosha and Walworth counties and 48 inches in Washington and Waukesha counties when air temperatures have been very low, the snow was thin or compact or both and soils were frozen before the snow cover fell. The ground usually begins to freeze in late November or early December and thaws in early April.

PRECIPITATION

Precipitation is normally adequate for the economy of the region. There are more light winter snowfalls near Lake Michigan while there are more summer showers inland. Precipitation intensities and amounts per month begin to increase in March and peak in June, decrease slightly in July, increase in early August, and then decrease to winter's low. Precipitation falls mainly

as rain from late March to late November and as snow the remainder of the year. Most of the summer rain falls in localized thunderstorms. Some degree of soil moisture deficiency can be expected in July and August, but severe drouths are rare. About one inch of rain is needed each week for efficient crop growth. The probability of receiving this amount during a week in the summer is 4 in 10 years in early June and early August and 2 in 10 years in late July and late August. The probability of a dry week, trace or less, during the summer is greatest in late August when it is 2 in 10 years. In inland areas the number of days in a year with 0.01 inch or more precipitation has averaged 115 and has been between 105 and 125 in 2 out of 3 years. The area near Lake Michigan averages 118 days in a year with 0.01 inch or more precipitation.

Three or more successive days without rain is important in harvesting top quality field cured hay. A dry day is one with less than 0.10 inch of rain. The probability of a dry day followed by at least two dry days is about 50 percent in June and 55 percent in July and August.

Gully erosion can be estimated from average annual precipitation and the number of days that precipitation is 0.50 inches or greater. Smaller daily totals contribute very little to

TABLE 2. CLIMATOLOGICAL SUMMARY FOR WAUKESHA, WISCONSIN
(Approximates the climate of the Region)

MEANS AND EXTREMES FOR PERIOD 1930-1959

Month	TEMPERATURE (°F)							Mean degree days	PRECIPITATION TOTALS (INCHES)							MEAN NUMBER OF DAYS						Month
	Means			Extremes					Mean	Greatest daily	Year	Snow, Sleet					Precip. .10 inch or more	Temperatures				
																		Max.		Min.		
	Daily maximum	Daily minimum	Monthly	Record highest	Year	Record lowest	Year					Mean	Maximum monthly	Year	Greatest daily	Year		90° and above	32° and below	32° and below	0° and below	
(a)	30	30	30	30		30		30	30	30		30	30		30	30	30	30	30			
Jan.	29.0	12.3	20.7	62	1944	-27	1951	1370	1.70	2.66	1938	11.8	35.0	1947	15.0	1947	4	0	18	30	7	Jan.
Feb.	31.6	14.5	23.1	61	1932	-24	1933	1170	1.26	1.43	1937	6.6	15.4	1946	10.0	1933	4	0	14	27	4	Feb.
Mar.	40.8	23.4	32.1	80	1945	-14	1943	1020	2.16	1.92	1943	10.7	23.3	1952	8.5	1951	5	0	7	27	1	Mar.
Apr.	56.0	34.7	45.4	89	1942+	11	1954	590	2.52	2.17	1956	1.1	11.0	1936	5.0	1949	6	0	*	14	*	Apr.
May	68.2	44.8	56.5	101	1934	25	1947+	300	3.46	3.05	1934	0.4	7.4	1940	5.0	1940	7	*	0	2	0	May
June	78.6	55.2	66.9	101	1934+	29	1945	50	3.72	4.05	1940	0	0		0		7	4	0	*	0	June
July	84.1	60.1	72.1	109	1936	42	1945	10	3.31	5.09	1952	0	0		0		5	7	0	0	0	July
Aug.	82.6	59.0	70.8	101	1948	39	1950+	20	3.06	2.42	1939	0	0		0		6	6	0	0	0	Aug.
Sept.	74.1	50.6	62.4	101	1953	25	1942	140	2.93	3.35	1941	T	T		T	1942	5	2	0	1	0	Sept.
Oct.	62.3	40.2	51.3	86	1952	17	1952+	430	2.09	1.83	1959	T	1.2	1952	1.2	1952	4	0	0	6	0	Oct.
Nov.	44.8	27.9	36.4	78	1944	-9	1950	860	2.30	2.02	1942	3.5	15.7	1940	8.0	1940	5	0	5	21	*	Nov.
Dec.	32.4	17.4	24.9	61	1946	-19	1933	1240	1.56	1.89	1942	7.7	22.5	1950	9.5	1959	4	0	15	29	4	Dec.
Year	57.0	36.7	46.9	109	July 1936	-27	Jan. 1951	7200	30.07	5.09	July 1952	41.8	35.0	Jan. 1947	15.0	Jan. 1947	62	19	59	157	16	Year

(a) Average length of record, years.

T Trace, an amount too small to measure.

+ Also on earlier dates, months, or years.

* Less than one half.

this type of erosion. The number of days in a year with 0.50 inches or more per day has averaged 20. About 60 percent of the total annual precipitation falls on days with 0.50 inches or more. The number of days with 0.50 inches or more precipitation has averaged 19 near Lake Michigan.

Seasonal snowfall ranges from an average of 40 inches along Lake Michigan in Ozaukee County to 35 inches in southwestern Walworth County. Snowfall in individual seasons has varied from more than 100 inches to less than 15 inches. Storm centers with wind circulations off Lake Michigan often result in much heavier snowfall along the shore than inland. The average date of the first one inch or greater snowfall is near the end of November; the chance of this amount by early November is one in ten years and by Christmas, nine in ten years. The ground is covered with one inch or more of snow about two-thirds of the time from December through February. The probability of snow on the ground increases rapidly to late December and then slowly increases to middle February after which it decreases rapidly.

OTHER CLIMATIC ELEMENTS

Thunderstorms have occurred on an average of 37 days a year along the lake and 40 days a year inland. June has more thunderstorms than any other month followed by July, August and May. Thunderstorms rarely occur in December, January and February. The most frequent time of the day for these storms is from noon to 6 p. m. followed by 6 p. m. to midnight, midnight to 6 a. m. and 6 a. m. to noon. The most frequent time for severe thunderstorms is between 2 p. m. and 7 p. m. in July.

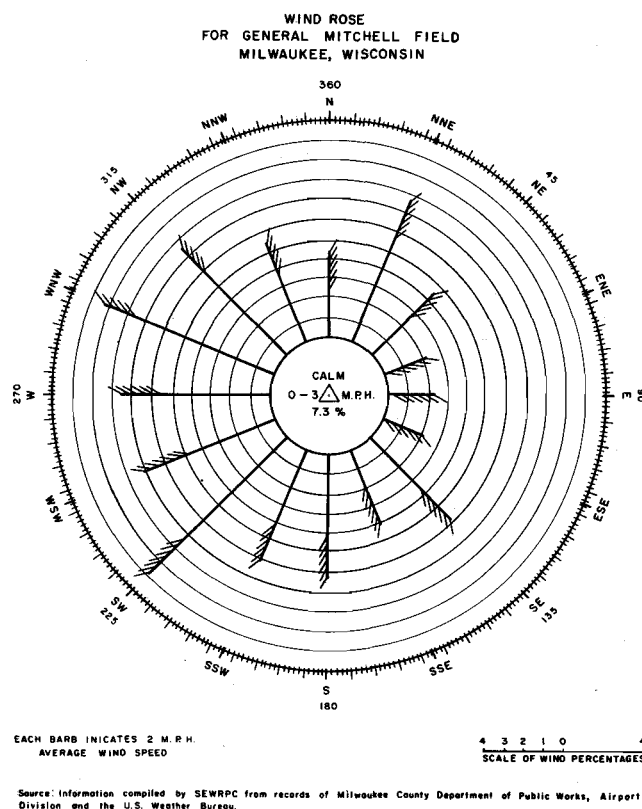
Hail has fallen on an average of two days a year near Lake Michigan and three days a year inland. The most frequent time for hail is in late afternoon in mid-spring while the chance of large damaging hail is greatest in late afternoon in mid-July. Very few hailstorms occur from mid-September to mid-March and from sunset to sunrise. Most of the hail that falls is small. Hail large enough to cause damage generally falls between mid-May to mid-August. Hail areas are generally local and the storms pass over in a few minutes.

Prevailing winds are westerly in winter and southerly in summer. Northeasterly winds prevail along Lake Michigan from April through June. The windiest months are normally March, April and November with ave-

rages of about 12 miles per hour; the least windy months are July and August with averages of about 9 miles per hour. The shore area will average from 1 to 2 miles per hour faster throughout the year. Wind speeds, neglecting gusts, can be expected to reach 55 miles per hour at the 30-foot level and 45 miles per hour at the 10-foot level in half the years. Velocities up to 100 miles per hour at the 30-foot level and 85 miles per hour at the 10-foot level can be expected once in 50 years.

Inland, the annual average hours of sunshine is near 60 percent of possible. In November and December the average is 40 to 45 percent; in January through April it is 50 to 60 percent; in May through October it is 60 percent and in July and August it is 70 to 75 percent of possible. Along Lake Michigan, the

Figure 2



Wind movement is generally from a westerly direction reflecting the wintertime spill of cold northwesterly air from continental highs and the westerly and southwesterly movement of Gulf and Pacific lows which dominate periods of the summer and fall. This wind rose also shows the added effects of the northeasterly Lake Michigan breezes.

**MAP 16
HISTORIC
URBAN GROWTH
MAP
1963**

Legend
Development of:
1850
1880
1900
1920
1940
1950
1963

The map displays the state of Wisconsin with various urban growth areas shaded in different colors corresponding to the years 1850, 1880, 1900, 1920, 1940, 1950, and 1963. Major cities and towns are labeled, including Milwaukee, Madison, Kenosha, and others. Water bodies and watersheds are also labeled, such as Lake Michigan, Lake Monona, and the Rock River Watershed. A legend on the left side of the map provides the key for the color-coded development periods. A scale bar and north arrow are located in the top right corner.

27

annual average hours of sunshine is 55 percent. During November through February the average is 40 to 45 percent; in March through May and in October it is 50 to 60 percent and in June through September it is greater than 60 percent. Only in July is it greater than 70 percent.

Annual lake evaporation ranges from 28 inches near Lake Michigan to 30 inches inland. About 80 percent of the year's total occurs in the warm season period of May through October.

CULTURAL CHANGE

The Southeastern Wisconsin Region is undergoing an unprecedented population growth and urbanization. The Region, which comprises only 5 percent of the total area of the state of Wisconsin, presently contains more than 41 percent of the state's population and employs about one-half of the state's labor force. The Region has in the last decade accounted for over 64 percent of the total population increase of the state. It contains the twelfth largest city in the Nation and is the fourth fastest growing metropolitan region in the United States, outranked only by Los Angeles, Washington, D. C., and Minneapolis. The population of the Region, which now stands at about 1.7 million people, is increasing at a faster rate than that of the state or nation; and over 33,000 people are being added to the population of the Region every year. If existing trends continue, southeastern Wisconsin will, by 1990, have become a part of a huge urban complex extending along the westerly and southerly shores of Lake Michigan from South Bend, Indiana, to Port Washington, Wisconsin. (See Map 1.)

Rapid population growth and urbanization,

rapidly expanding employment opportunities, rising income levels, increased educational achievement and increased leisure time have all combined to exert a strong demand for changes in the use of land within the Region. In 1850, 4 square miles of the Region's 2,689 square miles were developed for urban use. By 1950 over 130 square miles of land had been converted to urban use and over 90 percent of the population of the Region was classified as urban. The most dramatic increase in urban development within the Region, however, occurred between 1950 and 1963. (See Map 16, page 27.) While the regional population increased by about 35 percent during this 13 year period, land devoted to urban use increased by 146 percent. Population densities within the urban areas, however, dropped sharply from a peak of about 11,000 persons per square mile in 1940, to about 4,800 persons per square mile in 1963.

The term "urban sprawl" is quite descriptive of the pattern of development occurring within the Region. If present trends continue, between 10 and 15 square miles of land will be converted from rural to urban use each year within the Region. This figure is particularly significant when it is realized there are presently only 340 square miles of urban land within the Region. The current stock of open land, woodlands, and agricultural lands remaining within the Region is slightly in excess of 1,900 square miles in area, or about 70 percent of the land area of the Region. Continued conversion of this rural land to urban use without regard to the effects upon the underlying and sustaining resource base can only lead to severe environmental problems and the further deterioration and destruction of irreplaceable natural resources.

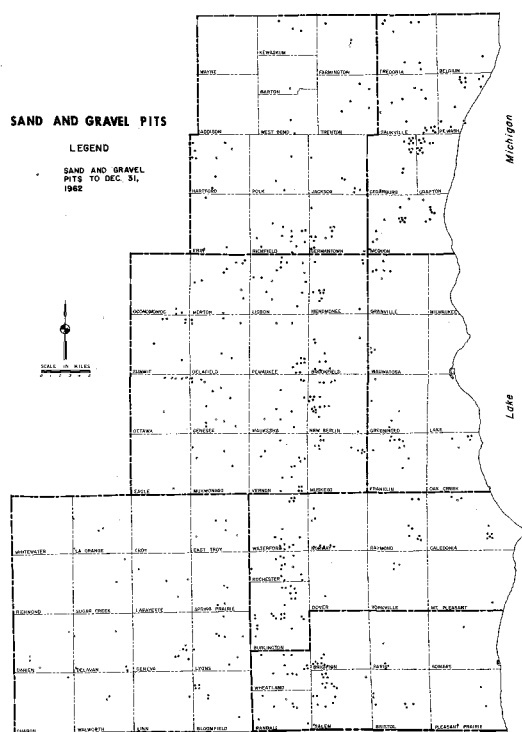
Chapter III

MINERAL AND ORGANIC RESOURCES

SAND AND GRAVEL DEPOSITS

Sand and gravel deposits are important sources of gravel for concrete, gravel for road surfacing and sand for mortar and for molding sand. In Waukesha County there are 33 private concerns engaged in the mining of sand and gravel. Other counties of the Region have from 2 to 10 commercial pits. There are large numbers of sand and gravel pits in the Region, but the quality and quantity of the deposits limits the commercial potential of most of them.

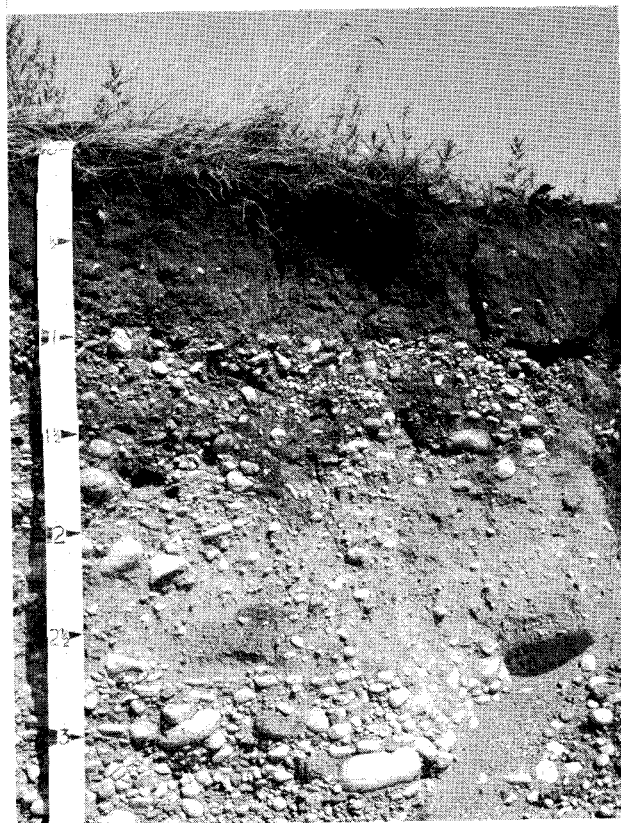
Map 17



Sand and gravel deposits within the Region are most abundant in the glacial outwash area of sandy soils and least abundant in the clayey soils near Lake Michigan. Deposits are, however, utilized throughout the Region because transportation costs often outweigh other cost considerations.

The soil survey can be used as a guide in determining the suitability of an area for mining of sand and gravel. Table 6 of the engineering section indicates the suitability of each soil in the area for this use. Soils underlain by glacial outwash are a major source of sand and gravel. The deposits are extremely variable, however, and on-site investigations are advisable to determine the suitability of each site for a specific purpose.

As a whole the Region has an abundant supply of sand and gravel. The soils in the Region most commonly suitable for this purpose are of the Rodman, Casco, Fox, War-



The outwash material under Lorenzo loam is a good source for gravel.

saw, Wea, Ockley, Lorenzo and Boyer series. These are underlain by glacial outwash. Areas of Hackett soils are a good source of sand but a poor source of gravel. In the counties bordering Lake Michigan the underlying material is mainly ground moraine. This material has not been washed and sorted as has the glacial outwash and is generally not suitable for commercial sand and gravel.

In general, the soils bordering and including the interlobate moraine (see Map 12, Page 17) are the most extensive source areas for sand and gravel. In this zone the melting waters of the glacier were most active in depositing high quality sand and gravel as kames, eskers and outwash terraces. These deposits occur mainly in Waukesha, Washington and Walworth counties.

Table 6, Chapter V, indicates the soils that are good sources of sand and gravel.

STONE FOR COMMERCIAL USE¹

Dolomite deposits are economically important in some areas of southeastern Wisconsin. All parts of the Region, except western Walworth County, are underlain by dolomite of the Niagaran series. All of the quarries that produce stones for building purposes are located in Waukesha County. The Galena dolomite is not economically important in the Region.

The Niagaran dolomite is variable in physical make up and thickness of bedding planes. In Waukesha County the thinly bedded Niagaran dolomite is well suited for dimensional stone. It is compact and fine grained. Lannon stone, a product of Waukesha County quarries, is well known for its excellent building qualities.

In other counties of the Region, there are one to three quarries that produce crushed dolomite commonly known as "crushed limestone". These quarries are generally located near points of use such as construction projects or intensive agricultural areas. In some areas, quarrying is not feasible be-

¹ In southeastern Wisconsin, the bedrock commonly called "limestone" is, in reality, calcitic dolomite. The more commonly used terms "dolomitic limestone" or "limestone" will be used in all parts of this report except in the geology section.



Soils and related underlying materials of glacial origin generally form a deep mantle within the Region over the underlying sedimentary formations. In several localities, however, the bedrock at or very near the surface provides an excellent source of building stone. In this quarry near the City of Waukesha dolomite is being quarried for crushed stone construction materials.

cause the glacial drift cover is excessively thick.

Table 4, Chapter V, indicates soils underlain by bedrock at depths of five feet or less.

ORGANIC DEPOSITS

Organic deposits are widely distributed throughout southeastern Wisconsin in small scattered areas. Peat and muck soils are formed in these deposits which accumulate in poorly drained, low lying areas and depressions in the landscape. In these areas excessive moisture inhibits oxidation and decay of the residues of water tolerant plants such as sedges, reeds and, in some areas, swamp hardwoods.

The thickness of the organic deposits is quite variable. Depth to the underlying glacial drift ranges from less than a foot to many feet. The texture of the glacial drift ranges from sand to clay. Some organic deposits are underlain by marl.

The soil maps of the Region indicate the extent and distribution of organic deposits.

The most extensive areas are in Waukesha, Walworth, Racine, Washington and Kenosha counties.

In southeastern Wisconsin organic soils, formed in the organic deposits, are used for wildlife and recreation, cropland, vege-



Organic soils such as this peat deposit are composed of deep accumulations of partially decomposed plant residue.

table crops, sod farming and peat mining.

Most organic soils, regardless of depth or feasibility of drainage, can be used for wildlife and recreation. They are used for public hunting and fishing areas as well as private developments for wildlife. Some areas are favorable environment for wildlife that use water or wet lands as a part of their habitat.

Field crops, such as corn or soybeans and specialized crops, such as vegetables are grown on some organic soils. The organic deposits must be deep enough for sustained production and artificial drainage must be feasible.

Where favorably located, organic soils are used for the commercial production of sod for establishing or reworking lawns. Deep organic deposits that are easily drained are also needed for this use. Sod farms are generally near metropolitan areas in which there is a ready market for the sod.

It is also important that organic deposits used as a source of peat be near a metropolitan market. Peat is excavated from open pits and is sold as an additive to improve soils for potted plants, gardens and greenhouse nurseries.

Soil surveys for the Region indicate the suitability of organic deposits for various uses. The organic soils have been classified according to thickness of the organic deposit, the nature of the underlying materials and the drainage class. The location of organic deposits can be determined from a soils map. The feasibility of artificial drainage, however, generally requires special engineering investigations.

Soils of the Adrian, Houghton, Muskego, Ogden, Palms and Rollin series are probable sources of organic deposits.

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Chapter IV

SOIL FORMATION, CLASSIFICATION AND DESCRIPTION

SOIL FORMATION

The nature of the soils in southeastern Wisconsin is the result of the interaction of parent materials, relief, climate, plants, animals, and time. Within each soil profile the effects of these soil forming factors are reflected in transformation of soil material in place, chemical removal of soil components by solution or physical removal by wind or water, additions by chemical precipitation or by physical deposition and transfer of some soil components from one part of the soil profile to another. For example, the soils of the Theresa Series have formed mainly in very calcareous gravelly loam glacial till. This material is covered by a mantle of silt loam about 12 to 20 inches thick. The silt loam was apparently deposited over glacial till by wind shortly after recession of the glacier. This happened several thousand years ago.

Each soil forming factor and process contributed to the character of Theresa silt loam as it exists today. *Parent materials* were layers of wind-blown silt loam over calcareous gravelly glacial till. The gently sloping to sloping *relief* and the moderately permeable soil materials predetermined that soils would be well drained. The temperate *climate* with adequate rainfall for the growth of plants was conducive to chemical and physical activities such as solution and movement of water downward in the soil profile. *Plants* and *animals* contributed to the accumulation of organic matter and some mixing of soil materials. *Time*, of course, is a factor in any process involving slow changes in naturally occurring materials. The evidence indicates that Theresa soils, as they occur today, are the result of thousands of years of slow and gradual changes that have taken place since the receding glaciers left the loamy drift hills and subsequent winds deposited silty materials on the surface. The nature of similar materials at the terminus of modern glaciers indicates to some degree the kind and extent of activity that contributes to the character of the modern soil.



Most of the soil forming factors and processes have contributed to the formation of Theresa silt loam pictured here.

After deposition of the calcareous gravelly loam and the overlying silt loam a combination of moisture and organic acids from the residues of minute organisms started the weathering process. Weathering was accelerated as higher forms of organisms grew in the soil material and produced more residues and organic acids. The free lime in the soil material was gradually dissolved and transported in solution by percolation into the lower parts of the soil. As water continued to move downward through the soil, suspended clay particles were also moved downward. Thus, in the Theresa profile, there is a larger quantity of clay in the lower part of the silty mantle and the upper part of the glacial till than in other parts of the

soil. Simultaneously, decomposed organic residues began to accumulate on and near the surface. This caused a dark colored surface soil. While these changes were occurring in the upper part or silty part of the soil, the loamy part, composed mainly of ground dolomite, was being subjected to chemical weathering. The upper layer of gravelly loam till changed to a mixture of gravel and brown clay loam. The presence of air permitted oxidation of the iron impurities in the ground dolomite rock and resulted in brown colors of the brown clay loam horizon. Thus, after thousands of years of chemical and physical weathering a soil has evolved that has a dark colored silt loam surface soil over a silty clay loam upper subsoil and a brown clay loam lower subsoil underlain at about 30 inches by the unweath-

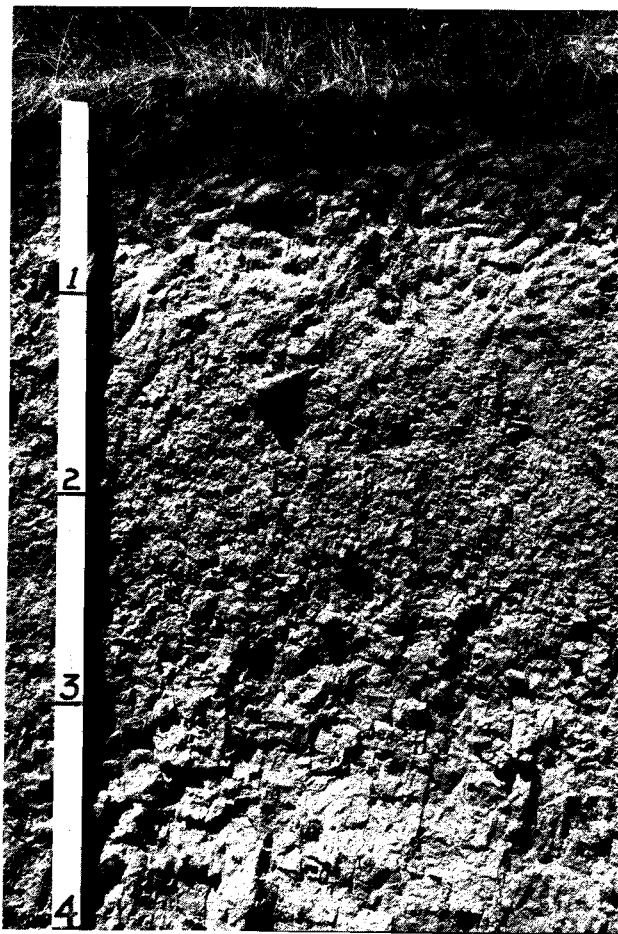
ered calcareous glacial till. The till has been changed very little in the several thousand years since it was pushed into its present location by the glacier. Organic matter *accumulated* in the surface soil, clay was *removed* from the upper part of the soil profile and *added* to the lower part and some materials were *transformed* in place. All these processes are occurring in all soils in this area to some degree.

In southeastern Wisconsin the nature of parent materials and the topography have mainly determined the kind of process that has dominated soil formation and thus caused soil differences within the Region.

Parent materials included glacial till that ranges in texture from sandy loam to clay



This soil has formed on an alluvial flood plain. The soil is stratified but there are no distinct genetic horizons.



The windlaid silty material in this soil has been in place more than 10,000 years. Color differences between the 0 to 8-inch depth and the 8 to 15-inch depth and the blocky subsoil at about 15 to 36 inches are evidences of distinct soil horizons.

loam, lacustrine lakebed deposits that range from sand to clay, wind blown, loess deposits that are mainly silt loam, outwash deposits comprised of sand and gravel, and alluvium that has been deposited by recent stream action. Each of these parent materials has had much influence on the kind of soil that has formed from it.

The drainage characteristics of soils are determined mainly by topography and position. Thus soils of the Dodge, Lamartine and Ehler series have all formed in silt mantles over calcareous gravelly loam glacial till. The Dodge soils that occur in relatively high positions are generally sloping and are well drained. Lamartine soils generally are in footslope positions that are nearly level to gently sloping. They receive some water from other soils. Surface water runs off slowly. These soils are somewhat poorly drained. Gray mottling indicates poor aeration and excess moisture. The Ehler soils are generally in the poorly drained depressional areas.

Water tables are generally near the soil surface and surface drainage is very slow. Soil colors of gray and olive gray indicate reduction of iron in the soil profile.

In southeastern Wisconsin time has had some effect on soil differences. Soils on alluvial plains and low terraces do not have distinct genetic horizons because the materials have been in place only long enough for accumulation of organic matter in the surface soils, a slight change in color of the subsoil or leaching of some carbonates from the upper soil profile into the lower profile or below the root zone. Soils in the older glacial till and windlaid materials have well defined horizons that have formed by processes requiring thousands of years of time. Some soils such as Juneau silt loam are today receiving additions in the form of surficial depositions.

Climatic differences within southeastern Wisconsin are too small to cause any obvious soil differences. The general nature of the climate, however, places the Region in a unique situation in climate-soil-plant relationship. The southern part of Wisconsin is within a climatic zone in which there are both prairie soils and woodland soils with dark surface soils. The prairie and woodland are constantly contesting each other for dominance in the soil-plant regime. Undisturbed woodland soils in southeastern

Wisconsin generally have thin surface soil horizons that are darker than most woodland soils. Many of the soils classified as prairie have dark surface soil horizons that are thinner than most prairie soils. Soil and plant disturbances, in woodland soils, such as removal of trees, burning, plowing and return of large amounts of plant residues to the soil have darkened and thickened the surface soils enough to qualify them for prairie soils or prairie-like soils. This can be seen by comparing undisturbed soils under trees, with cultivated soils a few feet distant. Similarly, trees will appear on cultivated "prairie" soils left idle and, often after only a few years, these soils begin to take on the characteristics of "timber" soils. Thus, the general nature of the soils have been influenced by climate and in turn by plants. Soil differences, however, are mainly caused by parent material and topography with time playing a minor role.

SOIL CHARACTERISTICS AND SOIL PROPERTIES

Soil characteristics, resulting from the interaction of soil forming factors and processes, are important to the prediction of soil properties, the making of soil interpretations and classification of soils. The principal soil characteristics used in describing and interpreting soils are soil texture, color, structure, consistence, reaction, depth, slope and position.

Soil texture is an expression of the proportion of sand, silt and clay size particles in the soil mass. Sand particles are .05 to 2.0 millimeters in diameter. Silt particles are .002 millimeters to .05 millimeters in diameter. Clay particles are less than .002 millimeters in diameter. Table 3 shows the range of percentages of sand, silt and clay for the basic soil textural class names.

Soil texture is one of the more important soil characteristics because of the number of properties and interpretations that are affected by it. Soil permeability is mainly a function of soil textures. Fine textured soils are generally slowly or very slowly permeable. Coarse textured soils are generally rapidly to very rapidly permeable. The available moisture capacity and fertility holding capacity of soils varies directly with texture. Moderately fine textured soils generally hold more water and fertility than

TABLE 3. SOIL TEXTURAL CLASS NAMES AND APPROXIMATE PERCENT OF SAND, SILT & CLAY.

GENERAL TERMS	BASIC SOIL TEXTURAL CLASSES	COMPOSITION		
		SAND percent	SILT percent	CLAY percent
Coarse Textured Soils Moderately Coarse Textured Soils Medium Textured Soils Moderate Fine-textured Soils Fine-textured soils	SANDS ¹ Coarse sand Sand Fine sand Very fine sand	+85	-15	-10
	LOAMY SANDS ¹ Loamy coarse sand Loamy sand Loamy fine sand Loamy very fine sand	70-90	-30	-15
	SANDY LOAMS ¹ Coarse sandy loam Sandy loam Fine sandy loam Very fine sandy loam	43-85	-50	-20
	LOAM	23-52	28-50	7-27
	SILT LOAM	20-50	50-80	12-27
	SILT or	-	50-80	-12
		-	+80	-12
	CLAY LOAM	20-45	15-53	27-40
	SANDY CLAY LOAM	45-80	-28	20-35
	SILTY CLAY LOAM	-20	40-73	27-40
	SANDY CLAY	45-65	-20	35-55
	SILTY CLAY	-20	40-60	40-60
	CLAY	-45	-40	+40

+ = more than

- = less than

1 The proportion of various size sand particles determines the name of these textural classes.

coarse or moderately coarse textured soils. The infiltration rate of a soil is dependent, to some degree, on the soil texture. Coarse textured soils generally have a higher infiltration rate than fine textured soils. Soil erodibility is related to soil texture. Sands and loamy sands are more susceptible to wind erosion than other soils. Fine textured soils are more susceptible to water erosion than other soils. Soil texture can be correlated with bearing capacity. Mixtures of silt and fine sand have very low bearing capacity. Gravelly loam soils generally have a high bearing capacity.

The shape and stability of aggregates of soil particles, expressed as soil structure, in-

fluences to some degree the permeability, infiltration rate and erodibility of soils. Soils are said to have granular, angular blocky, subangular blocky, platy or prismatic structure. These terms represent respectively spherical shapes, brick-like or cubical shapes, cubical shapes with rounded corners, dominantly horizontal cleavage with particles oriented in thin layers and dominantly vertical cleavage. In general structural arrangements with horizontal cleavage and aggregates that fit closely together are more slowly permeable than granular structure with spheroidal aggregates. Generally soils with stable granular or subangular blocky structure are less erosive than soils with other kinds of structure.



Platy Structure



Granular Structure



Prismatic Structure

Soil structure is the key to infiltration and permeability rates. The prismatic structure will break into angular blocky aggregates.

Soil color is used mainly to indicate the relative organic matter content and the quality of soil drainage. Dark colored soils have generally been formed under grass and contain more organic matter than light colored soils. Bright colored unmottled subsoils with red hues generally indicate a high degree of oxidation of iron in the soil mass and a well drained soil. Mottling and gray or olive gray colors in yellow and blue hues generally indicate slow drainage and wet soil conditions in which the reduction of iron has dominated chemical activity in the soil.

Consistence is described in terms that indicate resistance to change of form or rupture. It can be used to predict tillage properties or indirectly to verify soil texture. It is an expression of properties that cause cohesion and adhesion. It can be used to indicate levels of organic matter content and bacterial activity.

Soil reaction, expressed as pH ranging from extremely acid at pH 4.5 or below to strongly alkaline at pH 9.0 or above, is important to both agricultural and urban users of soils information. The values can be used to indicate crop suitability or treatment needed to grow certain crops that require large amounts of calcium. The various pH values can be used to indicate whether metal or concrete conduits can be used for various kinds of underground installations and the kind of treatment needed for each. The rate of corrosion for metal conduits is low in acid soils with low pH values and high for

concrete conduit. Metal conduit will corrode rapidly in soils with high pH values while concrete conduit corrodes very slowly.²

Soil slope mainly affects the amount of runoff from soils and the speed of its movement. Thus, slope is important in predicting susceptibility to erosion.

Soil position is the principal controlling factor for quality of drainage. Thus, soils located in low positions in the landscape are generally poorly or very poorly drained because of the presence of high water tables or slow surface drainage or both. Hillside, ridgetop, high bench, or terrace soils are generally well drained.

IDENTIFICATION AND NOMENCLATURE

In most parts of this report, self-explanatory terms have been used that can be understood by readers who are not soil scientists. In Tables 4 and 5, however, symbols indicating soil horizons were used. These terms are familiar to soil scientists but seldom used or understood by laymen.

The *A horizon* has formed at or adjacent to the soil surface. It is generally a layer in which organic matter has accumulated. In

2 In southeastern Wisconsin soils with high sodium or chloride content do not occur.



Well drained Rodman and Casco soils. Both surface and subsurface drainage is good.

most parts of this report, it is called the *surface soil*. In some soils it includes a thin layer from which clay, iron or aluminum has moved downward or a transitional layer between the surface soil and the subsoil.

The symbol "Ab" indicates a soil layer that, at one time, was at the surface but has been buried by recent deposition.

The *B horizon* is generally adjacent to and is below the A horizon. It is that part of the soil profile that has received additions of clay, iron, aluminum or humus that have moved from the A horizon or in which the original soil material has been changed to obliterate the original rock structure. This horizon is called the *subsoil* in most parts of the report.

The *AB horizon* indicates a transitional layer between the A horizon and the B horizon in which properties of both horizons can be identified.

The Roman number II prefixed to a horizon designation (IIB) indicates contrasting layers of soil materials.

The *C horizon* is adjacent to and below the A horizon or B horizon. The soil material in it has been little affected by bacterial activity, but in some soils alterations such as chemical weathering, cementation or accu-



Water often accumulates on nearly level to gently sloping poorly drained soils in times of heavy rains or spring thaw. When poorly planned urban development is allowed to encroach on such areas, the resultant damage to landscaping, sanitary facilities, streets and driveways, basement walls and foundations may become very costly to repair. The potential health hazard of such ponding is an even more serious factor to consider.

mulation of carbonates has occurred. The C horizon does not include consolidated bedrock. In this report, it is generally called *substratum*. The symbol "R" indicates consolidated bedrock such as sandstone or limestone.

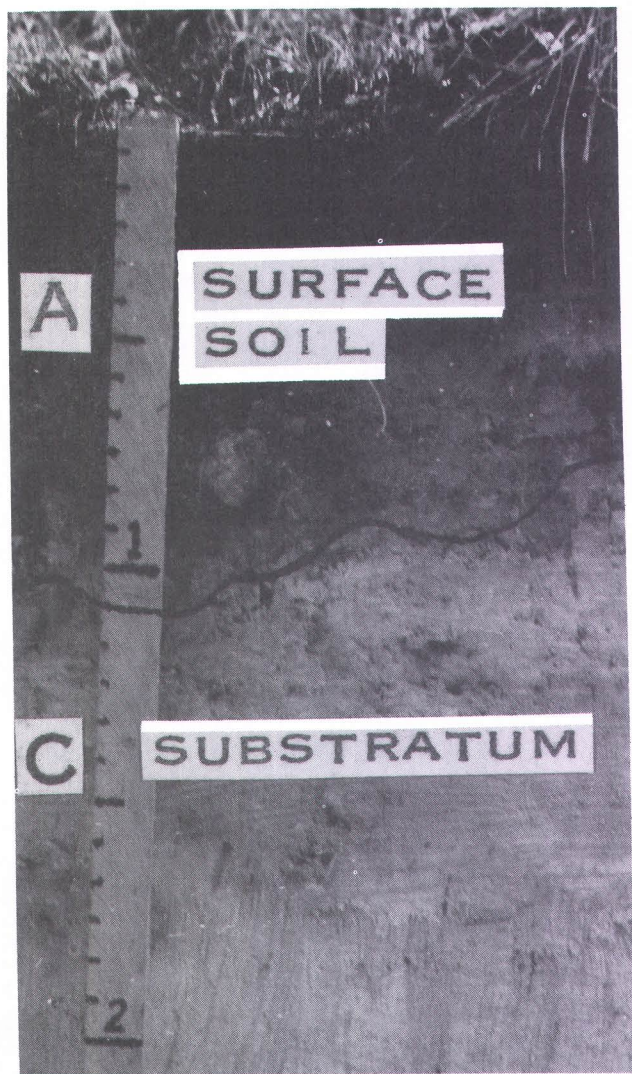
Most soils have A, B and C horizons. Some soils, such as Alluvial soils, do not have B horizons.

Soil scientists have set up an orderly worldwide system of soil classification that enables them to study and discuss broad groups of soils or narrow groups as needed.

The system uses six levels of classification³ or categories, namely, Order, Suborder, Great Group, Subgroup, Family and Series. The soil series is the lowest category in the system and the only one used in this report.

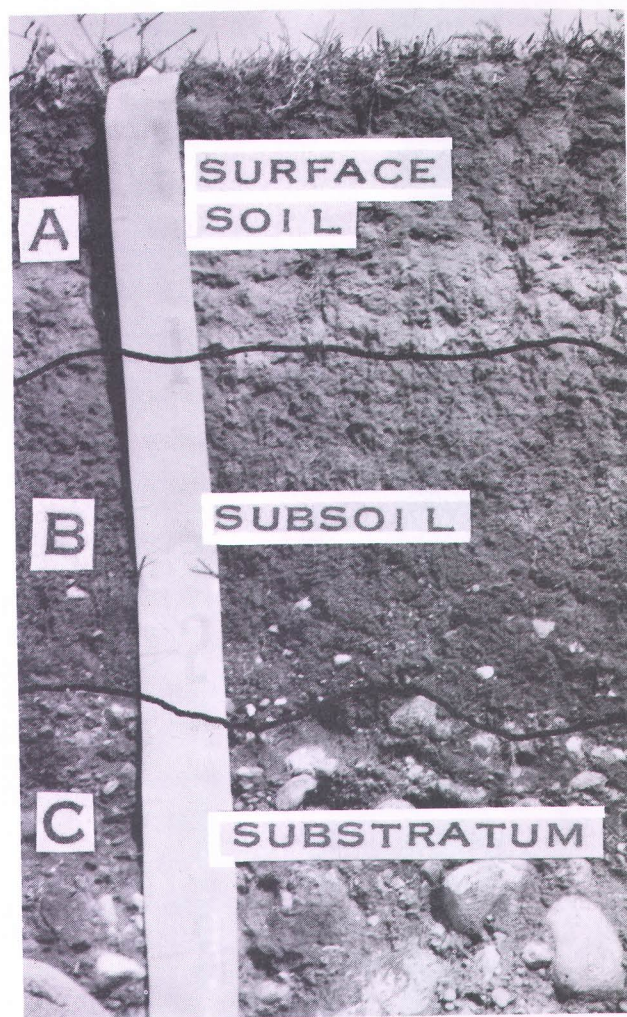
Each soil series is comprised of soils that have similar kinds and sequence of horizons. Thus, the soil color, texture, struc-

3 Soil Classification, A Comprehensive System, USDA, August 1960 (Tentative).



The A horizon or surface soil in this soil has been formed in fine sand. The quartz sand weathers so slowly and water moves through the sand so rapidly that a B horizon has not formed. The C horizon or substratum is slightly weathered sand.

ture, consistence, reaction and thickness of the A horizons and the B horizons for all the soils of a soil series are similar within a rather narrow range. The C horizons or underlying materials are generally similar in texture and reaction. The soil profiles pictured are of different soil series. One has only A and C horizons indicating that there has been little change in the original material except some darkening of the surface soil with accumulation of organic matter. Soils that have A, B and C horizons, however, represent a high degree of change in the original soil material.



The A horizon or surface soil in this soil is composed of a dark colored upper part and a light colored leached layer in the lower part. In some soils the A horizon is dark throughout. The B horizon or subsoil has more clay than the A or C horizon because the downward movement of water has transported clay into the B horizon. The C horizon or substratum is water-laid outwash materials that have been partially weathered.

Even if the substratum were similar, the soils above are different and are in different soil series.

Each soil series is named for a geographic feature such as a town, county or stream near the area where it was first described. It then retains the name wherever it occurs.

Some soils within a soil series are similar in all respects except for the texture of the

surface soil. These soils will have a different texture class in the name. Thus, Boyer fine sandy loam and Boyer loamy fine sand are in the same soil series, but the surface soil of the latter contains more sand than that of the Boyer fine sandy loam.

Most upland soils have a wide range of gradients. Many of them range from nearly level to steep. These slope differences influence the hazards of erosion and the limitations for use and management. In soil mapping the soils are separated by slope differences that have a narrow range of hazards and limitations. Thus, soils with gradients of 2 feet to 6 feet per hundred feet are separated from similar soils with gradients of 6 feet to 12 feet per hundred feet. Limitations for both urban and rural use are different for these two ranges of soil slopes. Other factors such as unusual substrata or depth to bedrock affect use and management of soils. Soil separations are generally made and the soils appropriately named to show where these unusual conditions occur.

THE SOIL SYMBOL

NUMERICAL SOIL MAP SYMBOLS

As explained in the introduction the soil within each soil map delineation is identified by a map symbol. The mapping symbol, 360-5-2, for Hochheim silt loam, 5 percent slope, moderately eroded also occurs on some maps as $\frac{360}{5-2}$ or 360. The

5
2

first number in the symbol number 360 indicates the soil type. The numerical listing in this chapter includes all the soils mapped in the Region and are described and interpreted in this report. The second part of the mapping symbol, number 5, indicating slope, will not be used in this report. Instead slope groups will be used. Thus, the number 5 for 5 percent slope will be designated in this report by the letter B for 2 to 6 percent slopes. The third part of the mapping symbol, number 2, indicates the degree of erosion that has occurred.

SLOPE GROUPS

Regular slopes - long slopes in areas that have well defined natural drainage systems

<i>Percent of Slope</i>	<i>Slope Group</i>	<i>Slope Class</i>
0 to 2 percent	A	Nearly level
2 to 6 percent	B	Gently sloping
6 to 12 percent	C	Sloping
12 to 20 percent	D	Moderately steep
20 to 30 percent	E	Steep
30 to 45 percent	F	Very steep

Complex slopes - areas with gradients in many directions and that have no defined natural drainage system

<i>Percent of Slope</i>	<i>Slope Group</i>	<i>Slope Class</i>
0 to 6 percent	M	Gently Undulating
6 to 12 percent	N	Undulating
12 to 20 percent	K	Rolling

DEGREES OF EROSION

- 1 - none to 1/4 of the original surface soil has been removed by erosion.
- 2 - one-fourth to 3/4 of the original surface soil has been removed by erosion.
- 3 - three-fourths of the original surface soil to 1/4 of the subsoil has been removed by erosion.

CONVENTIONAL MAP SYMBOLS

The symbols shown in Figure 3 were used on the soil survey field sheets to indicate various features of the landscape that will aid in understanding the survey and in interpretation of the soils for various uses.

Some of these are soil conditions that occur as areas too small to delineate on the map. Others are man made works and structures and natural features of the landscape that will aid the user in finding specific land areas.

FIGURE 3

CONVENTIONAL MAP SYMBOLS

Works and Structures



Dam



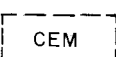
House or other building



Church



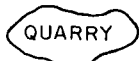
School



Cemetery



Gravel Pit



Quarry



Dump



Ditch or Canal

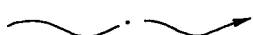
Drainage



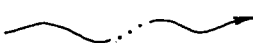
Wet Areas



Spring



Intermittent stream - crossable



Intermittent stream - not crossable



Perennial stream

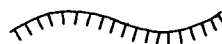


Lake or Pond



Intermittent Pond

Relief



Escarpment



Depressions

Special



Sandy Spot



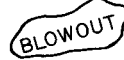
Gravelly Spot



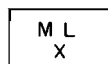
Stony



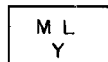
Bedrock Outcrop



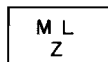
Blowout (severe wind erosion)



Filled areas or made land - sand & gravel



Filled areas or made land - loam

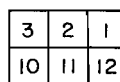


Filled areas or made land - clay



Gully

Boundaries, Marks



Block at edge of photo showing U.S. Public Land Survey sections covered by maps



Land hook - used to tie small areas (too small for mapping symbol) to another like area

THE SOIL LEGEND

SOIL SYMBOL	SOIL NAME	PAGE
1	Rough broken land - - - - -	186
2	Stinson silt loam - - - - -	199
3	Stony colluvium - - - - -	199
4	Marsh - - - - -	148
5	Lawson silt loam - - - - -	141
5W	Sawmill silt loam - - - - -	187
7	Dorchester silt loam - - - - -	84
7W	Lawson silt loam - - - - -	141
10	Alluvial land - - - - -	53
10W	Alluvial land, wet - - - - -	53
11	Alluvial land - - - - -	53
11W	Alluvial land, wet - - - - -	53
11WY	Alluvial land, wet - - - - -	53
12	Wea silt loam - - - - -	219
14	Crestview loamy fine sand; see No. 414 - - - - -	81
15	Hillside seepage - - - - -	108
16	Rome silt loam - - - - -	186
18	Sisson silt loam - - - - -	194
18Y	Sisson silt loam, loam substratum - - - - -	195
19	Sisson fine sandy loam - - - - -	192
21	Hebron loam - - - - -	105
21Y	Hebron loam, loam substratum - - - - -	105
22	Hebron sandy loam - - - - -	105
23	Lawson silt loam - - - - -	141
24	Hebron silt loam - - - - -	106
26	Wauconda fine sandy loam - - - - -	218
27	Wauconda silt loam - - - - -	218
27Z	Wauconda silt loam, clay substratum - - - - -	218
28	Colwood fine sandy loam - - - - -	79
28Z	Colwood fine sandy loam, clay substratum - - - - -	79
29	Colwood silt loam - - - - -	79
29V	Colwood silt loam - - - - -	79
29X	Colwood silt loam, gravelly substratum - - - - -	79
29Z	Colwood silt loam, clay substratum - - - - -	79
30	Colwood silt loam - - - - -	79
31	Rome loam - - - - -	185
32	Rome sandy loam - - - - -	185
33	Sisson fine sandy loam - - - - -	192
33Z	Sisson fine sandy loam, clay substratum - - - - -	193
34	Sisson silt loam - - - - -	194
35	Yahara very fine sandy loam - - - - -	224
35Z	Yahara very fine sandy loam, clay substratum - - - - -	224
36	Yahara silt loam - - - - -	223
37	Kibbie fine sandy loam - - - - -	130
37Z	Kibbie fine sandy loam, clay substratum - - - - -	130
38	Kibbie silt loam - - - - -	131
38R	Kibbie silt loam, rock substratum - - - - -	131
38Z	Kibbie silt loam, clay substratum - - - - -	131
39	Saylesville loam - - - - -	187
39X	Saylesville loam, gravelly substratum - - - - -	188
40	Saylesville silt loam - - - - -	188
40V	Saylesville silt loam, silt & fine sand substratum - - - - -	189
40X	Saylesville silt loam, gravelly substratum - - - - -	189
40Y	Saylesville silt loam, loam substratum - - - - -	189

SOIL SYMBOL	SOIL NAME	PAGE
41	Tichigan silt loam - - - - -	207
42	Tichigan silt loam - - - - -	207
42R	Tichigan silt loam, rock substratum - - - - -	208
42V	Tichigan silt loam, silt & fine sand substratum - - - - -	208
42X	Tichigan silt loam, gravelly substratum - - - - -	208
42Y	Tichigan silt loam, loam substratum - - - - -	208
44	Jericho silt loam - - - - -	121
45	Yahara very fine sandy loam - - - - -	224
45Z	Yahara very fine sandy loam, clay substratum - - - - -	224
46	Yahara silt loam - - - - -	223
47	Yahara loam - - - - -	223
47Z	Yahara loam, clay substratum - - - - -	223
48	Keowns silt loam - - - - -	125
48Z	Keowns silt loam, clay substratum - - - - -	125
49	Keowns fine sandy loam - - - - -	125
49Y	Keowns fine sandy loam, loam substratum - - - - -	125
51	Aztalan loam - - - - -	56
52	Aztalan sandy loam - - - - -	56
53	Aztalan silt loam - - - - -	56
54	Lawson silt loam - - - - -	141
59	Dousman sandy loam; see No. 77 - - - - -	85
59Z	Dousman sandy loam, clay substratum - - - - -	86
60	Dousman loam - - - - -	85
60Z	Dousman loam, clay substratum - - - - -	85
63	Brookston silt loam - - - - -	65
64	Brookston silt loam - - - - -	65
66	Granby fine sandy loam - - - - -	98
67	Granby fine sandy loam - - - - -	98
69	Casco-Fox silt loams - - - - -	74
70	Fox sandy loam - - - - -	94
70V	Fox sandy loam, silt and fine sand substratum - - - - -	96
70Y	Fox sandy loam, loam substratum - - - - -	95
70Z	Fox sandy loam, clay substratum - - - - -	95
71	Casco-Fox loams - - - - -	73
72	Fox loam - - - - -	92
72R	Fox loam, rock substratum - - - - -	94
72V	Fox loam, silt and fine sand substratum - - - - -	94
72Y	Fox loam, loam substratum - - - - -	94
72Z	Fox loam, clay substratum - - - - -	93
73	Fox silt loam - - - - -	93
73R	Fox silt loam, rock substratum - - - - -	97
73V	Fox silt loam, silt and fine sand substratum - - - - -	97
73Y	Fox silt loam, loam substratum - - - - -	97
73Z	Fox silt loam, clay substratum - - - - -	96
75	Rodman gravelly loam - - - - -	182
76	Sebewa silt loam - - - - -	191
76R	Sebewa silt loam, rock substratum - - - - -	191
76V	Sebewa silt loam, silt and fine sand substratum - - - - -	191
76Y	Sebewa silt loam, loam substratum - - - - -	191
76Z	Sebewa silt loam, clay substratum - - - - -	191
77	Dousman sandy loam - - - - -	85
77Z	Dousman sandy loam, clay substratum - - - - -	86
78	Dousman loam - - - - -	85
78V	Dousman loam, silt and fine sand substratum - - - - -	85
78Y	Dousman loam, loam substratum - - - - -	85
79	Waukechon loam - - - - -	218
80	Sebewa loam - - - - -	190
80V	Sebewa loam, silt and fine sand substratum - - - - -	190
80Y	Sebewa loam, loam substratum - - - - -	190

SOIL SYMBOL	SOIL NAME	PAGE
80Z	Sebewa loam, clay substratum - - - - -	190
81	Sebewa sandy loam - - - - -	191
82	Juneau silt loam - - - - -	122
84	Ockley silt loam - - - - -	168
84R	Ockley silt loam, rock substratum - - - - -	169
84V	Ockley silt loam, silt & fine sand substratum - - - - -	169
84Z	Ockley silt loam, clay substratum - - - - -	169
86	Thackery silt loam - - - - -	203
86V	Thackery silt loam, silt & fine sand substratum - - - - -	204
87	Sleeth silt loam - - - - -	196
87Z	Sleeth silt loam, clay substratum - - - - -	197
89	Briggsville silty clay loam - - - - -	63
91	Parr silt loam - - - - -	176
91D	Parr silt loam - - - - -	176
92	Parr loam - - - - -	176
92N	Parr loam - - - - -	176
97	Hackett loamy sand - - - - -	100
99	Kewaunee soils - - - - -	127
100	Kewaunee silt loam - - - - -	127
101	Kewaunee sandy loam - - - - -	127
102	Vilas loamy sand - - - - -	212
103	Kewaunee loam - - - - -	126
106	Lorenzo silt loam - - - - -	143
106Z	Lorenzo silt loam, clay substratum - - - - -	144
108	Lorenzo-Rodman loams - - - - -	144
109	Fabius loam - - - - -	89
109V	Fabius silt loam, silt & fine sand substratum - - - - -	91
109Y	Matherton loam, clay substratum - - - - -	149
109Z	Fabius silt loam, clay substratum - - - - -	90
110	Lorenzo loam - - - - -	142
110R	Knowles silt loam - - - - -	132
110Y	Lorenzo loam, loam substratum - - - - -	143
110Z	Lorenzo loam, clay substratum - - - - -	143
111	Dodge silt loam - - - - -	83
112	Calamus silt loam - - - - -	66
113	Clyman silt loam - - - - -	77
114	Miami silt loam - - - - -	157
116	Celina silt loam - - - - -	77
118	Crosby silt loam - - - - -	82
119	Warsaw silt loam - - - - -	216
119V	Warsaw silt loam, silt & fine sand substratum - - - - -	217
119Y	Warsaw silt loam, loam substratum - - - - -	217
119Z	Warsaw silt loam, clay substratum - - - - -	216
120	Warsaw loam - - - - -	214
120Y	Warsaw loam, loam substratum - - - - -	215
120Z	Warsaw loam, clay substratum - - - - -	215
121	Lorenzo loam (slopes of 0-20%) - - - - -	142
121	Lorenzo-Rodman loams (slopes of 20-30%) - - - - -	145
122	Lorenzo loam - - - - -	142
123	Tippecanoe silt loam - - - - -	209
123V	Tippecanoe silt loam, silt and fine sand substratum - - - - -	209
123Z	Tippecanoe silt loam, clay substratum - - - - -	209
124	Crane silt loam - - - - -	80
125	Knowles silt loam, shallow variant - - - - -	133
126	Westland silt loam - - - - -	220
126V	Westland silt loam, silt and fine sand substratum - - - - -	221
126Y	Westland silt loam, loam substratum - - - - -	220
126Z	Westland silt loam, clay substratum - - - - -	220

SOIL SYMBOL	SOIL NAME	PAGE
133	Spinks fine sand - - - - -	197
134	Spinks loamy fine sand - - - - -	198
142	Manawa silt loam - - - - -	146
144	Matherton loam, clay substratum - - - - -	149
152	Lapeer loam, shallow variant - - - - -	139
153	Lapeer loam - - - - -	137
154	McHenry silt loam - - - - -	153
155	McHenry silt loam - - - - -	153
155Z	McHenry silt loam, clay substratum - - - - -	154
156	Lapeer sandy loam - - - - -	138
156	Lapeer loam, shallow variant - - - - -	140
157	Lapeer sandy loam - - - - -	138
157	Lapeer loam, shallow variant - - - - -	140
160	Hochheim-Sisson-Casco loams - - - - -	114
161	Dodge silt loam - - - - -	83
161R	Dodge silt loam, rock substratum - - - - -	84
165	Poygan silt loam - - - - -	181
170	Casco sandy loam - - - - -	70
170V	Casco sandy loam, silt and fine sand substratum - - - - -	71
170Y	Casco sandy loam, loam substratum - - - - -	71
170Z	Casco sandy loam, clay substratum - - - - -	71
171	Poygan silty clay loam - - - - -	181
172	Casco loam - - - - -	67
172R	Casco loam, rock substratum - - - - -	69
172V	Casco loam, silt and fine sand substratum - - - - -	69
172Y	Casco loam, loam substratum - - - - -	69
172Z	Casco loam, clay substratum - - - - -	68
173	Casco silt loam - - - - -	71
173V	Casco silt loam, silt and fine sand substratum; same as No. 266 - - - - -	194
173Y	Casco silt loam, loam substratum - - - - -	72
173Z	Casco silt loam, clay substratum - - - - -	72
174	Fabius loam - - - - -	89
174R	Fabius loam, rock substratum - - - - -	89
174Z	Fabius loam, clay substratum - - - - -	89
175	Fabius sandy loam - - - - -	90
175Z	Fabius sandy loam, clay substratum - - - - -	90
176	Mussey loam - - - - -	164
176V	Mussey loam - - - - -	164
176Z	Mussey loam, clay substratum - - - - -	164
178	Crosby silt loam - - - - -	82
179	Brookston silt loam - - - - -	65
180	Mussey sandy loam - - - - -	164
181	Mussey silt loam - - - - -	164
181V	Mussey silt loam, silt & fine sand substratum - - - - -	165
181Y	Mussey silt loam, loam substratum - - - - -	165
181Z	Mussey silt loam, clay substratum - - - - -	165
182	Fabius silt loam - - - - -	90
182V	Fabius silt loam, silt and fine sand substratum - - - - -	90
182Y	Fabius silt loam, loam substratum - - - - -	90
182Z	Fabius silt loam, clay substratum - - - - -	90
188	Crosby silt loam - - - - -	82
189	Bristol silt loam - - - - -	64
191	Parr silt loam, shallow variant - - - - -	177
195	Hackett loamy sand - - - - -	100
195V	Hackett loamy sand, silt & fine sand substratum - - - - -	102
195Y	Hackett sandy loam, loam substratum - - - - -	103
195Z	Hebron sandy loam - - - - -	105
203	Matherton loam - - - - -	149

SOIL SYMBOL	SOIL NAME	PAGE
203V	Matherton loam, silt and fine sand substratum - - - - -	150
203Y	Matherton loam, loam substratum - - - - -	150
203Z	Matherton loam, clay substratum - - - - -	149
204	Knowles loam - - - - -	132
206	Knowles silt loam, shallow variant - - - - -	133
208	Knowles silt loam - - - - -	132
212	Ehler silt loam - - - - -	87
212R	Ehler silt loam, rock substratum - - - - -	87
212X	Ehler silt loam, gravelly substratum - - - - -	88
212Y	Ehler silt loam - - - - -	87
213	Ehler silt loam - - - - -	87
213R	Ehler silt loam, rock substratum - - - - -	88
213V	Colwood silt loam - - - - -	79
214	Ehler silt loam - - - - -	87
215	Ehler silt loam - - - - -	87
216	Ehler silt loam - - - - -	87
217	Bono silty clay loam - - - - -	59
218	Bono silty clay loam, thin surface variant - - - - -	59
218V	Bono silty clay loam - - - - -	59
218Y	Bono silty clay loam - - - - -	59
226	Keyser silt loam - - - - -	129
226D	Keyser silt loam - - - - -	129
228	Rollin muck, shallow phase - - - - -	184
231	Brookston silt loam - - - - -	65
231Z	Brookston silt loam, clay substratum - - - - -	66
233	Matherton silt loam - - - - -	150
233V	Matherton silt loam, silt and fine sand substratum - - - - -	151
233Y	Matherton silt loam, loam substratum - - - - -	151
233Z	Matherton silt loam, clay substratum - - - - -	151
234	Matherton sandy loam - - - - -	150
234V	Matherton sandy loam, silt and fine sand substratum - - - - -	150
234Y	Matherton sandy loam, loam substratum - - - - -	150
243	Calamus silt loam - - - - -	66
250	Tedrow sandy loam - - - - -	202
250V	Tedrow sandy loam, silt and fine sand substratum - - - - -	202
250Y	Tedrow sandy loam, loam substratum - - - - -	202
250Z	Tedrow sandy loam, clay substratum - - - - -	202
251	Tedrow loamy sand - - - - -	202
251Y	Tedrow loamy sand, loam substratum - - - - -	202
251Z	Tedrow loamy sand, clay substratum - - - - -	202
254	Tustin sandy loam - - - - -	210
261	Hackett sandy loam, wet variant - - - - -	104
262	Hackett loamy sand, wet variant - - - - -	104
266	Sisson silt loam - - - - -	194
266R	Sisson silt loam, rock substratum - - - - -	195
266X	Sisson silt loam, sand and gravel substratum - - - - -	195
266Z	Sisson silt loam, clay substratum - - - - -	195
267	Sisson fine sandy loam - - - - -	192
268	Sisson loam - - - - -	193
269	Warsaw sandy loam - - - - -	216
270	Hackett sandy loam - - - - -	102
270V	Hackett sandy loam - - - - -	102
271	Hackett loamy sand - - - - -	100
272	Tustin loamy fine sand - - - - -	210
276	Boyer sandy loam - - - - -	61

SOIL SYMBOL	SOIL NAME	PAGE
276Y	Boyer sandy loam, loam substratum	62
276Z	Boyer sandy loam, clay substratum	62
277	Sumner sandy loam	200
277Y	Sumner sandy loam, loam substratum	201
277Z	Sumner sandy loam, clay substratum	201
278	Clyman silt loam	77
279	Boyer sandy loam	61
280	Boyer loamy sand	60
281	Hackett loam	99
282	Casco-Rodman loam	74
283	Mosel sandy loam	162
284	Mosel sandy loam	162
285	Mussey loam	164
286	Mussey silt loam	165
287	Mussey loam	164
288	Hackett loamy sand	100
288V	Hackett loamy sand, silt & fine sand substratum	101
289	Hackett sandy loam	102
289Y	Hackett sandy loam, loam substratum	102
289Z	Hackett sandy loam, clay substratum	102
295	Morley-Beecher silt loam	161
297	Morley silt loam	159
297S	Morley sandy loam	159
297V	Morley silt loam, silt & fine sand substratum	160
297X	Morley silt loam, gravelly substratum	160
297Y	Morley silt loam	159
298	Ashkum silty clay loam	55
299	Blount silt loam	58
300	Ashkum-Beecher silt loam	55
302	Rollin muck	184
303	Alluvial land, rock substratum	53
305	Knowles silt loam	132
306	Knowles silt loam, wet variant	135
307	Knowles silt loam, wet variant	135
308	Knowles silt loam, shallow variant	133
311	Manawa loam	146
314	Sumner loamy sand	200
315	Oshtemo loamy sand	171
316	Boyer loamy sand	60
316Y	Boyer loamy sand, loam substratum	61
316Z	Boyer loamy sand, clay substratum	61
317	Oshtemo loamy fine sand	171
320	Oshtemo sandy loam	171
323	Ionia sandy loam	120
323V	Ionia sandy loam,	120
324	Ionia loam	119
324V	Ionia loam, silt and fine sand substratum	119
324Y	Ionia loam, loam substratum	119
324Z	Ionia loam, clay substratum	119
325	Varna silt loam	211
326	Abington silt loam	51
326Z	Abington silt loam, clay substratum	52
327	Wallkill silt loam	213
328	Pistakee silt loam	180
328Y	Pistakee silt loam	180
330	Navan loam	166
331	Markham-Elliott silt loam	148
332	Kane silt loam	123
332V	Kane silt loam, silt & fine sand substratum	124

SOIL SYMBOL	SOIL NAME	PAGE
332Y	Kane silt loam, loam substratum - - - - -	124
332Z	Kane silt loam, clay substratum - - - - -	124
333	Eagle silt loam (slopes 0-6%) - - - - -	86
333	Warsaw silt loam (slopes over 6%) - - - - -	216
333Y	Warsaw silt loam, loam substratum - - - - -	217
333Z	Warsaw silt loam, clay substratum - - - - -	216
334	Warsaw loam - - - - -	214
335	Ionia silt loam - - - - -	120
335Y	Ionia silt loam, loam substratum - - - - -	121
335Z	Ionia silt loam, clay substratum - - - - -	121
336	Markham silt loam - - - - -	115
338	Ashkum silty clay loam - - - - -	55
339	Abington silty clay loam - - - - -	52
340	Navan silt loam - - - - -	166
343	Celina silt loam (on 0-6% slopes) - - - - -	76
343	Theresa silt loam (over 6% slopes) - - - - -	205
344	Ashford silt loam - - - - -	554
345	Nenno silt loam - - - - -	167
346	Kane loam - - - - -	123
346Y	Kane loam, loam substratum - - - - -	123
346Z	Kane loam, clay substratum - - - - -	123
352	Lapeer loam - - - - -	137
355	Lapeer sandy loam - - - - -	138
356	Lapeer sandy loam - - - - -	138
357	Hochheim loam - - - - -	108
357R	Hochheim loam, rock substratum - - - - -	110
357X	Hochheim loam, gravelly substratum - - - - -	110
358	Miami loam - - - - -	156
359	Hennepin loam - - - - -	107
359	Lapeer loam (slopes of 12 to 30%) - - - - -	138
360	Hochheim silt loam - - - - -	110
360R	Hochheim silt loam, rock substratum - - - - -	111
360V	Hochheim silt loam, silt and fine sand substratum - - - - -	112
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386Z	Granby fine sandy loam, clay substratum - - - - -	98
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SOIL DESCRIPTIONS

The following descriptions of all soils and land types mapped in the Region are arranged alphabetically by the soil series name.

Each description contains a short paragraph in general terms, a description of a representative soil profile for the series, a diagrammatic sketch of the soil profile, the

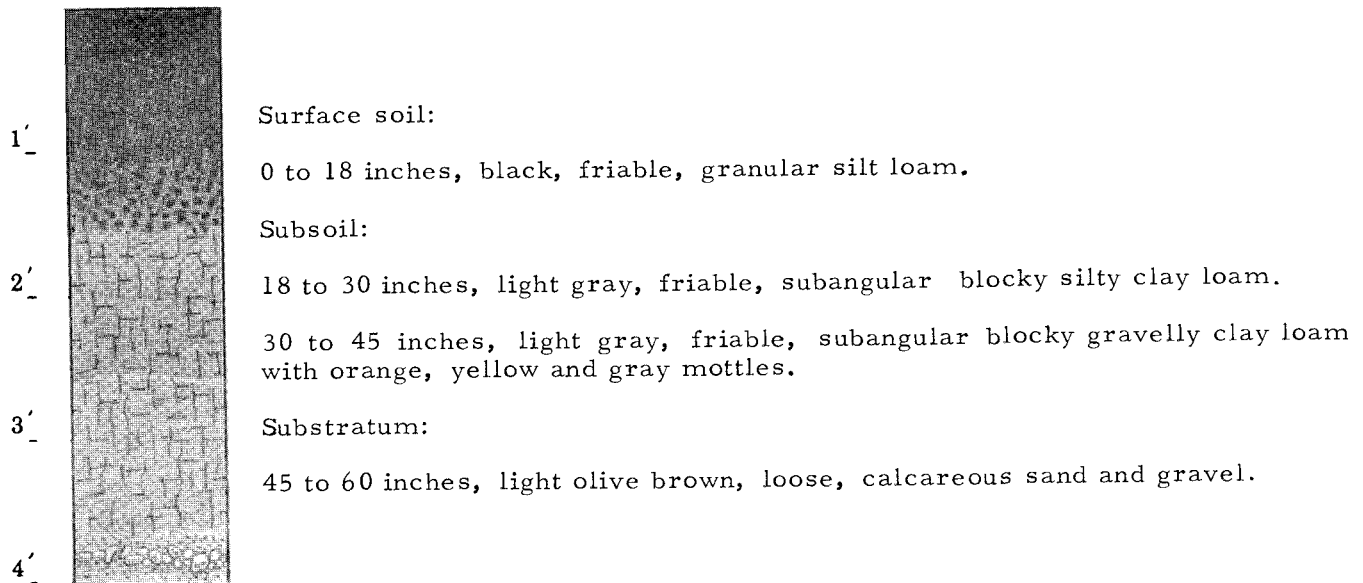
range of characteristics, important soil properties affecting interpretations and descriptions of soil mapping units. Profile sketches were not made for Alluvial land, Beach sand, Marsh, Stony colluvium and Terrace escarpments because of extreme variability of these land types.

ABINGTON SERIES

The very poorly drained, nearly level to gently sloping soils of the Abington series have developed from silty material overlying calcareous sand and gravel. They occupy low depressions on outwash plains

and stream benches.

The following profile description of 326 Abington silt loam, 0 to 2 percent slopes is representative of the series.



Surface soil textures are silt loam and silty clay loam. The thickness of the surface layer ranges from 15 to 20 inches. In some places the lower part of the subsoil is loam.

The soils of this series are subject to ponding or flooding and have a high water table. Sloping areas have a water erosion hazard. The Abington series are good cropland soils when adequately drained.

326-A-1 Abington silt loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Westland and Sebewa soils are included in this mapping unit. (Capability Unit IIw-1;

Woodland Suitability Group 7.)

326-B-1 Abington silt loam, 2 to 6 percent slopes

This soil is similar to 326-A-1 but it has a slight water erosion hazard. Small areas of Westland and Sebewa soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

326-B-2 Abington silt loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 326-A-1 by having a thinner surface soil and a slight water erosion hazard. Small areas of Sebewa and Westland soils are included in this mapping

unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

326Z-A-1 Abington silt loam, clay substratum, 0 to 2 percent slopes

This soil is similar to 326-A-1 but the lower part of the substratum is slowly permeable clay. Small areas of Sebewa and Westland soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability

Group 7.)

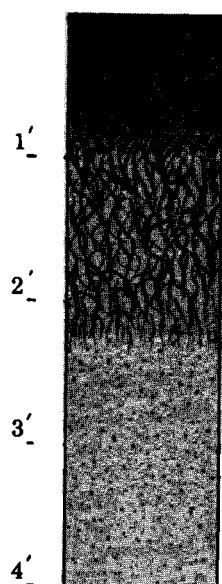
339-A-1 Abington silty clay loam, 0 to 2 percent slopes

This soil differs from 326-A-1 by having a silty clay loam surface soil. Small areas of Sebewa and Westland soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

ADRIAN SERIES

The poorly drained, level to sloping soils of the Adrian series have developed in organic material over loose sands. They occupy shallow glacial lake basins and depressional areas in stream valleys.

The following profile description of 452-A-1 Adrian muck, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 11 inches, black, friable, granular well decomposed muck.

Subsoil:

11 to 26 inches, dark yellowish-brown, partly decomposed peat composed of the roots, stems and leaves of sedges, reeds and grasses.

Substratum:

26 to 60 inches, light gray, loose sand.

The surface texture ranges from muck to muckypeat. The depth to loose sand ranges from 12 to 40 inches. In places the substratum is gravel.

These soils have a severe wetness hazard and sloping areas have an erosion hazard. They are fair cropland soils when adequately drained by open ditches. They are not suitable for tile drainage. They are subject to wind erosion, burning and subsidence hazards when drained and cultivated.

452-A-1 Adrian muck, 0 to 2 percent slopes

The profile description of this soil is a part

of the series description. Small areas of Houghton, Palms and Sebewa soils are included in this mapping unit. (Capability Unit IVw-7; Woodland Suitability Group 10.)

452-B-1 Adrian muck, 2 to 6 percent slopes

This soil is similar to 452-A-1, but it has a slight water erosion hazard. Small areas of Houghton, Palms and Sebewa soils are included in this mapping unit. (Capability Unit IVw-7; Woodland Suitability Group 10.)

452Z-A-1 Adrian muck, clay substratum, 0 to 2 percent slopes

This soil is similar to 452-A-1, but the lower

part of the substratum is slowly permeable clay. Small areas of Houghton and Ogden soils are included in this mapping unit. (Capability IIw-8; Woodland Suitability Group 10.)

453-A-1 Adrian mucky peat, 0 to 2 percent slopes

This soil differs from 452-A-1 by having a mucky peat surface soil. Small areas of Houghton, Palms, and Sebewa soils are included in this mapping unit. (Capability Unit IVw-7; Woodland Suitability Group 10.)

453-B-1 Adrian mucky peat, 2 to 6 percent slopes

This soil differs from 452-A-1 by having a mucky peat surface soil and a slight water erosion hazard. Small areas of Houghton, Palms and Sebewa soils are included in this mapping unit. (Capability Unit IVw-7; Woodland Suitability Group 10.)

453-C-1 Adrian mucky peat, 6 to 12 percent slopes

This soil differs from 452-A-1 by having a mucky peat surface soil and a moderate water erosion hazard. Small areas of Palms, Rollin and Sebewa soils are included in this mapping unit. (Capability Unit IVw-7; Woodland Suitability Group 10.)

ALLUVIAL LAND ¹

These land types are nearly level to gently sloping recent alluvial deposits in the flood plains of rivers and small streams. Generally, they have been transported by water and deposited when the speed of the moving water was reduced. Textures of the surface

soil and the profile below the surface vary from silty clay to gravel. There are some organic deposits mixed with the mineral material. These areas are all subject to some degree of flooding. They receive additional alluvial deposits with each flood.

11-A-1 Alluvial land

These are moderately well to somewhat poorly drained areas of alluvial land. They are generally suitable for cultivation when drained. (Capability Unit IIw-13; Woodland Suitability Group 1.)

10-A-1 Same as 11-A-1

11-B-1 Same as 11-A-1

11-M-1 Same as 11-A-1

303-A-1 Alluvial land, rock substratum

These poorly drained alluvial lands are un-

derlain by dolomite bedrock at depths of about 24 to 60 inches. These areas are frequently flooded. (Capability Unit Vw-14; Woodland Suitability Group 9.)

303-B-1 Same as 303-A-1

11W-A-1 Alluvial land, wet

These poorly drained alluvial lands are frequently flooded. They generally occur in the low parts of the flood plains that are difficult to drain. (Capability Unit Vw-14; Woodland Suitability Group 9.)

10W-A-1 Same as 11W-A-1

11WY-A-1 Same as 11W-A-1

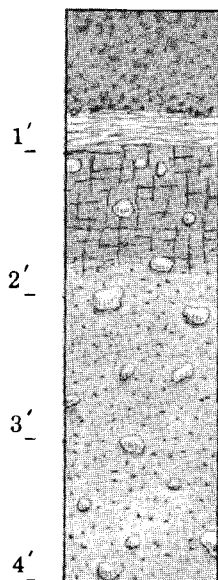
11W-B-1 Same as 11W-A-1

¹ Profile sketches have been omitted because of extreme variability.

ASHFORD SERIES

The moderately well drained, nearly level to sloping soils of the Ashford series have developed in a thin silt layer over calcareous loam till. They occupy footslopes and nearly level ridgetops of glacial upland.

The following profile description of 344-A-1 Ashford silt loam, 0 to 2 percent slopes, is representative of the series



Surface soil:

0 to 8 inches, dark grayish-brown, friable, moderate granular silt loam.

8 to 11 inches, grayish-brown, friable, weak platy silt loam.

Subsoil:

11 to 18 inches, dark brown, firm, subangular blocky clay loam.

18 to 20 inches, dark brown, firm, subangular blocky heavy loam with yellow and gray mottles.

Substratum:

20 to 60 inches, yellowish-brown, friable, massive loam glacial till high in limestone content.

The silt layer of these soils is less than 12 inches thick. Depth to the substratum ranges from 12 to 20 inches. The glacial till ranges in texture from loam to sandy loam and in places contains pockets and lenses of silt and sand.

The soils of this series have a water erosion hazard on sloping areas. They are good cropland soils on lower slopes.

344-A-1 Ashford silt loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Hochheim and Mayville soils are included in this mapping unit. (Capability Unit I; Woodland Suitability Group 5.)

344-B-1 Ashford silt loam, 2 to 6 percent slopes

This soil is similar to 344-A-1, but it has a slight water erosion hazard. Small areas of Hochheim and Mayville soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 5.)

344-B-2 Ashford silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 344-A-1, but it has a thinner, lighter colored surface soil and a slight water erosion hazard. Small areas of Hochheim and Mayville soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 5.)

344-C-1 Ashford silt loam, 6 to 12 percent slopes

This soil is similar to 344-A-1, but it has a moderate water erosion hazard. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 5.)

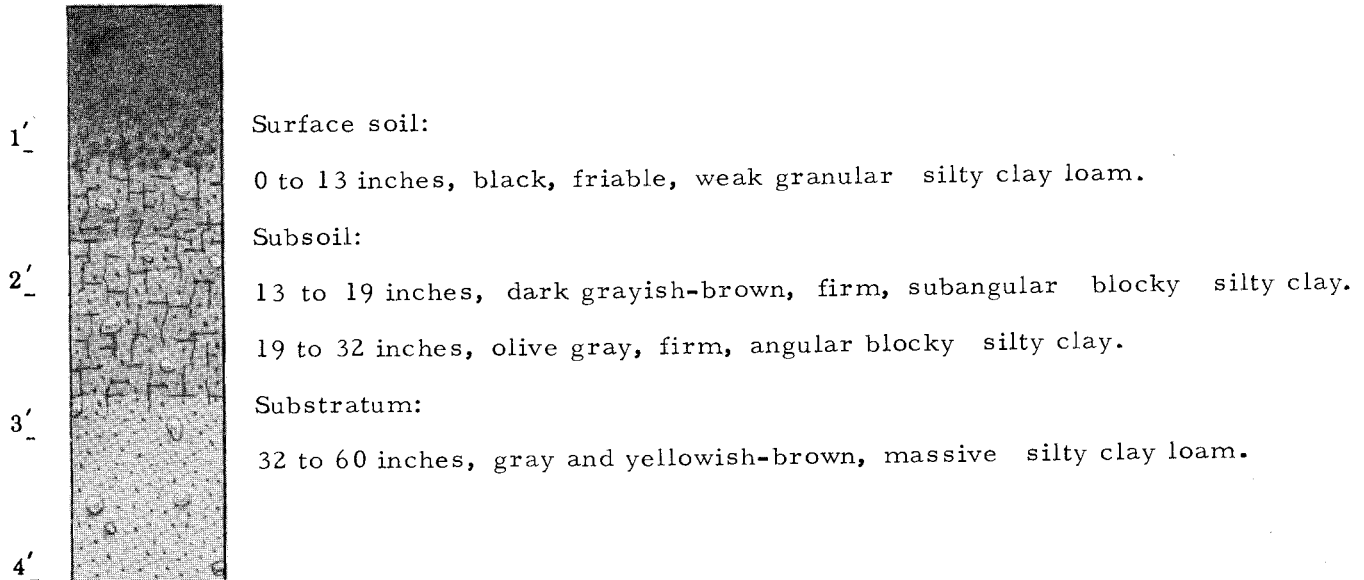
344-C-2 Ashford silt loam, 6 to 12 percent slopes, moderately eroded

This soil is similar to 344-A-1, but it has a thinner, lighter colored grayish-brown surface soil. It has a moderate water erosion hazard. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 5.)

ASHKUM SERIES

The poorly drained, nearly level to sloping soils of the Ashkum series have developed in silty clay loam till. They occupy drainage-ways and depressions of glacial till plains.

The following profile description of 298-A-1 Ashkum silty clay loam, 0 to 2 percent slopes, is representative of the series.



Surface soil textures are silt loam and silty clay loam. The texture of the substratum ranges from clay loam to silty clay.

The soils of this series are subject to flooding or ponding and have a high water table. They are slowly permeable. Sloping areas have a water erosion hazard. The Ashkum series are good cropland soils when adequately drained.

298-A-1 Ashkum silty clay loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Blount and Ehler soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

338-A-1 Same as 298-A-1

398-A-1 Same as 298-A-1

298-B-1 Ashkum silty clay loam, 2 to 6 percent slopes

This soil differs from 398-A-1 by having a slight water erosion hazard. Small areas

of Blount and Ehler soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

338-B-1 Same as 298-B-1

398-B-1 Same as 298-B-1

298-C-1 Ashkum silty clay loam, 6 to 12 percent slopes

This soil differs from 398-A-1 by having a moderate water erosion hazard. Small areas of Blount soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

300-A-1 Ashkum-Beecher silt loam, 0 to 2 percent slopes

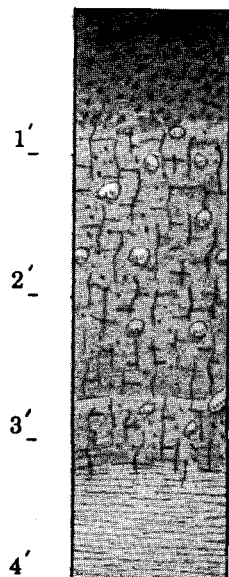
This mapping unit consists mainly of Ashkum, but it contains 15 to 50 percent Beecher. These soils are intermingled in such a pattern that they cannot be mapped separately. Small areas of Blount soils are included in this mapping unit. (Capability Unit, Ashkum IIw-1; Beecher IIw-2; Woodland Suitability Group, Ashkum 7; Beecher 7.)

AZTALAN SERIES

The somewhat poorly drained, nearly level to sloping soils of the Aztalan series have developed in thin outwash deposits over calcareous lacustrine silt and clay. They occupy drainageways and depressions of gla-

cial lake basins and river terraces.

The following profile description of 51-A-1 Aztalan loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 9 inches, black, friable, weak granular loam.

Subsoil:

9 to 32 inches, brown, friable, subangular blocky loam with yellow and gray mottles.

32 to 38 inches, brown, firm, subangular blocky silty clay loam with yellow and gray mottles.

Substratum:

38 to 60 inches, brown, massive, stratified silt and clay with gray mottles.

Surface soil textures are loam, silt loam and sandy loam. The outwash deposits range in thickness from 12 to 36 inches and the subsoil varies from loam to silty clay loam. In places the substratum contains lenses of sand, gravel and silt.

The Aztalan soils are subject to water ponding on the surface and the substratum is slowly permeable. They have a seasonal high water table. Sloping areas are subject to a water erosion hazard. They are good cropland soils when drained.

51-A-1 Aztalan loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Mosel, Tichigan and Kane soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 12.)

51-B-1 Aztalan loam, 2 to 6 percent slopes

This soil is similar to 51-A-1, but it has a slight water erosion hazard. Small areas of Mosel, Tichigan and Kane soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 12.)

51-B-2 Aztalan loam, 2 to 6 percent slopes, moderately eroded.

This soil is similar to 51-A-1, but it has a thinner, lighter colored dark brown surface soil. It has a slight water erosion hazard. Small areas of Mosel, Tichigan and Kane soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 12.)

52-A-1 Aztalan sandy loam, 0 to 2 percent slopes

This soil differs from 51-A-1 by having a sandy loam surface soil and a slightly higher sand and gravel content in the subsoil. Small areas of Mosel and Matherton soils are included in this mapping unit. (Capability Unit IIIw-6; Woodland Suitability Group 12.)

52-B-1 Aztalan sandy loam, 2 to 6 percent slopes

This soil differs from 51-A-1 by having a sandy loam surface soil, a higher sand and gravel content in the subsoil and a slight water erosion hazard. Small areas of Mosel and Matherton soils are included in this mapping unit. (Capability Unit IIIw-6; Woodland Suitability Group 12.)

53-A-1 Aztalan silt loam, 0 to 2 percent slopes

This soil differs from 51-A-1 by having a silt loam surface soil. Small areas of Mosel, Tichigan and Kane soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 12.)

53-B-1 Aztalan silt loam, 2 to 6 percent slopes

This soil differs from 51-A-1 by having a silt loam surface soil and a slight water erosion hazard. Small areas of Mosel, Kane and Tichigan soils are included in this map-

ping unit. (Capability Unit IIw-2; Woodland Suitability Group 12.)

53-C-1 Aztalan silt loam, 6 to 12 percent slopes

This soil differs from 51-A-1 by having a silt loam surface soil and a moderate water erosion hazard. Small areas of Mosel, Kane and Tichigan soils are included in this mapping unit. (Capability Unit IIIe-8; Woodland Suitability Group 12.)

BEACH SAND ¹

This land type consists of light gray and very pale brown sand deposited by water. It is a gently sloping long narrow strip of land bordering Lake Michigan. The width of this strip ranges from 100 to 300 feet. Part of it is continually being washed by wave action.

The sand is slightly acid in reaction and is unproductive. Areas not within the wave action are drouthy and susceptible to wind

erosion.

These areas are used mainly for recreation and wildlife.

419-B-1 Beach sand

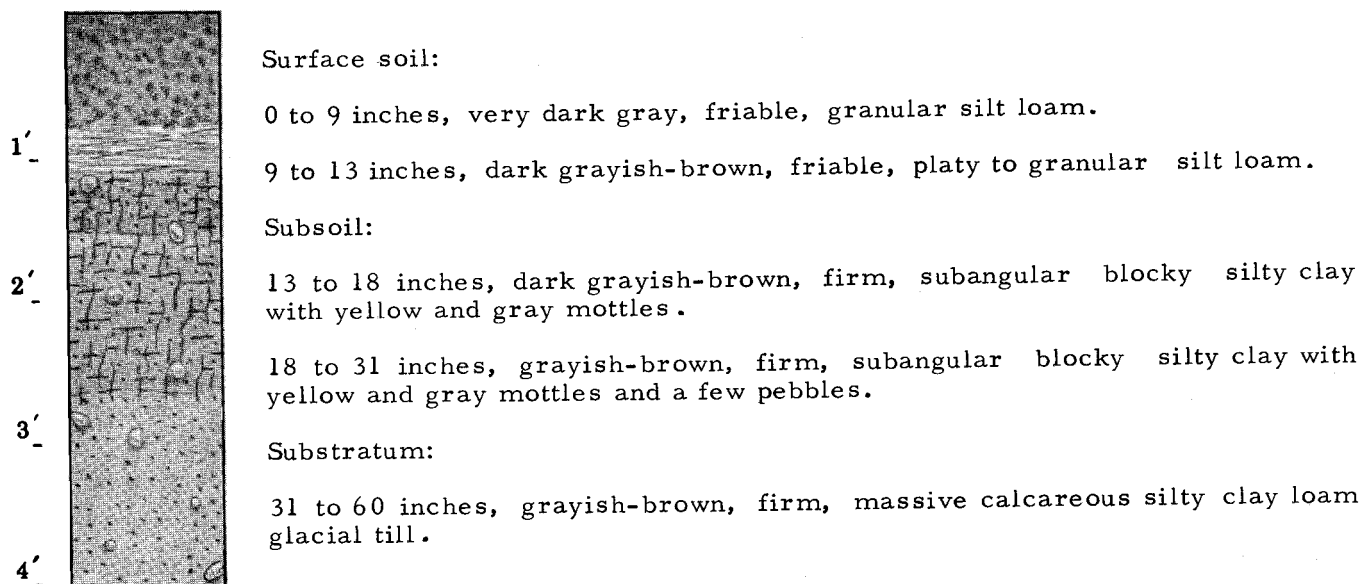
This is the only mapping unit in Beach sand land type. (Capability Unit VIIIs-10; Woodland Suitability Group 11.)

BEECHER SERIES

The somewhat poorly drained, nearly level to gently sloping soils of the Beecher series have developed in calcareous silty clay loam till. They occupy concave slopes of drainageways and slight depressional areas of

glacial uplands.

The following profile description of 3361-B-1 Beecher silt loam, 2 to 6 percent slopes, is representative of the series.



¹ Profile sketches have been omitted because of extreme variability.

The surface soil is very dark gray and very dark grayish-brown. The substratum contains pockets and lenses of sand and silt in some places.

Beecher soils are subject to water ponding for short periods and are slowly permeable. They are good cropland soils when drained.

3361-A-1 Beecher silt loam, 0 to 2 percent slopes

This soil is similar to 3361-B-1, but it does not have a water erosion hazard. Small areas of Markham, Blount, Elliott and Ash-

kum soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

3361-B-1 Beecher silt loam, 2 to 6 percent slopes

The profile description of this soil is a part of the series description. It has a slight water erosion hazard. Small areas of Markham, Blount, and Elliott soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

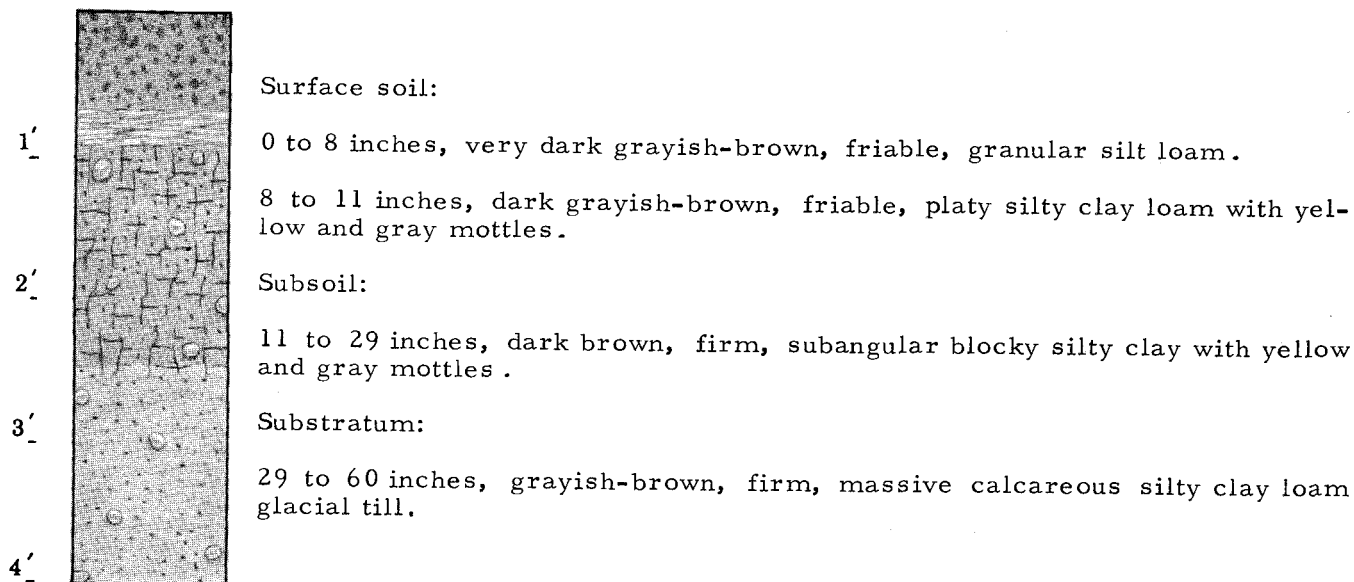
3361-M-1 Same as 3361-B-1

BLOUNT SERIES

The somewhat poorly drained, nearly level to gently sloping soils of the Blount series have developed in a thin silt layer over calcareous silty clay loam till. They occupy depressions, drainage ways and concave

slopes of glacial uplands.

The following profile description of 299-A-1 Blount silt loam, 0 to 2 percent slopes, is representative of the series.



The silt layer of these soils ranges from 6 to 18 inches thick. The substratum contains a few large boulders, limestone and shale fragments and in places, lenses of sand and silt.

The Blount soils are subject to water ponding for short periods and have slow permeability. They have a seasonal high water table. Sloping areas have a water erosion hazard. These are good cropland soils when adequately drained.

299-A-1 Blount silt loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Morley, Ashkum and Hahns soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

299-B-1 Blount silt loam, 2 to 6 percent slopes

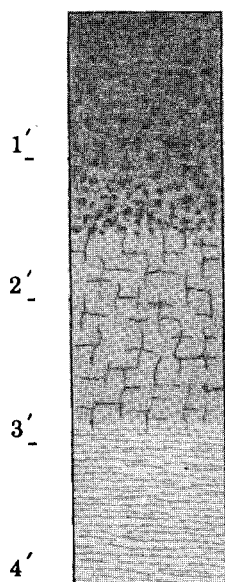
This soil is similar to 299-A-1 but has a slight water erosion hazard. Small areas of Morley, Ashkum and Hahns soils are in-

cluded in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

BONO SERIES

The very poorly drained, nearly level soils of the Bono series have developed in calcareous lacustrine clay with thin silt seams. They occupy depressions and broad nearly level areas of glacial lake basins and river benches.

The following profile description of 217-A-1 Bono silty clay loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 18 inches, black, firm, granular silty clay loam.

Subsoil:

18 to 34 inches, grayish-brown, very firm, angular blocky silty clay with brown and yellow mottles.

Substratum:

34 to 60 inches, gray, firm, massive calcareous silty clay with brown and yellow mottles and thin seams of silt.

The surface layer ranges from 15 to 20 inches thick. In places, the substratum contains layers of fine sand and coarse silt.

Bono soils are subject to water ponding for moderate periods, are slowly permeable and have a high water table. Sloping areas have a water erosion hazard. They are good cropland soils when adequately drained.

217-A-1 Bono silty clay loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Ehler soils are included in this mapping unit. (Capability Unit IIIw-1; Woodland Suitability Group 7.)

218V-A-1 Same as 217-A-1

218Y-A-1 Same as 217-A-1

217-B-1 Bono silty clay loam, 2 to 6 percent slopes

This soil is similar to 217-A-1, but it has a slight water erosion hazard. Small areas of Ehler soils are included in this mapping unit. (Capability Unit IIIw-1; Woodland Suitability Group 7.)

218-A-1 Bono silty clay loam, thin surface variant, 0 to 2 percent slopes

This soil differs from 217-A-1 in having a thinner surface soil generally 8 to 15 inches thick. Small areas of Ehler soils are included in this mapping unit. (Capability Unit IIIw-1; Woodland Suitability Group 7.)

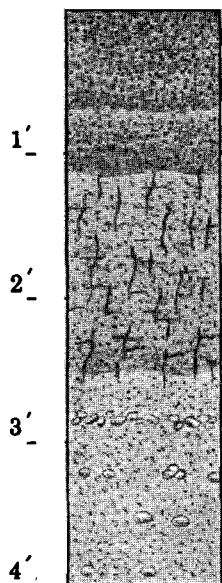
218-B-1 Bono silty clay loam, thin surface variant, 2 to 6 percent slopes

This soil differs from 217-A-1 in having a thinner surface soil and a slight erosion hazard. Small areas of Ehler soils are included in this mapping unit. (Capability Unit IIIw-1; Woodland Suitability Group 7.)

BOYER SERIES

The somewhat excessively to well drained nearly level to steep soils of the Boyer series have developed in loamy to sandy material over calcareous sand and gravel. They occupy glacial outwash plains and terraces.

The following profile description of 276-B-1 Boyer sandy loam, 2 to 6 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, dark grayish-brown, friable, granular sandy loam.

8 to 13 inches, brown, very friable, granular loamy sand.

Subsoil:

13 to 30 inches, dark brown, very friable, subangular blocky sandy loam.

Substratum:

30 to 60 inches, brown, loose calcareous outwash sand and gravel.

Surface soil textures are sandy loam and loamy sand. These soils range from 20 to 40 inches in depth. The subsoil ranges from sandy loam to sandy clay loam.

Boyer soils are drouthy and have low natural fertility. They are subject to wind erosion and sloping areas have a water erosion hazard. They are fair cropland soils on lower slopes.

316-A-1 Boyer loamy sand, 0 to 2 percent slopes

This nearly level soil differs from 276-B-1 by having no water erosion hazard and a loamy sand surface soil. Small areas of Oshtemo soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

280-A-1 Same as 316-A-1

316-B-1 Boyer loamy sand, 2 to 6 percent slopes

This soil differs from 276-B-1 by having a loamy sand surface soil. Small areas of Oshtemo soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

280-B-1 Same as 316-B-1

316-M-1 Same as 316-B-1

316-B-2 Boyer loamy sand, 2 to 6 percent slopes, moderately eroded

This soil differs from 276-B-1 by having a thinner, lighter colored grayish-brown loamy sand surface soil. Small areas of Oshtemo soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

316-M-2 Same as 316-B-2

316-C-1 Boyer loamy sand, 6 to 12 percent slopes

This soil differs from 276-B-1 by having a loamy sand surface soil. This sloping soil has a moderate water erosion hazard. Small areas of Oshtemo soils are included in this mapping unit. (Capability Unit IVe-9; Woodland Suitability Group 4.)

316-C-2 Boyer loamy sand, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 276-B-1 by having a thinner, lighter colored grayish-

brown loamy sand surface soil. It has a moderate water erosion hazard. Small areas of Oshtemo soils are included in this mapping unit. (Capability Unit IVe-9; Woodland Suitability Group 4.)

316-N-2 Same as 316-C-2

316-D-1 Boyer loamy sand, 12 to 20 percent slopes

This moderately steep soil differs from 276-B-1 by having a loamy sand surface soil and a severe water erosion hazard. Small areas of Oshtemo soils are included in this mapping unit. (Capability Unit VIe-9; Woodland Suitability Group 4.)

316-D-2 Boyer loamy sand, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 276-B-1 by having a thinner, lighter colored grayish-brown loamy sand surface soil. It has a severe water erosion hazard. Small areas of Oshtemo soils are included in this mapping unit. (Capability Unit VIe-9; Woodland Suitability Group 4.)

316-D-3 Boyer loamy sand, 12 to 20 percent slopes, severely eroded

This moderately steep soil differs from 276-B-1 by having a very thin brown loamy sand to sandy clay loam surface soil. It has a severe water erosion hazard. Small areas of Oshtemo soils are included in this mapping unit. (Capability Unit VIIe-9; Woodland Suitability Group 4.)

316Z-A-1 Boyer loamy sand, clay substratum, 0 to 2 percent slopes

This nearly level soil differs from 276-B-1 by having loamy sand surface soil. The lower part of the substratum is slowly permeable clay. It does not have a water erosion hazard. Small areas of Oshtemo soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 3.)

316Y-B-1 Boyer loamy sand, loam substratum, 2 to 6 percent slopes

This soil differs from 276-B-1 by having a loamy sand surface soil. The lower part of the underlying material is loam. Small areas of Oshtemo soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 3.)

276-A-1 Boyer sandy loam, 0 to 2 percent slopes

This nearly level soil is similar to 276-B-1, but it has no water erosion hazard. Small areas of Oshtemo and Fox soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 3.)

279-A-1 Same as 276-A-1

276-B-1 Boyer sandy loam, 2 to 6 percent slopes

The profile description of this soil is a part of the series description. The soil has a slight water erosion hazard. Small areas of Oshtemo and Fox soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 3.)

276-M-1 Same as 276-B-1

279-B-1 Same as 276-B-1

276-B-2 Boyer sandy loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 276-B-1, but it has a thinner lighter colored grayish-brown surface soil. Small areas of Oshtemo and Fox soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 3.)

276-C-1 Boyer sandy loam, 6 to 12 percent slopes

This sloping soil is similar to 276-B-1 but has a moderate water erosion hazard. Small areas of Fox and Oshtemo soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 2.)

276-C-2 Boyer sandy loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 276-B-1 by having a thinner lighter colored grayish-brown surface soil. It has a moderate water erosion hazard. Small areas of Oshtemo and Fox soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 3.)

276-D-1 Boyer sandy loam, 12 to 20 percent slopes

This moderately steep soil is similar to 276-B-1, but it has a severe erosion water hazard. Small areas of Oshtemo and Fox soils

are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 3.)

276-D-2 Boyer sandy loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 276-B-1 by having a thinner, lighter colored grayish-brown surface soil. It has a severe water erosion hazard. Small areas of Oshtemo and Fox soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 3.)

276Z-B-1 Boyer sandy loam, clay substratum, 2 to 6 percent slopes

This soil is similar to 276-B-1, but the lower part of the substratum is slowly permeable clay. Small areas of Oshtemo and Fox soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 3.)

276Y-B-1 Boyer sandy loam, loam substratum, 2 to 6 percent slopes

This soil is similar to 276-B-1, but the lower part of the substratum is loam. Small areas of Oshtemo and Fox soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 3.)

276Y-B-2 Boyer sandy loam, loam substratum, 2 to 6 percent slopes, moderately eroded

This soil is similar to 276-B-1, but it has a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is loam. Small areas of Oshtemo and Fox soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 3.)

276Y-C-1 Boyer sandy loam, loam substratum, 6 to 12 percent slopes

This sloping soil is similar to 276-B-1, but the lower part of the substratum is loam. It has a moderate water erosion hazard. Small areas of Oshtemo and Fox soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 3.)

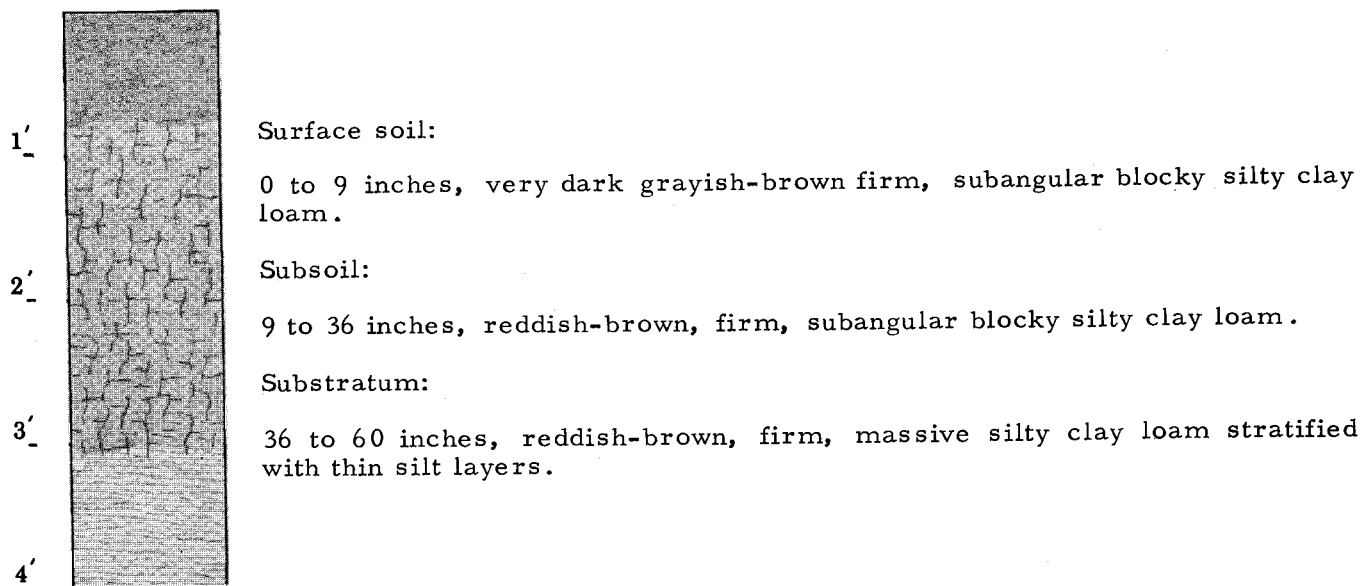
276Y-C-2 Boyer sandy loam, loam substratum, 6 to 12 percent slopes, moderately eroded.

This sloping soil differs from 276-B-1 by having a moderate water erosion hazard and in having a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is loam. Small areas of Oshtemo and Fox soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 3.)

BRIGGSVILLE SERIES

The well drained, nearly level soils of the Briggsville series have developed in reddish lake-laid lacustrine silt and clay. They occupy old glacial lake basins.

The following profile description of 89-A-1 Briggsville silty clay loam 0 to 2 percent slopes, is representative of the series.



These soils range in depth from 20 to 40 inches. These soils have a slow permeability and they are good cropland soils.

89-A-1 Briggsville silty clay loam, 0 to 2 percent slopes

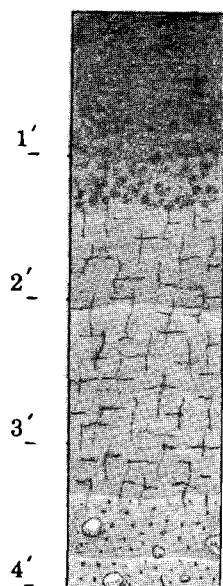
The profile description of this soil is a part of the series description. Small areas of Kewaunee and Manawa are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 2.)

BRISTOL SERIES

The somewhat poorly drained, nearly level to gently sloping soils of the Bristol series have developed in a thick silt layer overlying calcareous loam glacial till. They occupy flats, slight depression and drain-

ageways of glacial uplands.

The following profile description of 189-A-1 Bristol silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 16 inches, black, friable, granular silt loam.

Subsoil:

16 to 24 inches, dark grayish-brown, friable, subangular blocky heavy silt loam with few yellowish-brown mottles.

24 to 40 inches, dark brown, friable, subangular blocky silt clay loam with many yellowish-brown mottles.

40 to 45 inches, brown, firm, subangular blocky clay loam with yellowish-brown mottles.

Substratum:

45 to 60 inches, yellowish-brown, friable, massive loam till.

The silt mantle on this soil ranges from 36 to 50 inches thick. The substratum ranges from loam to sandy loam in texture and contains many limestone fragments.

Bristol soils are subject to occasional ponding and overflow. They are good cropland soils when adequately drained.

189-A-1 Bristol silt loam, 0 to 2 percent slopes

The profile description of this soil is a part

of the series description. Small areas of Ehler soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 12.)

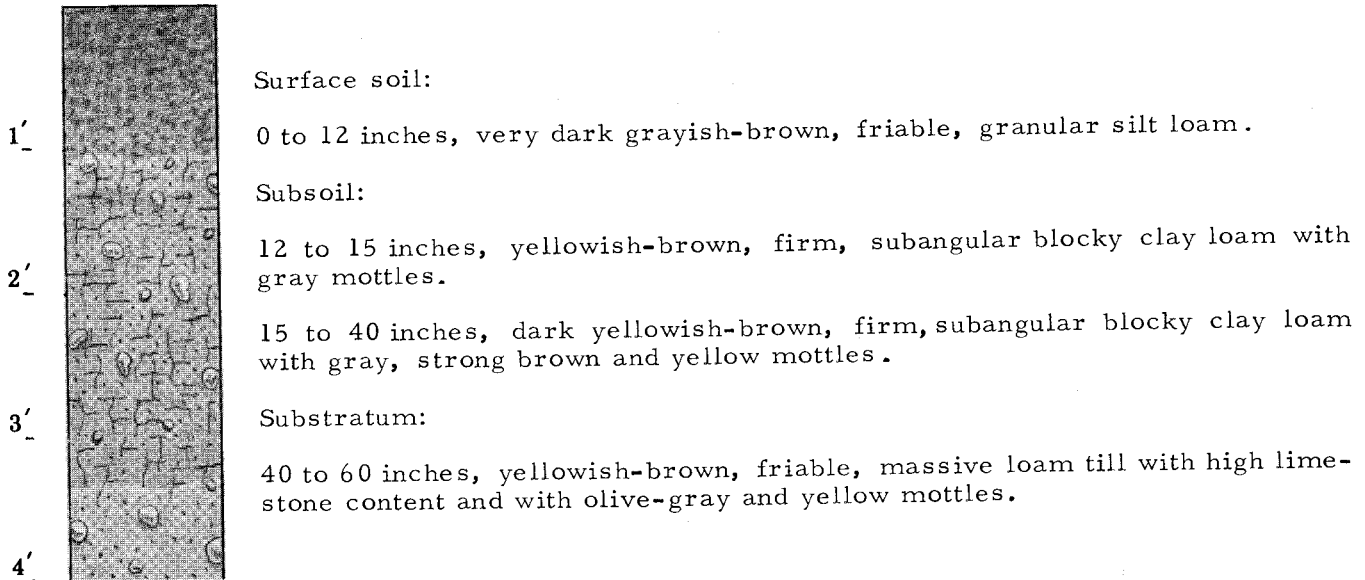
189-B-1 Bristol silt loam, 2 to 6 percent slopes

This soil is similar to 189-A-1, but it has a slight water erosion hazard. Small areas of Keyser, Waupun and Ehler soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 12.)

BROOKSTON SERIES

The poorly drained, nearly level to sloping soils of the Brookston series have developed in calcareous loam till. They occupy broad depressed flats and drainageways of till plains.

The following profile description of 231-A-1 Brookston silt loam, 0 to 2 percent slopes, is representative of the series.



The surface soil of the Brookston soils varies from 8 to 15 inches in thickness. The substratum contains pockets and lenses of sand and silt in places.

These Brookston soils are subject to ponding and have a fluctuating water table. Sloping areas have a water erosion hazard. They are good cropland soils when adequately drained.

231-A-1 Brookston silt loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Lamartine and Sebewa soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

63-A-1 Same as 231-A-1

64-A-1 Same as 231-A-1

179-A-1 Same as 231-A-1

231-B-1 Brookston silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to 231-A-1, but it has a slight water erosion hazard.

Small areas of Lamartine and Sebewa soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

231-M-1 Same as 231-B-1

63-B-1 Same as 231-B-1

64-B-1 Same as 231-B-1

179-B-1 Same as 231-B-1

231-B-2 Brookston silt loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 231-A-1 by having a thinner, lighter colored dark grayish-brown surface soil. It has a slight water erosion hazard. Small areas of Lamartine soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

179-B-2 Same as 231-B-2

231-C-1 Brookston silt loam, 6 to 12 percent slopes

This sloping soil is similar to 231-A-1 but has a moderate water erosion hazard. Small areas of Lamartine soils are included in this

mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

63-C-1 Same as 231-C-1

179-C-1 Same as 231-C-1

231-C-2 Brookston silt loam, 6 to 12 percent slopes, moderately eroded

This soil differs from 231-A-1 by having a thinner, lighter colored dark grayish-brown surface soil. It has a moderate water erosion hazard. Small areas of Lamartine soils

are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

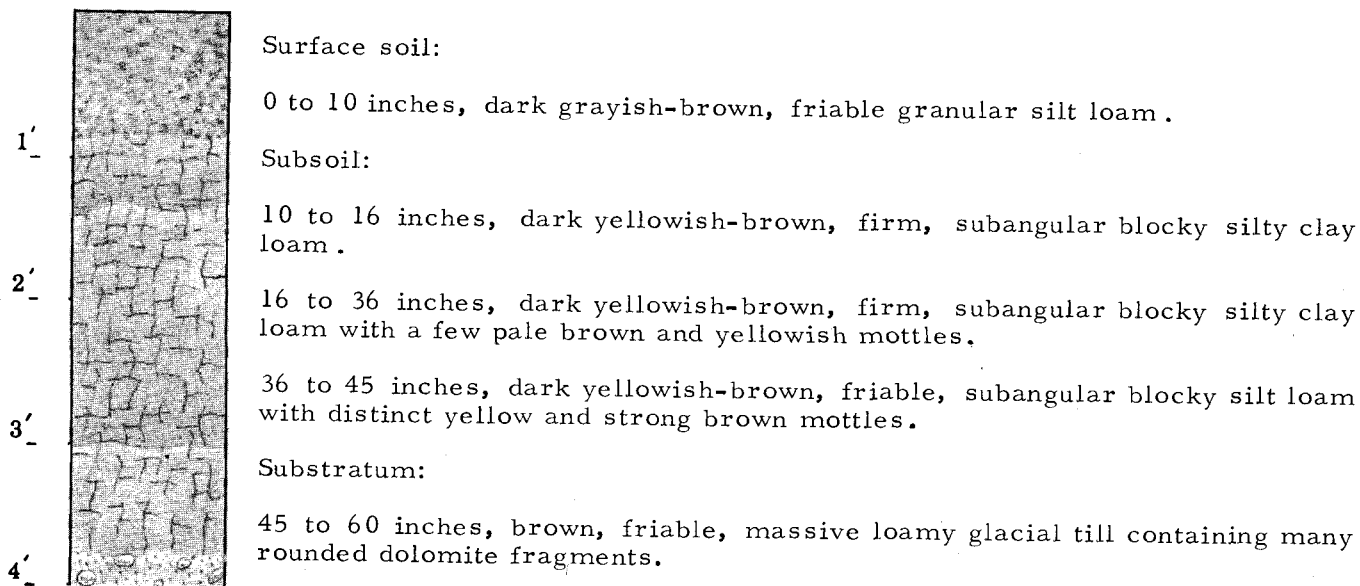
231Z-A-1 Brookston silt loam, clay substratum, 0 to 2 percent slopes

This soil differs from 231-A-1 in having a slowly permeable clay layer in the lower part of the substratum. Small areas of Lamartine soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

CALAMUS SERIES

The moderately well drained, nearly level to gently sloping soils of the Calamus series have developed in a thick silt mantle over calcareous till. They occupy flats and concave footslopes of the glacial uplands.

The following profile description of 243-A-1 Calamus silt loam, 0 to 2 percent slopes, is representative of the series.



The surface soil ranges from 8 to 14 inches in thickness. The depth at which mottling occurs ranges from 18 to 30 inches. The underlying material varies from gravelly loam to sandy loam and in places has thin lenses of sand.

Calamus soils have a water erosion hazard on sloping areas. They are good cropland soils on lower slopes.

243-A-1 Calamus silt loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Clyman and Juneau soils are included in this mapping unit. (Capability Unit I; Woodland Suitability Group 1.)

112-A-1 Same as 243-A-1

243-B-1 Calamus silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to 243-A-1, but it has a slight water erosion hazard.

Small areas of Juneau soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

112-B-1 Same as 243-B-1

243-M-1 Same as 243-B-1

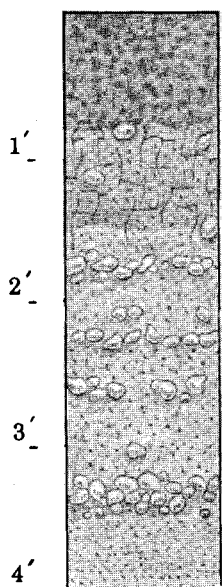
243-C-1 Calamus silt loam, 6 to 12 percent slopes

This sloping soil is similar to 243-A-1 but has a moderate water erosion hazard. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

CASCO SERIES ✓

The well drained, nearly level to very steep soils of the Casco series have developed in thin loamy material over calcareous sands and gravel. They occupy glacial outwash plains and terraces.

The following profile description of Casco silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 9 inches, dark grayish-brown, friable, granular silt loam.

Subsoil:

9 to 18 inches, dark brown, friable, subangular blocky silty clay loam.

Substratum:

18 to 60 inches, pale brown, loose calcareous outwash sand and gravel.

Surface soil textures are silt loam, loam and sandy loam. The depth of these soils ranges from 12 to 20 inches. The sandy loam type has a sandy loam to sandy clay loam subsoil. Soils in the mapping units of Casco-Fox and Casco-Rodman complexes are so intermingled that they cannot be separated.

The Casco soils have a water erosion hazard on sloping areas. They have a low available moisture capacity making them drouthy during dry periods. The nearly level to sloping Casco soils are good to fair for cropland.

172-A-1 Casco loam, 0 to 2 percent slopes

This soil differs from 173-A-1 by having a loam surface soil. Small areas of Fox, Lorenzo and Fabius soils are included in this mapping unit. (Capability Unit IIIs-2;

Woodland Suitability Group 5.)

172-B-1 Casco loam, 2 to 6 percent slopes

This gently sloping soil differs from 173-A-1 by having a loam surface soil and a slight water erosion hazard. Small areas of Fox, Lorenzo and Fabius soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 5.)

172-B-2 Casco loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 173-A-1 by having a thinner, lighter colored grayish-brown loam surface soil. It has a slight water erosion hazard. Small areas of Fox, Lorenzo and Fabius soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 5.)

172-M-2 Same as 172-B-2

172-C-1 Casco loam, 6 to 12 percent slopes

This sloping soil differs from 173-A-1 by having a loam surface soil and a moderate water erosion hazard. Small areas of Fox and Rodman soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 5.)

172-N-1 Same as 172-C-1

172-C-2 Casco loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 173-A-1 by having a thinner, lighter colored grayish-brown loam surface soil. It has a moderate water erosion hazard. Small areas of Fox and Rodman soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 5.)

172-N-2 Same as 172-C-2

172-D-1 Casco loam, 12 to 20 percent slopes

This moderately steep soil differs from 173-A-1 by having a loam surface soil and a severe water erosion hazard. Small areas of Fox and Rodman soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 5.)

172-K-1 Same as 172-D-1

172-D-2 Casco loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 173-A-1 by having a thinner, lighter colored grayish-brown loam surface soil and a severe water erosion hazard. Small areas of Rodman soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 5.)

172-K-2 Same as 172-D-2

172-E-1 Casco loam, 20 to 30 percent slopes

This steep soil differs from 173-A-1 by having a loam surface soil and a very severe water erosion hazard. Small areas of Rodman soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 5.)

172-E-2 Casco loam, 20 to 30 percent

slopes, moderately eroded

This soil differs from 173-A-1 by having a thinner, lighter colored grayish-brown loam surface soil. It has a very severe water erosion hazard. Small areas of Rodman soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 5.)

172-F-1 Casco loam, 30 to 45 percent slopes

This very steep soil differs from 173-A-1 by having a loam surface. It has a very severe water erosion hazard. Small areas of Rodman soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 5.)

172-F-2 Casco loam, 30 to 45 percent slopes, moderately eroded

This very steep soil differs from 173-A-1 by having a grayish-brown loam surface that is 3 to 7 inches thick. It has a very severe water erosion hazard. Small areas of Rodman soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 5.)

172Z-A-1 Casco loam, clay substratum, 0 to 2 percent slopes

This soil differs from 173-A-1 by having a loam surface soil. The lower part of the substratum is slowly permeable clay. Small areas of Fox and Fabius soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

172Z-B-1 Casco loam, clay substratum, 2 to 6 percent slopes

This gently sloping soil differs from 173-A-1 by having a loam surface soil. The lower part of the substratum is slowly permeable clay. It has a slight water erosion hazard. Small areas of Fox and Fabius soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

172Z-B-2 Casco loam, clay substratum, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 173-A-1 by having a thinner, lighter colored grayish-brown loam surface soil. The lower part of the substratum is slowly permeable clay. It has a slight water erosion hazard. Small areas of Fox and Fabius soils are included

in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

172Y-A-1 Casco loam, loam substratum, 0 to 2 percent slopes

This soil differs from 173-A-1 by having a loam surface soil. The lower part of the substratum is loam. Small areas of Fox and Fabius soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

172Y-B-1 Casco loam, loam substratum, 2 to 6 percent slopes

This gently sloping soil differs from 173-A-1 by having a loam surface soil. The lower part of the substratum is loam. It has a slight water erosion hazard. Small areas of Fox and Fabius soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

172Y-B-2 Casco loam, loam substratum, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 173-A-1 by having a thinner, lighter colored loam surface soil. The lower part of the substratum is loam. It has a slight water erosion hazard. Small areas of Fox and Fabius soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

172Y-C-2 Casco loam, loam substratum, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 173-A-1 by having a thinner, lighter colored grayish-brown loam surface soil. The lower part of the substratum is loam. It has a moderate water erosion hazard. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 1.)

172R-A-1 Casco loam, rock substratum, 0 to 2 percent slopes

This soil differs from 173-A-1 by having a loam surface soil. The lower part of the substratum is fissured dolomite bedrock. Small areas of Fox soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 5.)

172R-B-1 Casco loam, rock substratum, 2 to 6 percent slopes

This gently sloping soil differs from 173-A-1 by having a loam surface soil. The lower part of the substratum is fissured dolomite bedrock. It has a slight water erosion hazard. Small areas of Fox soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 5.)

172R-B-2 Casco loam, rock substratum, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 173-A-1 by having a thinner, lighter colored grayish-brown loam surface soil. The lower part of the substratum is fissured dolomite bedrock. It has a slight water erosion hazard. Small areas of Fox soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 5.)

172V-B-1 Casco loam, silt and fine sand substratum, 2 to 6 percent slopes

This gently sloping soil differs from 173-A-1 by having a loam surface soil. The lower part of the substratum is silt and fine sand. It has a slight water erosion hazard. Small areas of Fox and Fabius soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 1.)

172V-B-2 Casco loam, silt and fine sand substratum, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 173-A-1 by having a thinner, lighter colored grayish-brown loam surface soil. The lower part of the substratum is silt and fine sand. It has a slight water erosion hazard. Small areas of Fox and Fabius soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 1.)

172V-C-2 Casco loam, silt and fine sand substratum, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 173-A-1 by having a thinner, lighter colored grayish-brown loam surface soil. The lower part of the substratum is silt and fine sand. It has a moderate water erosion hazard. Small areas of Fox soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 1.)

172V-D-1 Casco loam, silt and fine sand substratum, 12 to 20 percent slopes

This moderately steep soil differs from 173-A-1 by having a loam surface soil. The lower part of the substratum is silt and fine sand. Small areas of Fox soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 1.)

172V-D-2 Casco loam, silt and fine sand substratum, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 173-A-1 by having a thinner grayish-brown loam surface soil. The lower part of the substratum is silt and fine sand. Small areas of Fox soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 1.)

170-A-1 Casco sandy loam, 0 to 2 percent slopes

This soil differs from 173-A-1 by having a sandy loam surface soil. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 5.)

170-B-1 Casco sandy loam, 2 to 6 percent slopes

This gently sloping soil differs from 173-A-1 by having a sandy loam surface soil and a slight water erosion hazard. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 5.)

170-B-2 Casco sandy loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 173-A-1 by having a thinner, lighter colored grayish-brown sandy loam surface soil. It has a slight water erosion hazard. Small areas of Fox, Lorenzo and Rodman soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 5.)

170-C-1 Casco sandy loam, 6 to 12 percent slopes

This sloping soil differs from 173-A-1 by having a sandy loam surface soil and a moderate water erosion hazard. Small areas of Fox and Rodman soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 5.)

170-C-2 Casco sandy loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 173-A-1 by having a thinner, lighter colored grayish-brown sandy loam surface soil. It has a moderate water erosion hazard. Small areas of Fox and Rodman soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 5.)

170-N-2 Same as 170-C-2

170-D-1 Casco sandy loam, 12 to 20 percent slopes

This moderately steep soil differs from 173-A-1 by having a sandy loam surface soil and a severe water erosion hazard. Small areas of Rodman soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 5.)

170-K-1 Same as 170-D-1

170-D-2 Casco sandy loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 173-A-1 by having a thinner, lighter colored grayish-brown sandy loam surface soil. It has a severe water erosion hazard. Small areas of Rodman soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 5.)

170-K-2 Same as 170-D-2

170-E-1 Casco sandy loam, 20 to 30 percent slopes

This soil differs from 173-A-1 by having a sandy loam surface soil and a very severe water erosion hazard. Small areas of Rodman soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 5.)

170-E-2 Casco sandy loam, 20 to 30 percent slopes, moderately eroded

This soil differs from 173-A-1 by having a thinner, lighter colored grayish-brown sandy loam surface soil. It has a very severe water erosion hazard. Small areas of Rodman soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 5.)

170-F-2 Casco sandy loam 30 to 45 percent slopes, moderately eroded

This very steep soil differs from 173-A-1 by having a sandy loam surface soil and a

very severe water erosion hazard. Small areas of Rodman soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 5.)

170Z-A-1 Casco sandy loam, clay substratum, 0 to 2 percent slopes

This soil differs from 173-A-1 by having a sandy loam surface soil. The lower part of the substratum is slowly permeable clay. Small areas of Fox and Fabius soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 1.)

170Z-B-1 Casco sandy loam, clay substratum, 2 to 6 percent slopes

This gently sloping soil differs from 173-A-1 by having a sandy loam surface soil. The lower part of the substratum is slowly permeable clay. It has a slight water erosion hazard. Small areas of Fox and Fabius soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 1.)

170Z-C-2 Casco sandy loam, clay substratum, 6 to 12 percent slopes, moderately eroded

This soil differs from 173-A-1 by having a thinner, lighter colored grayish-brown sandy loam surface. The lower part of the substratum is slowly permeable clay. It has a moderate water erosion hazard. Small areas of Fox are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 1.)

170Y-B-1 Casco sandy loam, loam substratum, 2 to 6 percent slopes

This soil differs from 173-A-1 by having a sandy loam surface soil. The lower part of the substratum is loam. It has a slight water erosion hazard. Small areas of Fox and Fabius soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 1.)

170Y-B-2 Casco sandy loam, loam substratum, 2 to 6 percent slopes, moderately eroded

This soil differs from 173-A-1 by having a thinner, lighter colored grayish-brown sandy loam surface soil. The lower part of the substratum is loam. It has a slight water erosion hazard. Small areas of Fox and Ionia soils are included in this mapping

unit. (Capability Unit IIIe-4; Woodland Suitability Group 1.)

170V-B-1 Casco sandy loam, silt and fine sands substratum, 2 to 6 percent slopes

This gently sloping soil differs from 173-A-1 by having a sandy loam surface soil. The lower part of the substratum is silt and fine sands. It has a slight water erosion hazard. Small areas of Fox and Fabius soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 1.)

173-A-1 Casco silt loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Fox, Lorenzo and Fabius soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 5.)

173-B-1 Casco silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to 173-A-1 but it has a slight water erosion hazard. Small areas of Fox, Lorenzo and Fabius soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 5.)

173-M-1 Same as 173-B-1

173-B-2 Casco silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 173-A-1, but it has a thinner, lighter colored grayish-brown surface soil. It has a slight water erosion hazard. Small areas of Fox, Lorenzo and Fabius soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 5.)

173-C-1 Casco silt loam, 6 to 12 percent slopes

This sloping soil is similar to 173-A-1, but it has a moderate water erosion hazard. Small areas of Fox soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 5.)

173-N-1 Same as 173-C-1

173-C-2 Casco silt loam, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 173-A-1, but it has a thinner, lighter colored grayish-

brown surface soil. It has a moderate water erosion hazard. Small areas of Fox and Rodman soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 5.)

173-N-2 Same as 173-C-2

173-D-1 Casco silt loam, 12 to 20 percent slopes

This moderately steep soil is similar to 173-A-1, but it has a severe water erosion hazard. Small areas of Rodman and Fox soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 5.)

173-K-1 Same as 173-D-1

173-D-2 Casco silt loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil is similar to 173-A-1, but it has a thinner, lighter colored grayish-brown surface soil and a severe water erosion hazard. Small areas of Rodman soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 5.)

173-K-2 Same as 173-D-2

173-E-1 Casco silt loam, 20 to 30 percent slopes

This steep soil is similar to 173-A-1, but it has a very severe water erosion hazard. Small areas of Rodman soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 5.)

173-E-2 Casco silt loam, 20 to 30 percent slopes, moderately eroded

This soil is similar to 173-A-1, but it has a thinner, lighter colored grayish-brown surface soil. It has a very severe water erosion hazard. Small areas of Rodman soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 5.)

173Z-B-1 Casco silt loam, clay substratum, 2 to 6 percent slopes

This gently sloping soil is similar to 173-A-1, but it has a slight water erosion hazard and the lower part of the substratum is slowly permeable clay. Small areas of Fox and Fabius soils are included in this mapping unit.

(Capability Unit IIe-2; Woodland Suitability Group 1.)

173Z-C-1 Casco silt loam, clay substratum, 6 to 12 percent slopes

This sloping soil is similar to 173-A-1, but it has a moderate water erosion hazard and the lower part of the substratum is slowly permeable clay. Small areas of Fox and Fabius soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 1.)

173Y-A-1 Casco silt loam, loam substratum, 0 to 2 percent slopes

This soil is similar to 173-A-1, but the lower part of the substratum is loam. Small areas of Fox and Fabius soils are included in this mapping unit. (Capability Unit IIs-1; Woodland Suitability Group 1.)

173Y-B-1 Casco silt loam, loam substratum, 2 to 6 percent slopes

This gently sloping soil is similar to 173-A-1, but it has a slight water erosion hazard and the lower part of the substratum is loam. Small areas of Fox and Fabius soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

172-B-3 Casco soils, 2 to 6 percent slopes, severely eroded

This soil differs from 173-A-1 by having a very thin light colored grayish-brown and brown loam grading to clay loam surface soil. It has a slight water erosion hazard. Small areas of Fox and Rodman soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 5.)

172-C-3 Casco soils, 6 to 12 percent slopes, severely eroded

This sloping soil differs from 173-A-1 by having a very thin, light colored grayish-brown loam grading to clay loam surface soil. It has a moderate water erosion hazard. Small areas of Fox and Rodman soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 5.)

170-C-3 Same as 172-C-3

172-N-3 Same as 172-C-3

173-C-3 Same as 172-C-3

170-D-3 Casco soils, 12 to 20 percent slopes, severely eroded

This moderately steep soil differs from 173-A-1 by having a very thin light colored grayish-brown and brown sandy loam grading to sandy clay loam surface soil. It has a severe water erosion hazard. Small areas of Rodman soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 5.)

172-D-3 Same as 170-D-3

172-K-3 Same as 170-D-3

173-D-3 Same as 170-D-3

170-E-3 Casco soils, 20 to 30 percent slopes, severely eroded

This soil differs from 173-A-1 by having a very thin, light colored grayish-brown and brown sandy loam grading to sandy clay loam surface soil. It has a very severe water erosion hazard. Small areas of Rodman soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 5.)

172-E-3 Same as 170-E-3

173-F-1 Casco soils, 30 to 45 percent slopes

This soil is similar to 173-A-1, but it has a very thin light-colored grayish-brown silt loam grading to clay loam surface soil. It has a very severe water erosion hazard. Small areas of Rodman soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 5.)

71-A-1 Casco-Fox loams, 0 to 2 percent slopes

This mapping unit is about 50 to 80 percent Casco loam in capability unit IIIs-2; woodland suitability group 5. The remainder is Fox loam in capability unit IIs-1; woodland suitability group 1. Small areas of Dodge and Ionia soils are included in this mapping unit.

71-B-1 Casco-Fox loams, 2 to 6 percent slopes

This mapping unit is about 50 to 80 percent Casco loam in capability unit IIIs-4; woodland suitability group 5. The remainder is Fox loam in capability unit IIs-2; woodland

suitability group 1. Small areas of Dodge and Ionia soils are included in this mapping unit.

71-M-1 Same as 71-B-1

71-M-2 Same as 71-B-1

71-C-1 Casco-Fox loams, 6 to 12 percent slopes

This mapping unit is about 50 to 80 percent Casco loam in capability unit IVe-4; woodland suitability group 5. The remainder is Fox loam in capability unit IIIs-2; woodland suitability group 1. Small areas of Dodge and Ionia soils are included in this mapping unit.

71-N-1 Same as 71-C-1

71-C-2 Casco-Fox loams, 6 to 12 percent slopes, moderately eroded

This mapping unit is about 50 to 80 percent Casco loam in capability unit IVe-4; woodland suitability group 5. The remainder is Fox loam in capability unit IIIs-2; woodland suitability group 1. Small areas of Dodge and Ionia soils are included in this mapping unit.

71-N-2 Same as 71-C-2

71-D-1 Casco-Fox loams, 12 to 20 percent slopes

This mapping unit is about 60 to 80 percent Casco loam in capability unit VIe-4; woodland suitability group 5. The remainder is Fox loam in capability unit IVe-2; woodland suitability group 1. Small areas of Rodman soils are included in this mapping unit.

71-K-1 Same as 71-D-1

71-D-2 Casco-Fox loams, 12 to 20 percent slopes, moderately eroded

This mapping unit is about 60 to 80 percent Casco loam in capability unit VIe-4; woodland suitability group 5. The remainder is Fox silt loam in capability unit IVe-2; woodland suitability group 1. Small areas of Rodman soils are included in this mapping unit.

71-K-2 Same as 71-D-2

71-E-1 Casco-Fox loams, 20 to 30 percent slopes

This mapping unit is about 65 to 80 percent Casco loam in capability unit VIIe-4; woodland suitability group 5. The remainder is Fox loam in capability unit VIe-2; woodland suitability group 1. Small areas of Rodman soils are included in this mapping unit.

71-E-2 Casco-Fox loams, 20 to 30 percent slopes, moderately eroded

This mapping unit is about 65 to 80 percent Casco loam in capability unit VIIe-4; woodland suitability group 5. The remainder is Fox loam in capability unit VIe-2; woodland suitability group 1. Small areas of Rodman soils are included in this mapping unit.

69-A-1 Casco-Fox silt loams, 0 to 2 percent slopes

This mapping unit is about 50 to 80 percent Casco silt loam in capability unit IIIs-2; woodland suitability group 5. The remainder is Fox silt loam in capability unit IIs-1; woodland suitability group 1. Small areas of Ionia soils are included in this mapping unit.

69-B-1 Casco-Fox silt loams, 2 to 6 percent slopes

This mapping unit is about 50 to 80 percent Casco silt loam in capability unit IIIs-4; woodland suitability group 5. The remainder is Fox silt loam in capability unit IIs-2; woodland suitability group 1. Small areas of Ionia soils are included in this mapping unit.

69-M-1 Same as 69-B-1

69-B-2 Casco-Fox silt loams, 2 to 6 percent slopes, moderately eroded

This mapping unit is about 50 to 80 percent Casco silt loam in capability unit IIIs-4; woodland suitability group 5. The remainder is Fox silt loam in capability unit IIs-2; woodland suitability group 1. Small areas of Ionia soils are included in this mapping unit.

69-M-2 Same as 69-B-2

69-C-1 Casco-Fox silt loams, 6 to 12 percent slopes

This mapping unit is about 50 to 80 percent Casco silt loam in capability unit IVe-4; woodland suitability group 5. The remainder is Fox silt loam in capability unit IIIs-2; woodland suitability group 1.

69-N-1 Same as 69-C-1

69-C-2 Casco-Fox silt loams, 6 to 12 percent slopes, moderately eroded

This mapping unit is about 50 to 80 percent Casco silt loam in capability unit IVe-4; woodland suitability group 5. The remainder is Fox silt loam in capability unit IIIs-2; woodland suitability group 1. Small areas of Dodge soils are included in this mapping unit.

69-N-2 Same as 69-C-2

69-D-1 Casco-Fox silt loams, 12 to 20 percent slopes

This mapping unit is about 60 to 80 percent Casco silt in capability unit VIe-4; woodland suitability group 5. The remainder is Fox silt loam in capability unit IVe-2; woodland suitability group 1. Small areas of Rodman soils are included in this mapping unit.

69-K-1 Same as 69-D-1

69-D-2 Casco-Fox silt loams, 12 to 20 percent slopes, moderately eroded

This mapping unit is about 60 to 80 percent Casco silt loam in capability unit VIe-4; woodland suitability group 5. The remainder is Fox silt loam in capability unit IVe-2; woodland suitability group 1. Small areas of Rodman soils are included in this mapping unit.

69-K-2 Same as 69-D-2

69-E-1 Casco-Fox silt loams, 20 to 30 percent slopes

This mapping unit is about 65 to 80 percent Casco silt loam in capability unit VIIe-4; woodland suitability group 5. The remainder is Fox silt loam in capability unit VIe-2; woodland suitability group 1.

69-F-1 Casco-Fox silt loams, 30 to 45 percent slopes.

This mapping unit is about 65 to 80 percent Casco silt loam in capability unit IIIs-4; woodland suitability group 5. The remainder is Fox silt loam in capability unit IIs-2; woodland suitability group 1. Small areas of Rodman soils are included in this mapping unit.

282-B-1 Casco-Rodman loams, 2 to 6 percent slopes

This mapping unit is about 50 to 80 percent Casco loams in capability unit IIIe-4; woodland suitability group 5. The rest is Rodman loams in capability unit VIs-5, woodland suitability group 6.

282-B-2 Casco-Rodman loams, 2 to 6 percent slopes, moderately eroded

This mapping unit is about 50 to 80 percent Casco loams in capability unit IIIe-4; woodland suitability group 5. The rest is Rodman loams in capability unit VIs-5; woodland suitability group 6. Small areas of Fox and Lorenzo soils are included in this mapping unit.

282-M-2 Same as 282-B-2



Soils of the Casco and Rodman series on morainic relief. Rodman soils are generally steeper than Casco soils.

282-C-1 Casco-Rodman loams, 6 to 12 percent slopes

This mapping unit is about 50 to 80 percent Casco loams in capability unit IVe-4; woodland suitability group 5. The rest is Rodman loams in capability unit VIs-5; woodland suitability group 6. Small areas of Fox and Lorenzo soils are included in this mapping unit.

282-N-1 Same as 282-C-1

282-C-2 Casco-Rodman loams, 6 to 12 percent slopes, moderately eroded

This mapping unit is about 50 to 80 percent Casco loams in capability unit IVe-4; woodland suitability group 5. The rest is Rodman loams in capability unit VIs-5; woodland suitability group 6. Small areas of Lorenzo soils are included in this mapping unit.

282-N-2 Same as 282-C-2

282-C-3 Casco-Rodman loams, 6 to 12 percent slopes

This mapping unit is about 50 to 80 percent Casco loams in capability unit IVe-4; woodland suitability group 5. The rest is Rodman loams in capability unit VIs-5; woodland suitability group 6. Small areas of Lorenzo soils are included in this mapping unit.

282-N-3 Same as 282-C-3

282-D-1 Casco-Rodman loams, 12 to 20 percent slopes

This mapping unit is about 50 to 70 percent Casco loams in capability unit IVe-4; woodland suitability group 5. The rest is Rodman loams in capability unit VIs-5; woodland suitability group 6. Small areas of Lorenzo soils are included in this mapping unit.

282-K-1 Same as 282-D-1

282-D-2 Casco-Rodman loams, 12 to 20 percent slopes, moderately eroded

This mapping unit is about 50 to 70 percent Casco loams in capability unit IVe-4; woodland suitability group 5. The rest is Rodman loams in capability unit VIs-5; woodland suitability group 6. Small areas of Lorenzo soils are included in this mapping unit.

282-K-2 Same as 282-D-2

282-D-3 Casco-Rodman loams, 12 to 20 percent slopes, severely eroded

This mapping unit is about 50 to 70 percent Casco loams in capability unit VIIe-4; woodland suitability group 5. The rest is Rodman loams in capability unit VIs-5; woodland suitability group 6. Small areas of Lorenzo soils are included in this mapping unit.

282-K-3 Same as 282-D-3

282-E-1 Casco-Rodman loams, 20 to 30 percent slopes

This mapping unit is about 45 to 65 percent Casco loams in capability unit VIIe-4; woodland suitability group 5. The rest is Rodman loams in capability unit VIIs-5; woodland suitability group 6.

282-E-2 Casco-Rodman loams, 20 to 30 percent slopes, moderately eroded

This mapping unit is about 45 to 65 percent Casco loams in capability unit VIIe-4; woodland suitability group 5. The rest is Rodman loams in capability unit VIIs-5; woodland suitability group 6.

282-E-3 Casco-Rodman loams, 20 to 30 percent slopes, severely eroded

This mapping unit is about 45 to 65 percent Casco loams in capability unit VIIe-4; woodland suitability group 5. The rest is Rod-

man loams in capability unit VIIs-5; woodland suitability group 6.

282-F-1 Casco-Rodman loams, 30 to 45 percent slopes

This mapping unit is about 40 to 60 percent Casco loams in capability unit VIIe-4; woodland suitability group 5. The rest is Rodman loams in capability unit VIIs-5; woodland suitability group 6.

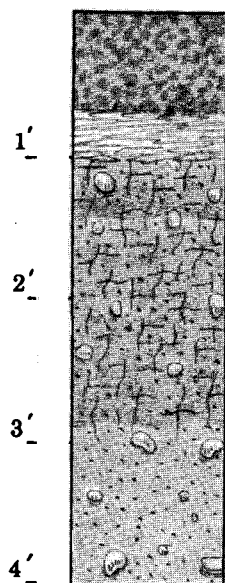
282-F-2 Casco-Rodman loams, 30 to 45 percent slopes, moderately eroded

This mapping unit is about 40 to 60 percent Casco loams in capability unit VIIe-4; woodland suitability group 5. The rest is Rodman loams in capability unit VIIs-5; woodland suitability group 6.

CELINA SERIES

The moderately well drained, nearly level to sloping soils of the Celina series have developed in a silt mantle over calcareous loam till. They occupy glacial till uplands and plains.

The following profile description of 343-A-1 Celina silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, dark grayish-brown, friable, granular silt loam.

8 to 12 inches, grayish-brown, friable, platy silt loam.

Subsoil:

12 to 17 inches, brown, friable, subangular blocky silty clay loam.

17 to 34 inches, brown to yellowish-brown, firm, subangular blocky, gritty clay loam with strong brown mottles.

Substratum:

34 to 60 inches, yellowish-brown, friable, massive loam glacial till.

The surface soil ranges from 8 to 12 inches thick. The substratum ranges in texture from sandy loam to loam and in places contains pockets and lenses of silt and sand.

Sloping areas of Celina soils have a water erosion hazard. They are good cropland soils.

343-A-1 Celina silt loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Miami and Crosby soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)

116-A-1 Same as 343-A-1

343-B-1 Celina silt loam, 2 to 6 percent slopes

This soil is similar to 343-A-1, but it has a slight water erosion hazard. Small areas of Miami and Crosby soils are included in

this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

116-B-1 Same as 343-B-1

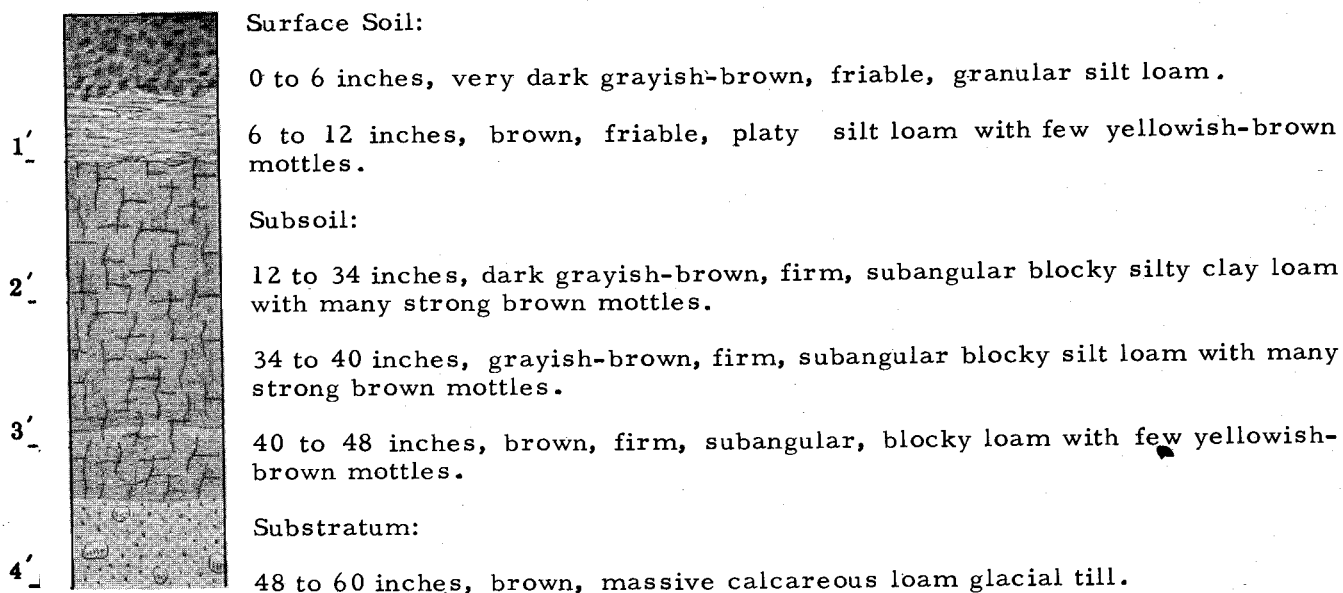
343-M-1 Same as 343-B-1

343-B-2 Same as 343-B-1

CLYMAN SERIES

The somewhat poorly drained, nearly level to sloping soils of the Clyman series have developed in a thick silt mantle over calcareous loam till. They occupy drainage-ways and depressions in glacial uplands.

The following profile description of 278-A-1 Clyman silt loam, 0 to 2 percent slopes, is representative of the series.



The thickness of the silt layer ranges from 36 to 50 inches and the substratum ranges in texture from loam to sandy loam.

The nearly level Clyman soils are subject to ponding and sloping areas have a water erosion hazard. They are fair to good cropland soils when adequately drained.

278-A-1 Clyman silt loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Ehler and Calamus soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

113-A-1 Same as 278-A-1

278-B-1 Clyman silt loam, 2 to 6 percent slopes

This soil is similar to 278-A-1, but it has a slight water erosion hazard. Small areas of Ehler and Calamus soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

113-B-1 Same as 278-B-1

278-C-1 Clyman silt loam, 6 to 12 percent slopes

This soil is similar to 278-A-1, but it has a moderate water erosion hazard. Small areas of Calamus soils are included in this mapping unit. (Capability Unit IIIe-8; Woodland Suitability Group 7.)

278-C-2 Clyman silt loam, 6 to 12 percent slopes, moderately eroded

This soil is similar to 278-A-1, but it has a thinner, lighter colored grayish-brown surface soil. It has a moderate water erosion hazard. Small areas of Calamus soils are included in this mapping unit. (Capability Unit IIIe-8; Woodland Suitability Group 7.)

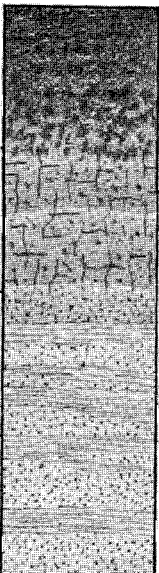


Nearly level landscape of Clyman and Ehler soils.

COLWOOD SERIES

The poorly to very poorly drained, nearly level to gently sloping soils of the Colwood series have developed in calcareous lacustrine silt and fine sand. They occupy broad nearly level glacial lake and river basins.

The following profile description of 29-A-1 Colwood silt loam, 0 to 2 percent slopes, is representative of the series.

	<p>Surface soil:</p> <p>0 to 12 inches, black, friable, granular silt loam.</p> <p>Subsoil:</p> <p>12 to 17 inches, grayish-brown, friable, subangular blocky silt loam with yellow and gray mottles.</p> <p>17 to 23 inches, grayish-brown, firm, subangular blocky clay loam with yellow and gray mottles.</p> <p>23 to 27 inches, grayish-brown, friable, subangular blocky and prismatic fine sandy loam with yellow and gray mottles.</p> <p>Substratum:</p> <p>27 to 60 inches, grayish-brown, friable, massive layers of calcareous silt and fine sand with yellow and gray mottles.</p>
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Surface soil textures are fine sandy loam and silt loam. In places the upper part of the surface is mucky, the subsoil contains a few rounded limestone fragments or lenses of sandy loam, and the substratum has thin layers of clay.

The Colwood soils have a high water table and are subject to ponding or flooding for short periods of time. They are fair cropland soils when drained by surface field ditches. They are not suitable for tile drains.

28-A-1 Colwood fine sandy loam, 0 to 2 percent slopes

This soil differs from 29-A-1 by having a fine sandy loam surface soil. Small areas of Ehler, Keowns, and Kibbie soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

28-B-1 Colwood fine sandy loam, 2 to 6 percent slopes

This soil differs from 29-A-1 by having a fine sandy loam surface soil and a slight water erosion hazard. Small areas of Ehler, Keowns, and Kibbie soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

28Z-A-1 Colwood fine sandy loam, clay substratum, 0 to 2 percent slopes

This soil differs from 29-A-1 by having a fine sandy loam surface soil. The lower part of the substratum is slowly permeable clay. Small areas of Kibbie and Navan soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

29-A-1 Colwood silt loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Ehler and Kibbie soils are included in this mapping unit. (Capability Unit IIIw-3; Wood-

land Suitability Group 7.)

29V-A-1 Same as 29-A-1

30-A-1 Same as 29-A-1

213V-A-1 Same as 29-A-1

29-B-1 Colwood silt loam, 2 to 6 percent slopes

This soil differs from 29-A-1 by having a slight water erosion hazard. Small areas of Ehler and Kibbie soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

29X-A-1 Colwood silt loam, gravelly substratum, 0 to 2 percent slopes

This soil differs from 29-A-1 by having sand and gravel in the lower part of the substratum. Small areas of Westland and Keowns soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

29Z-A-1 Colwood silt loam, clay substratum, 0 to 2 percent slopes

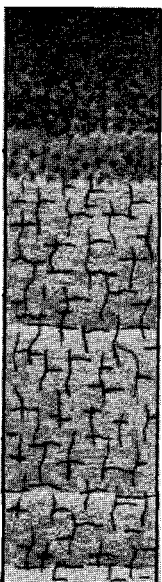
This soil is similar to 29-A-1, but the lower part of the substratum is slowly permeable clay. Small areas of Navan and Westland soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

CRANE SERIES

The somewhat poorly drained, nearly level to gently sloping soils of the Crane series have developed in a thick silt layer over calcareous loose sand and gravel. They occupy depressions and drainageways in

outwash plains.

The following profile description of 124-A-1 Crane silt loam, 0 to 2 percent slopes, is representative of the series.

	Surface soil:
	0 to 10 inches, black, friable, granular silt loam.
	10 to 14 inches, very dark grayish-brown, friable, granular silt loam.
	Subsoil:
	14 to 26 inches, dark brown to dark grayish-brown, firm, subangular, blocky, silty clay loam with many gray and yellowish-brown mottles.
	26 to 40 inches, mottled yellowish-brown and grayish-brown and dark yellowish-brown, firm, subangular blocky silty clay loam.
	40 to 46 inches, grayish-brown firm, massive gravelly loam with many yellowish-brown mottles.
	Substratum
	46 to 60 inches, gray and brown loose sand and gravel.

The depth to loose sand and gravel ranges from 40 to 65 inches. These Crane soils are subject to ponding and are good cropland soils when adequately drained.

124-A-1 Crane silt loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Westland and Sleeth soils are included in

this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 12.)

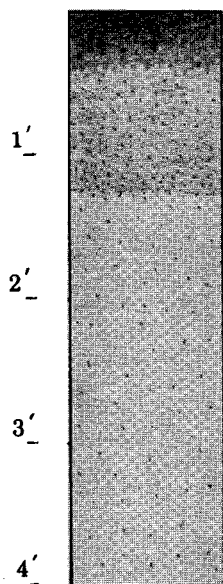
124-B-1 Crane silt loam, 2 to 6 percent slopes

This soil is similar to 124-A-1, but it has a slight water erosion hazard. Small areas of Tippecanoe and Westland soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 12.)

CRESTVIEW SERIES

The well drained, nearly level to sloping soils of the Crestview series have developed in deep sandy deposits. They occupy plain and convex slopes of outwash plains and terraces.

The following profile description of 413-A-1 Crestview fine sandy loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 5 inches, black, friable, granular fine sandy loam.

5 to 15 inches, dark brown, friable loamy fine sand.

Substratum:

15 to 60 inches, brown, loose, single grained sand.

The surface soil textures are loamy fine sand and fine sandy loam. The depth to loose sand ranges from 10 to 20 inches.

The Crestview soils are subject to drouth, wind and water erosion hazards. They have a low natural fertility. They have severe limitations for use as cropland.

413-A-1 Crestview fine sandy loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Tedrow soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 3.)

413-B-1 Crestview fine sandy loam, 2 to 6 percent slopes

This soil is similar to 413-A-1, but it has a slight water erosion hazard. Small areas of Tedrow soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 3.)

413Z-A-1 Crestview fine sandy loam, clay substratum, 0 to 2 percent slopes

This soil is similar to 413-A-1, but the

lower part of the substratum is slowly permeable clay. Small areas of Hebron soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 3.)

413Z-B-1 Crestview fine sandy loam, clay substratum, 2 to 6 percent slopes

This soil is similar to 413-A-1, but the lower part of the substratum is slowly permeable clay and it has a slight water erosion hazard. Small areas of Hebron soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 3.)

414-A-1 Crestview loamy fine sand, 0 to 2 percent slopes

This soil differs from 413-A-1 by having a loamy fine sand surface soil. Small areas of Tedrow soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

414-B-1 Crestview loamy fine sand, 2 to 6 percent slopes

This soil differs from 413-A-1 by having a loamy fine sand surface soil and a slight

water erosion hazard. Small areas of Tedrow soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

414-B-2 Crestview loamy fine sand, 2 to 6 percent slopes, moderately eroded

This soil differs from 413-A-1 by having a thinner, lighter colored very dark grayish-brown loamy fine sand surface soil. It has a slight water erosion hazard. Small areas of Tedrow soils are included in this map-

ping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

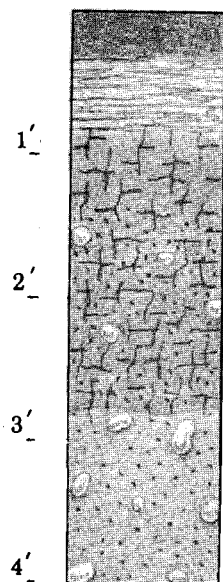
414-C-2 Crestview loamy fine sand, 6 to 12 percent slopes, moderately eroded

This soil differs from 413-A-1 by having a thinner, lighter colored, very dark grayish-brown loamy fine sand surface soil. It has a moderate water erosion hazard. Small areas of Tedrow soils are included in this mapping unit. (Capability Unit VI-3; Woodland Suitability Group 4.)

CROSBY SERIES

The somewhat poorly drained, nearly level to sloping soils of the Crosby series have developed in a thin layer of silt over calcareous loam till. They occupy drainage-ways of glacial till uplands and plains.

The following profile description of 178-A-1 Crosby silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 4 inches, very dark brown, friable, subangular blocky silt loam.

4 to 10 inches, dark gray, very friable, platy silt loam.

Subsoil:

10 to 33 inches, dark grayish-brown, friable, subangular blocky silty clay loam with yellowish-brown mottles.

Substratum:

33 to 60 inches, yellowish-brown and brown, friable, massive loam glacial till.

The surface soil ranges from 8 to 12 inches in total thickness. The substratum ranges in texture from loam to sandy loam and in places contains pockets and lenses of silt and sand.

These Crosby soils are subject to ponding and have a seasonal high water table. Sloping areas have a water erosion hazard. They are good cropland soils when adequately drained.

178-A-1 Crosby silt loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Celina soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

118-A-1 Same as 178-A-1

188-A-1 Same as 178-A-1

178-B-1 Crosby silt loam, 2 to 6 percent slopes

This soil is similar to 178-A-1, but it has a

slight water erosion hazard. Small areas of Celina soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

118-B-1 Same as 178-B-1

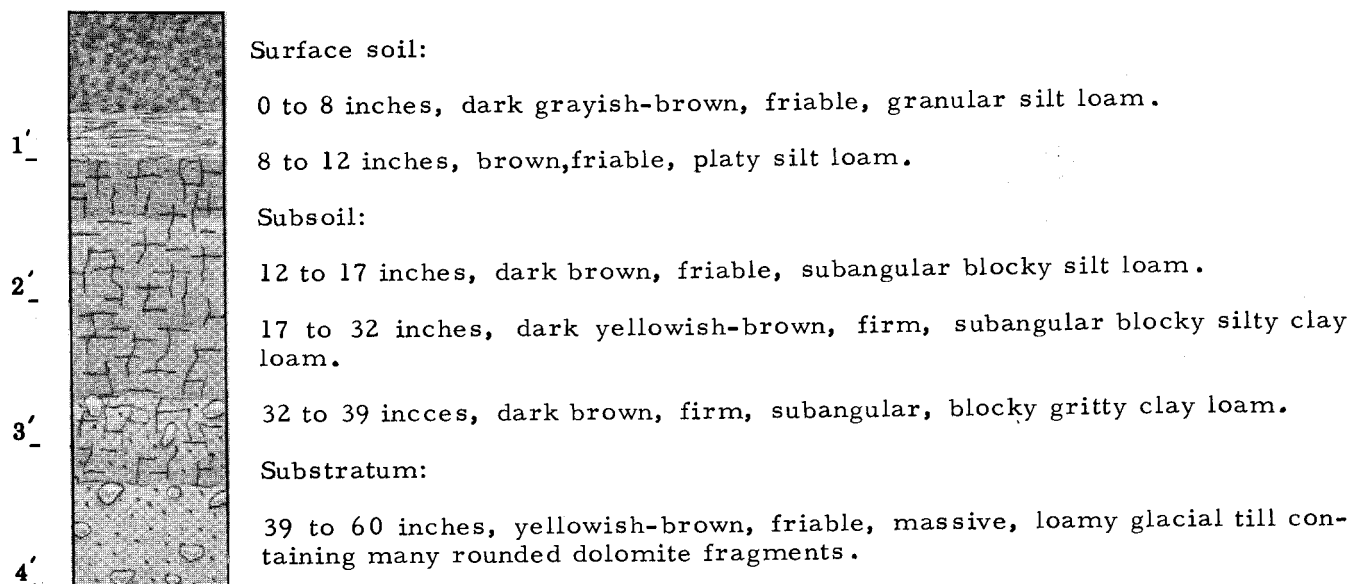
188-B-1 Same as 178-B-1

DODGE SERIES

The well drained, nearly level to sloping soils of the Dodge series have developed in a moderately deep silt layer over calcareous loam till. They occur on ridgetops and sloping areas of ground moraines in the

glacial uplands.

The following profile description of 161-B-1 Dodge silt loam, 2 to 6 percent slopes, is representative of the series.



The surface layer varies from 6 to 10 inches in thickness. In places the platy layer is absent. Depth to the substratum ranges from 36 to 48 inches.

These Dodge soils have a water erosion hazard on sloping areas. They are good cropland soils on the lower slopes.

161-A-1 Dodge silt loam, 0 to 2 percent slopes

This nearly level soil is similar to 161-B-1, but it has little or no water erosion hazard. Small areas of Mayville, Miami and Theresa soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)

111-A-1 Same as 161-A-1

421-A-1 Same as 161-A-1

161-B-1 Dodge silt loam, 2 to 6 percent slope

The profile description of this soil is a part of the series description. It has a slight water erosion hazard. Small areas of Theresa, Miami and Mayville soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

111-B-1 Same as 161-B-1

421-B-1 Same as 161-B-1

161-B-2 Dodge silt loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 161-B-1 by having a thinner, lighter colored grayish-brown surface soil. Small areas of Theresa and Miami soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

111-B-2 Same as 161-B-2

161-M-2 Same as 161-B-2

161-C-1 Dodge silt loam, 6 to 12 percent slopes

This soil differs from 161-B-1 by having a moderate water erosion hazard. Small areas of Theresa and Miami soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

111-C-1 Same as 161-C-1

161-C-2 Dodge silt loam, 6 to 12 percent slopes, moderately eroded

This soil differs from 161-B-1 in having a thinner, lighter colored grayish-brown surface soil. It has a moderate water erosion hazard. Small areas of Theresa and Miami soils are included in this mapping unit. (Ca-

pability Unit IIIe-1; Woodland Suitability Group 1.)

111-C-2 Same as 161-C-2

111-N-2 Same as 161-C-2

161-N-2 Same as 161-C-2

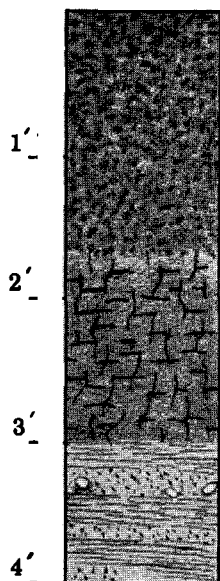
161R-A-1 Dodge silt loam, rock substratum, 0 to 2 percent slopes

This soil is similar to 161-B-1, but the lower part of the substratum is fissured dolomite bedrock. It does not have a water erosion hazard. Small areas of Theresa, Miami and Mayville soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)

DORCHESTER SERIES

The well to moderately well drained, nearly level soils of the Dorchester series have developed from silty alluvium. They occupy the floodplains of major streams and rivers.

The following profile description of 7-A-1 Dorchester silt loam is representative of the series.



Surface soil:

0 to 20 inches, dark grayish-brown, friable, granular silt loam.

Subsoil:

20 to 36 inches, dark grayish-brown, friable, subangular blocky to massive silt loam.

Substratum:

36 to 60 inches, dark grayish-brown, friable layers of loam and silt loam.

Surface soil thickness ranges from 18 to 30 inches. In some places small gray and yellow mottles occur below a depth of 30 inches and thin layers of sand or fine gravel are in the substratum. Small snail shell fragments occur throughout the profile in some places.

These Dorchester soils are subject to overflow and stream bank erosion. They are

good soils for cropland when adequately protected from stream overflow.

7-A-1 Dorchester silt loam

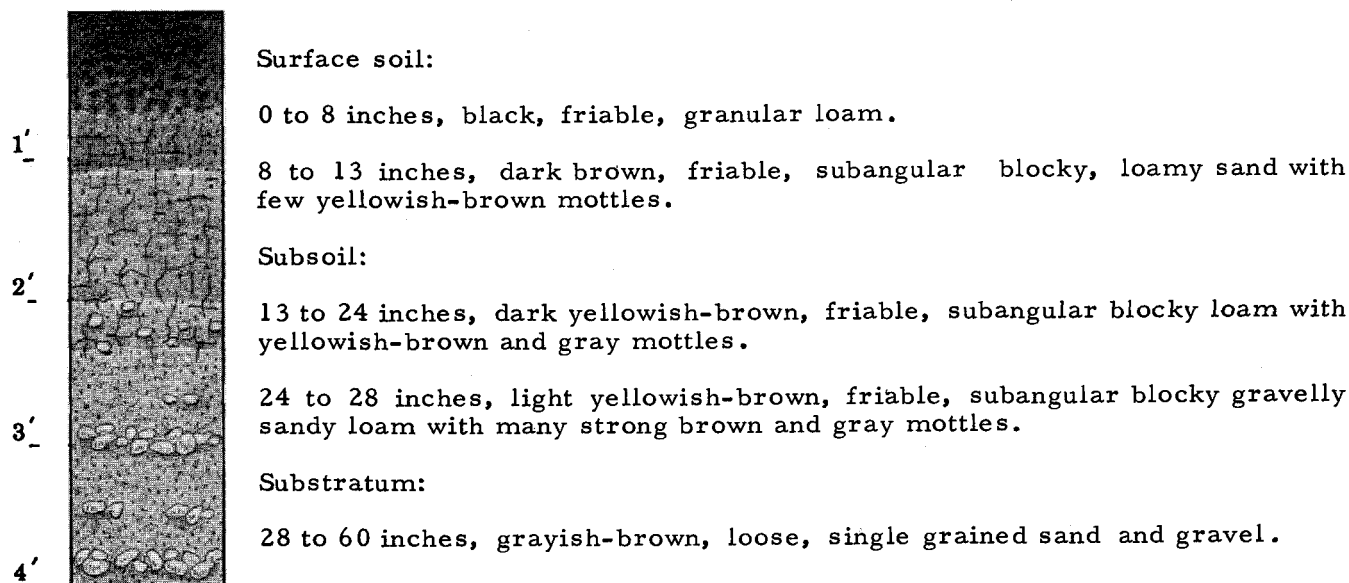
The profile description of this soil is a part of the series description. Small areas of Alluvial land are included in this mapping unit. (Capability Unit IIw-11; Woodland Suitability Group 1.)

DOUSMAN SERIES

The somewhat poorly drained, nearly level to gently sloping soils of the Dousman series have developed in loamy material over calcareous sand and gravel. They occupy depressions and drainageways in outwash

plains and stream benches.

The following profile description of 77-A-1 Dousman sandy loam, 0 to 2 percent slopes. is representative of the series.



The surface textures are loam and sandy loam. The depth to loose sand and gravel ranges from 20 to 40 inches.

The Dousman soils have a wetness hazard and sloping areas have a water erosion hazard. They are fair cropland soils.

78-A-1 Dousman loam, 0 to 2 percent slopes

This soil differs from 77-A-1 by having a loam surface soil. Small areas of Fabius and Waukechon soils are included in this mapping unit. (Capability Unit IIIw-5; Woodland Suitability Group 7.)

60-A-1 Same as 78-A-1

78-B-1 Dousman loam, 2 to 6 percent slopes

This soil differs from 77-A-1 by having a loam surface soil and a slight water erosion hazard. Small areas of Fabius and Waukechon soils are included in this mapping unit. (Capability Unit IIIw-5; Woodland Suitability Group 7.)

60-B-1 Same as 78-B-1

60Z-A-1 Dousman loam, clay substratum, 0 to 2 percent slopes

This soil is similar to 77-A-1, but the lower part of the substratum is slowly permeable clay. Small areas of Waukechon and Fabius soils are included in this mapping unit. (Capability Unit IIIw-5; Woodland Suitability Group 7.)

78Y-B-1 Dousman loam, loam substratum, 2 to 6 percent slopes

This gently sloping soil differs from 77-A-1 by having a loam surface soil. The lower part of the substratum is loam. Small areas of Fabius and Lamartine soils are included in this mapping unit. (Capability Unit IIIw-5; Woodland Suitability Group 7.)

78V-A-1 Dousman loam, silt and fine sand substratum, 0 to 2 percent slopes

This soil differs from 77-A-1 by having a loam surface soil. The lower part of the substratum is silt and fine sand. Small areas of Waukechon and Fabius soils are included in this mapping unit. (Capability Unit IIIw-5; Woodland Suitability Group 7.)

77-A-1 Dousman sandy loam, 0 to 2 percent slopes

The profile description of this soil is part

of the series description. Small areas of Waukechon and Fabius soils are included in this mapping unit. (Capability Unit IIIw-5; Woodland Suitability Group 8.)

77-B-1 Dousman sandy loam, 2 to 6 percent slopes

This soil is similar to 77-A-1, but it has a slight water erosion hazard. Small areas of Waukechon and Fabius soils are included in this mapping unit. (Capability Unit IIIw-5; Woodland Suitability Group 8.)

77Z-A-1 Dousman sandy loam, clay substratum, 0 to 2 percent slopes

This gently sloping soil is similar to 77-A-1, but the lower part of the substratum is

slowly permeable clay. Small areas of Waukechon and Fabius soils are included in this mapping unit. (Capability Unit IIIw-5; Woodland Suitability Group 8.)

59Z-A-1 Same as 77Z-A-1

77Z-B-1 Dousman sandy loam, clay substratum, 2 to 6 percent slopes

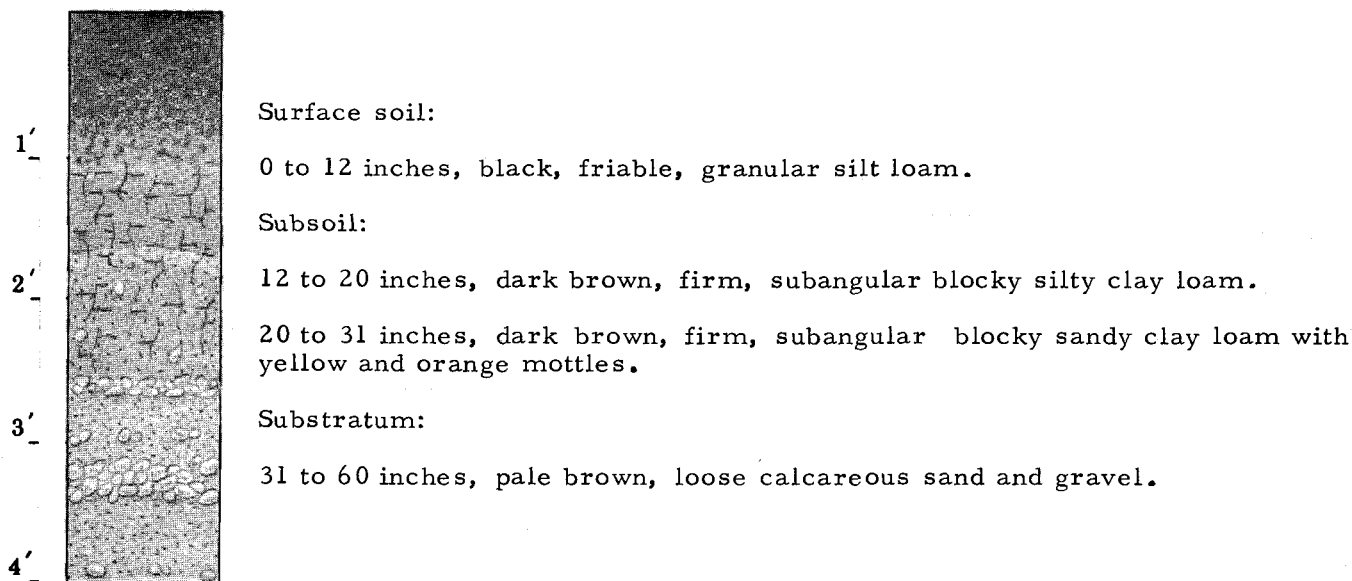
This soil is similar to 77-A-1, but it has a slight water erosion hazard and the lower part of the substratum is slowly permeable clay. Small areas of Waukechon and Fabius soils are included in this mapping unit. (Capability Unit IIIw-5; Woodland Suitability Group 7.)

59Z-B-1 Same as 77Z-B-1

EAGLE SERIES

The moderately well drained, nearly level to sloping soils of the Eagle series have developed from loamy outwash overlying calcareous sand and gravel.

The following profile description of 333-A-1 Eagle silt loam, 0 to 2 percent slopes, is representative of the series.



The color of the surface soil ranges from black to very dark grayish-brown and the thickness from 10 to 14 inches. The depth to the calcareous sand and gravel substratum varies from 20 to 40 inches.

Eagle soils are somewhat drouthy and sloping areas have a water erosion hazard. They are good cropland soils.

333-A-1 Eagle silt loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Warsaw, Kane and Ionia soils are included in this mapping unit. (Capability Unit IIs-1; Woodland Suitability Group 12.)

333-B-1 Eagle silt loam, 2 to 6 percent slopes

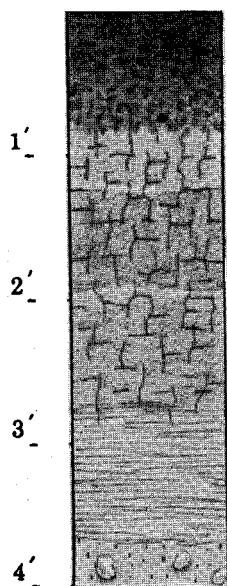
This soil is similar to 333-A-1, but it has

a slight water erosion hazard. Small areas of Warsaw and Kane soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 12.)

EHLER SERIES

The poorly drained, nearly level to gently sloping soils of the Ehler series have developed in water-laid silt. They occupy depressions and broad nearly level bottomlands.

The following profile description of 212-A-1 Ehler silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 10 inches, black, friable, granular silt loam.

Subsoil:

10 to 15 inches, grayish-brown, firm, subangular, blocky silty clay loam.

15 to 23 inches, dark olive-gray, firm, subangular, blocky silty clay loam with yellowish-brown and gray mottles.

23 to 33 inches, dark olive-gray, friable, subangular blocky silt loam with yellowish-brown and gray mottles.

Substratum:

33 to 60 inches, grayish-brown, friable, massive silt and clay or friable, massive, calcareous loam till with yellowish-brown and gray mottles.

In places the substratum contains layers of fine sand and coarse silt.

The Ehler soils are subject to ponding and have a high water table. They are good cropland soils when adequately drained by surface field ditches.

212-A-1 Ehler silt loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of thin organic and Bono soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

212Y-A-1 Same as 212-A-1

213-A-1 Same as 212-A-1

214-A-1 Same as 212-A-1

215-A-1 Same as 212-A-1

216-A-1 Same as 212-A-1

212-B-1 Ehler silt loam, 2 to 6 percent slopes

This soil is similar to 212-A-1 except it has a slight water erosion hazard. Small areas of Bono and Brookston soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

213-B-1 Same as 212-B-1

214-B-1 Same as 212-B-1

215-B-1 Same as 212-B-1

216-B-1 Same as 212-B-1

212R-A-1 Ehler silt loam, rock substratum, 0 to 2 percent slopes

This soil is similar to 212-A-1 except the lower part of the substratum is fissured dolomite bedrock. Small areas of Brookston soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

213R-A-1 Same as 212R-A-1

550-A-1 Same as 212R-A-1

212X-A-1 Ehler silt loam, gravelly substratum, 0 to 2 percent slopes

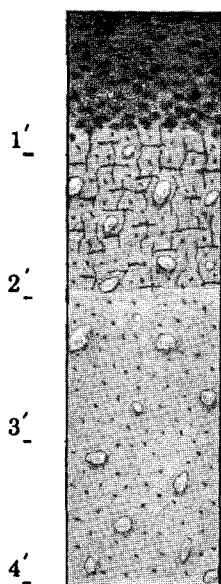
This soil is similar to 212-A-1, but the lower part of the substratum is loose sand and gravel. Small areas of Sebewa soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

ELLIOTT SERIES

The somewhat poorly drained, nearly level to sloping soils of the Elliott series have developed from a thin silty layer over calcareous silty clay loam till. They occupy slightly concave slopes of drainageways and

depressions.

The following profile description of 3251-A-1 Elliott silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 10 inches, black, friable, granular silt loam.

Subsoil:

10 to 23 inches, dark grayish-brown, firm, subangular blocky, silty clay loam with a few yellowish-brown mottles in the upper part and many mottles in the lower part.

Substratum:

23 to 60 inches, mixed olive-gray and yellowish-brown, firm, calcareous silty clay loam glacial till.

The surface soil ranges from 8 to 14 inches in thickness. The subsoil and substratum contains small brown shale and dolomite fragments. In places there are lenses or pockets of silt, sand or loamy material in the substratum.

These Elliott soils are subject to ponding and are slowly permeable. They are good cropland soils when adequately drained.

3251-A-1 Elliott silt loam, 0 to 2 percent slopes

The profile description of this soil is a part

of the series description. Small areas of Varna, Beecher and Ashkum soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 12.)

3251-B-1 Elliott silt loam, 2 to 6 percent slopes

This soil differs from 3251-A-1 by having a slight erosion hazard. Small areas of Blount, Beecher and Varna soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 12.)

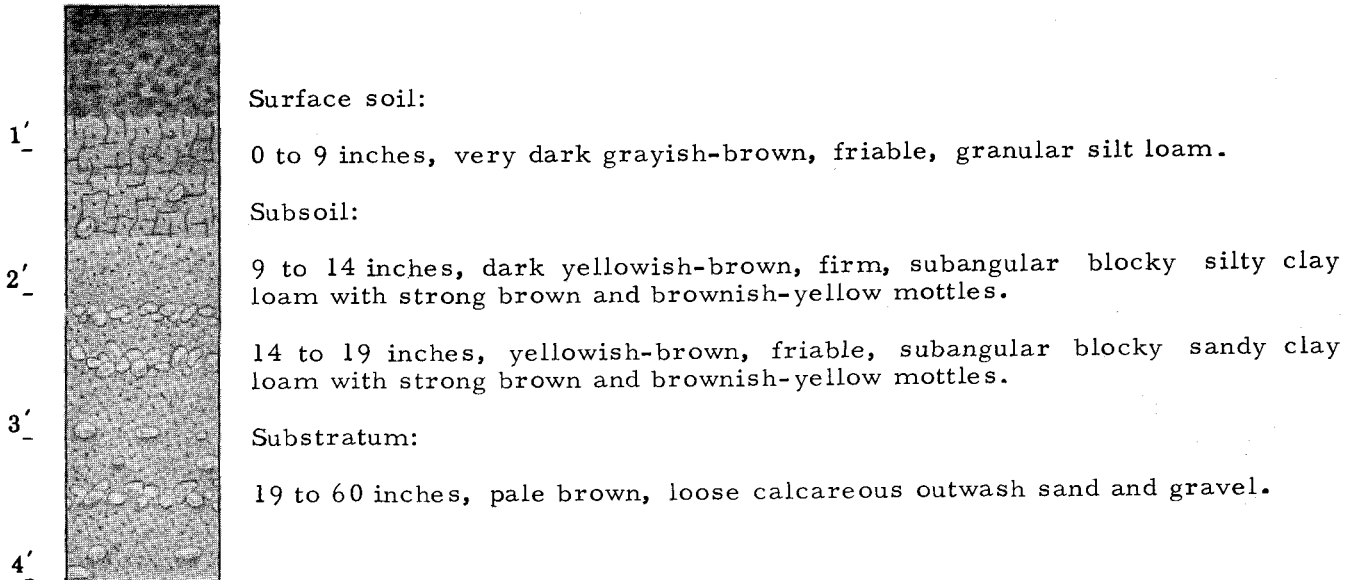
3251V-B-1 Same as 3251-B-1

FABIUS SERIES

The somewhat poorly drained, nearly level to sloping soils of the Fabius series have developed in loamy outwash overlying calcareous sand and gravel. They occupy depressions and drainageways of outwash

plains.

The following profile description of 182-A-1 Fabius silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil textures are silt loam, loam and sandy loam. These soils range in thickness from 12 to 20 inches.

The Fabius soils are subject to ponding and have a high water table. Sloping areas have a water erosion hazard. They are fair cropland soils when adequately drained.

174-A-1 Fabius loam, 0 to 2 percent slopes

This soil differs from 182-A-1 by having a loam surface soil. Small areas of Casco, Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

109-A-1 Same as 174-A-1

174-B-1 Fabius loam, 2 to 6 percent slopes

This soil differs from 182-A-1 by having a loam surface soil and a slight water erosion hazard. Small areas of Casco, Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

109-B-1 Same as 174-B-1

174-B-2 Fabius loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 182-A-1 by having a thinner, lighter colored dark grayish-brown loam surface soil. It has a slight water erosion hazard. Small areas of Casco, Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

174Z-B-1 Fabius loam, clayey substratum, 2 to 6 percent slopes

This soil differs from 182-A-1 by having a loam surface soil. The lower part of the substratum is slowly permeable clay. This soil has a slight water erosion hazard. Small areas of Casco, Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

174R-B-1 Fabius loam, rock substratum 2 to 6 percent slopes

This soil differs from 182-A-1 by having a loam surface soil. The lower part of the substratum is fissured dolomite bedrock. This soil has a slight water erosion hazard. Small areas of Casco, Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

175-A-1 Fabius sandy loam, 0 to 2 percent slopes

This soil differs from 182-A-1 by having a sandy loam surface soil. Small areas of Casco, Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

175-B-1 Fabius sandy loam, 2 to 6 percent slopes

This soil differs from 182-A-1 by having a sandy loam surface soil and a slight water erosion hazard. Small areas of Casco, Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

175-C-2 Fabius sandy loam, 6 to 12 percent slopes, moderately eroded

This soil differs from 182-A-1 by having a thinner, lighter colored dark grayish-brown sandy loam surface soil. It has a moderate water erosion hazard. Small areas of Casco and Matherton soils are included in this mapping unit. (Capability Unit IIIe-8; Woodland Suitability Group 7.)

175-D-3 Fabius sandy loam, 12 to 20 percent slopes, severely eroded

This soil differs from 182-A-1 by having a very thin, light colored grayish-brown sandy loam surface soil and a severe water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit IVe-8; Woodland Suitability Group 7.)

175Z-B-1 Fabius sandy loam, clay substratum, 2 to 6 percent slopes

This soil differs from 182-A-1 by having a sandy loam surface soil. The lower part of the substratum is slowly permeable clay. This soil has a slight water erosion hazard. Small areas of Casco, Matherton and Mussey soils are included with this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

182-A-1 Fabius silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Casco, Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

182-B-1 Fabius silt loam, 2 to 6 percent slopes

This soil is similar to 182-A-1, but it has a slight water erosion hazard. Small areas of Casco, Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

182Z-A-1 Fabius silt loam, clay substratum, 0 to 2 percent slopes

This soil is similar to 182-A-1, but the lower part of the substratum is slowly permeable clay. Small areas of Casco, Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

109Z-A-1 Same as 182Z-A-1

182Z-B-1 Fabius silt loam, clay substratum, 2 to 6 percent slopes

This soil is similar to 182-A-1, but the lower part of the substratum is slowly permeable clay. This soil has a slight water erosion hazard. Small areas of Casco, Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

109Z-B-1 Same as 182Z-B-1

182Y-A-1 Fabius silt loam, loam substratum, 0 to 2 percent slopes

This soil is similar to 182-A-1, but the lower part of the substratum is loam. Small areas of Casco, Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

182Y-C-1 Fabius silt loam, loam substratum, 6 to 12 percent slopes

This soil is similar to 182-A-1, but the lower part of the substratum is loam. This soil has a moderate water erosion hazard. Small areas of Casco, Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIe-8; Woodland Suitability Group 7.)

182V-A-1 Fabius silt loam, silt and fine sand substratum, 0 to 2 percent slopes

This soil is similar to 182-A-1, but the lower part of the substratum is silt and fine sand. Small areas of Casco, Matherton and Mussey soils are included in this mapping unit.

(Capability Unit IIw-5; Woodland Suitability Group 7.)

109V-A-1 Same as 182V-A-1

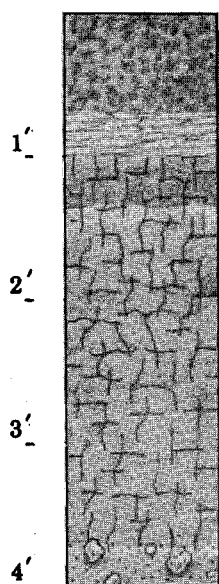
182V-B-1 Fabius silt loam, silt and fine sand substratum, 2 to 6 percent slopes

This soil is similar to 182-A-1, but the lower part of the substratum is silts and fine sands. This soil has a slight water erosion hazard. Small areas of Casco, Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

FLAGG SERIES

The well to moderately well drained, nearly level to gently sloping soils of the Flagg series have developed in a thick silt layer over loam till. They occupy the higher areas of glacial uplands.

The following profile description of 504-B-1 Flagg silt loam, 2 to 6 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, dark grayish-brown, friable, granular silt loam.

8 to 12 inches, grayish-brown, friable, platy silt loam.

Subsoil:

12 to 16 inches, dark brown, friable, subangular blocky silty clay loam.

16 to 44 inches, dark yellowish-brown, firm, subangular blocky silty clay loam with few yellow mottles in the lower part.

44 to 52 inches, dark yellowish-brown, friable, subangular blocky sandy clay loam with few gray and yellow mottles.

Substratum:

52 to 60 inches, yellowish-brown, friable, massive, calcareous glacial loam till.

The silt layer ranges in thickness from 30 to 50 inches. In some places the subsoil does not have any mottling. The substratum ranges from loam to sandy loam.

Sloping areas have a water erosion hazard. These Flagg soils are good for cropland. The wet variant soils are also good cropland soils when adequately drained.

504-A-1 Flagg silt loam, 0 to 2 percent slopes

This soil is similar to 504-B-1, but it does not have a water erosion hazard. Small areas of Pecatonica and Flagg, wet variant are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)

502-A-1 Same as 504-A-1

504-B-1 Flagg silt loam, 2 to 6 percent slopes

The profile of this soil is the same as that described in the series description. It has a slight water erosion hazard. Small areas of Pecatonica are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

502-B-1 Same as 504-B-1

505-A-1 Flagg silt loam, wet variant, 0 to 2 percent slopes

This soil differs from 504-B-1 in being somewhat poorly drained. It is subject to water ponding for short periods. Small areas of Pecatonica and Flagg soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 12.)

511-A-1 Same as 505-A-1

505-B-1 Flagg silt loam, wet variant, 2 to 6 percent slopes

This soil differs from 504-B-1 in being somewhat poorly drained. Small areas of Pecatonica and Flagg soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 12.)

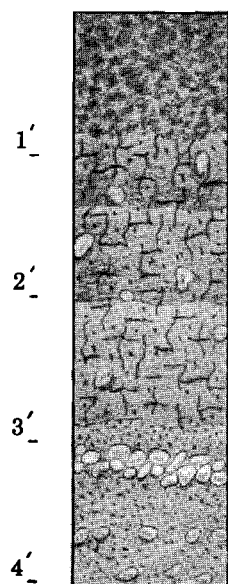
505-C-1 Flagg silt loam, wet variant, 6 to 12 percent slopes

This soil differs from 504-A-1 in being somewhat poorly drained and by having more sloping relief and a moderate water erosion hazard. Small areas of Flagg and Pecatonica soils are included in this mapping unit. (Capability Unit IIIe-8; Woodland Suitability Group 12.)

FOX SERIES

The well drained, nearly level to very steep soils of the Fox series have developed in loamy outwash overlying calcareous sand and gravel. They occupy glacial outwash plains and terraces.

The following profile description of 73-A-1 Fox silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 10 inches, dark grayish-brown, friable, granular silt loam.

Subsoil:

10 to 16 inches, dark brown, firm, subangular blocky silty clay loam.

16 to 24 inches, dark yellowish-brown, firm, subangular blocky clay loam.

24 to 34 inches, dark yellowish-brown, firm, subangular blocky loam.

Substratum:

34 to 60 inches, yellowish-brown, loose calcareous sand and gravel.

Surface soil textures are silt loam, loam and sandy loam. The depth of these soils ranges from 20 to 40 inches. The sandy loam type generally has a sandy clay loam subsoil. The Fox soils have a water erosion hazard on sloping areas. They are drouthy during prolonged dry periods. The nearly level to moderately steep soils are suitability for cropland.

72-A-1 Fox loam, 0 to 2 percent slopes

This soil differs from 73-A-1 by having a loam surface soil. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIs-1; Woodland Suitability Group 1.)

72-B-1 Fox loam, 2 to 6 percent slopes

This gently sloping soil differs from 73-A-1 by having a loam surface soil and a slight water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

72-M-1 Same as 72-B-1

72-B-2 Fox loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 73-A-1 by having a thinner, lighter colored, grayish-brown loam surface soil. It has a slight

water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)



Fox silt loam on nearly level glacial outwash plain.

72-M-2 Same as 72-B-2

73-C-1 Fox loam, 6 to 12 percent slopes

This sloping soil differs from 73-A-1 by having a loam surface soil and a moderate water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 1.)

72-C-2 Fox loam, 2 to 6 percent slopes, moderately eroded

This sloping soil differs from 73-A-1 by having a thinner lighter colored grayish-brown loam surface soil. It has a moderate water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 1.)

72-N-2 Same as 72-C-2

72-D-1 Fox loam, 12 to 20 percent slopes

This moderately steep soil differs from 73-A-1 by having a loam surface soil and a severe water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit IVe-2; Woodland Suitability Group 1.)

72-D-2 Fox loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 73-A-1 by having a thinner, lighter colored grayish-brown loam surface soil. It has a severe water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit IVe-2; Woodland Suitability Group 1.)

72-K-2 Same as 72-D-2

72-E-1 Fox loam, 20 to 30 percent slopes

This steep soil differs from 73-A-1 by having a loam surface soil and a severe water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit VIe-2; Woodland Suitability Group 1.)

72-E-2 Fox loam, 20 to 30 percent slopes, moderately eroded

This steep soil differs from 73-A-1 by having a thinner, lighter colored grayish-brown loam surface soil. It has a very severe water erosion hazard. Small areas of Casco are included in this mapping unit. (Capability Unit VIe-2; Woodland Suitability Group 1.)

72Z-A-1 Fox loam, clay substratum, 0 to 2 percent slopes

This soil differs from 73-A-1 by having a loam surface soil. The lower part of the substratum is slowly permeable clay. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIs-1; Woodland Suitability Group 1.)

72Z-B-1 Fox loam, clay substratum, 2 to 6 percent slopes

This gently sloping soil differs from 73-A-1 by having a loam surface soil. The lower part of the substratum is slowly permeable clay. It has a slight water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

72Z-B-2 Fox loam, clay substratum, 2 to 6 percent slopes

This gently sloping soil differs from 73-A-1 by having a thinner, lighter colored grayish-brown loam surface soil. The lower part

of the substratum is slowly permeable clay. It has a slight water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

72Z-C-1 Fox loam, clay substratum, 6 to 12 percent slopes

This sloping soil differs from 73-A-1 by having a loam surface soil and the lower part of the substratum is slowly permeable clay. It has a moderate water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 1.)

72Y-A-1 Fox loam, loam substratum, 0 to 2 percent slopes

This soil differs from 73-A-1 by having a loam surface soil. The lower part of the substratum is loam. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIs-1; Woodland Suitability Group 1.)

72Y-B-1 Fox loam, loam substratum, 2 to 6 percent slopes

This gently sloping soil differs from 73-A-1 by having a loam surface soil. The lower part of the substratum is loam. It has a slight water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

72Y-B-2 Fox loam, loam substratum, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 73-A-1 by having a thinner, lighter colored grayish-brown loam surface soil. The lower part of the substratum is loam. It has a slight water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

72R-B-2 Fox loam, rock substratum, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 73-A-1 by having a thinner, lighter colored grayish-brown loam surface soil. The lower part of the substratum is fissured dolomite bedrock. It has a slight water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capa-

bility Unit IIe-2; Woodland Suitability Group 1.)

72V-A-1 Fox loam, silt and fine sand substratum, 0 to 2 percent slopes

This soil differs from 73-A-1 by having a loam surface soil. The lower part of the substratum is silt and fine sand. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIs-1; Woodland Suitability Group 1.)

72V-B-1 Fox loam, silt and fine sand substratum, 2 to 6 percent slopes

This gently sloping soil differs from 73-A-1 by having a loam surface soil. The lower part of the substratum is silt and fine sand. It has a slight water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

72V-B-2 Fox loam, silt and fine sand substratum, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 73-A-1 by having a thinner, lighter colored grayish-brown loam surface soil. The lower part of the substratum is silt and fine sand. It has a slight water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

70V-M-2 Same as 72V-B-2

72V-C-1 Fox loam, silt and fine sand substratum, 2 to 6 percent slopes

This sloping soil is similar to 73-A-1, but it has a loam surface soil. The lower part of the substratum is silt and fine sand. It has a moderate water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 1.)

70-A-1 Fox sandy loam, 0 to 2 percent slopes

This soil differs from 73-A-1 by having a sandy loam surface soil. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 1.)

70-B-1 Fox sandy loam, 2 to 6 percent slopes

This gently sloping soil differs from 73-A-1 by having a sandy loam surface soil and a slight water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

70-M-1 Same as 70-B-1

70-B-2 Fox sandy loam 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 73-A-1 by having a thinner, lighter colored grayish-brown sandy loam surface soil. It has a slight water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

70-C-1 Fox sandy loam, 6 to 12 percent slopes

This sloping soil differs from 73-A-1 by having a sandy loam surface soil and a moderate water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

70-C-2 Fox sandy loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 73-A-1 by having a thinner, lighter colored grayish-brown sandy loam surface soil. It has a moderate water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

70-D-1 Fox sandy loam, 12 to 20 percent slopes

This moderately steep soil differs from 73-A-1 by having a sandy loam surface soil and a severe water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit IVs-7; Woodland Suitability Group 3.)

70-D-2 Fox sandy loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 73-A-1 by having a thinner, lighter colored grayish-brown sandy loam surface soil. It has a severe water erosion hazard. Small

areas of Casco soils are included in this mapping unit. (Capability Unit IVs-7; Woodland Suitability Group 3.)

70-F-1 Fox sandy loam, 30 to 45 percent slopes

This very steep soil differs from 73-A-1 by having a thin sandy loam surface soil and a very severe water erosion hazard. It is too steep for the operation of equipment for pasture renovation of woodland production. Small areas of Rodman and Casco soils are included in this mapping unit. (Capability Unit VIIs-7; Woodland Suitability Group 3.)

70Z-A-1 Fox sandy loam, clay substratum, 0 to 2 percent slopes

This soil differs from 73-A-1 by having a sandy loam surface soil. The lower part of the substratum is slowly permeable clay. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

70Z-B-1 Fox sandy loam, clay substratum, 2 to 6 percent slopes

This gently sloping soil differs from 73-A-1 by having a sandy loam surface soil. The lower part of the substratum is slowly permeable clay. It has a slight water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

70Z-C-1 Fox sandy loam, clay substratum, 6 to 12 percent slopes

This sloping soil differs from 73-A-1 by having a sandy loam surface soil. The lower part of the substratum is slowly permeable clay. It has a moderate water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

70Y-A-1 Fox sandy loam, loam substratum, 0 to 2 percent slopes

This soil differs from 73-A-1 by having a sandy loam surface soil. The lower part of the substratum is loam. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

70Y-B-1 Fox sandy loam, loam substratum, 2 to 6 percent slopes

This gently sloping soil differs from 73-A-1 by having a sandy loam surface soil. The lower part of the substratum is loam. It has a slight water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

70V-B-1 Fox sandy loam, silt and fine sand substratum, 2 to 6 percent slopes

This gently sloping soil differs from 73-A-1 by having a sandy loam surface soil. The lower part of the substratum is silt and fine sand. It has a slight water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

73-A-1 Fox silt loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Casco, Ockley and Ionia soils are included in this mapping unit. (Capability Unit IIs-1; Woodland Suitability Group 1.)

73-B-1 Fox silt loam, 2 to 6 percent slopes

✓ This gently sloping soil is similar to 73-A-1, but it has a slight water erosion hazard. Small areas of Casco, Ockley and Ionia soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

73-M-1 Same as 73-B-1

73-B-2 Fox silt loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 73-A-1 by having a thinner, lighter colored grayish-brown surface soil. It has a slight water erosion hazard. Small areas of Casco, Ockley and Ionia soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

73-M-2 Same as 73-B-2

73-C-1 Fox silt loam, 6 to 12 percent slopes

This sloping soil is similar to 73-A-1, but it has a moderate water erosion hazard. Small areas of Casco are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

73-N-1 Same as 73-C-1

73-C-2 Fox silt loam, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 73-A-1, but it has a thinner, lighter colored grayish-brown surface soil. It has a moderate water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

73-D-1 Fox silt loam, 12 to 20 percent slopes

This moderately steep soil is similar to 73-A-1, but it has a severe water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit IVe-2; Woodland Suitability Group 1.)

73-D-2 Fox silt loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil is similar to 73-A-1, but it has a thinner, lighter colored grayish-brown surface soil. It has a severe water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit IVe-2; Woodland Suitability Group 1.)

73-E-1 Fox silt loam, 20 to 30 percent slopes

This steep soil is similar to 73-A-1, but it has a very severe water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit VIe-2; Woodland Suitability Group 1.)

73Z-A-1 Fox silt loam, clay substratum, 0 to 2 percent slopes

This soil is similar to 73-A-1, but the lower part of the substratum is slowly permeable clay. Small areas of Casco, Ockley and Ionia soils are included in this mapping unit. (Capability Unit IIs-1; Woodland Suitability Group 1.)

73Z-B-1 Fox silt loam, clay substratum, 2 to 6 percent slopes

This gently sloping soil is similar to 73-A-1, but the lower part of the substratum is slowly permeable clay. It has a slight water erosion hazard. Small areas of Casco, Ockley and Ionia soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

73Z-B-2 Fox silt loam, clay substratum, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 73-A-1 by having a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is slowly permeable clay. It has a slight water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

73Y-B-1 Fox silt loam, loam substratum, 2 to 6 percent slopes

This gently sloping soil is similar to 73-A-1, but the lower part of the substratum is loam. It has a slight water erosion hazard. Small areas of Casco and Fabius soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

73Y-B-2 Fox silt loam, loam substratum, 2 to 6 percent slopes, moderately eroded

This gently sloping soil is similar to 73-A-1, but it has a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is loam. It has a slight water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

73Y-C-2 Fox silt loam, loam substratum, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 73-A-1 by having a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is loam. It has a moderate water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 1.)

73R-B-1 Fox silt loam, rock substratum, 2 to 6 percent slopes

This gently sloping soil is similar to 73-A-1, but the lower part of the underlying material is fissured dolomite bedrock. It has a slight water erosion hazard. Small areas of Casco, Ockley and Ionia soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

73V-A-1 Fox silt loam, silt and fine sand substratum, 0 to 2 percent slopes

This soil is similar to 73-A-1, but the lower part of the substratum is silt and fine sand. Small areas of Casco, Ockley and Ionia soils are included in this mapping unit. (Capability Unit IIs-1; Woodland Suitability Group 1.)

73V-B-1 Fox silt loam, silt and fine sand substratum, 2 to 6 percent slopes

This gently sloping soil is similar to 73-A-1, but the lower part of the substratum is silt and fine sand and it has a slight water erosion hazard. Small areas of Casco, Ockley and Ionia soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

73V-B-2 Fox silt loam, silt and fine sand substratum, 2 to 6 percent slopes, moderately eroded

This gently sloping soil is similar to 73-A-1, but it has a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is silt and fine sand. It has a slight water erosion hazard. Small areas of Casco and Ionia soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

73V-C-2 Fox silt loam, silt and fine sand substratum, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 73-A-1 by having a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is silt and fine sand. It has a moderate water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 1.)

70-C-3 Fox soils, 6 to 12 percent slopes, severely eroded

This sloping soil differs from 73-A-1 by having a very thin, light colored grayish-brown and brown sandy loam grading to sandy clay loam surface soil. It has a moderate water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit IVe-7; Woodland Suitability Group 3.)

72-C-3 Same as 70-C-3

73-C-3 Same as 70-C-3

72-D-3 Fox soils, 12 to 20 percent slopes, severely eroded

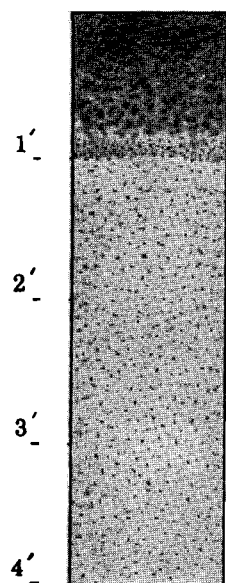
This moderately steep soil differs from 73-A-1 by having a very thin, light colored grayish-brown and dark brown loam grading

to clay loam surface soil. It has a severe water erosion hazard. Small areas of Casco are included in this mapping unit. (Capability Unit VIe-2; Woodland Suitability Group 1.)

GRANBY SERIES

The poorly drained, nearly level to gently sloping soils of the Granby series have formed in sandy outwash material. They occupy depressions and drainageways in outwash plains.

The following profile description of 386-A-1 Granby fine sandy loam, 0 to 2 percent slopes is representative of the series:



Surface soil:

0 to 10 inches, black, friable, weak granular fine sandy loam.

10 to 12 inches, dark loose, single grained loamy fine sand.

Substratum:

12 to 60 inches, dark gray with many mottles of yellowish-brown, loose, single grained sand.

Surface soil textures are fine sandy loam and loamy sand and the thickness ranges from 7 to 16 inches.

The Granby soils have a wetness hazard and sloping areas have a water erosion hazard. They have a low natural fertility. They are fair to poor cropland soils when adequately drained.

386-A-1 Granby fine sandy loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Tedrow soils are included in this mapping unit. (Capability Unit IIIw-5; Woodland Suitability Group 8.)

66-A-1 Same as 386-A-1

67-A-1 Same as 386-A-1

386-B-1 Granby fine sandy loam, 2 to 6 percent slopes

This gently sloping soil is similar to 386-A-1, but it has a slight water erosion hazard. Small areas of Tedrow soils are included in this mapping unit. (Capability Unit IIIw-5; Woodland Suitability Group 8.)

66-B-1 Same as 386-B-1

67-B-1 Same as 386-B-1

67-M-1 Same as 386-B-1

386Z-A-1 Granby fine sandy loam, clay substratum, 0 to 2 percent

This soil is similar to 386-A-1, but the lower part of the substratum is slowly permeable clay. Small areas of Sebewa and Tedrow soils are included in this mapping unit.

(Capability Unit IIIw-5; Woodland Suitability Group 8.)

386Y-A-1 Granby fine sandy loam, loam substratum, 0 to 2 percent slopes

This soil is similar to 386-A-1, but the lower part of the substratum is loam. Small areas of Brookston and Tedrow soils are included in this mapping unit. (Capability Unit IIIw-5; Woodland Suitability Group 8.)

387-A-1 Granby loamy sand, 0 to 2 percent slopes

This soil differs from 386-A-1 by having a loamy sand surface soil. Small areas of Tedrow soils are included in this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

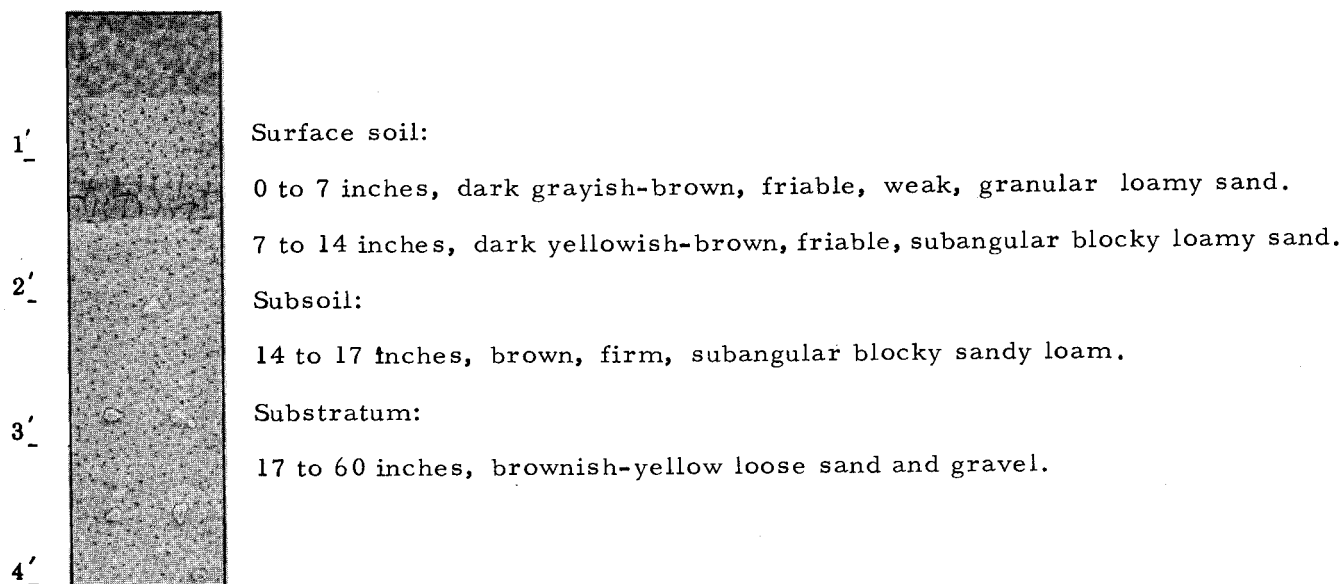
387V-A-1 Granby loamy sand, silt and fine sand substratum, 0 to 2 percent slopes

This soil differs from 386-A-1 by having a loamy sand surface soil. The lower part of the substratum is silt and fine sand. Small areas of Tedrow and Keowns soils are included in this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

HACKETT SERIES

The somewhat excessively drained, nearly level to very steep soils of the Hackett series have formed in sandy material. They occupy outwash plains, terraces and escarpments.

The following profile description of 288-A-1 Hackett loamy sand, 0 to 2 percent slopes, is representative of the series.



Surface soil textures are loam, sandy loam and loamy sand. The depth to loose sand ranges from 10 to 20 inches.

These Hackett soils are drouthy and have a wind erosion hazard. They have a low natural fertility. Sloping areas have a water erosion hazard.

281-B-1 Hackett loam, 2 to 6 percent slopes

This gently sloping soil differs from 288-A-1 by having a loam surface soil and slight

water erosion hazard. Small areas of Fox and Casco soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 3.)

281-B-2 Hackett loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 288-A-1 by having a thinner, lighter colored grayish-brown surface soil. It has a slight water erosion hazard. Small areas of Fox and Casco soils are included in this mapping

unit. (Capability Unit IIIe-4; Woodland Suitability Group 3.)

281-C-2 Hackett loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 288-A-1 by having a thinner, lighter colored grayish-brown loam surface soil. It has a moderate water erosion hazard. Small areas of Casco and Boyer soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 3.)

281-D-1 Hackett loam, 12 to 20 percent slopes

This moderately steep soil differs from 288-A-1 by having a loam surface soil and a severe water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 3.)

281-D-2 Same as 281-D-1

288-A-1 Hackett loamy sand, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Casco and Boyer soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

288-A-2 Hackett loamy sand, 0 to 2 percent slopes, moderately eroded

This soil is similar to 288-A-1, but it has a thinner, lighter colored grayish-brown surface soil. Small areas of Casco and Boyer soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

288-B-1 Hackett loamy sand, 2 to 6 percent slopes

This gently sloping soil is similar to 288-A-1, but it has a slight water erosion hazard. Small areas of Casco and Boyer soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

195-B-1 Same as 288-B-1

271-B-1 Same as 288-B-1

288-M-1 Same as 288-B-1

288-B-2 Hackett loamy sand, 2 to 6 per-

cent slopes, moderately eroded

This gently sloping soil is similar to 288-A-1, but it has a thinner, lighter colored grayish-brown surface soil. It has a slight water erosion hazard. Small areas of Casco, Fox and Boyer soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

97-B-2 Same as 288-B-2

97-M-2 Same as 288-B-2

195-B-2 Same as 288-B-2

195-M-2 Same as 288-B-2

271-B-2 Same as 288-B-2

288-M-2 Same as 288-B-2

288-B-3 Hackett loamy sand, 2 to 6 percent slopes, severely eroded

This gently sloping soil is similar to 288-A-1, but it has a very thin, light colored grayish-brown and yellowish-brown sandy loam surface soil. It has a slight water erosion hazard. Small areas of Fox, Casco and Boyer soils are included in this mapping unit. (Capability Unit VIIs-3; Woodland Suitability Group 4.)

288-C-1 Hackett loamy sand, 6 to 12 percent slopes

This sloping soil is similar to 288-A-1, but it has a moderate water erosion hazard. Small areas of Casco and Boyer soils are included in this mapping unit. (Capability Unit IVe-9; Woodland Suitability Group 4.)

97-C-1 Same as 288-C-1

195-C-1 Same as 288-C-1

271-C-1 Same as 288-C-1

288-N-1 Same as 288-C-1

288-C-2 Hackett loamy sand, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 288-A-1, but it has a thinner, lighter colored grayish-brown surface soil. It has a moderate water erosion hazard. Small areas of Casco and Boyer soils are included in this mapping unit. (Capability Unit IVe-9; Woodland Suitability Group 4.)

97-C-2 Same as 288-C-2

97-M-2 Same as 288-C-2

195-C-2 Same as 288-C-2

271-C-2 Same as 288-C-2

288-N-2 Same as 288-C-2

288-D-1 Hackett loamy sand, 12 to 20 percent slopes

This moderately steep soil is similar to 288-A-1, but it has a severe water erosion hazard. Small areas of Casco and Boyer soils are included in this mapping unit. (Capability Unit VIe-9; Woodland Suitability Group 4.)

97-D-1 Same as 288-D-1

97-K-1 Same as 288-D-1

195-D-1 Same as 288-D-1

271-D-1 Same as 288-D-1

288-K-1 Same as 288-D-1

288-D-2 Hackett loamy sand, 12 to 20 percent slopes, moderately eroded

This moderately steep soil is similar to 288-A-1, but it has a thinner, lighter colored grayish-brown surface soil. It has a severe water erosion hazard. Small areas of Casco and Boyer soils are included in this mapping unit. (Capability Unit VIe-9; Woodland Suitability Group 4.)

97-D-2 Same as 288-D-2

97-K-2 Same as 288-D-2

195-D-2 Same as 288-D-2

195-K-2 Same as 288-D-2

288-K-2 Same as 288-D-2

288-D-3 Hackett loamy sand, 12 to 20 percent slopes, severely eroded

This moderately steep soil is similar to 288-A-1, but it has a very thin, light colored grayish-brown and yellowish-brown loamy sand surface soil. It has a severe water erosion hazard. Small areas of Casco and Boyer soils are included in this mapping unit. (Capability Unit VIIe-9; Woodland Suit-

ability Group 4.)

288-E-1 Hackett loamy sand, 20 to 30 percent slopes

This steep soil is similar to 288-A-1, but it has a very severe water erosion hazard. Small areas of Casco and Rodman soils are included in this mapping unit. (Capability Unit VIIe-9; Woodland Suitability Group 4.)

97-E-1 Same as 288-E-1

195-E-1 Same as 288-E-1

288-E-2 Hackett loamy sand, 20 to 30 percent slopes, moderately eroded

This steep soil is similar to 288-A-1, but it has a thinner, lighter colored grayish-brown surface soil. It has a very severe water erosion hazard. Small areas of Casco and Rodman soils are included in this mapping unit. (Capability Unit VIIe-9; Woodland Suitability Group 4.)

97-E-2 Same as 288-E-2

195-E-2 Same as 288-E-2

288-F-1 Hackett loamy sand, 30 to 45 percent slopes

This very steep soil is similar to 288-A-1, but it has a very severe erosion hazard. Small areas of Casco and Rodman soils are included in this mapping unit. (Capability Unit VIIe-9; Woodland Suitability Group 4.)

97-F-1 Same as 288-F-1

288-F-2 Hackett loamy sand, 30 to 45 percent slopes, moderately eroded

This very steep soil is similar to 288-A-1, but it has a very severe erosion hazard. Small areas of Casco and Rodman soils are included in this mapping unit. (Capability Unit VIIe-9; Woodland Suitability Group 4.)

288V-B-2 Hackett loamy sand, silt and fine sand substratum, 2 to 6 percent slopes, moderately eroded

This gently sloping soil is similar to 288-A-1, but it has a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is silt and fine sand. It has a slight water erosion hazard. Small areas of Sisson and Boyer soils are included in this mapping unit. (Capability Unit IVs-

3; Woodland Suitability Group 4.)

195V-B-1 Same as 288V-B-2

289-A-1 Hackett sandy loam, 0 to 2 percent slopes

This soil differs from 288-A-1 by having a sandy loam surface soil. Small areas of Boyer and Fox soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 3.)

270-A-1 Same as 289-A-1

270V-A-1 Same as 289-A-1

289-B-1 Hackett sandy loam, 2 to 6 percent slopes

This gently sloping soil differs from 288-A-1 by having a sandy loam surface soil and a slight water erosion hazard. Small areas of Boyer, Casco and Fox soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 3.)

270-B-1 Same as 289-B-1

289-B-2 Hackett sandy loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 288-A-1 by having a thinner, lighter colored grayish-brown sandy loam surface soil and a slight water erosion hazard. Small areas of Fox, Casco and Boyer soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 3.)

289-M-2 Same as 289-B-2

289-C-1 Hackett sandy loam, 6 to 12 percent slopes

This sloping soil differs from 288-A-1 by having a sandy loam surface soil and a moderate water erosion hazard. Small areas of Casco, Boyer and Fox soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 3.)

270-C-1 Same as 289-C-1

289-C-2 Hackett sandy loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 288-A-1 by having a thinner, lighter colored grayish-brown sandy loam surface soil. It has a moderate water erosion hazard. Small ar-

reas of Casco, Boyer and Fox soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 3.)

270-C-2 Same as 289-C-2

289-N-2 Same as 289-C-2

289-D-1 Hackett sandy loam, 12 to 20 percent slopes

This moderately steep soil differs from 288-A-1 by having a sandy loam surface soil and a severe water erosion hazard. Small areas of Casco and Boyer soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 3.)

289-D-2 Hackett sandy loam, 21 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 288-A-1 by having a thinner, lighter colored grayish-brown sandy loam surface soil. It has a severe water erosion hazard. Small areas of Casco and Boyer soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 3.)

289-K-2 Same as 289-D-2

289-E-2 Hackett sandy loam, 20 to 30 percent slopes, moderately eroded

This soil differs from 288-A-1 by having a thinner, lighter colored grayish-brown sandy loam surface soil. It has a very severe water erosion hazard. Small areas of Casco and Boyer soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 3.)

289Z-B-1 Hackett sandy loam, clay substratum, 2 to 6 percent slopes

This soil differs from 288-A-1 by having a sandy loam surface soil. The lower part of the substratum is slowly permeable clay. It has a slight water erosion hazard. Small areas of Hebron, Fox and Boyer soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 3.)

289Y-B-2 Hackett sandy loam, loam substratum, 2 to 6 percent slopes, moderately eroded

This soil differs from 288-A-1 by having a thinner grayish-brown sandy loam surface soil. The lower part of the substratum is loam. It has a moderate water erosion haz-

ard. Small areas of Hochheim, Fox and Boyer soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 3.)

195Y-M-2 Same as 289Y-B-2

289Y-C-2 Hackett sandy loam, loam substratum, 6 to 12 percent slopes, moderately eroded

This soil differs from 288-A-1 by having a thinner, lighter colored grayish-brown sandy loam surface soil. The lower part of the substratum is loam. It has a moderate water erosion hazard. Small areas of Hochheim, Fox and Boyer soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 3.)

195Y-N-2 Same as 289-C-2

289-B-3 Hackett soils, 2 to 6 percent slopes, severely eroded

This gently sloping soil differs from 288-A-1 by having a very thin, light colored grayish-brown and yellowish-brown sand

surface soil. It has a slight water erosion hazard. Small areas of Casco, Fox and Boyer soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 3.)

288-C-3 Hackett soils, 6 to 12 percent slopes, severely eroded

This sloping soil is similar to 288-A-1, but it has a very thin, light colored grayish-brown and yellowish-brown surface soil. It has a moderate water erosion hazard. Small areas of Casco and Boyer soils are included in this mapping unit. (Capability Unit VIe-9; Woodland Suitability Group 4.)

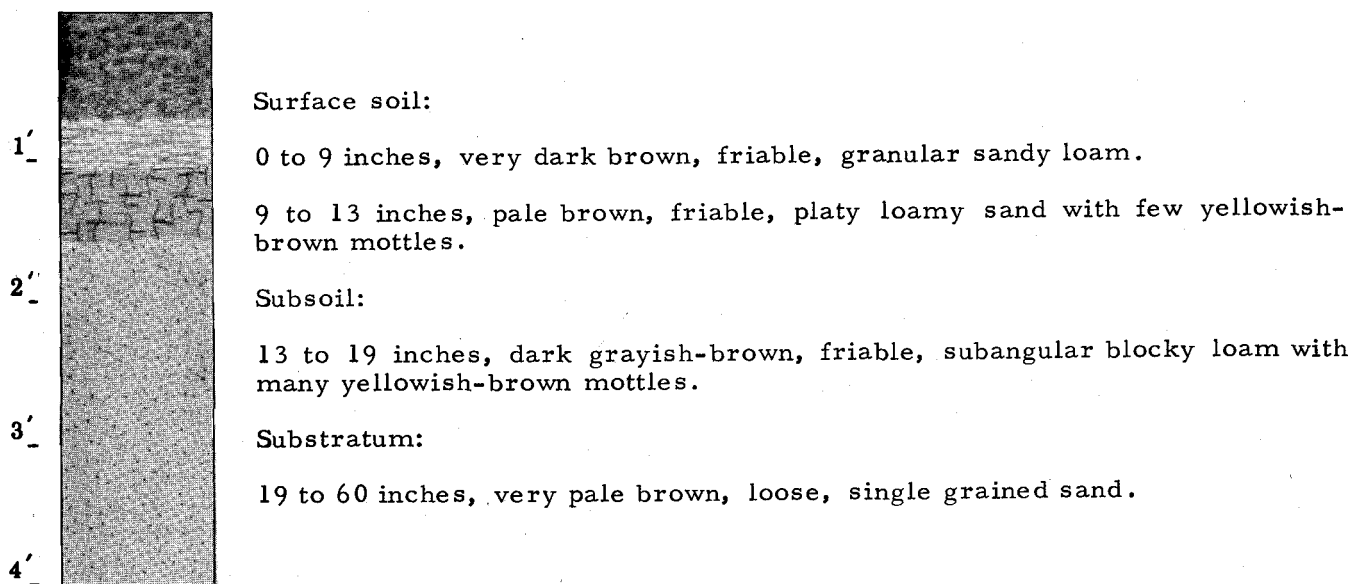
289-D-3 Hackett soils, 12 to 20 percent slopes, severely eroded

This soil differs from 288-A-1 by having a very thin, light colored grayish-brown and yellowish-brown loam surface soil. It has a severe water erosion hazard. Small areas of Casco and Boyer soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 3.)

HACKETT SERIES, WET VARIANT

The somewhat poorly drained, nearly level to gently sloping soils of the Hackett series, wet variant, have developed in sandy material with a moderately high water table. They occupy concave slopes of outwash plains.

The following profile description of 261-A-1 Hackett sandy loam, wet variant, 0 to 2 percent slopes, is representative of the series.



In places the substratum contains gravel.

These soils have a wetness hazard and sloping areas have a water erosion hazard. They are low in natural fertility and are fair cropland soils when adequately drained.

262-A-1 Hackett loamy sand, wet variant, 0 to 2 percent slopes

This soil differs from 261-A-1 by having a loamy sand surface soil. Small areas of Granby soils are included in this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

262-B-1 Hackett loamy sand, wet variant, 2 to 6 percent slopes

This gently sloping soil differs from 261-A-1 by having a loamy sand surface soil and a slight water erosion hazard. Small areas of Granby soils are included in each mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

261-A-1 Hackett sandy loam, wet variant, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Granby soils are included in this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

261-B-1 Hackett sandy loam, wet variant, 2 to 6 percent slopes

This gently sloping soil is similar to 261-A-1, but it has a slight water erosion hazard. Small areas of Granby soils are included in this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

261-B-2 Hackett sandy loam, wet variant, 2 to 6 percent slopes, moderately eroded

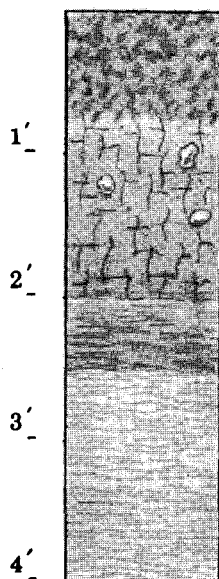
This gently sloping soil is similar to 261-A-1, but it has a thinner, lighter colored dark brown surface soil. It has a slight water erosion hazard. Small areas of Granby soils are included in this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

HEBRON SERIES

The well to moderately well drained, nearly level to moderately steep soils of the Hebron series have developed in a thin layer of loamy outwash material over calcareous lacustrine silts and clays. They occupy glacial lake

basins and terraces.

The following profile description of 21-A-1 Hebron loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 9 inches, dark grayish-brown, friable, weak granular loam.

Subsoil:

9 to 24 inches, dark brown, firm, subangular blocky clay loam.

24 to 30 inches, yellowish-brown, firm, subangular blocky silty clay loam.

Substratum:

30 to 60 inches, light yellowish-brown, friable, massive layers of calcareous clay and silt.

Surface soil textures are silt loam, loam and sandy loam. Brown and yellow mottles occur in the lower part of the subsoil in places.

In places the substratum contains layers of fine sand and silt.

Sloping areas have a water erosion hazard. The substratum and the lower part of the subsoil have slow permeability. They are good cropland soils on lower slopes.

21-A-1 Hebron loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Fox, Saylesville and Mosel soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 1.)

21-B-1 Hebron loam, 2 to 6 percent slopes

This gently sloping soil is similar to 21-A-1, but it has a slight water erosion hazard. Small areas of Fox, Saylesville and Mosel soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 1.)

21-B-2 Hebron loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil is similar to 21-A-1, but it has a thinner, lighter colored grayish-brown surface soil. It has a slight water erosion hazard. Small areas of Fox, Saylesville, and Sisson soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 1.)

21-C-1 Hebron loam, 6 to 12 percent slopes

This sloping soil is similar to 21-A-1, but it has a moderate water erosion hazard. Small areas of Saylesville and Fox soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 1.)

21-C-2 Hebron loam, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 21-A-1, but it has a thinner, lighter colored grayish-brown surface soil. It has a moderate water erosion hazard. Small areas of Saylesville and Fox soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 1.)

21-N-2 Same as 21-C-2

21-D-1 Hebron loam, 12 to 20 percent slopes

This moderately steep soil is similar to 21-A-1, but it has a severe water erosion hazard. Small areas of Saylesville and Fox soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 1.)

21-D-2 Hebron loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil is similar to 21-A-1, but it has a thinner, lighter colored grayish-brown surface soil and a severe water erosion hazard. Small areas of Saylesville and Fox soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 1.)

21-E-2 Hebron loam, 20 to 30 percent slopes

This steep soil is similar to 21-A-1, but it has a severe water erosion hazard. Small areas of Saylesville and Fox soils are included in this mapping unit. (Capability Unit VIe-6; Woodland Suitability Group 1.)

21Y-A-1 Hebron loam, loam substratum, 0 to 2 percent slopes

This soil is similar to 21-A-1, but the lower part of the substratum is loam. Small areas of Hochheim and Saylesville soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 1.)

22-A-1 Hebron sandy loam, 0 to 2 percent slopes

This soil differs from 21-A-1 by having a sandy loam surface soil. Small areas of Fox, Saylesville and Sisson soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 3.)

22-B-1 Hebron sandy loam, 2 to 6 percent slopes

This gently sloping soil differs from 21-A-1 by having a sandy loam surface soil and a slight water erosion hazard. Small areas of Fox, Saylesville and Sisson soils are included in this mapping unit. (Capability Unit IIe-7; Woodland Suitability Group 3.)

195Z-B-1 Same as 22-B-1

22-B-2 Hebron sandy loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 21-A-1 by having a thinner, lighter colored grayish-brown sandy loam surface soil. It has a slight water erosion hazard. Small areas of Fox, Saylesville and Sisson soils are included in this mapping unit. (Capability Unit IIe-7; Woodland Suitability Group 3.)

22-C-1 Hebron sandy loam, 6 to 12 percent slopes

This sloping soil differs from 21-A-1 by having a sandy loam surface soil and a moderate water erosion hazard. Small areas of Saylesville, Fox and Sisson soils are included in this mapping unit. (Capability Unit IIIe-7; Woodland Suitability Group 3.)

22-C-2 Hebron sandy loam, 6 to 12 percent slopes, moderately eroded

This soil differs from 21-A-1 by having a thinner, lighter colored grayish-brown sandy loam surface soil. It has a moderate water erosion hazard. Small areas of Fox, Saylesville and Sisson soils are included in this mapping unit. (Capability Unit IIIe-7; Woodland Suitability Group 3.)

195Z-C-2 Same as 22-C-2

24-A-1 Hebron silt loam, 0 to 2 percent slopes

This soil differs from 21-A-1 by having a silt loam surface soil. Small areas of Saylesville and Mosel soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 1.)

24-B-1 Hebron silt loam, 2 to 6 percent slopes

This gently sloping soil differs from 21-A-1 by having a silt loam surface soil and a slight water erosion hazard. Small areas of Saylesville and Mosel soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 1.)

24-B-2 Hebron silt loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 21-A-1 by having a thinner, lighter colored grayish-brown silt loam surface soil. It has a slight water erosion hazard. Small areas of Saylesville and Mosel soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 1.)

24-C-1 Hebron silt loam, 6 to 12 percent slopes

This soil differs from 21-A-1 by having a silt loam surface soil and a moderate water erosion hazard. Small areas of Sisson, Fox and Saylesville soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 1.)

24-C-2 Hebron silt loam, 6 to 12 percent slopes, moderately eroded

This soil differs from 21-A-1 by having a thinner, lighter colored grayish-brown silt loam surface soil. It has a moderate water erosion hazard. Small areas of Sisson, Fox and Saylesville soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 1.)

24-D-1 Hebron silt loam, 12 to 20 percent slopes

This soil differs from 21-A-1 by having a silt loam surface soil and a severe water erosion hazard. Small areas of Saylesville, Sisson and Fox soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 1.)

24-D-2 Hebron silt loam, 12 to 20 percent slopes, moderately eroded

This soil differs from 21-A-1 by having a thinner, lighter colored grayish-brown silt loam surface soil. It has a severe water erosion hazard. Small areas of Saylesville, Sisson and Fox soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 1.)

22-C-3 Hebron soils, 6 to 10 percent slopes, severely eroded

This soil differs from 21-A-1 by having a very thin, lighter colored, grayish-brown and dark brown sandy loam to sandy clay loam surface soil. It has a moderate water erosion hazard. Small areas of Sisson and Fox soils are included in this mapping unit. (Capability Unit IVe-7; Woodland Suitability Group 3.)

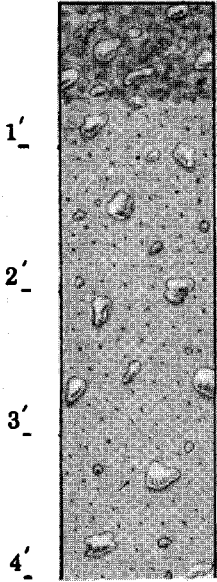
21-D-3 Hebron soils, 12 to 20 percent slopes, severely eroded

This moderately steep soil differs from 21-A-1 by having a very thin, light colored grayish-brown and dark brown clay loam to silty clay loam surface soil. It has a severe water erosion hazard. Small areas of Saylesville and Fox soils are included in this mapping unit. (Capability Unit VIe-6; Woodland Suitability Group 1.)

HENNEPIN SERIES

The excessively drained, moderately steep to steep soils of the Hennepin series have formed in loamy till. They occupy steep slopes of the glacial uplands.

The following profile description of 359-D-1 Hennepin loam, 12 to 20 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, dark grayish-brown, friable, weak granular loam.

Substratum:

8 to 60 inches, light yellowish-brown, calcareous glacial loam till.

The surface soil ranges from 6 to 12 inches thick and the substratum ranges from gravelly sandy loam to gravelly loam in texture.

These Hennepin soils have a severe drouth hazard and sloping areas have an erosion hazard. They are very poor cropland soils.

359-D-1 Hennepin loam, 12 to 20 percent slopes

The profile description of this soil is part of the series description. It has a severe water erosion hazard. Small areas of Casco and Hochheim soils are included in this mapping unit. (Capability Unit VIs-5; Woodland Suitability Group 5.)

359-E-1 Hennepin loam, 20 to 30 percent slopes

This soil is similar to 359-D-1, but it has a very severe water erosion hazard. Small areas of Casco, Rodman and Hochheim soils are included in this mapping unit. (Capability Unit VIIs-5; Woodland Suitability Group 5.)

359-F-1 Hennepin loam, 30 to 45 percent slopes

This soil is similar to 359-D-1, but it has a thinner, lighter colored surface soil and a very severe water erosion hazard. Small areas of Casco, Rodman and Hochheim are included in this mapping unit. (Capability Unit VIIs-5; Woodland Suitability Group 5.)

HILLSIDE SEEPAGE ¹

This poorly drained, sloping to moderately steep land type consists of hillside areas that are wet almost continuously. These areas are adjacent to springs or are seepage areas on hillsides.

These are mixed organic and mineral material of variable depths over silty clay to

gravel. They have a moderate to severe water erosion hazard.

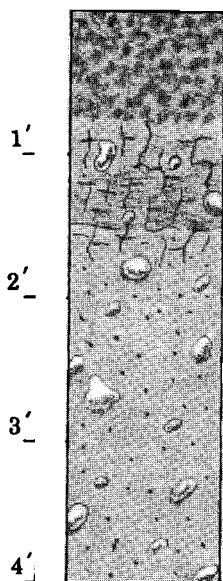
15-C-1 Hillside Seepage

These mapping units are sloping and moderately steep areas that are subject to water seepage. (Capability Unit IIIw-9; Woodland Suitability Group 7.)

HOCHHEIM SERIES

The well drained, nearly level to very steep soils of the Hochheim series have developed in calcareous loam glacial till. They occupy glacial upland ridges and sideslopes.

The following description of 360-B-1 Hochheim silt loam, 2 to 6 percent slopes, is representative of the series.



Surface soil:

0 to 9 inches, dark grayish-brown, friable, weak granular silt loam.

Subsoil:

9 to 18 inches, dark brown, firm subangular blocky clay loam.

Substratum:

18 to 60+ inches, pale brown, calcareous loam glacial till.

Surface soil textures are silt loam, loam and sandy loam. The depth of these soils ranges from 10 to 20 inches. The till varies from loam to sandy loam and in places contains pockets and lenses of silt and sand.

These Hochheim soils have a water erosion hazard on sloping areas. They are good cropland soils on lower slopes.

367-A-1 Hochheim fine sandy loam, 0 to 2 percent slopes

This nearly level soil differs from 360-B-1 by having a sandy loam surface soil. Small

areas of Lamartine soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 5.)

367-B-1 Hochheim fine sandy loam, 2 to 6 percent slopes

This soil differs from 360-B-1 by having a sandy loam surface soil. Small areas of Ashford soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 5.)

357-A-1 Hochheim loam, 0 to 2 percent slopes

This nearly level soil differs from 360-B-1 by having a loam surface soil and no water

¹ Profile sketches have been omitted because of extreme variability.

erosion hazard. Small areas of Lamartine and Ashford soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 5.)



Hochheim and Theresa soils are generally closely associated in this kind of topography. Calcareous loam glacial till is exposed in the road cut.

357-B-1 Hochheim loam, 2 to 6 percent slopes

This soil differs from 360-B-1 by having a loam surface soil. Small areas of Lamartine and Ashford soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 5.)

357-M-1 Same as 357-B-1

357-B-2 Hochheim loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 360-B-1 by having a thinner, lighter colored grayish-brown loam surface soil. Small areas of Lamartine and Ashford soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 5.)

357-M-2 Same as 357-B-2

357-C-1 Hochheim loam, 6 to 12 percent slopes

This sloping soil differs from 360-B-1 by having a loam surface soil and a moderate water erosion hazard. Small areas of Lamartine soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 5.)

357-N-1 Same as 357-C-1

357-C-2 Hochheim loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 360-B-1 by having a thinner, lighter colored grayish-brown loam surface soil. It has a moderate water erosion hazard. Small areas of Lamartine soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 5.)

357-N-2 Same as 357-C-2

357-D-1 Hochheim loam, 12 to 20 percent slopes

This moderately steep soil differs from 360-B-1 by having a loam surface soil and a severe water erosion hazard. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 5.)

357-K-1 Same as 357-D-1

357-D-2 Hochheim loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 360-B-1 by having a thinner, lighter colored grayish-brown loam surface soil. It has a severe water erosion hazard. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 5.)

357-K-2 Same as 357-D-2

357-E-1 Hochheim loam, 20 to 30 percent slopes

This steep soil differs from 360-B-1 by having a loam surface soil and a very severe water erosion hazard. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 5.)

357-E-2 Hochheim loam, 20 to 30 percent slopes, moderately eroded

This steep soil differs from 360-B-1 by having a thinner, lighter colored grayish-brown loam surface soil. It has a very severe water erosion hazard. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 5.)

357-F-1 Hochheim loam, 30 to 45 percent slopes

This very steep soil differs from 360-B-1 by having a loam surface soil and a very severe water erosion hazard. It is too steep to permit operation of equipment for pasture renovation and woodland purposes. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit VIIe-1; Woodland Suitability Group 5.)

357-F-2 Hochheim loam, 30 to 45 percent slopes, moderately eroded

This very steep soil differs from 360-B-1 by having a thinner, lighter colored grayish-brown loam surface soil. It has a very severe water erosion hazard. It is too steep to permit operation of equipment for pasture renovation and woodland purposes. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit VIIe-1; Woodland Suitability Group 5.)

357X-C-2 Hochheim loam, gravelly substratum, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 360-B-1 by having a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is sand and gravel. It has a moderate water erosion hazard. Small areas of Lamartine and Casco soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 5.)

357R-B-1 Hochheim loam, rock substratum, 2 to 6 percent slopes

This soil differs from 360-B-1 by having a loam surface soil. The lower part of the substratum is fissured dolomite bedrock. Small areas of Lamartine soils are included in this mapping. (Capability Unit IIe-2; Woodland Suitability Group 5.)

357R-C-2 Hochheim loam, rock substratum, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 360-B-1 by having a thinner grayish-brown loam surface soil and a moderate water erosion hazard. The lower part of the substratum is fissured dolomite bedrock. Small areas of Lamartine soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 5.)

357R-D-2 Hochheim loam, rock substratum, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 360-B-1 by having a thinner grayish-brown loam surface soil and a severe water erosion hazard. The lower part of the substratum is fissured dolomite bedrock. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit IVe-2; Woodland Suitability Group 5.)

360-B-1 Hochheim silt loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Theresa, Ashford and Lamartine soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 5.)

360-M-1 Same as 360-B-1

360-B-2 Hochheim silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 360-B-1, but it has a thinner, lighter colored surface soil. Small areas of Theresa, Ashford and Lamartine soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 5.)

360-M-2 Same as 360-B-2

360-C-1 Hochheim silt loam, 6 to 12 percent slopes

This sloping soil is similar to 360-B-1, but it has a moderate water erosion hazard. Small areas of Theresa soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 5.)

360-N-1 Same as 360-C-1

360-C-2 Hochheim silt loam, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 360-B-1, but it has a thinner, lighter colored grayish-brown surface soil. It has a moderate water erosion hazard. Small areas of Theresa soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 5.)

360-N-2 Same as 360-C-2

360-D-1 Hochheim silt loam, 12 to 20 percent slopes

This moderately steep soil is similar to

360-B-1, but it has a severe water erosion hazard. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit IVE-1; Woodland Suitability Group 5.)

360-K-1 Same as 360-D-1

360-D-2 Hochheim silt loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 360-B-1 by having a thinner, lighter colored grayish-brown surface soil. It has a severe water erosion hazard. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit IVE-1; Woodland Suitability Group 5.)

360-K-2 Same as 360-D-2

360-E-1 Hochheim silt loam, 20 to 30 percent slopes

This steep soil is similar to 360-B-1, but it has a very severe water erosion hazard. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 5.)

360-E-2 Hochheim silt loam, 20 to 30 percent slopes, moderately eroded

This steep soil differs from 360-B-1 by having a thinner, lighter colored grayish-brown surface soil. It has a very severe water erosion hazard. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 5.)

360-F-1 Hochheim silt loam, 30 to 45 percent slopes

This very steep soil is similar to 360-B-1, but it has a very severe water erosion hazard. It is too steep to permit operation of equipment for pasture renovation and woodland purposes. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit VIIe-1; Woodland Suitability Group 5.)

360-F-2 Hochheim silt loam, 30 to 45 percent slopes, moderately eroded

This very steep soil is similar to 360-B-1, but it has a thinner, lighter colored grayish-brown surface soil. It has a very severe water erosion hazard. It is too steep to permit operation of equipment for pasture renovation and woodland purposes. Small

areas of Hennepin soils are included in this mapping unit. (Capability Unit VIIe-1; Woodland Suitability Group 5.)

360X-B-1 Hochheim silt loam, gravelly substratum, 2 to 6 percent slopes

This soil is similar to 360-B-1, but the lower part of the substratum is sand and gravel. Small areas of Theresa and Casco soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 5.)

360X-C-2 Hochheim silt loam, gravelly substratum, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 360-B-1 by having a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is sand and gravel. It has a moderate water erosion hazard. Small areas of Theresa and Casco soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 5.)

360X-D-1 Hochheim silt loam, gravelly substratum 12 to 20 percent slopes

This moderately steep soil is similar to 360-B-1, but the lower part of the substratum is sand and gravel. It has a severe water erosion hazard. Small areas of Hennepin and Casco soils are included in this mapping unit. (Capability Unit IVE-1; Woodland Suitability Group 5.)

360X-D-2 Hochheim silt loam, gravelly substratum, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 360-B-1 by having a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is sand and gravel. It has a severe water erosion hazard. Small areas of Hennepin and Casco soils are included in this mapping unit. (Capability Unit IVE-1; Woodland Suitability Group 5.)

360R-A-1 Hochheim silt loam, rock substratum, 0 to 2 percent slopes

This nearly level soil is similar to 360-B-1, but the lower part of the substratum is fissured dolomite bedrock. It has little or no water erosion hazard. Small areas of Theresa, Knowles and Lamartine soils are included in this mapping unit. (Capability Unit IIs-1; Woodland Suitability Group 5.)

360R-B-1 Hochheim silt loam, rock substratum, 2 to 6 percent slopes

This soil is similar to 360-B-1, but the lower part of the substratum is fissured dolomite bedrock. Small areas of Theresa, Knowles and Lamartine soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 5.)

360R-B-2 Hochheim silt loam, rock substratum, 2 to 6 percent slopes, moderately eroded

This soil differs from 360-B-1 by having a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is fissured dolomite bedrock. Small areas of Theresa and Knowles soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 5.)

360R-C-1 Hochheim silt loam, rock substratum, 6 to 12 percent slopes

This sloping soil is similar to 360-B-1, but the lower part of the substratum is fissured dolomite bedrock. It has a moderate water erosion hazard. Small areas of Theresa and Knowles soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 5.)

360R-C-2 Hochheim silt loam, rock substratum, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 360-B-1 by having a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is fissured dolomite bedrock. It has a moderate water erosion hazard. Small areas of Theresa and Knowles soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 5.)

360V-C-2 Hochheim silt loam, silt and fine sand substratum, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 360-B-1 by having a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is silt and fine sand. It has a moderate water erosion hazard. Small areas of Theresa soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 5.)

357-B-3 Hochheim soils, 2 to 6 percent slopes, severely eroded

This soil differs from 360-B-1 by having a very thin, light colored grayish-brown and dark brown loam surface soil. It has a slight water erosion hazard. Small areas of Lamartine soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 5.)

357-C-3 Hochheim soils, 6 to 12 percent slopes, severely eroded

This sloping soil differs from 360-B-1 by having a very thin, light colored grayish-brown and dark brown loam surface soil. It has a moderate water erosion hazard. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 5.)

357-N-3 Same as 357-C-3

360-C-3 Same as 357-C-3

357-D-3 Hochheim soils, 12 to 20 percent slopes, severely eroded

This moderately steep soil differs from 360-B-1 by having a very thin, lighter colored grayish-brown and dark brown loam surface soil. It has a severe water erosion hazard. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 5.)

357-K-3 Same as 357-D-3

360-D-3 Same as 357-D-3

357-E-3 Hochheim soils, 20 to 30 percent slopes, severely eroded

This steep soil differs from 360-B-1 by having a very thin, light colored grayish-brown and dark brown loam to clay loam surface soil. It has a very severe water erosion hazard. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit VIIe-1; Woodland Suitability Group 5.)

360-E-3 Same as 357-E-3

360X-D-3 Hochheim soils, gravelly substratum, 12 to 20 percent slopes, severely eroded

This moderately steep soil differs from 360-B-1 by having a very thin, light colored grayish-brown and dark brown silt loam to clay loam surface soil. The lower part of the substratum is sand and gravel. It has a severe water erosion hazard. Small areas of Hennepin and Casco soils are included in

this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 5.)

360V-D-3 Hochheim soils, silt and fine sand substratum, 12 to 20 percent slopes, severely eroded

This moderately steep soil differs from 360-B-1 by having a very thin, light colored grayish-brown and dark brown loam to clay loam surface soil. The lower part of the substratum is silt and fine sand. It has a severe water erosion hazard. Small areas of Hennepin and Sisson soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 5.)

365-B-1 Hochheim-Hennepin loams, 2 to 6 percent slopes

This mapping unit consists of about 50 to 70 percent Hochheim loam. The rest is Hennepin loam. Small areas of Casco soils are included in this mapping unit. Hochheim loam is in Capability Unit IIe-1; Hennepin loam is in VIs-5. Both soils are in Woodland Suitability Group 5.

365-C-1 Hochheim-Hennepin loams, 6 to 12 percent slopes

This mapping unit consists of about 50 to 70 percent Hochheim loam. The rest is Hennepin loam. Small areas of Casco soils are included in this mapping unit. Hochheim loam is in Capability Unit IIIe-1; Hennepin loam is in VIs-5. Both soils are in Woodland Suitability Group 5.

365-C-2 Hochheim-Hennepin loams, 6 to 12 percent slopes, moderately eroded

This mapping unit consists of about 50 to 70 percent Hochheim loam. The rest is Hennepin loam. Small areas of Casco soils are included in this mapping unit. Hochheim loam is in Capability Unit IIIe-1; Hennepin loam is in VIs-5. Both soils are in Woodland Suitability Group 5.

365-N-2 Same as 365-C-2

365-D-1 Hochheim-Hennepin loams, 12 to 20 percent slopes

This mapping unit consists of about 40 to 60 percent Hochheim loam. The rest is Hennepin loam. Small areas of Casco and Rodman soils are included in this mapping unit. Hochheim loam is in Capability Unit IVe-1; Hennepin loam is in VIs-5; both soils are in Woodland Suitability Group 5.

365-K-1 Same as 365-D-1

365-D-2 Hochheim-Hennepin loams, 12 to 20 percent slopes, moderately eroded

This mapping unit consists of about 40 to 60 percent Hochheim loam. The rest is Hennepin loam. Small areas of Casco and Rodman soils are included in this mapping unit. Hochheim loam is in Capability Unit IVe-1; Hennepin loam is in VIs-5. Both soils are in Woodland Suitability Group 5.

365-K-2 Same as 365-D-2

365-D-3 Hochheim-Hennepin loams, 12 to 20 percent slopes, severely eroded

This mapping unit consists of about 40 to 60 percent Hochheim loam. The rest is Hennepin loam. Small areas of Casco and Rodman soils are included in this mapping unit. Hochheim loam is in Capability Unit VIe-1; Hennepin loam is in VIs-5. Both soils are in Woodland Suitability Group 5.

365-E-1 Hochheim-Hennepin loams, 20 to 30 percent slopes

This mapping unit consists of about 40 to 60 percent Hochheim loam. The rest is Hennepin loam. Small areas of Casco and Rodman soils are included in this mapping unit. Hochheim loam is in Capability Unit VIe-1; Hennepin loam is in VIs-5. Both soils are in Woodland Suitability Group 5.

365-E-2 Hochheim-Hennepin loams, 20 to 30 percent slopes, moderately eroded

This mapping unit consists of about 40 to 60 percent Hochheim loam. The rest is Hennepin loam. Small areas of Casco and Rodman soils are included in this mapping unit. Hochheim loam is in Capability Unit VIe-1; Hennepin loam is in VIs-5. Both soils are in Woodland Suitability Group 5.

365-E-3 Hochheim-Hennepin loams, 20 to 30 percent slopes, severely eroded

This mapping unit consists of about 40 to 60 percent Hochheim loam. The rest is Hennepin loam. Small areas of Casco and Rodman soils are included in this mapping unit. Hochheim loam is in Capability Unit VIIe-1; Hennepin loam is in VIs-5. Both soils are in Woodland Suitability Group 5.

365-F-1 Hochheim-Hennepin loams, 30 to 45 percent slopes

This mapping unit consists of about 40 to 60 percent Hochheim loam. The rest is Hennepin loam. Small areas of Casco and Rodman loams are included in this mapping unit. Hochheim loam is in Capability Unit VIIe-1; Hennepin loam is in VIIe-5. Both soils are in Woodland Suitability Group 5.

365-F-2 Hochheim-Hennepin loams, 30 to 45 percent slopes, moderately eroded

This mapping unit consists of about 40 to 60 percent Hochheim loam. The rest is Hennepin loam. Small areas of Casco and Rodman soils are included in this mapping unit. Hochheim loam is in Capability Unit VIIe-1; Hennepin loam is in VIIe-5. Both soils are in Woodland Suitability Group 5.

365X-D-1 Hochheim-Hennepin loams, gravelly substratum, 12 to 20 percent slopes

This mapping unit consists of about 40 to 60 percent Hochheim loam gravelly substratum. The rest is Hennepin loam. Small areas of Casco soils are included in this mapping unit. Hochheim loam is in Capability Unit IVe-1; Hennepin loam is in VIe-5. Both soils are in Woodland Suitability Group 5.

365X-F-1 Hochheim-Hennepin loams, gravelly substratum, 30 to 45 percent slopes

This mapping unit consists of about 40 to 60 percent Hochheim loam gravelly substratum. The rest is Hennepin loam. Small areas of Casco and Rodman soils are included in this mapping unit. Hochheim loam is in Capability Unit VIe-1; Hennepin loam is in VIIe-5. Both soils are in Woodland Suitability Group 5.

160-A-1 Hochheim-Sisson-Casco loams, 0 to 2 percent slopes

This mapping unit consists of about 40 percent Hochheim loams in Capability Unit I-1, Woodland Suitability Group 5; about 35 percent Sisson loams in Capability Unit I-1, Woodland Suitability Group 1 and about 25 percent Casco loams in Capability Unit IIIs-2, Woodland Suitability Group 5. Small areas of Theresa and Fox soils are included in this mapping unit.

160-B-1 Hochheim-Sisson-Casco loams, 2 to 6 percent slopes

This mapping unit consists of about 40 percent Hochheim loams in Capability Unit IIe-

1, Woodland Suitability Group 5; about 35 percent Sisson loams in Capability Unit IIe-1, Woodland Suitability Group 1; and about 25 percent Casco loams in Capability Unit IIIs-4, Woodland Suitability Group 5. Small areas of Theresa and Fox soils are included in this mapping unit.

160-M-1 Same as 160-B-1

160-B-2 Hochheim-Sisson-Casco loams, 2 to 6 percent slopes, moderately eroded

This mapping unit consists of about 40 percent Hochheim loams in Capability Unit IIe-1, Woodland Suitability Group 5; about 35 percent Sisson loams, in Capability Unit IIe-1, Woodland Suitability Group 5; and about 25 percent Casco loams in Capability Unit IIIs-4, Woodland Suitability Group 5. Small areas of Theresa and Fox soils are included in this mapping unit.

160-M-2 Same as 160-B-2

160-C-1 Hochheim-Sisson-Casco loams, 6 to 12 percent slopes

This mapping unit consists of about 40 percent Hochheim loams in Capability Unit IIIs-1, Woodland Suitability Group 5; about 35 percent Sisson loams, in Capability Unit IIIs-1, Woodland Suitability Group 1; and about 25 percent Casco loams in Capability Unit IVe-4, Woodland Suitability Group 5. Small areas of Theresa and Fox soils are included in this mapping unit.

160-N-1 Same as 160-C-1

160-C-2 Hochheim-Sisson-Casco loams, 6 to 12 percent slopes, moderately eroded

This mapping unit consists of about 40 percent Hochheim loams in Capability Unit IIIs-1, Woodland Suitability Group 5; about 35 percent Sisson loams in Capability Unit IIIs-1, Woodland Suitability Group 1; and about 25 percent Casco loams in Capability Unit IVe-4, Woodland Suitability Group 5.

160-N-2 Same as 160-C-2

160-C-3 Hochheim-Sisson-Casco loams, 6 to 12 percent slopes, severely eroded

This mapping unit consists of about 40 percent Hochheim loams in Capability Unit IVe-1, Woodland Suitability Group 5; about 35 percent Sisson loams in Capability Unit IVe-1, Woodland Suitability Group 1; and about

25 percent Casco loams in Capability Unit VIe-4, Woodland Suitability Group 5. Small areas of Fox soils are included in this mapping unit.

160-D-1 Hochheim-Sisson-Casco loams, 12 to 20 percent slopes

This mapping unit consists of about 40 percent Hochheim loams in Capability Unit IVE-1, Woodland Suitability Group 5; about 35 percent Sisson loams in Capability Unit IVE-1, Woodland Suitability Group 1; and about 25 percent Casco loams in Capability Unit VIe-4; Woodland Suitability Group 5. Small areas of Theresa and Fox soils are included in this mapping unit.

160-K-1 Same as 160-D-1

160-D-2 Hochheim-Sisson-Casco loams, 12 to 20 percent slopes, moderately eroded

This mapping unit consists of about 40 percent Hochheim loams in Capability Unit IVE-1, Woodland Suitability Group 5; about 35 percent Sisson loams in Capability Unit IVE-1; Woodland Suitability Group 1, and about 25 percent Casco loams in Capability Unit VIe-4, Woodland Suitability Group 5.

160-K-2 Same as 160-D-2

160-D-3 Hochheim-Sisson-Casco loams, 12 to 20 percent slopes, severely eroded

This mapping unit consists of about 40 percent Hochheim loams in Capability Unit VIe-1, Woodland Suitability Group 5; about 35 percent Sisson loams in Capability Unit VIe-1, Woodland Suitability Group 1, and about 25 percent Casco loams in Capability Unit VIIe-4, Woodland Suitability Group 5. Small areas of Hennepin and Rodman soils are included in this mapping unit.

160-K-3 Same as 160-D-3

160-E-1 Hochheim-Sisson-Casco loams, 20 to 30 percent slopes

This mapping unit consists of about 40 percent Hochheim loams in Capability Unit VIe-1, Woodland Suitability Group 5; about 35 percent Sisson loams in Capability Unit VIe-1, Woodland Suitability Group 1; and about 25 percent Casco loams in Capability Unit VIIe-4, Woodland Suitability Group 5.

160-E-2 Hochheim-Sisson-Casco loams, 20 to 30 percent slopes, moderately eroded

This mapping unit consists of about 40 percent Hochheim loams in Capability Unit VIe-1, Woodland Suitability Group 5; about 35 percent Sisson loams in Capability Unit VIe-1, Woodland Suitability Group 1; and about 25 percent Casco loams in Capability Unit VIIe-4, Woodland Suitability Group 5. Small areas of Rodman soils are included in this mapping unit.

160-E-3 Hochheim-Sisson-Casco loams, 20 to 30 percent slopes, severely eroded

This mapping unit consists of about 40 percent Hochheim loams in Capability Unit VIIe-1, Woodland Suitability Group 5; about 35 percent Sisson loams in Capability Unit VIIe-1, Woodland Suitability Group 1; and about 25 percent Casco loams in Capability Unit VIIe-4, Woodland Suitability Group 5. Small areas of Hennepin and Rodman soils are included in this mapping unit.

160-F-1 Hochheim - Sisson - Casco loams, 30-45 percent slopes

This mapping unit consists of about 40 percent Hochheim loams in Capability Unit VIIe-1, Woodland Suitability Group 5; about 35 percent Sisson loams in Capability Unit VIIe-1, Woodland Suitability Group 1; and about 25 percent Casco loams in Capability Unit VIIe-4, Woodland Suitability Group 5.

160-F-2 Hochheim - Sisson - Casco loams, 30-45 percent slopes, moderately eroded

This mapping unit consists of about 40 percent Hochheim loams in Capability Unit VIIe-1; Woodland Suitability Group 5; and about 35 percent Sisson loams in Capability Unit VIIe-1, Woodland Suitability Group 1; and about 25 percent Casco loams in Capability Unit VIIe-4, Woodland Suitability Group 5.

366-B-1 Hochheim-Theresa loams, 2 to 6 percent slopes

This mapping unit consists of about 50 to 70 percent Hochheim loams. The rest is Theresa loams. Small areas of Mayville soils are included in this mapping unit. Both soils are in Capability Unit IIe-1. Hochheim loams are in Woodland Suitability Group 5; Theresa loams are in Group 1.

336-M-1 Same as 366-B-1

366-B-2 Hochheim-Theresa loams, 2 to 6 percent slopes, moderately eroded

This mapping unit consists of about 50 to 70 percent Hochheim loams. The rest is Theresa loams. Small areas of Mayville soils are included in this mapping unit. Both soils are in Capability Unit IIe-1. Hochheim loams are in Woodland Suitability Group 5; Theresa loams are in Group 1.

366-M-2 Same as 366-B-2

366-C-1 Hochheim-Theresa loams, 6 to 12 percent slopes

This mapping unit consists of about 50 to 70 percent Hochheim loams. The rest is Theresa loams. Small areas of Fox and Casco soils are included in this mapping unit. Both soils are in Capability Unit IIIe-1. Hochheim loams are in Woodland Suitability Group 5; Theresa loams are in Group 1.

366-N-1 Same as 366-C-1

366-C-2 Hochheim-Theresa loams, 6 to 12 percent slopes, moderately eroded

This mapping unit consists of about 50 to 70 percent Hochheim loams. The rest is Theresa loams. Small areas of Fox and Casco soils are included in this mapping unit. Both soils are in Capability Unit IIIe-1. Hochheim loams are in Woodland Suitability Group 5; Theresa loams are in Group 1.

366-N-2 Same as 366-C-2

366-D-1 Hochheim-Theresa loams, 12 to 20 percent slopes

This mapping unit consists of about 50 to 70 percent Hochheim loams. The rest is Theresa loams. Small areas of Fox and Casco soils are included in this mapping unit. Both soils are in Capability Unit IVe-1. Hochheim loams are in Woodland Suitability Group 5; Theresa loams are in Group 1.

366-K-1 Same as 366-D-1

366-D-2 Hochheim-Theresa loams, 12 to 20 percent slopes, moderately eroded

This mapping unit consists of about 50 to 70 percent Hochheim loams. The rest is Theresa loams. Small areas of Fox and Casco soils are included in this mapping unit. Both soils are in Capability Unit IVe-1. Hochheim loams are in Woodland Suitability Group 5; Theresa loams are in Group 1.

366-E-1 Hochheim-Theresa loams, 20 to 30 percent slopes

This mapping unit consists of about 50 to 70 percent Hochheim loams. The rest is Theresa loams. Small areas of Fox and Casco soils are included in this mapping unit. Both soils are in Capability Unit VIe-1. Hochheim loams are in Woodland Suitability Group 5; Theresa loams are in Group 1.

366-E-2 Hochheim-Theresa loams, 20 to 30 percent slopes, moderately eroded

This mapping unit consists of about 50 to 70 percent Hochheim loams. The rest is Theresa loams. Small areas of Fox and Casco soils are included in this mapping unit. Both soils are in Capability Unit VIe-1. Hochheim loams are in Woodland Suitability Group 5; Theresa loams are in Group 1.

366-F-1 Hochheim-Theresa, 30 to 45 percent slopes

This mapping unit consists of about 50 to 70 percent Hochheim loams. The rest is Theresa loams. Small areas of Fox and Casco soils are included in this mapping unit. Both soils are in Capability Unit VIIe-1. Hochheim loams are in Woodland Suitability Group 5; Theresa loams are in Group 1.

366-F-2 Hochheim-Theresa loams, 30 to 45 percent slopes, moderately eroded

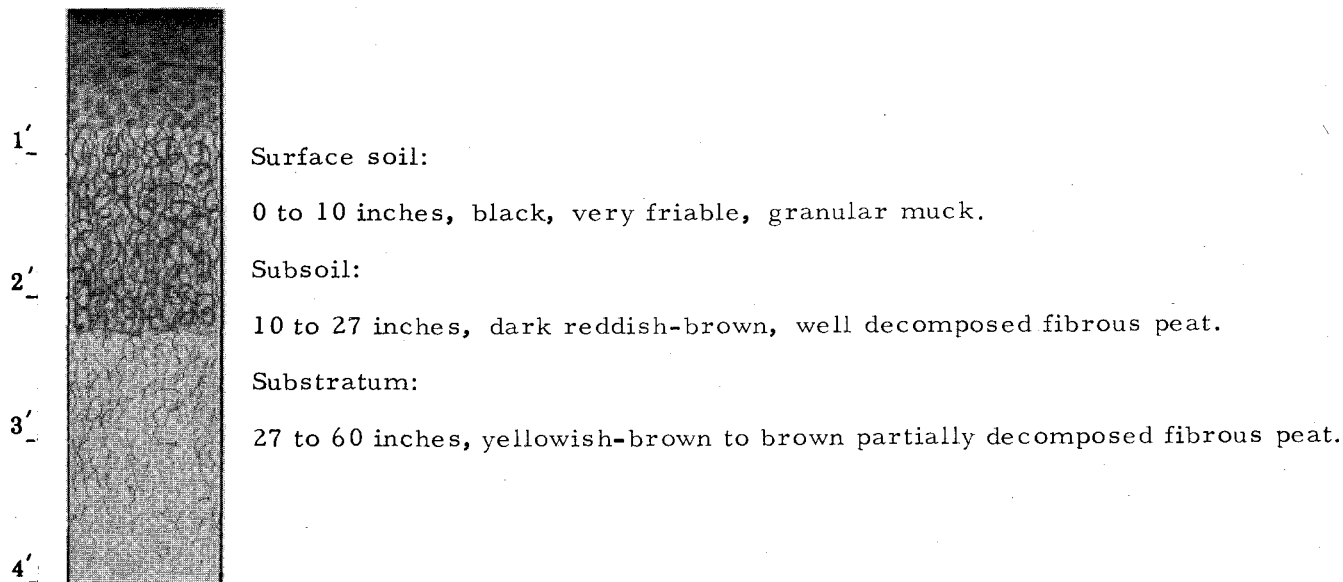
This mapping unit consists of about 50 to 70 percent Hochheim loams. The rest is Theresa loams. Small areas of Casco soils are included in this mapping unit. Both soils are in Capability Unit VIIe-1. Hochheim loams are in Woodland Suitability Group 5; Theresa loams are in Group 1.

HOUGHTON SERIES

The very poorly drained, nearly level to sloping soils of the Houghton series have formed from fibrous plant remains of grasses, sedges, reeds and other non-woody plants. They occur in extinct lake beds,

river valleys and on seepage slopes.

The following profile description of 450-A-1 Houghton muck is representative of the series.



Surface soils vary from muck to mucky peat. In places a few woody fragments occur throughout the profile.

These Houghton soils are generally low in phosphorous and potash. Ponding of water occurs frequently and the water table is at or near the surface except where they have been drained. Drained areas have severe wind erosion and burning hazards. When adequately drained these soils are fair for cropland.

450-A-1 Houghton muck, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Houghton mucky peat and Adrian, Palms and Wallkill soils are included in this mapping unit. (Capability Unit IIIw-9; Woodland Suitability Group 10.)

450-B-1 Houghton muck, 2 to 6 percent slopes

This gently sloping soil is similar to 450-A-1, but it has a slight water erosion hazard. Small areas of Houghton mucky peat and Palms and Adrian soils are included in this

mapping unit. (Capability Unit IIIw-9; Woodland Suitability Group 10.)

450-C-1 Houghton muck, 6 to 12 percent slopes

This sloping soil differs from 450-A-1 in that it has a moderate water erosion hazard. It occurs in narrow bands at the base of steep slopes and contains numerous seepage spots or springs. This soil is generally impractical to drain. Small areas of Palms, Adrian and Wallkill soils are included in this mapping unit. (Capability Unit IIIw-9; Woodland Suitability Group 10.)

450-D-1 Houghton muck, 12 to 20 percent slopes

This moderately steep soil differs from 450-A-1 by having a severe water erosion hazard. It occupies the base of steep slopes and contains numerous seepage areas or springs. This soil is generally impractical to drain. Small areas of Palms, Adrian and Wallkill soils are included in this mapping unit. (Capability Unit IIIw-9; Woodland Suitability Group 10.)

451-A-1 Houghton mucky peat, 0 to 2 percent slopes

This soil differs from 450-A-1 in that the fibrous plant remains are only partially decomposed in the surface soil. Small areas of Adrian, Palms and Wallkill soils are included in this mapping unit. (Capability Unit IIIw-9; Woodland Suitability Group 10.)

449-A-1 Same as 451-A-1

451-B-1 Houghton mucky peat, 2 to 6 percent slopes

This gently sloping soil differs from 450-A-1 in that the fibrous plant remains are only partially decomposed in the surface soil. It has a slight water erosion hazard. Small areas of Adrian, Palms and Wallkill soils are included in this mapping unit. (Capa-

bility Unit IIIw-9; Woodland Suitability Group 10.)

451-C-1 Houghton mucky peat, 6 to 12 percent slopes

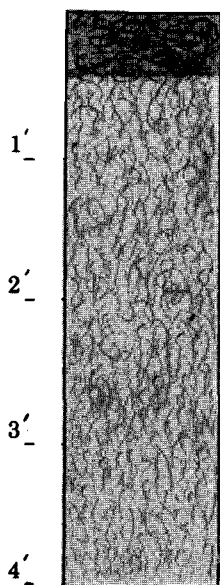
This sloping soil differs from 450-A-1 in that the fibrous plant remains are only partially decomposed in the surface soil. This soil occurs in narrow bands at the base of steep slopes and contains seepage spots or springs. It has a moderate water erosion hazard and is generally impractical to drain. Small areas of Palms, Brookston and Rollin soils are included in this mapping unit. (Capability Unit IIIw-9; Woodland Suitability Group 10.)

HOUGHTON SERIES, ACID VARIANT

The very poorly drained, nearly level soils of the Houghton series, acid variant have developed in deep organic deposits from mosses, grasses, sedges and reeds. They occupy

small depressions within morainic areas.

The following profile description of 462-A-1 Houghton peat is representative of the series.



Surface soil:

0 to 5 inches, dark grayish-brown, structureless sphagnum moss.

Subsoil and substratum:

5 to 60 inches, dark reddish brown, structureless, partly decomposed mixed fibrous, sedge, reed and pulpy peat.

The surface soil ranges from 3 to 8 inches thick.

These soils have a severe wetness hazard, a very low natural fertility and they are very acid in reaction. They are subject to wind erosion, fire and subsidence when drained. They are very poor cropland soils.

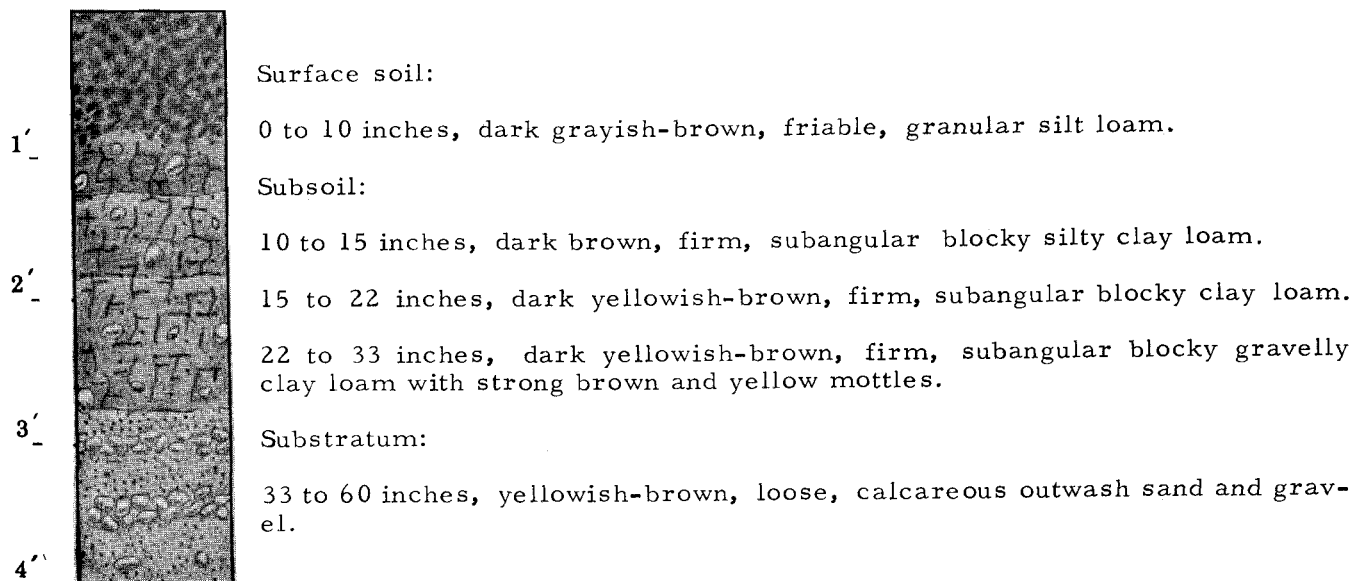
462-A-1 Houghton peat, acid variant, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Houghton and Palms soils are included in this mapping unit. (Capability Unit VIIIw-10; Woodland Suitability Group 10.)

IONIA SERIES

The moderately well drained, nearly level to sloping soils of the Ionia series have developed in calcareous sand and gravel. They occupy glacial outwash plains and terraces.

The following profile description of 335-B-1 Ionia silt loam, 2 to 6 percent slopes, is representative of the series.



Surface soil textures are silt loam, loam and sandy loam. These Ionia soils range in thickness from 20 to 40 inches. The sandy loam type generally has a sandy clay loam subsoil.

They are fair to good cropland soils on lower slopes.

324-A-1 Ionia loam, 0 to 2 percent slopes

This nearly level soil differs from 335-B-1 by having a loam surface soil. Small areas of Fox and Matherton soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

324-B-1 Ionia loam, 2 to 6 percent slopes

This soil differs from 335-B-1 by having a loam surface soil. Small areas of Fox and Matherton soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

324-B-2 Ionia loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 335-B-1 by having a thinner grayish-brown loam surface soil. It has a moderate water erosion hazard. Small areas of Fox and Matherton soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

324-C-2 Ionia loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 335-B-1 by having a thinner, lighter colored grayish-brown loam surface soil. It has a moderate water erosion hazard. Small areas of Fox soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 1.)

324Z-A-1 Ionia loam, clay substratum, 0 to 2 percent slopes

This soil differs from 335-B-1 by having a loam surface soil. The lower part of the substratum is slowly permeable clay. Small areas of Fox and Matherton soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

324Z-B-1 Ionia loam, clay substratum, 2 to 6 percent slopes

This soil differs from 335-B-1 by having a loam surface soil. The lower part of the substratum is slowly permeable clay. Small areas of Fox and Matherton soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

324Y-B-1 Ionia loam, loam substratum, 2 to 6 percent slopes

This soil differs from 335-B-1 by having a loam surface soil and the lower part of the substratum is loam. Small areas of Fox and Matherton soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

324V-B-1 Ionia loam, silt and fine sand substratum, 2 to 6 percent slopes

This soil differs from 335-B-1 by having a loam surface soil. The lower part of the substratum is silt and fine sand. Small areas of Fox, Matherton and Kibbie soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

323-A-1 Ionia sandy loam, 0 to 2 percent slopes

This nearly level soil differs from 335-B-1 by having a sandy loam surface soil. It does not have a water erosion hazard. Small areas of Fox and Matherton soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

323-B-1 Ionia sandy loam, 2 to 6 percent slopes

This soil differs from 335-B-1 by having a sandy loam surface soil. Small areas of Fox and Matherton soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

323-C-1 Ionia sandy loam, 6 to 12 percent slopes

This sloping soil differs from 335-B-1 by having a sandy loam surface soil and a moderate water erosion hazard. Small areas of Fox soils are included in this mapping unit. (Capability Unit IIIs-7; Woodland Suitability Group 3.)

323V-A-1 Ionia sandy loam, silt and fine sand substratum, 0 to 2 percent slopes

This soil differs from 335-B-1 by having a sandy loam surface soil. The lower part of the substratum is silt and sand. Small areas of Fox, Matherton and Kibbie soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

323V-B-1 Ionia sandy loam, silt and fine sand substratum, 2 to 6 percent slopes

This soil differs from 335-B-1 by having a sandy loam surface soil. The lower part of

the substratum is silt and fine sand. Small areas of Fox, Matherton and Kibbie soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

335-A-1 Ionia silt loam, 0 to 2 percent slopes

This soil is similar to 335-B-1. It does not have a water erosion hazard. Small areas of Fox and Matherton soils are included in this mapping unit. (Capability Unit IIIs-1; Woodland Suitability Group 1.)

335-B-1 Ionia silt loam, 2 to 6 percent slopes

The profile of this soil is described in the series description. It has a slight water erosion hazard. Small areas of Fox and Matherton soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

335-M-1 Same as 335-B-1

335-B-2 Ionia silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 335-B-1, but it has a thinner, lighter colored grayish-brown surface soil. Small areas of Fox and Matherton soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

335-B-3 Same as 335-B-2

335-C-1 Ionia silt loam, 6 to 12 percent slopes

This soil is similar to 335-B-1, but it has a moderate water erosion hazard. Small areas of Fox soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 1.)

335-C-2 Ionia silt loam, 6 to 12 percent slopes, moderately eroded

This soil is similar to 335-B-1, but it has a thinner, lighter colored grayish-brown surface soil. It has a moderate water erosion hazard. Small areas of Fox and Matherton soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 1.)

335-N-2 Same as 335-C-2

335Z-A-1 Ionia silt loam, clay substratum,
0 to 2 percent slopes

This soil is similar to 335-B-1, but the lower part of the substratum is slowly permeable clay. It does not have a water erosion hazard. Small areas of Fox and Matherton soils are included in this mapping unit. (Capability Unit IIs-1; Woodland Suitability Group 1.)

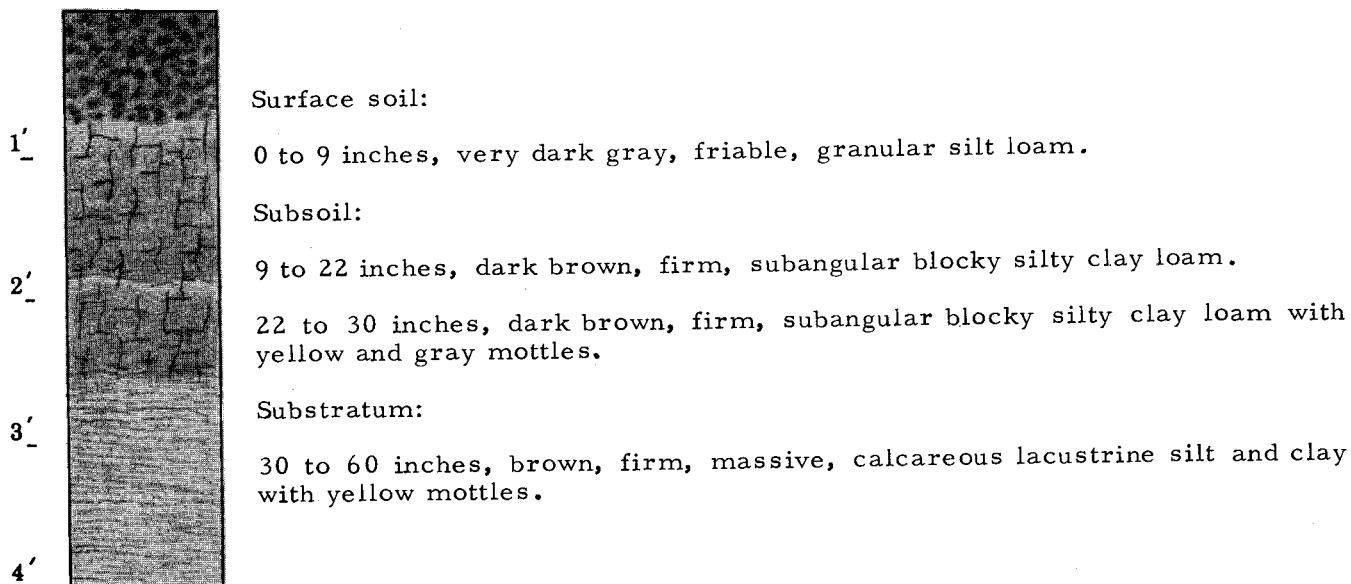
335Y-B-1 Ionia silt loam, loam substratum,
2 to 6 percent slopes

This soil is similar to 335-B-1, but the lower part of the underlying material is loam. Small areas of Fox and Matherton soils are included in this mapping unit. (Capability Unit IIs-2; Woodland Suitability Group 1.)

JERICOH SERIES

The well to moderately well drained, nearly level to gently sloping soils of the Jericho series have developed in calcareous lacustrine clay and silt. They occupy glacial lake basins and river terraces.

The following profile description of 44-B-1 Jericho silt loam, 2 to 6 percent slopes, is representative of the series.



In places the upper part of the subsoil has a few pebbles. The subsoil may be free of mottling in some areas and the substratum has layers of sands in some places.

Sloping areas have a water erosion hazard. These soils are slowly permeable. They are good cropland soils.

44-A-1 Jericho silt loam, 0 to 2 percent slopes

This nearly level soil is similar to 44-B-1, but it does not have a water erosion hazard. Small areas of Saylesville, Tichigan and Rome soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 2.)

44-B-1 Jericho silt loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Tichigan, Saylesville and Rome soils are included in this mapping unit. (Capability Unit IIs-6; Woodland Suitability Group 2.)

44-B-2 Jericho silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 44-B-1 but has a dark gray surface soil that is thinner. Small areas of Tichigan, Saylesville and Rome soils are included in this mapping unit. (Capability Unit IIs-6; Woodland Suitability Group 2.)

44-C-2 Jericho silt loam, 6 to 12 percent slopes, moderately eroded

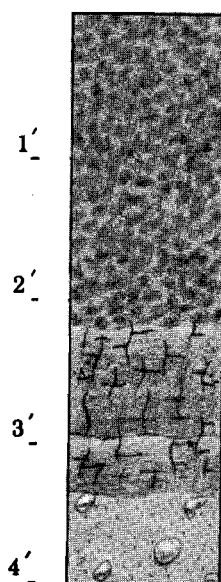
This sloping soil is similar to 44-B-1 but has a dark gray surface soil that is thinner.

Small areas of Saylesville and Rome soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 2.)

JUNEAU SERIES

The well to moderately well drained, nearly level to sloping soils of the Juneau series have developed in alluvial materials. They occur along footslopes and drainageways in glacial uplands.

The following profile description of 82-A-1 Juneau silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 26 inches, dark grayish-brown, friable, granular silt loam.

Subsoil:

26 to 35 inches, dark brown, friable, subangular blocky silt loam.

35 to 40 inches, dark brown, firm, subangular blocky silty clay loam.

Substratum:

40 to 60 inches, brown, friable, massive, sandy loam glacial till.

The surface soil ranges in thickness from 18 to 36 inches. Lenses of lighter colored material are common. In places the lower part of the subsoil is mottled with yellow and strong brown. The substratum ranges from sandy loam to silty clay loam.

These Juneau soils are subject to overflow for short periods of time and to deposition of material washed in from adjacent slopes. They are good cropland soils.

82-A-1 Juneau silt loam, 0 to 2 percent slopes

This profile description of this soil is part of the series description. Small areas of Pistakee and Wallkill soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)

82-B-1 Juneau silt loam, 2 to 6 percent slopes

This soil is similar to 82-A-1, but it has a slight erosion hazard. Small areas of Pistakee soils are included in this mapping unit. (Capability Unit IIe-5; Woodland Suitability Group 1.)

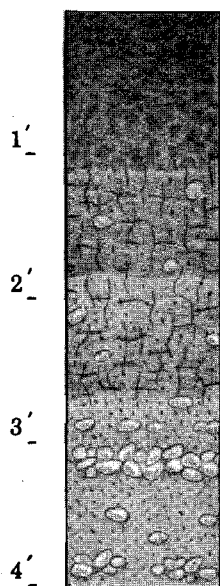
82-C-1 Juneau silt loam, 6 to 12 percent slopes

This soil is similar to 82-A-1, but it has a moderate water erosion hazard. Small areas of adjacent soils are included in this mapping unit. (Capability Unit IIIe-5; Woodland Suitability Group 1.)

KANE SERIES

The somewhat poorly drained, nearly level to gently sloping soils of the Kane series have developed in loamy outwash over calcareous sand and gravel. They occupy depressions and drainageways of outwash plains.

The following profile description of 332-A-1 Kane silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 13 inches, black, friable, weak granular silt loam.

Subsoil:

13 to 22 inches, dark grayish-brown, firm, subangular blocky silty clay loam with yellow and gray mottles.

22 to 32 inches, dark grayish-brown, firm, subangular blocky sandy clay loam with yellow and gray mottles.

Substratum:

32 to 60 inches, pale brown, loose, calcareous outwash sands and gravels.

The surface soil is loam or silt loam. These soils range from 20 to 40 inches in thickness.

These Kane soils are subject to ponding and have a high water table. Sloping areas have a water erosion hazard. They are good cropland soils when adequately drained.

346-A-1 Kane loam, 0 to 2 percent slopes

This soil differs from 332-A-1 by having a loam surface soil. Small areas of Sebewa and Matherton soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 12.)

346-B-1 Kane loam, 2 to 6 percent slopes

This soil differs from 332-A-1 by having a loam surface soil and a slight water erosion hazard. Small areas of Matherton and Eagle soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 12.)

346Z-A-1 Kane loam, clay substratum, 0 to 2 percent slopes

This soil differs from 332-A-1 by having a loam surface soil. The lower part of the substratum is slowly permeable clay. Small

areas of Eagle and Sebewa soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 12.)

346Z-B-1 Kane loam, clay substratum, 2 to 6 percent slopes

This soil differs from 332-A-1 by having a loam surface soil and a slight water erosion hazard. The lower part of the substratum is slowly permeable clay. Small areas of Eagle and Sebewa soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 12.)

346Y-B-1 Kane loam, loam substratum, 2 to 6 percent slopes

This soil differs from 332-A-1 by having a loam surface soil. The lower part of the substratum is loam, and it has a slight water erosion hazard. Small areas of Eagle and Sebewa soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 12.)

332-A-1 Kane silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Ma-

Matherton, Eagle and Sebewa soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 12).

332-B-1 Kane silt loam, 2 to 6 percent slopes

This soil is similar to 332-A-1, but it has a slight water erosion hazard. Small areas of Matherton, Eagle and Sebewa soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 12).

332Z-A-1 Kane silt loam, clay substratum, 0 to 2 percent slopes

This soil is similar to 332-A-1, but the lower part of the substratum is slowly permeable clay. Small areas of Matherton, Eagle and Sebewa soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 12).

332Z-B-1 Kane silt loam, clay substratum, 2 to 6 percent slopes

This soil is similar to 332-A-1, but the lower part of the substratum is slowly permeable clay. It has a slight water erosion hazard. Small areas of Eagle, Matherton and Sebewa soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 12.)

332Y-A-1 Kane silt loam, loam substratum, 0 to 2 percent slopes

This soil is similar to 332-A-1, but the low-

er part of the underlying material is loam. Small areas of Eagle, Matherton and Sebewa soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 12.)

332Y-B-1 Kane silt loam, loam substratum, 2 to 6 percent slopes

This soil is similar to 332-A-1, but the lower part of the substratum is loam and has a slight water erosion hazard. Small areas of Eagle, Matherton and Sebewa soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 12.)

332V-A-1 Kane silt loam, silt and fine sand substratum, 0 to 2 percent slopes

This soil is similar to 332-A-1, but the lower part of the substratum is silt and fine sands. Small areas of Eagle, Matherton and Sebewa soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 12.)

332V-B-1 Kane silt loam, silt and fine sand substratum, 2 to 6 percent slopes

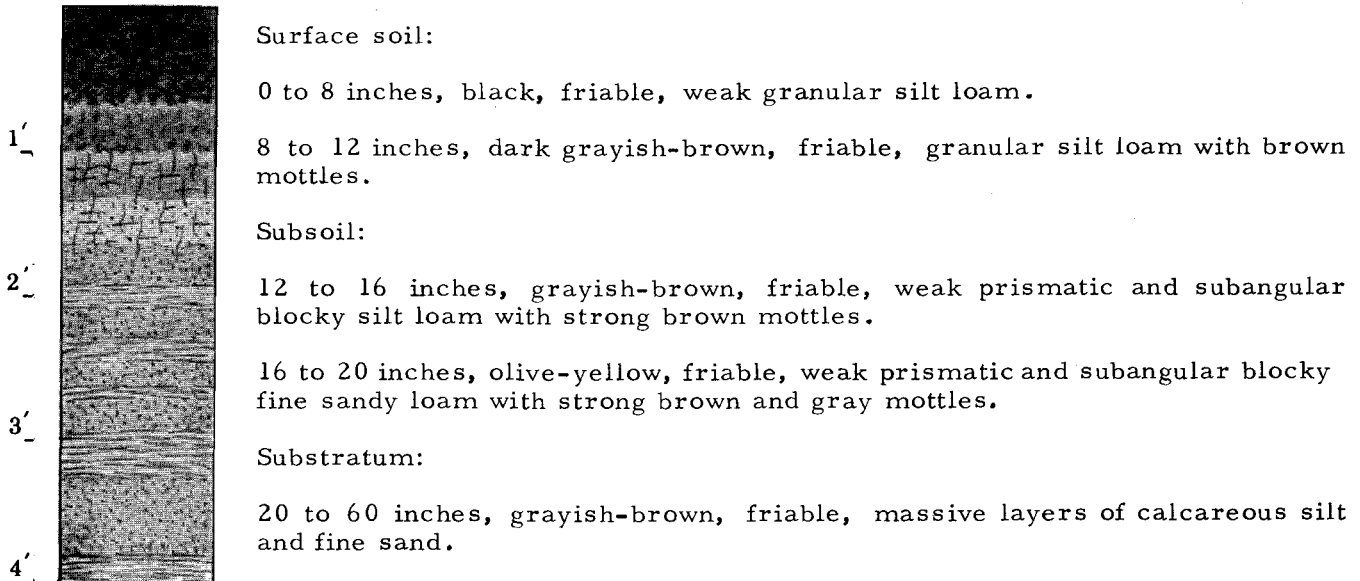
This soil is similar to 332-A-1, but the lower part of the substratum is silt and fine sands. This soil has a slight water erosion hazard. Small areas of Eagle, Matherton and Sebewa soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 12.)

KEOWNS SERIES

The poorly drained, nearly level to gently sloping soils of the Keowns series have developed in calcareous, lacustrine silt and fine sand. They occupy depressions and broad flats of glacial lake basins and river

terraces.

The following profile description of 48-A-1 Keowns silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil textures are silt loam and fine sandy loam. In some places the underlying material contains layers of clay.

These Keowns soils are subject to ponding and have a high water table. Sloping areas have a water erosion hazard. They are fair to good cropland soils when adequately drained by surface field ditches. They are not suitable for tile drains.

49-A-1 Keowns fine sandy loam, 0 to 2 percent slopes

This soil differs from 48-A-1 by having a fine sandy loam surface soil. Small areas of Colwood and Yahara soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

49-B-1 Keowns fine sandy loam, 2 to 6 percent slopes

This soil differs from 48-A-1 by having a fine sandy loam surface soil and a slight water erosion hazard. Small areas of Colwood and Yahara soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

49Y-A-1 Keowns fine sandy loam, loam substratum, 0 to 2 percent slopes

This soil differs from 48-A-1 by having a fine sandy loam surface soil. The lower part of the substratum is loam. Small areas of Colwood and Yahara soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

48-A-1 Keowns silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Colwood and Yahara soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

48-B-1 Keowns silt loam, 2 to 6 percent slopes

This soil is similar to 48-A-1, but it has a slight water erosion hazard. Small areas of Colwood and Yahara soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

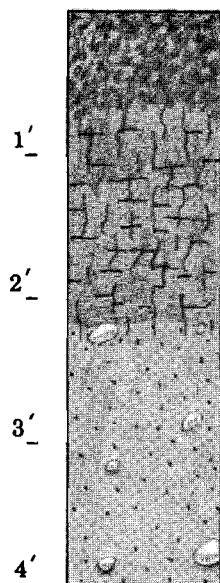
48Z-A-1 Keowns silt loam, clay substratum, 0 to 2 percent slopes

This soil is similar to 48-A-1, but the lower part of the substratum is clay. Small areas of Colwood and Yahara soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

KEWAUNEE SERIES

The well to moderately well drained, nearly level to steep soils of the Kewaunee series have developed in reddish brown silty clay loam till. They occupy glacial till uplands.

The following profile description of 100-B-1 Kewaunee silt loam, 2 to 6 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, dark brown, friable, granular silt loam.

Subsoil:

8 to 26 inches, dark reddish brown, firm, subangular blocky silty clay.

Substratum:

26 to 60 inches, reddish brown, firm, massive, calcareous silty clay loam glacial till.

Surface soil textures are silt loam, loam, sandy loam and silty clay loam. In some places the lower part of the subsoil is mottled. The substratum contains pockets and lenses of silt in some places.

These Kewaunee soils have slow permeability and sloping areas have a water erosion hazard. They are good cropland soils on the lower slopes.

103-A-1 Kewaunee loam, 0 to 2 percent slopes

This nearly level soil differs from 100-B-1 by having a loam surface soil and little or no water erosion hazard. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIe-7; Woodland Suitability Group 2.)

103-B-1 Kewaunee loam, 2 to 6 percent slopes

This soil differs from 100-B-1 by having a loam surface soil. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 2.)

103-B-2 Kewaunee loam, 2 to 6 percent slopes, moderately eroded

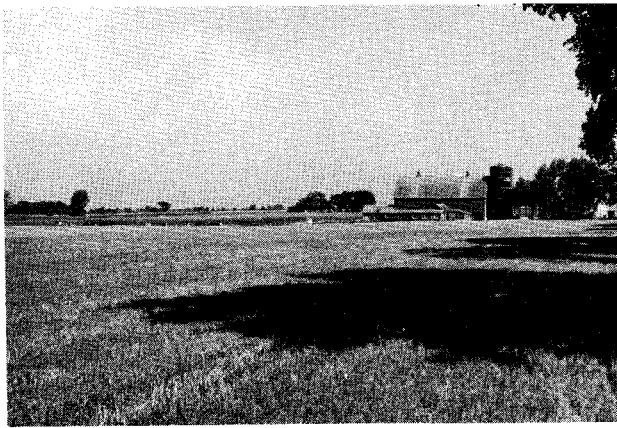
This soil differs from 100-B-1 by having a thinner, lighter colored brown loam surface soil. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 2.)

103-C-1 Kewaunee loam, 6 to 12 percent slopes

This soil differs from 100-B-1 by having a loam surface soil and a moderate water erosion hazard. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 2.)

103-C-2 Kewaunee loam, 6 to 12 percent slopes, moderately eroded

This soil differs from 100-B-1 by having a thinner, lighter colored brown loam surface soil. It has a moderate water erosion hazard. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 2.)



This nearly level clayey glacial till plain is characteristic of the Kewaunee, Manawa and Poygan soils.

101-A-1 Kewaunee sandy loam, 0 to 2 percent slopes

This nearly level soil differs from 100-B-1 by having a sandy loam surface soil and no water erosion hazard. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 2.)

101-B-1 Kewaunee sandy loam, 2 to 6 percent slopes

This soil differs from 100-B-1 by having a sandy loam surface soil. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 2.)

101-B-2 Kewaunee sandy loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 100-B-1 by having a thinner, lighter colored brown sandy loam surface soil. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 2.)

101-C-2 Kewaunee sandy loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 100-B-1 by having a thinner, lighter colored brown sandy loam surface soil. It has a moderate water erosion hazard. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIIs-7; Woodland Suitability Group 2.)

101-D-2 Kewaunee sandy loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 100-B-1 by having a thinner, lighter colored brown sandy loam surface soil. It has a severe water erosion hazard. Small areas of soils with loam surface soils are included in this mapping unit. (Capability Unit IVe-7; Woodland Suitability Group 2.)

100-A-1 Kewaunee silt loam, 0 to 2 percent slopes

This nearly level soil is similar to 100-B-1, but it has little or no water erosion hazard. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 2.)

99-A-2 Same as 100-A-1

100-B-1 Kewaunee silt loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIs-6; Woodland Suitability Group 2.)

100-M-1 Same as 100-B-1

100-B-2 Kewaunee silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 100-B-1, but it has a thinner, lighter colored brown surface soil. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIs-6; Woodland Suitability Group 2.)

99-B-2 Same as 100-B-2

100-M-2 Same as 100-B-2

100-C-1 Kewaunee silt loam, 6 to 12 percent slopes

This sloping soil is similar to 100-B-1, but it has a moderate water erosion hazard. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIIs-6; Woodland Suitability Group 2.)

100-C-2 Kewaunee silt loam, 6 to 12 percent slopes, moderately eroded

This soil is similar to 100-B-1, but it has a thinner, lighter colored brown surface

soil. It has a moderate water erosion hazard. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 2.)

100-N-2 Same as 100-C-2

100-D-1 Kewaunee silt loam, 12 to 20 percent slopes

This moderately steep soil is similar to 100-B-1, but it has a severe water erosion hazard. Small areas of soils with silty clay loam surface soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 2.)

100-D-2 Kewaunee silt loam, 12 to 20 percent slopes, moderately eroded

This soil is similar to 100-B-1, but it has a thinner, lighter colored brown surface soil. It has a severe water erosion hazard. Small areas of soils with silty clay loam surface soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 2.)

100-E-1 Kewaunee silt loam, 20 to 30 percent slopes

This moderately steep soil is similar to 100-B-1, but it has a very severe water erosion hazard. Small areas of soils with silty clay loam surface soils are included in this mapping unit. (Capability Unit VIe-6; Woodland Suitability Group 2.)

100-E-2 Kewaunee silt loam, 20 to 30 percent slopes, moderately eroded

This moderately steep soil is similar to 100-B-1, but it has a thinner, lighter colored brown surface soil. It has a very severe water erosion hazard. Small less eroded areas are included in this mapping unit. (Capability Unit VIe-6; Woodland Suitability Group 2.)

99-B-3 Kewaunee soils, 2 to 6 percent slopes, severely eroded

This soil differs from 100-B-1 by having a very thin, light colored thin brown and reddish-brown silty clay loam and silty clay surface soil. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 2.)

99-C-3 Kewaunee soils, 6 to 12 percent slopes, severely eroded

This sloping soil differs from 100-B-1 by having a very thin, light colored thin brown and reddish-brown silty clay loam and silty clay surface soil. It has a moderate water erosion hazard. Small areas of soils with silt loam surface soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 2.)

99-D-3 Kewaunee soils, 12 to 20 percent slopes, severely eroded

This moderately steep soil differs from 100-B-1 by having a very thin, light colored brown and dark reddish-brown silty clay loam and silty clay surface soil. It has a severe water erosion hazard. Small areas of soils with silt loam surface soils are included in this mapping unit. (Capability Unit VIe-6, Woodland Suitability Group 2.)

103-D-3 Same as 99-D-3

99-E-3 Kewaunee soils, 20 to 40 percent slopes, severely eroded

This steep soil differs from 100-B-1 by having a very thin, light colored brown and dark reddish-brown silty clay loam and silty clay surface soil. It has a very severe water erosion hazard. Small areas of soils with a silt loam surface soils are included in this mapping unit. (Capability VIIe-6; Woodland Suitability Group 2.)

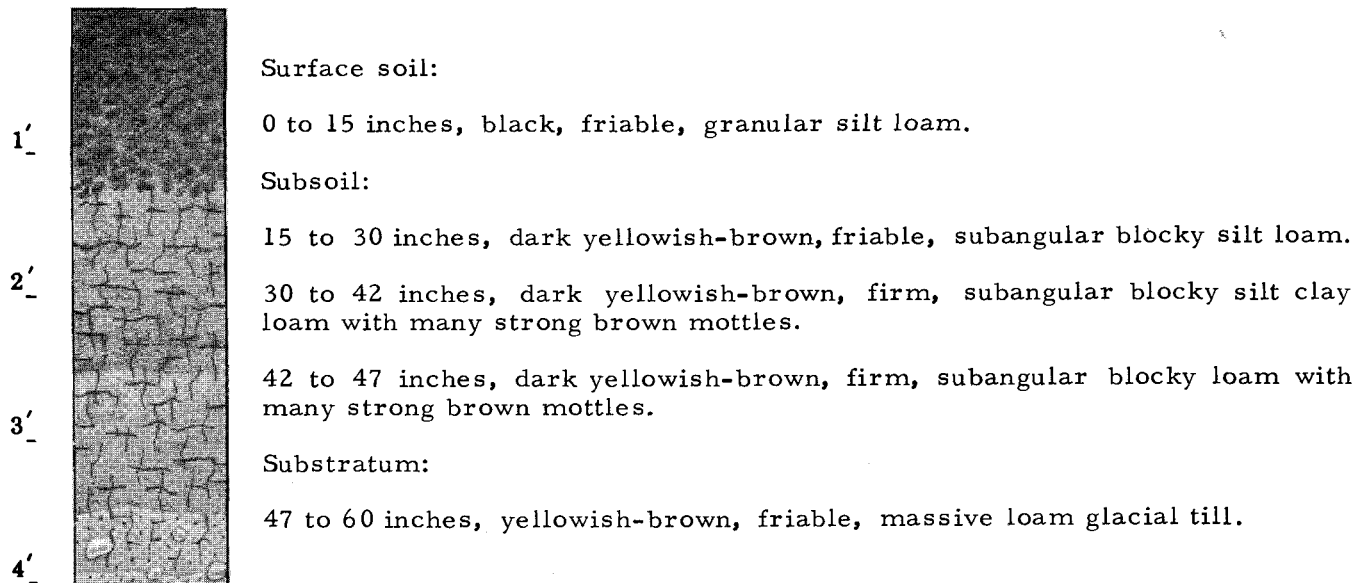
100-E-3 Same as 99-E-3

KEYSER SERIES

The moderately well drained, nearly level to gently sloping soils of the Keyser series have developed in a thick silt layer over loam glacial till. They occupy slight depressions and gentle slopes in glacial up-

lands.

The following profile description of 226D-A-1 Keyser silt loam, 0 to 2 percent slopes, is representative of the series.



The thickness of the silt layer ranges from 36 to 50 inches.

The Keyser soils have an erosion hazard on sloping areas. They are good cropland soils.

226D-A-1 Keyser silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Bristol soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 12.)

226-A-1 Same as 226D-A-1

226D-B-1 Keyser silt loam, 2 to 6 percent slopes

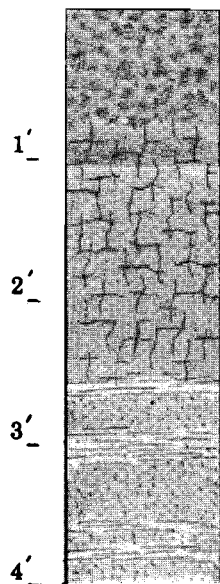
This soil is similar to 226D-A-1, but it has a slight water erosion hazard. Small areas of Bristol soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability 12.)

226-B-1 Same as 226D-B-1

KIBBIE SERIES

The somewhat poorly drained, nearly level to gently sloping soils of the Kibbie series have developed in stratified silt and fine sand. They occupy beach lines of glacial lake and river basins.

The following profile description of 38-A-1 Kibbie silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 9 inches, dark grayish-brown, friable, granular silt loam.

Subsoil:

9 to 13 inches, dark yellowish-brown, friable, subangular blocky silt loam with many yellow and gray mottles.

13 to 31 inches, brown, firm, subangular blocky silt loam with many yellow and gray mottles.

Substratum:

31 to 60 inches, pale brown, friable layers of calcareous silt and fine sand with many yellow and gray mottles.

Surface soil textures are fine sandy loam and silt loam. The thickness of the surface soil ranges from 6 to 10 inches. The depth of the substratum ranges from 20 to 35 inches. In places there are thin layers of clay in the underlying material.

These Kibbie soils are subject to ponding and have a seasonal high water table. They have a severe drainage limitation and are fair to good cropland soils when adequately drained.

37-A-1 Kibbie fine sandy loam, 0 to 2 percent slopes

This soil differs from 38-A-1 by having a fine sandy loam surface soil. Small areas of Yahara and Colwood soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

37-B-1 Kibbie fine sandy loam, 2 to 6 percent slopes

This soil differs from 38-A-1 by having a fine sandy loam surface soil. It has a slight water erosion hazard. Small areas of Yahara and Colwood soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

37-C-2 Kibbie fine sandy loam, 6 to 12 percent slopes, moderately eroded

This soil differs from 38-A-1 by having a thinner, lighter colored grayish-brown fine sandy loam surface soil. It has a moderate water erosion hazard. Small areas of Yahara soils are included in this mapping unit. (Capability Unit IIIe-8; Woodland Suitability Group 7.)

37Z-A-1 Kibbie fine sandy loam, clay substratum, 0 to 2 percent slopes

This soil differs from 38-A-1 by having a fine sandy loam surface soil. The lower part of the substratum is slowly permeable clay. Small areas of Mosel soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

37Z-B-1 Kibbie fine sandy loam, clay substratum, 2 to 6 percent slopes

This soil differs from 38-A-1 by having a fine sandy loam surface soil. The lower part of the substratum is clay. This soil has a slight water erosion hazard. Small areas of Mosel soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

38-A-1 Kibbie silt loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Yahara and Colwood soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

38-B-1 Kibbie silt loam, 2 to 6 percent slopes

This soil is similar to 38-A-1, but it has a slight water erosion hazard. Small areas of Yahara and Colwood soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

38-M-1 Same as 28-B-1

38-B-2 Kibbie silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 38-A-1, but it has a

thinner, lighter colored grayish-brown surface soil and a slight water erosion hazard. Small areas of Yahara and Colwood soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

38Z-A-1 Kibbie silt loam, clay substratum, 0 to 2 percent slopes

This soil is similar to 38-A-1, but the lower part of the substratum is slowly permeable clay. Small areas of Tichigan soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

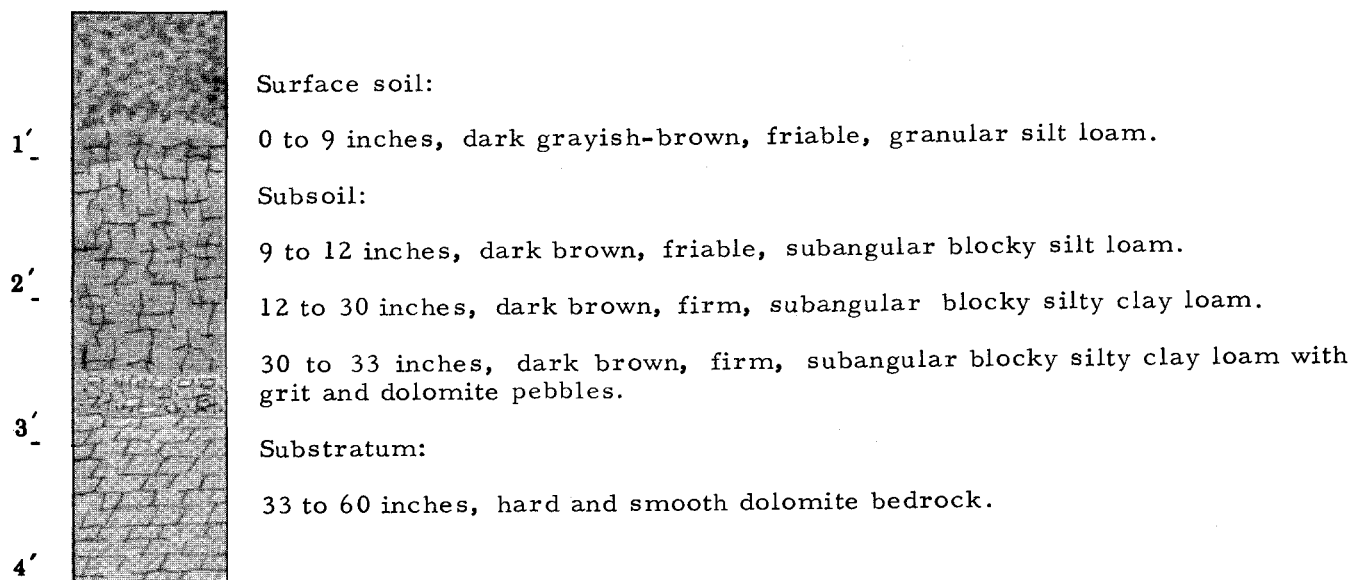
38R-A-1 Kibbie silt loam, rock substratum, 0 to 2 percent slopes

This soil is similar to 38-A-1, but the lower part of the substratum is dolomite bedrock. Small areas of Tichigan soils are included in this mapping unit. (Capability Unit IIw-3; Woodland Suitability Group 7.)

KNOWLES SERIES

The well drained, nearly level to steep soils of the Knowles series have developed in calcareous till over dolomite bedrock. They occupy glacial till uplands and till plains.

The following profile description of 208-B-1 Knowles silt loam, 2 to 6 percent slopes is representative of the series.



Surface soil textures are silt loam and loam. These soils range in depth from 20 to 40 inches to the dolomite bedrock. Outcrops occur in some places.

The Knowles soils have a water erosion hazard on sloping areas. They are drouthy and tillage is hindered where the dolomite is near the surface. They are fair to good cropland soils.

204-A-1 Knowles loam, 0 to 2 percent slopes

This soil differs from 208-B-1 by having a loam surface soil. It does not have a water erosion hazard. Small areas of Knowles, shallow variant, and Hochheim soils are included in this mapping unit. (Capability Unit IIs-1; Woodland Suitability Group 1.)

204-B-1 Knowles loam, 2 to 6 percent slope

This soil differs from 208-B-1 by having a loam surface soil. Small areas of Knowles, shallow variant, and Hochheim soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

204-B-2 Knowles loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 208-B-1 by having a thinner, lighter colored grayish-brown loam surface soil. Small areas of Knowles, shallow variant and Hochheim soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

204-C-1 Knowles loam, 6 to 12 percent slopes

This soil differs from 208-B-1 by having a loam surface soil and a moderate water erosion hazard. Small areas of Knowles, shallow variant, and Hochheim soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 1.)

204-C-2 Knowles loam, 6 to 12 percent slopes, moderately eroded

This soil differs from 208-B-1 by having a thinner, lighter colored grayish-brown loam surface soil and a moderate water erosion hazard. Small areas of Knowles, shallow variant and Hochheim soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 1.)

208-A-1 Knowles silt loam, 0 to 2 percent slopes

This soil is similar to 208-B-1, but it does not have a water erosion hazard. Small areas of Knowles, shallow variant, and Theresa soils are included in this mapping unit. (Capability Unit IIs-1; Woodland Suitability Group 1.)

110R-A-1 Same as 208-A-1

305-A-1 Same as 208-A-1

364R-A-1 Same as 208-A-1

208-B-1 Knowles silt loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Knowles, shallow variant, Theresa and Hochheim soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

110R-B-1 Same as 208-B-1

208-M-1 Same as 208-B-1

305-B-1 Same as 208-B-1

364R-B-1 Same as 208-B-1

208-B-2 Knowles silt loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 208-B-1 by having a thinner, lighter colored grayish-brown surface soil. Small areas of Knowles, shallow variant, Theresa and Hochheim soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 1.)

208-M-2 Same as 208-B-2

208-C-1 Knowles silt loam, 6 to 12 percent slopes

This soil is similar to 208-B-1 but it has a moderate water erosion hazard. Small areas of Knowles, shallow variant, Theresa and Hochheim soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 1.)

305-C-1 Same as 208-C-1

208-C-2 Knowles silt loam, 6 to 12 percent slopes, moderately eroded

This soil differs from 208-B-1 by having a thinner, lighter colored grayish-brown surface soil and a moderate water erosion hazard. Small areas of Knowles, shallow variant, Theresa and Hochheim soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 1.)

305-C-2 Same as 208-C-2

208-D-2 Knowles silt loam, 12 to 20 percent slopes, moderately eroded

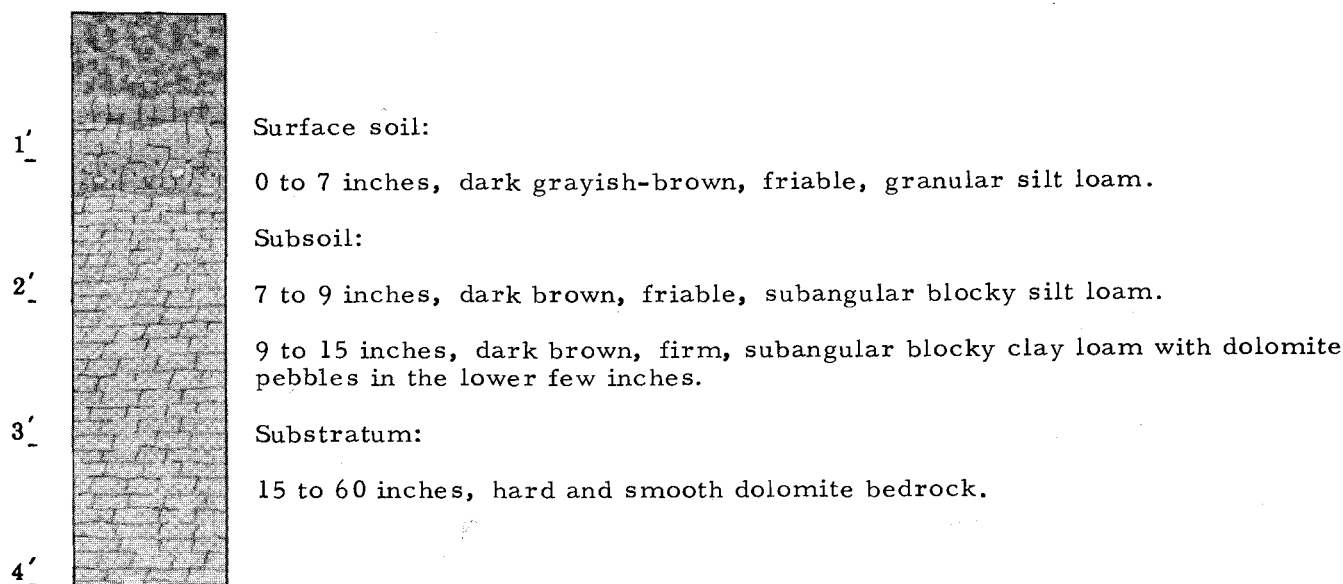
This soil differs from 208-B-1 by having a thinner, lighter colored grayish-brown surface soil and a severe water erosion hazard. Small areas of Knowles, shallow var-

iant and Hochheim soils are included in this mapping unit. (Capability Unit IVe-2; Woodland Suitability Group 1.)

KNOWLES SERIES, SHALLOW VARIANT

The well drained, gently sloping to moderately steep soils of the Knowles series, shallow variant, have developed in thin calcareous till over dolomite bedrock. They occupy low glacial till uplands and till plains.

The following profile description of 206-B-1 Knowles silt loam, shallow variant, 2 to 6 percent slopes is representative of the series.



These soils are less than 20 inches deep to dolomite bedrock. Outcrops are common throughout these areas.

These soils are drouthy and sloping areas have a water erosion hazard. Tillage operations are hindered where bedrock is near the surface. They are fair to poor cropland soils.

206-A-1 Knowles silt loam, shallow variant, 0 to 2 percent slopes

This soil is similar to 206-B-1, but it does not have a water erosion hazard. Small areas of Knowles soils are included in this mapping unit. (Capability Unit IIIs-8; Woodland Suitability Group 5.)

125-A-1 Same as 206-A-1

206-B-1 Knowles silt loam, shallow variant, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Knowles soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 5.)

125-B-1 Same as 206-B-1

308-B-1 Same as 206-B-1

206-B-2 Knowles silt loam, shallow variant, 2 to 6 percent slopes, moderately eroded

This soil differs from 206-B-1 by having a thinner, lighter colored grayish-brown surface soil. Small areas of Knowles soils are included in this mapping unit. (Capability Unit IIIe-3; Woodland Suitability Group 5.)

308-B-2 Same as 206-B-2

206-C-1 Knowles silt loam, shallow variant, 6 to 12 percent slopes

This sloping soil is similar to 206-B-1, but it has a moderate water erosion hazard. Small areas of Knowles soils are included in this mapping unit. (Capability Unit IVe-3; Woodland Suitability Group 5.)

125-C-1 Same as 206-C-1

206-C-2 Knowles silt loam, shallow variant, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 206-B-1 by having a thinner, lighter colored grayish-brown surface soil and a moderate water erosion hazard. Small areas of Knowles soils are included in this mapping unit. Capability Unit IVe-3; Woodland Suitability Group 5.)

125-C-2 Same as 206-C-2

206-C-3 Knowles silt loam, shallow variant, 6 to 12 percent slopes, severely eroded

This sloping soil differs from 206-B-1 by having a very thin, light colored grayish-brown to dark brown silt loam to clay loam surface soil and a moderate water erosion hazard. Small areas of Knowles soils are included in this mapping unit. (Capability Unit VIe-3; Woodland Suitability Group 5.)

206-D-1 Knowles silt loam, shallow variant, 12 to 20 percent slopes

This moderately steep soil is similar to 206-B-1, but it has a severe water erosion hazard. Small areas of Knowles soils are included in this mapping unit. (Capability Unit VIe-3; Woodland Suitability Group 5.)

125-D-1 Same as 206-D-1

206-D-2 Knowles silt loam, shallow variant, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 206-B-1 by having a thinner, lighter colored grayish-brown surface soil and a severe water erosion hazard. Small areas of Knowles soils are included in this mapping unit. (Capability Unit VIe-3; Woodland Suitability Group 5.)

125-D-2 Same as 206-D-2

125-F-1 Knowles silt loam, shallow variant, 30 to 45 percent slopes

This soil differs from 206-B-1 by having a very severe water erosion hazard. Small areas of Knowles silt loam are included in this mapping unit. (Capability Unit VIIe-5; Woodland Suitability Group 6.)

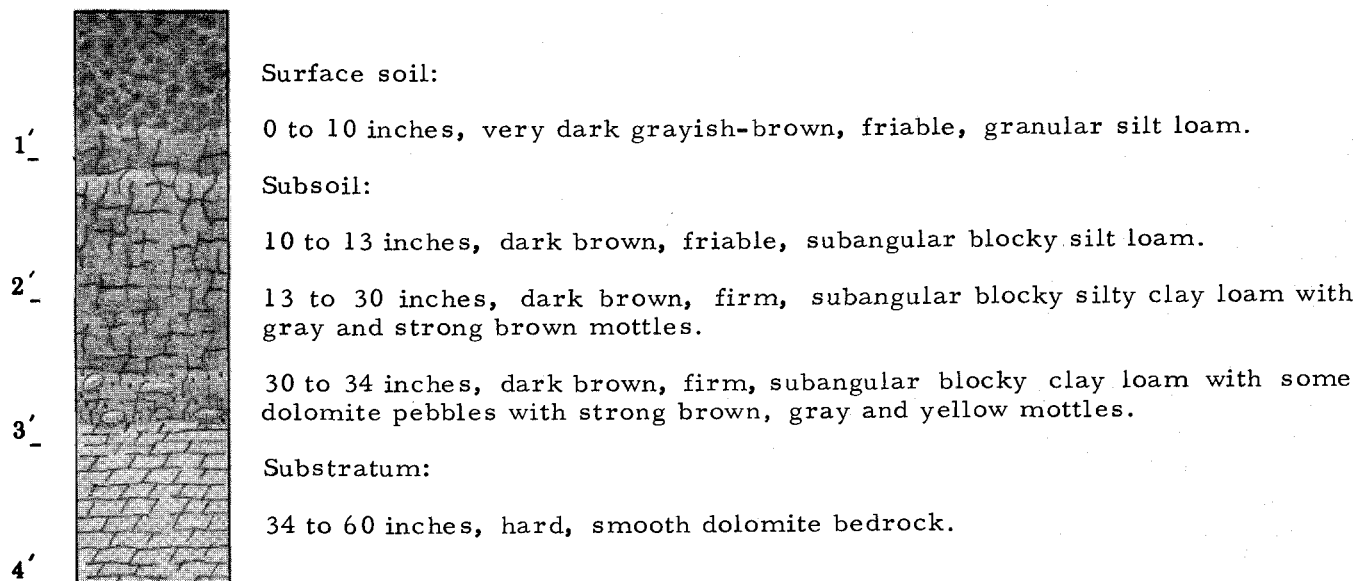
431-B-1 Knowles stony silt loam, shallow variant, 2 to 6 percent slopes

This soil differs from 125-B-1 by having many large dolomite fragments in the surface soil. Small areas of Knowles silt loam are included in this mapping unit. (Capability Unit VIe-5; Woodland Suitability Group 6.)

KNOWLES SERIES, WET VARIANT

The somewhat poorly drained, nearly level to sloping soils of the Knowles series, wet variant, have developed in calcareous till over dolomite bedrock. They occupy low glacial till uplands and till plains.

The following profile description of 306-B-1, Knowles silt loam, wet variant, 2 to 6 percent slopes, is representative of the series.



The soils of this series range in depth from 20 to 40 inches to the dolomite bedrock. In some places the subsoil has mottles only in the lower part. Outcrops occur in many places.

These soils are subject to ponding in the lower areas and have a water erosion hazard on sloping areas. They have a low available moisture capacity and tillage is hindered where the bedrock is near the surface. They are fair to good cropland soils when adequately drained.

306-A-1 Knowles silt loam, wet variant, 0 to 2 percent slopes

This soil is similar to 306-B-1. It does not have a water erosion hazard. Small areas of Knowles and Lamartine soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 1.)

307-A-1 Same as 306-A-1

306-B-1 Knowles silt loam, wet variant, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Knowles and Lamartine soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 1.)

307-B-1 Same as 306-B-1

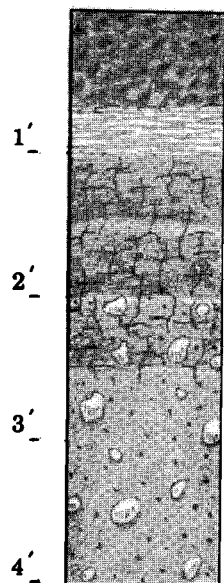
306-C-1 Knowles silt loam, wet variant, 6 to 12 percent slopes

This soil is similar to 306-B-1, but it has a moderate water erosion hazard. Small areas of Knowles soils are included in this mapping unit. (Capability Unit IIIe-8; Woodland Suitability Group 1.)

LAMARTINE SERIES

The somewhat poorly drained, nearly level to sloping soils of the Lamartine series have developed in a silty layer over calcareous loam till. They occupy drainageways and depressions of glacial uplands.

The following description of 364-A-1 Lamartine silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, very dark brown, friable, granular silt loam.

8 to 12 inches, dark grayish-brown, friable, platy silt loam.

Subsoil:

12 to 18 inches, dark brown, friable, subangular blocky silty clay loam with few yellow and gray mottles.

18 to 24 inches, dark brown, firm, subangular blocky silty clay loam with many yellow, gray and strong brown mottles.

24 to 30 inches, dark brown, firm, subangular blocky clay loam with many yellow-gray and strong brown mottles.

Substratum:

30 to 60 inches, yellowish-brown, friable, massive, calcareous loam glacial till.

The silt mantle in these soils ranges from 18 to 36 inches thick. The underlying material ranges from loam to sandy loam.

The Lamartine soils are subject to ponding. They have a water erosion hazard on sloping areas. They are good cropland soils when adequately drained.

364-A-1 Lamartine silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Ehler and Ashford soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

364-B-1 Lamartine silt loam, 2 to 6 percent slopes

This soil is similar to 364-A-1, but it has a slight water erosion hazard. Small areas of Ehler, Ashford and Mayville soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

364-B-2 Lamartine silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 364-A-1, but it has

a thinner, lighter colored dark brown surface soil and a slight water erosion hazard. Small areas of Mayville and Ashford soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

364-B-3 Same as 364-B-2

364-C-1 Lamartine silt loam, 6 to 12 percent slopes

This soil is similar to 364-A-1, but it has a moderate water erosion hazard. Small areas of Ashford and Mayville soils are included in this mapping unit. (Capability Unit IIIe-8; Woodland Suitability Group 7.)

364-C-2 Lamartine silt loam, 6 to 12 percent slopes, moderately eroded

This soil is similar to 364-A-1 but it has a thinner, lighter colored dark brown surface soil and a moderate water erosion hazard. Small areas of Ashford and Mayville soils are included in this mapping unit. (Capability Unit IIIe-8; Woodland Suitability Group 7.)

364Z-B-1 Lamartine silt loam, clay substratum, 2 to 6 percent slopes

This soil is similar to 364-A-1, but the lower part of the substratum is slowly permeable clay. It has a slight water erosion hazard. Small areas of Mayville soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

364X-B-1 Lamartine silt loam, gravelly substratum, 2 to 6 percent slopes

This soil is similar to 364-A-1, but the lower part of the substratum is loose sand and gravel. It has a slight water erosion hazard. Small areas of Matherton and Mayville soils

are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

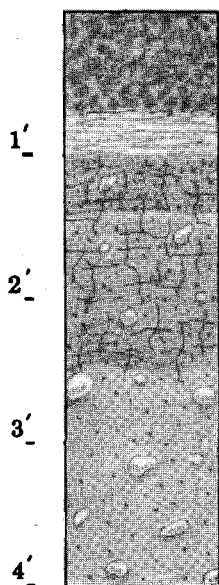
364V-B-1 Lamartine silt loam, silt and fine sand substratum, 2 to 6 percent slopes

This soil is similar to 364-A-1, but the lower part of the substratum is silt and fine sand. It has a slight water erosion hazard. Small areas of Kibbie and Mayville soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

LAPEER SERIES

The well drained, nearly level to steep soils of the Lapeer series have developed in calcareous sandy loam till. They occupy glacial uplands.

The following profile description of 153-B-1 Lapeer loam, 2 to 6 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, dark grayish-brown, friable, granular loam.

8 to 12 inches, brown, friable, platy sandy loam.

Subsoil:

12 to 17 inches, yellowish-brown, firm, subangular blocky heavy sandy loam.

17 to 30 inches, brown, firm, subangular blocky clay loam.

Substratum:

30 to 60 inches, yellowish-brown, friable, massive calcareous sandy loam till.

Surface soil textures are loam and sandy loam. The depth to sandy loam till ranges from 20 to 40 inches. The substratum is loam and loamy sand in some places.

Sloping areas have a water erosion hazard. They are slightly drought. These Lapeer soils are good to fair cropland soils on lower slopes.

153-A-1 Lapeer loam, 0 to 2 percent slopes

This soil is similar to 153-B-1, but it does not have a water erosion hazard. Small areas of McHenry and Hochheim soils are included in this mapping unit. (Capability Unit

I-1; Woodland Suitability Group 1.)

352-A-1 Same as 153-A-1

153-B-1 Lapeer loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of McHenry and Hochheim soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

153-B-2 Lapeer loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 153-B-1, but it has a thinner, lighter colored grayish-brown surface soil. Small areas of McHenry and Hochheim soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

352-B-2 Same as 153-B-2

153-C-1 Lapeer loam, 6 to 12 percent slopes

This soil is similar to 153-B-1, but it has a moderate water erosion hazard. Small areas of McHenry and Hochheim soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

153-C-2 Lapeer loam, 6 to 12 percent slopes, moderately eroded

This soil is similar to 153-B-1, but it has a thinner, lighter colored grayish-brown surface soil and a moderate water erosion hazard. Small areas of McHenry and Hochheim are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

352-C-2 Same as 153-C-2

153-D-1 Lapeer loam, 12 to 20 percent slopes

This soil differs from 153-B-1 by having a severe water erosion hazard. Small areas of McHenry and Hochheim soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 1.)

359-D-1 Same as 153-D-1

153-D-2 Lapeer loam, 12 to 20 percent slopes, moderately eroded

This soil is similar to 153-B-1, but it has a thinner, lighter colored grayish-brown surface soil and a severe water erosion hazard. Small areas of McHenry and Hochheim soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 1.)

153-E-1 Lapeer loam, 20 to 30 percent slopes

This soil is similar to 153-B-1, but it has a very severe water erosion hazard. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 1.)

359-E-1 Same as 153-E-1

156-A-1 Lapeer sandy loam, 0 to 2 percent slopes.

This soil differs from 153-B-1 by having a sandy loam surface soil and no water erosion hazard. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 3.)

355-A-1 Same as 156-A-1

156-B-1 Lapeer sandy loam, 2 to 6 percent slopes

This soil differs from 153-B-1 by having a sandy loam surface soil. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 3.)

156-M-1 Same as 156-B-1

157-B-1 Same as 156-B-1

355-B-1 Same as 156-B-1

356-B-1 Same as 156-B-1

156-B-2 Lapeer sandy loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 153-B-1 by having a grayish-brown surface soil. Depth to the till substratum is generally less than 36 inches. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 3.)

156-C-1 Lapeer sandy loam, 6 to 12 percent slopes

This soil differs from 153-B-1 by having a sandy loam surface soil and a moderate water erosion hazard. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 3.)

157-C-1 Same as 156-C-1

156-C-2 Lapeer sandy loam, 6 to 12 percent slopes, moderately eroded

This soil differs from 153-B-1 by having a thinner, lighter colored grayish-brown sandy loam surface soil and a moderate water erosion hazard. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 3)

157-C-2 Same as 156-C-2

355-C-2 Same as 156-C-2

356-C-2 Same as 156-C-2

156-D-1 Lapeer sandy loam, 12 to 20 percent slopes

This moderately steep soil differs from 153-B-1 by having a severe water erosion hazard. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit IVE-1; Woodland Suitability Group 1.)

156-K-1 Same as 156-D-1

157-D-1 Same as 156-D-1

156-D-2 Lapeer sandy loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 153-B-1 by having a thinner grayish-brown surface soil. Depth to the till substratum is less than 36 inches. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit IVE-1; Woodland Suitability Group 1.)

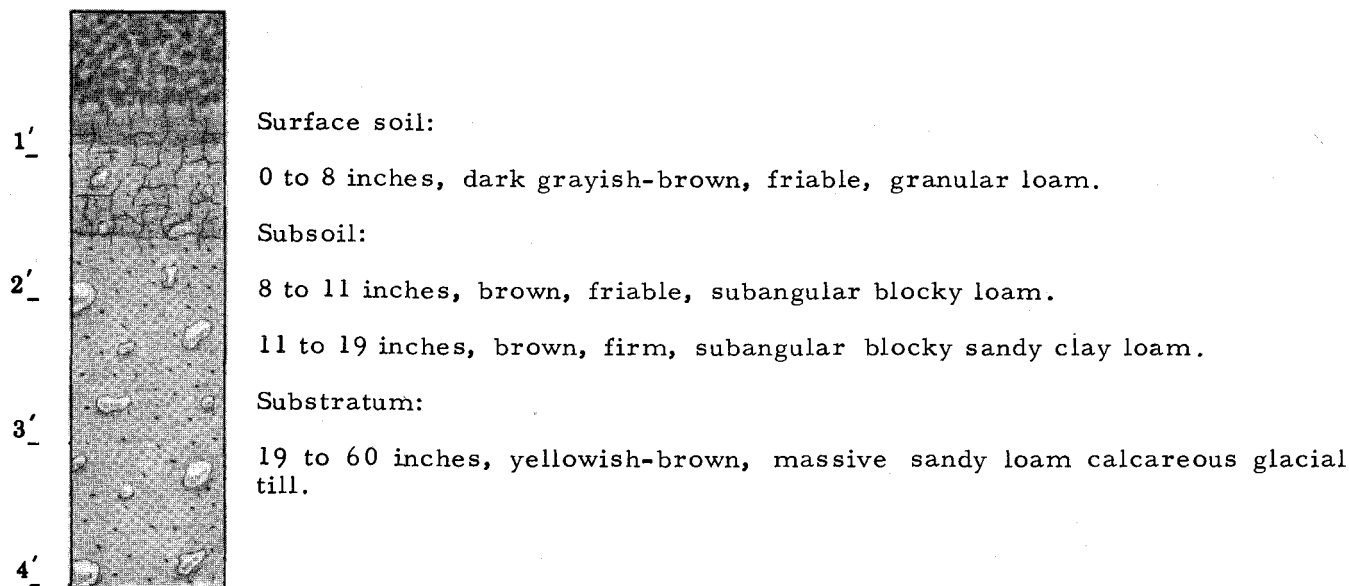
156-K-2 Same as 156-D-2

157-D-2 Same as 156-D-2

LAPEER SERIES, SHALLOW VARIANT

The well drained, nearly level to very steep soils of the Lapeer series, shallow variant, have developed in loamy material over calcareous sandy loam till. They occupy all slopes of the glacial uplands.

The following profile description of 152-B-1 Lapeer loam, shallow variant, 2 to 6 percent slopes, is representative of the series.



Surface soil textures are loam and sandy loam. The depth to the sandy loam till ranges from 15 to 20 inches.

These soils are drouthy and sloping areas have an erosion hazard. They are fair to poor cropland soils.

152-A-1 Lapeer loam, shallow variant, 0 to 2 percent slopes

This nearly level soil is similar to 152-B-1,

but it does not have a water erosion hazard. Small areas of Hochheim, McHenry and Miami soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 5.)

152-B-1 Lapeer loam, shallow variant, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Mc-

Henry, Miami and Hochheim soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 5.)

152-B-2 Lapeer loam, shallow variant, 2 to 6 percent slopes, moderately eroded

This soil is similar to 152-B-1, but it has a thinner, lighter colored grayish-brown surface soil. Small areas of McHenry, Miami and Hochheim soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 5.)

152-C-1 Lapeer loam, shallow variant, 6 to 12 percent slopes

This sloping soil is similar to 152-B-1, but it has a moderate water erosion hazard. Small areas of McHenry, Miami and Hochheim soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 5.)

152-C-2 Lapeer loam, shallow variant, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 152-B-1, but it has a thinner, lighter colored grayish-brown surface soil and a moderate water erosion hazard. Small areas of McHenry, Miami and Hochheim soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 5.)

152-N-2 Same as 152-C-2

152-D-1 Lapeer loam, shallow variant, 12 to 20 percent slopes

This moderately steep soil is similar to 152-B-1, but it has a severe water erosion hazard. Small areas of Miami and Hochheim soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 5.)

152-K-1 Same as 152-D-1

152-D-2 Lapeer loam, shallow variant, 12 to 20 percent slopes, moderately eroded

This moderately steep soil is similar to 152-B-1, but it has a thinner, lighter colored grayish-brown surface soil and a severe water erosion hazard. Small areas of Miami and Hochheim soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 5.)

152-K-2 Same as 152-D-2

152-E-1 Lapeer loam, shallow variant, 20 to 30 percent slopes

This steep soil is similar to 152-B-1, but it has a very severe water erosion hazard. Small areas of Casco and Hochheim soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 5.)

156-E-1 Same as 152-E-1

157-E-1 Same as 152-E-1

152-E-2 Lapeer loam, shallow variant, 20 to 30 percent slopes, moderately eroded

This steep soil is similar to 152-B-1, but it has a thinner, lighter colored surface soil and a very severe water erosion hazard. Small areas of Casco and Hochheim soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 5.)

157-E-2 Same as 152-E-2

152-F-1 Lapeer loam, shallow variant, 30 to 45 percent slopes

This very steep soil differs from 152-B-1 by having a very severe water erosion hazard. Small areas of Casco, Rodman and Hochheim soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 5.)

152-F-2 Lapeer loam, shallow variant, 30 to 45 percent slopes, moderately eroded

This very steep soil differs from 152-B-1 by having a grayish-brown surface soil. Small areas of Casco, Rodman and Hochheim soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 5.)

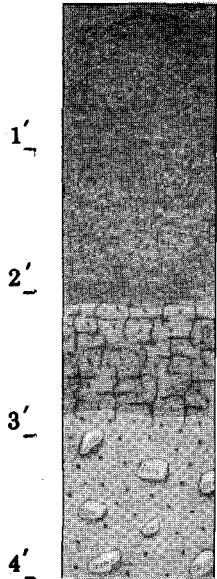
152-E-3 Lapeer soils, shallow variant, 20 to 30 percent slopes, severely eroded

This steep soil is similar to 152-B-1, but it has a very thin, light colored grayish-brown and brown loam to sandy clay loam surface soil. It has a very severe water erosion hazard. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 5.)

LAWSON SERIES

The somewhat poorly drained, nearly level soils of the Lawson series developed from alluvial material overlying a buried mineral soils. They occupy alluvial high bottoms along streams and major drainageways.

The following profile description of 54-A-1, Lawson silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 25 inches, black, friable, weak, subangular blocky silt loam.

Subsoil:

25 to 34 inches, dark grayish-brown, firm, subangular blocky clay loam with yellow and gray mottles.

Substratum:

34 to 60 inches, pale brown, friable, massive calcareous loamy alluvium.

The surface soil ranges in depth from 24 to 40 inches. The subsoil varies from silt loam to silty clay loam and the substratum ranges from sandy loam to silty clay loam.

These Lawson soils are subject to flooding and streambank erosion. They are good cropland soils when adequately drained and protected from overflow.

54-A-1 Lawson silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Sawmill soils and Alluvial Land, are included in this mapping unit. (Capability Unit IIw-13; Woodland Suitability Group 12.)

5A-1 Same as 54-A-1

7W-A-1 Same as 54-A-1

23-A-1 Same as 54-A-1

54-B-1 Lawson silt loam, 2 to 6 percent slopes

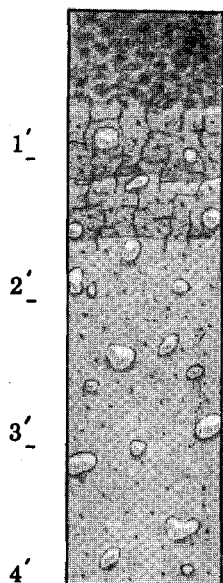
This soil is similar to 54-A-1, but it has a slight water erosion hazard. Small areas of Sebewa soils are included in this mapping unit. (Capability Unit IIe-5; Woodland Suitability Group 12.)

23-B-1 Same as 54-B-1

LORENZO SERIES

The well drained, nearly level to very steep soils of the Lorenzo series were developed in loamy material underlain by sand and gravel. They occupy glacial outwash plains and terraces.

The following profile description of 106-B-1, Lorenzo silt loam, 2 to 6 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, very dark gray, friable, granular silt loam.

Subsoil:

8 to 14 inches, dark grayish-brown, firm, subangular blocky clay loam.

14 to 19 inches, dark brown, firm, subangular blocky, gravelly clay loam.

Substratum:

19 to 60 inches, pale brown, loose, calcareous outwash sand and gravel.

The depth of these soils ranges from 12 to 20 inches. Where there is no silt mantle, surface soils are loam or gravelly loam. The gravelly loam type generally occurs as long narrow terrace escarpments. Soils of the Lorenzo-Rodman complex are intermingled in such a pattern that they cannot be separately mapped.

The Lorenzo soils are drouthy during dry periods. They have a water erosion hazard on sloping areas. They are fair cropland soils on lower slopes.

110-A-1 Lorenzo loam, 0 to 2 percent slopes

This nearly level soil differs from 106-B-1 by having a loam surface soil and not having a water erosion hazard. Small areas of Warsaw, Casco and Fabius soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 12.)

122-A-1 Same as 110-A-1

110-B-1 Lorenzo loam, 2 to 6 percent slopes

This soil differs from 106-B-1 by having a loam surface soil. Small areas of Warsaw, Casco and Fabius soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 12.)

121-B-1 Same as 110-B-1

122-B-1 Same as 110-B-1

110-B-2 Lorenzo loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 106-B-1 by having a thinner, lighter colored dark gray surface soil. Small areas of Warsaw, Casco and Fabius soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 12.)

110-M-2 Same as 110-B-2

121-B-2 Same as 110-B-2

122-B-2 Same as 110-B-2

110-C-1 Lorenzo loam, 6 to 12 percent slopes

This sloping soil differs from 106-B-1 by having a loam surface soil and moderate water erosion hazard. Small areas of Warsaw and Casco soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 12.)

121-C-1 Same as 110-C-1

110-C-2 Lorenzo loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 106-B-1 by having a thinner, lighter colored dark gray loam surface soil and a moderate water erosion hazard. Small areas of Warsaw and Casco soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 12.)

121-C-2 Same as 110-C-2

122-C-2 Same as 110-C-2

110-D-1 Lorenzo loam, 12 to 20 percent slopes

This moderately steep soil differs from 106-B-1 by having a loam surface soil and a severe water erosion hazard. Small areas of Casco and Rodman soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 12.)

121-D-1 Same as 110-D-1

110-D-1 Lorenzo loam, 12 to 20 percent slopes

This moderately steep soil differs from 106-B-1 by having a loam surface soil and a severe water erosion hazard. Small areas of Casco and Rodman soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 12.)

121-D-1 Same as 110-D-1

110-D-2 Lorenzo loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 106-B-1 by having a thinner, lighter colored dark gray loam surface soil and a severe water erosion hazard. Small areas of Casco and Rodman soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 12.)

110-K-2 Same as 110-D-2

121-D-2 Same as 110-D-2

122-D-2 Same as 110-D-2

110-E-1 Lorenzo loam, 20 to 30 percent slopes

This steep soil differs from 106-B-1 by having a loam surface soil and a very severe

water erosion hazard. Small areas of Casco and Rodman soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 12.)

110-K-1 Same as 110-E-1

110-E-2 Lorenzo loam, 20 to 30 percent slopes, moderately eroded

This steep soil differs from 106-B-1 by having a thinner, lighter colored dark gray loam surface soil and a very severe water erosion hazard. Small areas of Casco and Rodman soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 12.)

110Z-A-1 Lorenzo loam, clay substratum, 0 to 2 percent slopes

This nearly level soil differs from 106-B-1 by having a loam surface soil. The lower part of the substratum is slowly permeable clay. It has no water erosion hazard. Small areas of Warsaw, Casco and Fabius soils are included in this mapping unit. (Capability Unit IIIs-1; Woodland Suitability Group 12.)

110Y-A-1 Lorenzo loam, loam substratum, 0 to 2 percent slopes

This nearly level soil differs from 106-B-1 by having a loam surface soil and the lower part of the substratum is loam. It has no water erosion hazard. Small areas of Warsaw, Casco and Fabius soils are included in this mapping unit. (Capability Unit IIIs-1; Woodland Suitability Group 12.)

110Y-B-1 Lorenzo loam, loam substratum, 2 to 6 percent slopes

This soil differs from 106-B-1 by having a loam surface soil and the lower part of the substratum is loam. Small areas of Warsaw, Casco and Fabius soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 12.)

106-A-1 Lorenzo silt loam, 0 to 2 percent slopes

This nearly level soil is similar to 106-B-1, but it does not have a water erosion hazard. Small areas of Warsaw, Casco and Fabius soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 12.)

106-B-1 Lorenzo silt loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Warsaw, Casco and Fabius soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 12.)

106-B-2 Lorenzo silt loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 106-B-1 by having a thinner, lighter colored dark gray surface soil. Small areas of Warsaw, Casco and Fabius soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 12.)

106-C-1 Lorenzo silt loam, 6 to 12 percent slopes

This sloping soil is similar to 106-B-1 except that it has a moderate water erosion hazard. Small areas of Warsaw and Casco soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 12.)

106-C-2 Lorenzo silt loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 106-B-1 by having a thinner, lighter colored surface soil and a moderate water erosion hazard. Small areas of Warsaw and Casco soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 12.)

106-D-2 Lorenzo silt loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil is similar to 106-B-1, but it has a thinner, lighter colored dark gray surface soil and a severe water erosion hazard. Small areas of Casco and Rodman soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 12.)

106-E-1 Lorenzo silt loam, 20 to 30 percent slopes

This steep soil is similar to 106-B-1, but it has a very severe water erosion hazard. Small areas of Casco and Rodman soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 12.)

106Z-B-1 Lorenzo silt loam, clay substratum, 2 to 6 percent slopes

This soil is similar to 106-B-1, but the lower part of the substratum is slowly permeable clay. Small areas of Warsaw, Casco and Fabius soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 12.)

110-C-3 Lorenzo soils, 6 to 12 percent slopes, severely eroded

This sloping soil differs from 106-B-1 by having a very thin, light colored loam to clay loam surface soil and a moderate water erosion hazard. Small areas of Casco and Rodman soils are included in this mapping unit. (Capability Unit VIe-4; Woodland Suitability Group 12.)

122-C-3 Same as 110-C-3

110-D-3 Lorenzo soils, 12 to 20 percent slopes, severely eroded

This moderately steep soil differs from the 106-B-1 by having very thin, light colored dark gray and dark grayish-brown loam to clay loam surface soils. It has a severe water erosion hazard. Small areas of Casco and Rodman soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 12.)

121-D-3 Same as 110-D-3

108-C-1 Lorenzo-Rodman loams, 6 to 12 percent slopes

This mapping unit consists of about 70 percent Lorenzo loam and about 30 percent Rodman gravelly loam. Small areas of Warsaw soils and Lorenzo silt loam are included in this mapping unit. Lorenzo loam is in capability unit IVe-4; woodland suitability group 12. Rodman gravelly loam is in capability unit VIs-5; woodland suitability group 6.

108-C-2 Lorenzo-Rodman loams, 6 to 12 percent slopes, moderately eroded

This mapping unit consists of about 70 percent Lorenzo loam and 30 percent Rodman gravelly loam. Small areas of Warsaw soils and Lorenzo silt loam are included in this mapping unit. Lorenzo loam is in capability unit VIe-4; woodland suitability group 12. Rodman gravelly loam is in capability unit VIs-5; woodland suitability group 6.

108-C-3 Lorenzo-Rodman loams, 6 to 12 percent slopes, severely eroded

This mapping unit consists of 70 percent Lorenzo loam and 30 percent Rodman gravelly loam. Small areas of Warsaw soils and Lorenzo silt loam are included in this mapping unit. Lorenzo loam is in capability unit VIe-4; woodland suitability group 12. Rodman gravelly loam is in capability unit VIIs-5; woodland suitability group 6.

108-D-1 Lorenzo-Rodman loams, 12 to 20 percent slopes

This mapping unit consists of about 50 percent of Lorenzo loam and 50 percent Rodman gravelly loam. Small areas of Casco soils are included in this mapping unit. Lorenzo loam is in capability unit VIe-4; woodland suitability group 12. Rodman gravelly loam is in capability unit VIIs-5; woodland suitability group 6.

108-D-2 Lorenzo-Rodman loams, 12 to 20 percent slopes, moderately eroded

This mapping unit consists of about 50 percent Lorenzo loam and 50 percent Rodman gravelly loam. Small areas of Casco soils are included in this mapping unit. Lorenzo loam is in capability unit VIe-4; woodland suitability group 12. Rodman gravelly loam is in capability unit VIIs-5; woodland suitability group 6.

108-D-3 Lorenzo-Rodman loams, 12 to 20 percent slopes, severely eroded

This mapping unit consists of about 50 percent Lorenzo loam and about 50 percent Rodman gravelly loam. Small areas of Casco soils are included in this mapping unit. Lorenzo loam is in capability unit VIIe-4; woodland suitability group 12. Rodman gravelly loam is in capability unit VIIs-5; woodland suitability group 6.

108-E-1 Lorenzo-Rodman loams, 20 to 30 percent slopes

This mapping unit consists of about 30 percent Lorenzo loam and 70 percent Rodman

gravelly loam. Small areas of Casco soils are included in this mapping unit. Lorenzo loam is in capability unit VIIe-4; woodland suitability group 12. Rodman gravelly loam is in capability unit VIIs-5; woodland suitability group 5.

121-E-1 Same as 108-E-1

108-E-2 Lorenzo-Rodman loams, 20 to 30 percent slopes, moderately eroded

This mapping unit consists of about 30 percent Lorenzo loam and 70 percent Rodman gravelly loam. Small areas of Casco soils are included in this mapping unit. Lorenzo loam is in capability unit VIIe-4; woodland suitability group 12. Rodman gravelly loam is in capability unit VIIs-5; woodland suitability group 6.

121-E-2 Same as 108-E-1

108-E-3 Lorenzo-Rodman loams, 20 to 30 percent slopes, severely eroded

This mapping unit consists of about 30 percent Lorenzo loam and 70 percent Rodman gravelly loam. Small areas of Casco soils are included in this mapping unit. Lorenzo loam is in capability unit VIIe-4; woodland suitability group 12. Rodman gravelly loam is in capability unit VIIs-5; woodland suitability group 6.

108-F-1 Lorenzo-Rodman loams, 30 to 45 percent slopes

This mapping unit is about 30 percent Lorenzo loam and 70 percent Rodman gravelly loam. Small areas of Casco soils are included in the mapping unit. Lorenzo loam is in capability unit VIIe-4; woodland suitability group 12. Rodman gravelly loam is in capability unit VIIs-5; woodland suitability group 6.

160-F-1 Same as 108-F-1

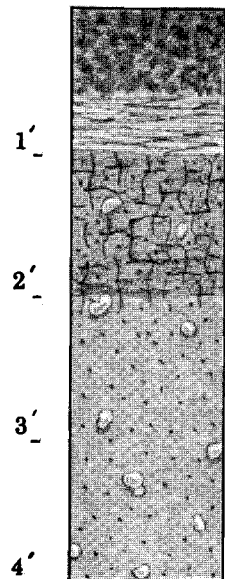
110-F-1 Same as 108-F-1

110-F-2 Same as 108-F-1

MANAWA SERIES

The somewhat poorly drained, nearly level to gently sloping soils of the Manawa series have developed in silty clay loam till. They occupy concave slopes and drainageways in glacial uplands.

The following profile description of 142-A-1 Manawa silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 7 inches, very dark brown, friable, granular silt loam.

7 to 12 inches, grayish-brown, friable, platy silt loam.

Subsoil:

12 to 24 inches, reddish-brown, firm, angular blocky silty clay with reddish-gray mottles.

Substratum:

24 to 60 inches, reddish-brown, firm, massive calcareous silty clay loam glacial till.

Surface soil textures range from loam to silt loam and the substratum ranges from 20 to 30 inches in depth. Small dolomite fragments occur in the substratum.

These Manawa soils have a wetness limitation and sloping areas have a water erosion hazard. They have slow permeability and are subject to ponding. They are good cropland soils when adequately drained.

142-A-1 Manawa silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Poygan soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

142-B-1 Manawa silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to

142-A-1, but it has a slight water erosion hazard. Small areas of Kewaunee and Poygan soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

311-A-1 Manawa loam, 0 to 2 percent slopes

This soil differs from 142-A-1 by having a loam surface soil. Small areas of Poygan soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

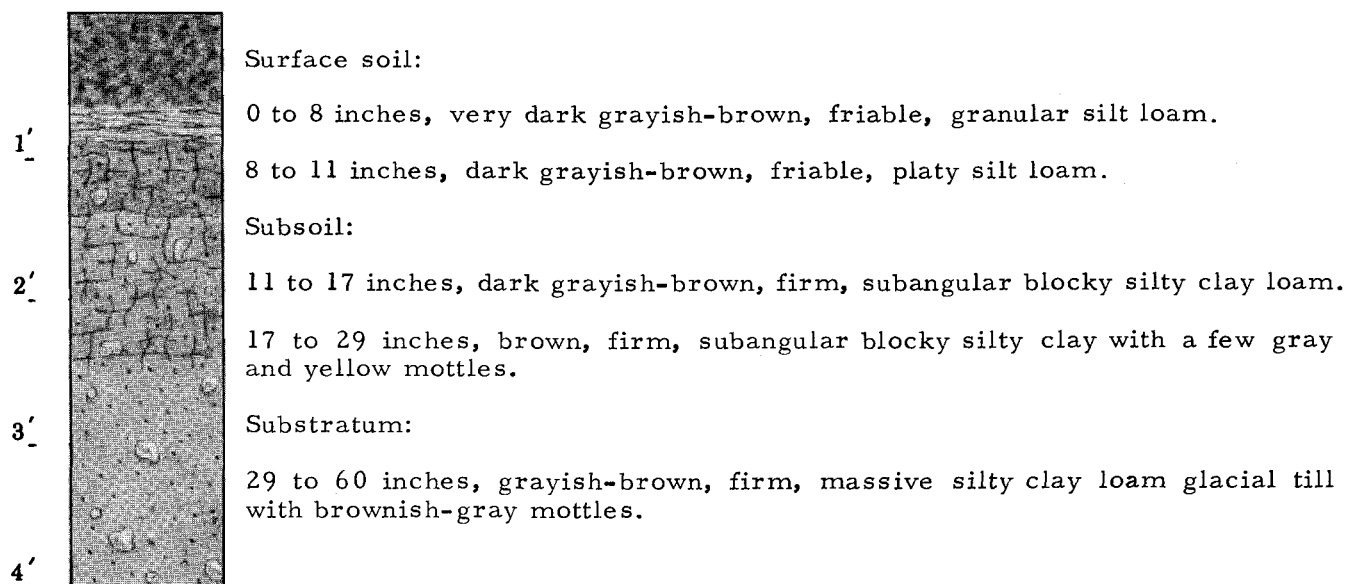
311-B-1 Manawa loam, 2 to 6 percent slopes

This gently sloping soil differs from 142-A-1 by having a loam surface soil and a slight water erosion hazard. Small areas of Kewaunee and Poygan soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

MARKHAM SERIES

The well to moderately well drained, nearly level to moderately steep soils of the Markham series have developed in silty clay loam till. They occupy convex slopes of the glacial uplands.

The following profile description of 336-B-1 Markham silt loam, 2 to 6 percent slopes, is representative of the series.



The depth to the glacial till ranges from 24 to 36 inches. In places there are not mottles in the subsoil. The substratum contains some gravel.

These Markham soils have slow permeability and sloping areas have a water erosion hazard. They are good to fair cropland soils.

336-A-1 Markham silt loam, 0 to 2 percent slopes

This nearly level soil is similar to 336-B-1, but it does not have a water erosion hazard. Small areas of Varna and Beecher soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 1.)

336-B-1 Markham silt loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Varna, Morley and Beecher soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 1.)

336-B-2 Markham silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 336-B-1, but it has a thinner, lighter colored dark grayish-brown surface soil. Small areas of Varna, Morley and Beecher soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 1.)

336-C-1 Markham silt loam, 6 to 12 percent slopes

This sloping soil is similar to 336-B-1, but it has a moderate water erosion hazard. Small areas of Morley and Varna soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 1.)

336-C-2 Markham silt loam, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 336-B-1, but it has a thinner, lighter colored dark grayish-brown surface soil and a moderate water erosion hazard. Small areas of Varna and Morley soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 1.)

336-D-1 Markham silt loam, 12 to 20 percent slopes

This moderately steep soil is similar to 336-B-1, but it has a severe water erosion hazard. Small areas of Morley soils are included in this mapping unit. (Capability Unit VIe-6; Woodland Suitability Group 1.)

336-D-2 Markham silt loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil is similar to 336-B-1, but it has a thinner, lighter colored dark-grayish-brown surface soil and a severe water erosion hazard. Small areas of Morley soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 1.)

336-C-3 Markham soils, 6 to 12 percent slopes, severely eroded

This sloping soil is similar to 336-B-1, but it has a very thin, lighter colored dark grayish-brown silt loam to silty clay loam surface soil and a moderate water erosion hazard. Small areas of Morley soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 1.)

336-D-3 Markham soils, 12 to 20 percent slopes, severely eroded

This moderately steep soil is similar to 336-B-1, but it has a very thin lighter colored dark grayish-brown silt loam to silty clay loam surface soil and a severe water erosion hazard. Small areas of Morley soils are included in this mapping unit. (Capability Unit VIe-6; Woodland Suitability Group 1.)

331-B-1 Markham-Elliott silt loam, 2 to 6 percent slopes

This mapping unit consists mainly of Markham silt loam, but it contains 20 to 50 percent of Elliott silt loam. They are intermingled in such a pattern that they cannot be mapped separately. Small areas of Ashkum and Beecher soils are included in this mapping unit. Markham silt loam is in capability unit IIe-6; woodland suitability group 1. Elliott silt loam is in capability unit IIw-2; woodland suitability group 12.)

MARSH¹

This very poorly drained land type consists of organic and mineral material in low areas bordering on lakes or streams. This land type is very difficult to drain because of its location and type of soil material. This land type is not suited for cropland, but is best used as wildlife areas.

4-A-1 Marsh

This land type has a high water table throughout the year. (Capability Unit VIIIw-15; Woodland Suitability Group 11.)

¹ Profile sketches have been omitted because of extreme variability.



Very poorly drained marsh near Lake Ottawa in Kettle Moraine State Park.

MATHERTON SERIES

The somewhat poorly drained, nearly level to sloping soils of the Matherton series have developed in loamy material overlying calcareous sand and gravel. They occupy depressions and drainageways of glacial out-

wash plains and stream terraces.

The following profile description of 233-B-1 Matherton silt loam, 2 to 6 percent slopes, is representative of the series.

1'	<p>Surface soil:</p> <p>0 to 7 inches, very dark grayish-brown, friable, granular silt loam.</p> <p>7 to 11 inches, dark grayish-brown friable, platy silt loam.</p>
2'	<p>Subsoil:</p> <p>11 to 16 inches, yellowish-brown, firm, subangular blocky silty clay loam with yellow and gray mottles.</p> <p>16 to 21 inches, yellowish-brown, firm, subangular blocky clay loam with gray and strong brown mottles.</p>
3'	<p>21 to 35 inches, brown, friable, subangular blocky gravelly clay loam with yellow, gray and strong brown mottles.</p>
4'	<p>Substratum:</p> <p>35 to 60 inches, pale brown, loose, calcareous outwash sand and gravel.</p>

Surface soil textures are silt loam, loam and sandy loam. The depth of these soils ranges from 20 to 40 inches. The subsoil of the sandy loam type is generally a heavy sandy loam to sandy clay loam.

The soils of the Matherton series have a seasonal high water table and are subject to ponding and overflow from adjacent lands. Sloping areas have a water erosion hazard. They are good cropland soils when adequately drained.

203-A-1 Matherton loam, 0 to 2 percent slopes

This nearly level soil differs from 233-B-1 by having a loam surface soil. It does not have a water erosion hazard. Small areas of Sebewa, Ionia and Fabius soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

203-B-1 Matherton loam, 2 to 6 percent slopes

This soil differs from 233-B-1 by having a loam surface soil. Small areas of Ionia and Fabius soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

203-M-1 Same as 203-B-1

203-B-2 Matherton loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 233-B-1 by having a thinner, lighter colored dark grayish-brown loam surface soil. Small areas of Ionia and Fabius soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

203Z-A-1 Matherton loam, clay substratum, 0 to 2 percent slopes

This nearly level soil differs from 233-B-1 by having a loam surface soil. The lower part of the substratum is slowly permeable clay. It does not have a water erosion hazard. Small areas of Sebewa, Ionia and Mosel soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

109Y-A-1 Same as 203Z-A-1

144-A-1 Same as 203Z-A-1

203Z-B-1 Matherton loam, clay substratum, 2 to 6 percent slopes

This soil differs from 233-B-1 by having a loam surface soil. The lower part of the substratum is slowly permeable clay. Small areas of Ionia and Mosel soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

109Y-B-1 Same as 203Z-B-1

144-B-1 Same as 203Z-B-1

203Y-A-1 Matherton loam, loam substratum, 0 to 2 percent slopes

This nearly level soil differs from 223-B-1 by having a loam surface soil and the lower part of the substratum is loam. It does not have a water erosion hazard. Small areas of Sebewa, Ionia, Fabius and Lamartine soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

203Y-B-1 Matherton loam, loam substratum, 2 to 6 percent slopes

This soil differs from 233-B-1 by having a loam surface soil and the lower part of the substratum is loam. Small areas of Ionia, Fabius and Lamartine soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

203Y-B-2 Matherton loam, loam substratum, 2 to 6 percent slopes, moderately eroded

This soil differs from 233-B-1 by having a thinner, lighter colored dark grayish-brown loam surface soil and the lower part of the substratum is loam. Small areas of Ionia, Fabius and Lamartine soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

203V-A-1 Matherton loam, silt and fine sand substratum, 0 to 2 percent slopes

This nearly level soil differs from 233-B-1 by having a loam surface and a lower substratum of fine sand and silt. Small areas of Sebewa, Ionia, Fabius and Wauconda soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

203V-B-1 Matherton loam, silt and fine sand substratum, 2 to 6 percent slopes

This soil differs from 233-B-1 by having a loam surface soil. The lower part of the substratum is silt and fine sand. Small

areas of Ionia, Fabius and Wauconda soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

203V-B-2 Matherton loam, silt and fine sand substratum, 2 to 6 percent slopes, moderately eroded

This soil differs from 233-B-1 by having a thinner, lighter colored dark grayish-brown loam surface soil. The lower part of the substratum is silt and fine sand. Small areas of Ionia, Fabius and Kibbie soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

234-A-1 Matherton sandy loam, 0 to 2 percent slopes

This nearly level soil differs from 233-B-1 by having a sandy loam surface soil. It does not have a water erosion hazard. Small areas of Sebewa, Fabius and Ionia soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

234-B-1 Matherton sandy loam, 2 to 6 percent slopes

This soil differs from 233-B-1 by having a sandy loam surface soil. Small areas of Ionia and Fabius soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

234Y-A-1 Matherton sandy loam, loam substratum, 0 to 2 percent slopes

This nearly level soil differs from 233-B-1 by having a sandy loam surface soil. The lower part of the substratum is loam. It does not have a water erosion hazard. Small areas of Ionia, Lamartine and Fabius soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

234V-A-1 Matherton sandy loam, silt and fine sand substratum, 0 to 2 percent slope

This nearly level soil differs from 233-B-1 by having a sandy loam surface soil. The lower part of the substratum is silt and fine sand. Small areas of Sebewa, Ionia, Fabius and Wauconda soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

233-A-1 Matherton silt loam, 0 to 2 percent slopes

This nearly level soil is similar to 233-B-1, but it does not have a water erosion hazard. Small areas of Sebewa, Ionia and Fabius soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

233-B-1 Matherton silt loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Ionia and Fabius soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

233-B-2 Matherton silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 233-B-1, but it has a thinner, lighter colored dark grayish-brown surface soil. Small areas of Fabius and Ionia soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

233-C-1 Matherton silt loam, 6 to 12 percent slopes

This sloping soil is similar to 233-B-1, but it has a moderate water erosion hazard. Small areas of Fabius and Ionia soils are included in this mapping unit. (Capability Unit IIIe-8; Woodland Suitability Group 7.)

233-C-2 Matherton silt loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 233-B-1 by having a thinner, lighter colored dark grayish-brown surface soil and a moderate water erosion hazard. Small areas of Fabius and Ionia soils are included in this mapping unit. (Capability Unit IIIe-8; Woodland Suitability Group 7.)

233Z-A-1 Matherton silt loam, clay substratum, 0 to 2 percent slopes

This nearly level soil is similar to 233-B-1, but the lower part of the substratum is slowly permeable clay. It does not have a water erosion hazard. Small areas of Ionia, Fabius, Sebewa and Mosel soils are included

in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

233Z-B-1 Matherton silt loam, clay substratum, 2 to 6 percent slopes

This soil is similar to 233-B-1, but the lower part of the substratum is slowly permeable clay. Small areas of Ionia, Fabius and Mosel soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

233Y-A-1 Matherton silt loam, loam substratum, 0 to 2 percent slopes

This nearly level soil is similar to 233-B-1, but the lower part of the substratum is loam. It does not have a water erosion hazard. Small areas of Fabius, Sebewa, Ionia and Lamartine soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

233Y-B-1 Matherton silt loam, loam substratum, 2 to 6 percent slopes

This soil is similar to 233-B-1, but the lower part of the substratum is loam. Small areas of Ionia, Fabius and Lamartine soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

233V-A-1 Matherton silt loam, silt and fine sand substratum, 0 to 2 percent slopes

This nearly level soil is similar to 233-B-1, but the lower part of the substratum is silt and fine sand. Small areas of Fabius, Sebewa, Ionia and Wauconda soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

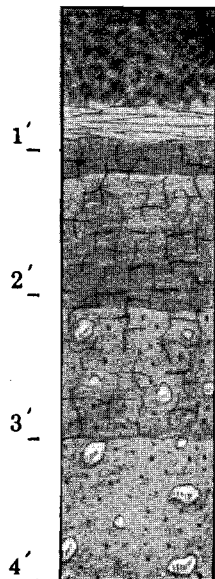
233V-B-1 Matherton silt loam, silt and fine sand substratum, 2 to 6 percent slopes

This soil is similar to 233-B-1, but the lower part of the substratum is silt and fine sand. Small areas of Fabius, Ionia and Wauconda soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

MAYVILLE SERIES

The moderately well drained, nearly level to sloping soils of the Mayville series have developed in a silt layer over calcareous loam till. They occupy drainageways and footslopes of glacial uplands.

The following profile description of 363-A-1 Mayville silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, dark grayish-brown, friable, granular silt loam.

8 to 11 inches, brown, friable, platy silt loam.

Subsoil:

11 to 14 inches, dark brown, friable, subangular blocky silt loam.

14 to 25 inches, dark brown, firm, subangular blocky silty clay loam with few yellow mottles in lower part.

25 to 36 inches, dark brown, firm, subangular blocky clay loam with many yellow and strong brown mottles.

Substratum:

36 to 60 inches, brown, friable, massive loam glacial till with many dolomite fragments.

The silt layer ranges from 20 to 46 inches thick. The substratum ranges from loam to sandy loam.

The Mayville soils are subject to overflow from adjacent uplands. They have a water erosion hazard on sloping areas. They are good cropland soils on the lower slopes.

363-A-1 Mayville silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Lamartine and Dodge soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)

363-B-1 Mayville silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to 363-A-1, but it has a slight water erosion hazard. Small areas of Lamartine and Dodge soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

363-M-1 Same as 363-B-1

363Y-B-1 Same as 363-B-1

363-B-2 Mayville silt loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil is similar to 363-A-1, but it has a thinner, lighter colored grayish-brown surface soil and a slight water erosion hazard. Small areas of Lamartine and Dodge soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

363-C-1 Mayville silt loam, 6 to 12 percent slopes

This sloping soil is similar to 363-A-1, but it has a moderate water erosion hazard. Small areas of Theresa and Dodge soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

363-N-1 Same as 363-C-1

363-C-2 Mayville silt loam, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 363-A-1, but it has a thinner, lighter colored grayish-brown surface soil and a moderate water

erosion hazard. Small areas of Theresa and Dodge soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

363Z-B-1 Mayville silt loam, clay substratum, 2 to 6 percent slopes

This gently sloping soil is similar to 363-A-1, but the lower part of the substratum is slowly permeable clay. It has a slight water erosion hazard. Small areas of Lamartine and Dodge soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

363X-B-1 Mayville silt loam, gravelly substratum, 2 to 6 percent slopes

This gently sloping unit is similar to 363-A-1, but the lower part of the substratum is loose sand and gravel. It has a slight water erosion hazard. Small areas of Matherton, Fox, Dodge and Lamartine soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

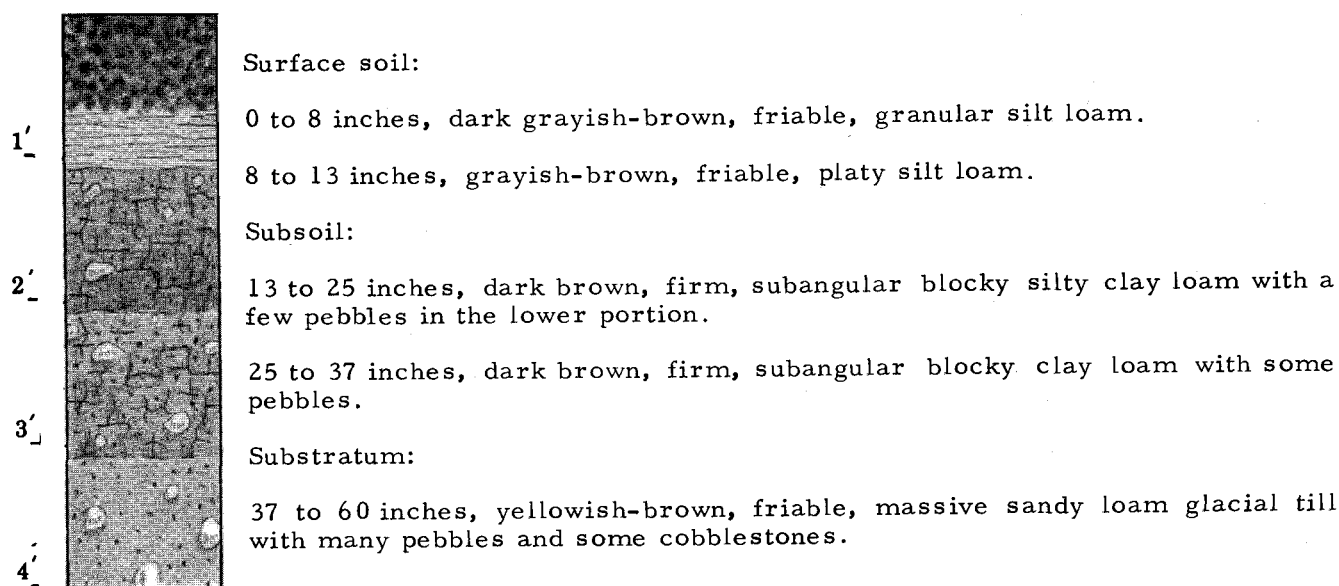
363R-B-1 Mayville silt loam, rock substratum, 2 to 6 percent slopes

This gently sloping soil is similar to 363-A-1, but the lower part of the substratum is fissured limestone bedrock. It has a slight water erosion hazard. Small areas of Knowles, Dodge and Lamartine soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

MCHENRY SERIES

The well drained, nearly level to steep soils of the McHenry series have developed in a silt mantle over sandy loam till. They occupy all slopes of glacial uplands.

The following profile description of 155-A-1, McHenry silt loam, 0 to 2 percent slopes, is representative of the series.



The silt mantle ranges from 15 to 30 inches thick.

Sloping areas have a water erosion hazard. They are good cropland soils on the lower slopes.

155-A-1 McHenry silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Lapeer soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)

154-A-1 Same as 155-A-1

155-B-1 McHenry silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to 155-A-1, but it has a slight water erosion hazard. Small areas of Lapeer soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

155-B-2 McHenry silt loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil is similar to 155-A-1, but it has a thinner, lighter colored grayish-brown surface soil and a slight water erosion hazard. Small areas of Lapeer soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

155-C-1 McHenry silt loam, 6 to 12 percent slopes

This sloping soil is similar to 155-A-1, but it has a moderate water erosion hazard. Small areas of Lapeer soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

155-C-2 McHenry silt loam, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 155-A-1, but it has a thinner, lighter colored grayish-brown surface soil and a moderate water erosion hazard. Small areas of Lapeer soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

155-D-1 McHenry silt loam, 12 to 20 percent slopes

This moderately steep soil is similar to 155-A-1, but it has a severe water erosion hazard. Small areas of Lapeer soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 1.)

155-D-2 McHenry silt loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil is similar to 155-A-1, but it has a thinner, lighter colored grayish-brown surface soil and a severe water erosion hazard. Small areas of Lapeer soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 1.)

155Z-C-1 McHenry silt loam, clay substratum, 6 to 12 percent slopes

This sloping soil is similar to 155-A-1, but it has a slowly permeable clay substratum. Small areas of Lapeer soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 1.)

155-D-3 McHenry soils, 12 to 20 percent slopes, severely eroded

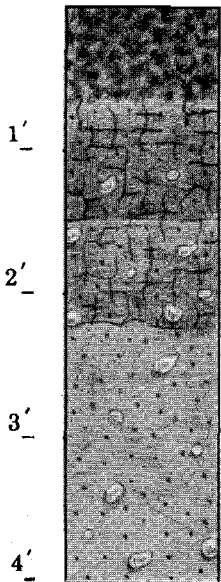
This moderately steep soil is similar to 155-A-1, but it has a lighter colored, very thin, dark brown and grayish-brown silt loam to silty clay loam surface soil. It has a severe water erosion hazard. Small areas of Lapeer soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 1.)

MEQUON SERIES

The somewhat poorly drained, nearly level to gently sloping soils of the Mequon series have developed in a thin silt layer over calcareous silty clay loam till. They occupy drainageways and depressions of glacial up-

lands.

The following profile description of 399-A-1 Mequon silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, dark grayish-brown, friable, granular silt loam.

Subsoil:

8 to 18 inches, dark grayish-brown, friable, subangular blocky silty clay loam with brown and gray mottles.

18 to 27 inches, brown, firm, angular blocky silty clay loam with gray and yellow mottles.

Substratum:

27 to 60 inches, strong brown, firm, massive, calcareous silty clay loam glacial till with strong brown and gray mottles.

In places the substratum contains large boulders, numerous cobblestones and pockets or lenses of silt and fine sand.

Sloping areas have a water erosion hazard. The soils of this series are subject to ponding and are slowly permeable. They are good cropland soils when adequately drained.

399-A-1 Mequon silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Ashkum and Ozaukee soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

399-B-1 Mequon silt loam, 2 to 6 percent

slopes

This gently sloping soil is similar to 399-A-1, but it has a slight water erosion hazard. Small areas of Ashkum and Ozaukee soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

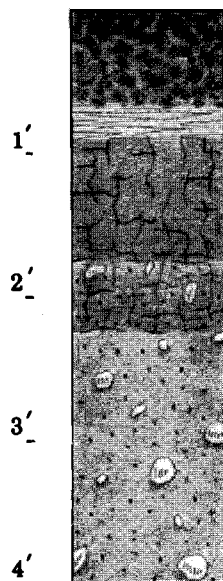
399-B-2 Mequon silt loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil is similar to 399-A-1, but it has a thinner, lighter colored grayish-brown surface soil. It has a slight water erosion hazard. Small areas of Ashkum and Ozaukee soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

MIAMI SERIES

The well drained, nearly level to steep soils of the Miami series have developed in calcareous loam till. They occupy glacial till uplands and till plains.

The following profile description of 361-B-1 Miami silt loam, 2 to 6 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, dark grayish-brown, friable, granular silt loam.

8 to 11 inches, brown, friable, platy silt loam.

Subsoil:

11 to 21 inches, yellowish-brown, firm, subangular blocky silty clay loam.

21 to 27 inches, dark brown, firm, subangular blocky clay loam.

Substratum:

27 to 60 inches, light yellowish-brown, friable, massive calcareous loam glacial till with many dolomite fragments.

The surface soil textures are silt loam and loam. The underlying material ranges from silt loam to heavy sandy loam and in places contains pockets and lenses of sand and silt.

Sloping areas have a water erosion hazard. These are good cropland soils on lower slopes.

358-A-1 Miami loam, 0 to 2 percent slopes

This nearly level soil differs from 361-B-1 by having a loam surface soil. Small areas of Dodge and Celina soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)

358-B-1 Miami loam, 2 to 6 percent slopes

This soil differs from 361-B-1 by having a loam surface soil. Small areas of Dodge and Celina soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

557-B-1 Same as 358-B-1

358-B-2 Miami loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 361-B-1 by having a thinner, lighter colored grayish-brown loam

surface soil. Small areas of Dodge and Celina soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

557-B-2 Same as 358-B-2

358-C-1 Miami loam, 6 to 12 percent slopes

This sloping soil differs from 361-B-1 by having a loam surface soil and a moderate water erosion hazard. Small areas of Dodge and Celina soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

557-C-1 Same as 358-C-1

358-C-2 Miami loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 361-B-1 by having a thinner, lighter colored surface soil and a moderate water erosion hazard. Small areas of Dodge and Celina soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

358-N-2 Same as 358-C-2

557-C-2 Same as 358-C-2

358-D-1 Miami loam, 12 to 20 percent slopes

This moderately steep soil differs from 361-B-1 by having a loam surface soil and a severe water erosion hazard. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit IVE-1; Woodland Suitability Group 1.)

557-D-1 Same as 358-D-1

358-D-2 Miami loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 361-B-1 by having a thinner, lighter colored, grayish-brown loam surface soil and a severe water erosion hazard. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit IVE-4; Woodland Suitability Group 1.)

557-D-2 Same as 358-D-2

358-E-1 Miami loam, 20 to 30 percent slopes

This steep soil differs from 361-B-1 by having a loam surface soil and a very severe water erosion hazard. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 1.)

358-E-2 Miami loam, 20 to 30 percent slopes, moderately eroded

This steep soil differs from 361-B-1 by having a thinner, lighter colored grayish-brown loam surface soil and a very severe water erosion hazard. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 1.)

557-E-2 Same as 358-E-2

361-A-1 Miami silt loam, 0 to 2 percent slopes

This nearly level soil is similar to 361-B-1, but it does not have a water erosion hazard. Small areas of Theresa, Dodge and Celina soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)

114-A-1 Same as 361-A-1

361-B-1 Miami silt loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Theresa, Dodge and Celina soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

114-B-1 Same as 361-B-1

420-B-1 Same as 361-B-1

560-B-1 Same as 361-B-1

361-B-2 Miami silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 361-B-1, but it has a thinner, lighter colored grayish-brown surface soil. Small areas of Theresa, Dodge, and Celina soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

114-B-2 Same as 361-B-2

420-B-2 Same as 361-B-2

560-B-2 Same as 361-B-2

361-C-1 Miami silt loam, 6 to 12 percent slopes

This sloping soil is similar to 361-B-1, but it has a moderate erosion hazard. Small areas of Theresa, Dodge and Celina soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

114-C-1 Same as 361-C-1

560-C-1 Same as 361-C-1

361-C-2 Miami silt loam, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 361-B-1, but it has a thinner, lighter colored grayish-brown surface soil and a moderate water erosion hazard. Small areas of Theresa, Dodge and Celina soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

114-C-2 Same as 361-C-2

420-C-2 Same as 361-C-2

560-C-2 Same as 361-C-2

361-D-1 Miami silt loam, 12 to 20 percent slopes

This moderately steep soil is similar to 361-B-1, but it has a severe water erosion hazard. Small areas of Theresa and Hochheim soils are included in this mapping unit. (Capability Unit IVE-1; Woodland Suitability Group 1.)

114-D-1 Same as 361-D-1

560-D-1 Same as 361-D-1

361-D-2 Miami silt loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil is similar to 361-B-1, but it has a thinner, lighter colored grayish-brown surface soil and a severe water erosion hazard. Small areas of Theresa and Hochheim soils are included in this mapping unit. (Capability Unit IVE-1; Woodland Suitability Group 1.)

114-D-2 Same as 361-D-2

560-D-2 Same as 361-D-2

358-C-3 Miami soils, 6 to 12 percent slopes, severely eroded

This sloping soil differs from 361-B-1 by

having a very thin, light colored grayish-brown and brown loam to clay loam surface soil and a moderate water erosion hazard. Small areas of Dodge and Celina soils are included in this mapping unit. (Capability Unit IVE-1; Woodland Suitability Group 1.)

114-C-3 Same as 358-C-3

361-C-3 Same as 358-C-3

557-C-3 Same as 358-C-3

358-D-3 Miami soils, 12 to 20 percent severely eroded

This moderately steep soil differs from 361-B-1 by having a very thin, light colored grayish-brown and brown loam to clay loam surface soil and a severe water erosion hazard. Small areas of Hennepin soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 1.)

114-D-3 Same as 358-D-3

361-D-3 Same as 358-D-3

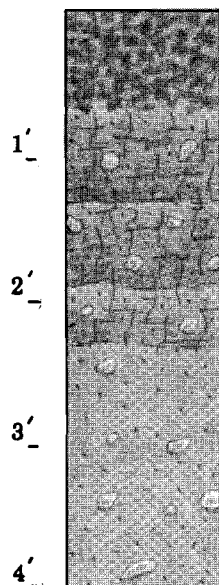
557-D-3 Same as 358-D-3

560-D-3 Same as 358-D-3

MORLEY SERIES

The well to moderately well drained, nearly level to steep soils of the Morley series have developed in calcareous silty clay loam till. They occupy glacial till uplands.

The following profile description of 297-B-1 Morley silt loam, 2 to 6 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, dark grayish-brown, friable, granular silt loam.

Subsoil:

8 to 16 inches, dark brown, firm, subangular blocky silty clay loam.

16 to 23 inches, dark brown, firm, angular blocky silty clay.

23 to 28 inches, dark brown, firm, subangular blocky silty clay loam.

Substratum:

28 to 60 inches, grayish-brown, firm, massive, calcareous silty clay loam glacial till.

The subsoil ranges from a silty clay loam to clay. In places the subsoil is mottled in the lower part and the substratum contains pebbles and lenses of sand and silt.

These Morley soils have a water erosion hazard on sloping areas and they are slowly permeable. They are good cropland soils on the lower slopes.

297S-B-1 Morley sandy loam, 2 to 6 percent slopes

This soil differs from 297-B-1 by having a sandy loam. Small areas of Hebron and Morley soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 1.)

297S-M-1 Same as 297S-B-1

297-A-1 Morley silt loam, 0 to 2 percent slopes

This nearly level soil is similar to 297-B-1 but it does not have a water erosion hazard. Small areas of Blount, Saylesville and Ozaukee soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 1.)

297-B-1 Morley silt loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Blount, Ozaukee and Saylesville soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 1.)

297Y-B-1 Same as 297-B-1

297-M-1 Same as 297-B-1

297-B-2 Morley silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 297-B-1, but it has a thinner, lighter colored grayish-brown surface soil. Small areas of Blount, Ozaukee and Saylesville soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 1.)

297-M-2 Same as 297-B-2

297-C-1 Morley silt loam, 6 to 12 percent slopes

This sloping soil is similar to 297-B-1, but it has a moderate water erosion hazard. Small areas of Blount, Ozaukee and Saylesville soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 1.)



Nearly level to gently sloping Morley silt loam and associated soils on a clayey glacial till plain.

297-C-2 Morley silt loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 297-B-1 by having a thinner, lighter colored grayish-brown surface soil and a moderate water erosion hazard. Small areas of Blount, Ozaukee, and Saylesville soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 1.)

297-N-2 Same as 297-C-2

297-D-1 Morley silt loam, 12 to 20 percent slopes

This moderately steep soil is similar to 297-B-1, but it has a severe water erosion hazard. Small areas of Ozaukee and Saylesville soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 1.)

297-D-2 Morley silt loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 297-B-1 by having a thinner, lighter colored grayish-brown surface soil and a severe water erosion hazard. Small areas of Ozaukee and Saylesville soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 1.)

297-E-2 Morley silt loam, 20 to 30 percent slopes, moderately eroded

This steep soil differs from 297-B-1 by hav-

ing a thinner, lighter colored grayish-brown surface soil and a very severe water erosion hazard. Small areas of Ozaukee soils are included in this mapping unit. (Capability Unit VIe-6; Woodland Suitability Group 1.)

297-F-1 Morley silt loam, 30 to 45 percent slopes

This very steep soil is similar to 297-B-1, but it has a very severe water erosion hazard. It is too steep for the operation of equipment for pasture renovation or woodland purposes. Small areas of Ozaukee soils are included in this mapping unit. (Capability Unit VIIe-7; Woodland Suitability Group 1.)

297X-B-1 Morley silt loam, gravelly substratum, 2 to 6 percent slopes

This soil is similar to 297-B-1, but the lower part of the substratum is sand and gravel. Small areas of Blount and Ozaukee soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 1.)

297X-B-2 Morley silt loam, gravelly substratum, 2 to 6 percent slopes, moderately eroded

This soil is similar to 297-B-1, but it has a thinner, lighter colored grayish-brown surface soil and the lower part of the substratum is sand and gravel. Small areas of Blount and Ozaukee soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 1.)

297V-B-1 Morley silt loam, silt and fine sand substratum, 2 to 6 percent slopes

This soil is similar to 297-B-1, but the lower part of the substratum is silt and fine sand. Small areas of Blount, Ozaukee and Saylesville soils are included in this mapping unit. (Capability Unit IIe-6, Woodland Suitability Group 1.)

297-B-3 Morley soils, 2 to 6 percent slopes, severely eroded

This soil differs from 297-B-1 by having a very thin, light colored grayish-brown and dark brown loam to silty clay loam surface soil. Small areas of Blount and Ozaukee soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 1.)

297-C-3 Morley soils, 6 to 12 percent slopes, severely eroded

This sloping soil differs from 297-B-1 by having a very thin, light colored grayish-brown and dark brown loam to silty clay loam surface soil and a moderate water erosion hazard. Small areas of Ozaukee soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 1.)

297-D-3 Morley soils, 12 to 20 percent slopes, severely eroded

This moderately steep soil differs from 297-B-1 by having a very thin, light colored grayish-brown and dark brown silt loam to silty clay loam surface soil and a severe water erosion hazard. Small areas of Ozaukee soils are included in this mapping unit. (Capability Unit VIe-6; Woodland Suitability Group 1.)

297-E-3 Morley soils, 20 to 30 percent

slopes, severely eroded

This steep soil differs from 297-B-1 by having a very thin, light colored grayish-brown and dark brown silt loam to silty clay loam surface soil and a very severe water erosion hazard. Small areas of Ozaukee soils are included in this mapping unit. (Capability Unit VIIe-6; Woodland Suitability Group 1.)

295-B-1 Morley-Beecher silt loam, 2 to 6 percent slopes

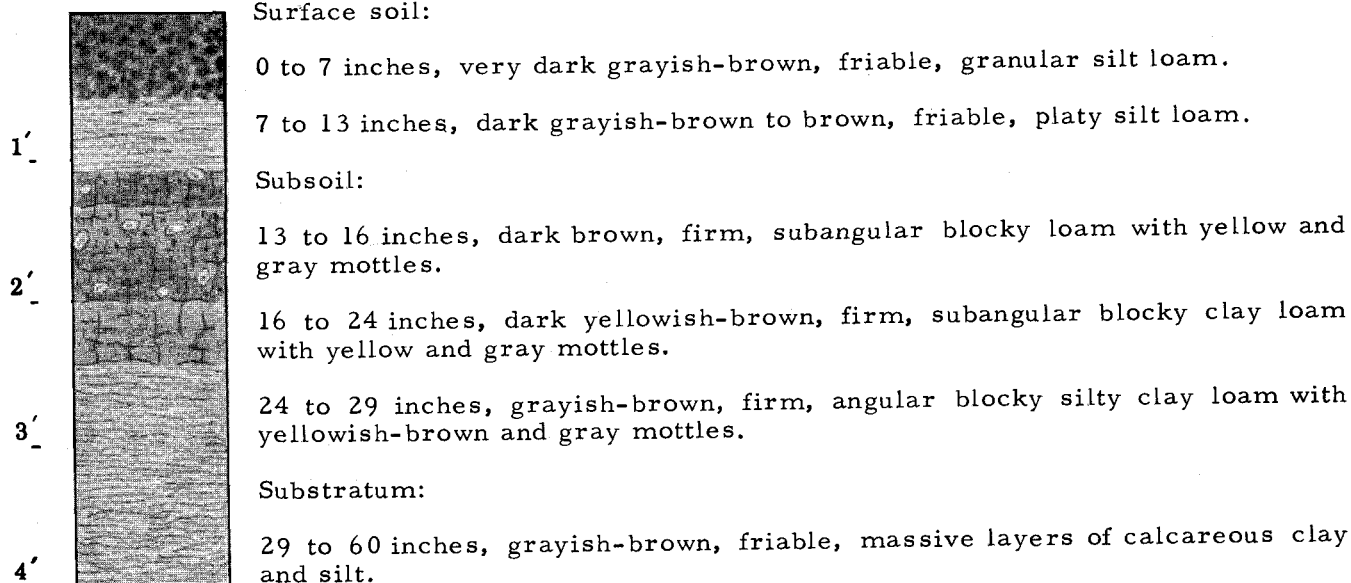
This mapping unit consists mainly of Morley silt loam but contains 25 to 50 percent Beecher silt loam. These soils are intermingled in such a pattern that they cannot be mapped separately. Small areas of Blount and Markham soils are included in this map. Unit IIe-6; Woodland Suitability Group 1. Beecher soils are in Capability Unit IIw-2; Woodland Suitability Group 7.

MOSEL SERIES

The somewhat poorly drained, nearly level to sloping soils of the Mosel series have developed in a thin loamy outwash mantle over calcareous lacustrine clay and silt. They occupy glacial lake basins and river ter-

aces.

The following profile description of 369-B-1 Mosel silt loam, 2 to 6 percent slopes, is representative of the series.



The surface soil is light brownish-gray when dry.

Surface soil textures are silt loam, loam and sandy loam. In places the substratum contains layers of fine sand and silt.

The Mosel soils are subject to ponding and the underlying material is slowly permeable. Sloping areas have a water erosion hazard. They are good cropland soils when drained.

371-A-1 Mosel loam, 0 to 2 percent slopes

This nearly level soil differs from 369-B-1 by having a loam surface soil. It has no water erosion hazard. Small areas of Tichigan, Hebron, Matherton and Navan soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

371-B-1 Mosel loam, 2 to 6 percent slopes

This soil differs from 369-B-1 by having a loam surface soil. Small areas of Hebron, Tichigan and Matherton soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

371-B-2 Mosel loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 369-B-1 by having a thinner, lighter colored grayish-brown surface soil. Small areas of Hebron, Tichigan and Matherton soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

370-A-1 Mosel sandy loam, 0 to 2 percent slopes

This nearly level soil differs from 369-B-1 by having a sandy loam surface soil. It does not have a water erosion hazard. Small areas of Tichigan, Hebron and Matherton soils are included in this mapping unit. (Capability Unit IIIw-6; Woodland Suitability Group 8.)

283-A-1 Same as 370-A-1

284-A-1 Same as 370-A-1

370-B-1 Mosel sandy loam, 2 to 6 percent slopes

This soil differs from 369-B-1 by having a sandy loam surface soil. Small areas of Tichigan, Hebron and Matherton soils are included in this mapping unit. (Capability Unit IIIw-6; Woodland Suitability Group 8.)

283-B-1 Same as 370-B-1

284-B-1 Same as 270-B-1

370-C-1 Mosel sandy loam, 6 to 12 percent slopes

This sloping soil differs from 369-B-1 by having a sandy loam surface soil, and it has a slight water erosion hazard. Small areas of Tichigan and Hebron soils are included in this mapping unit. (Capability Unit IIIe-8; Woodland Suitability Group 8.)

369-A-1 Mosel silt loam, 0 to 2 percent slopes

This nearly level soil is similar to 369-B-1, but it does not have a water erosion hazard. Small areas of Tichigan, Hebron, Matherton and Navan soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

369-B-1 Mosel silt loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Tichigan, Hebron and Matherton soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

369-C-1 Mosel silt loam, 6 to 12 percent slopes

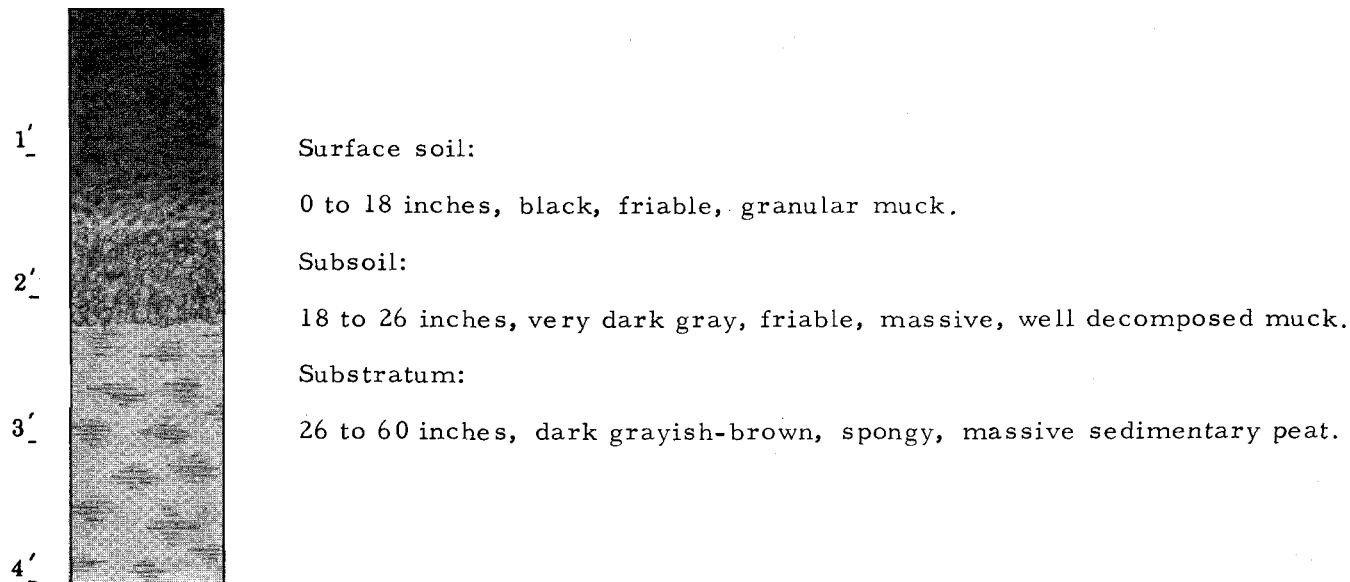
This sloping soil is similar to 369-B-1. It has a moderate water erosion hazard. Small areas of Tichigan, Hebron and Matherton soils are included in the mapping unit. (Capability Unit IIIe-8; Woodland Suitability Group 8.)

MUSKEGO SERIES

The poorly drained, nearly level soils of the Muskego series have developed in fibrous organic material from sedges, grasses and reeds over sedimentary peat. They occupy level glacial lake basins and depres-

sions.

The following profile description of 461 Muskego muck is representative of the series.



The depth to the substratum ranges from 20 to 42 inches. In some places shell fragments occur in the surface and subsoil. The substratum varies in color from a greenish-gray to very dark gray.

These Muskego soils have a severe wetness hazard. They are poor cropland soils and are very difficult to drain. They are subject to wind erosion hazards, burning and

subsidence when drained and cultivated.

461-A-1 Muskego muck, 0 to 2 percent slopes

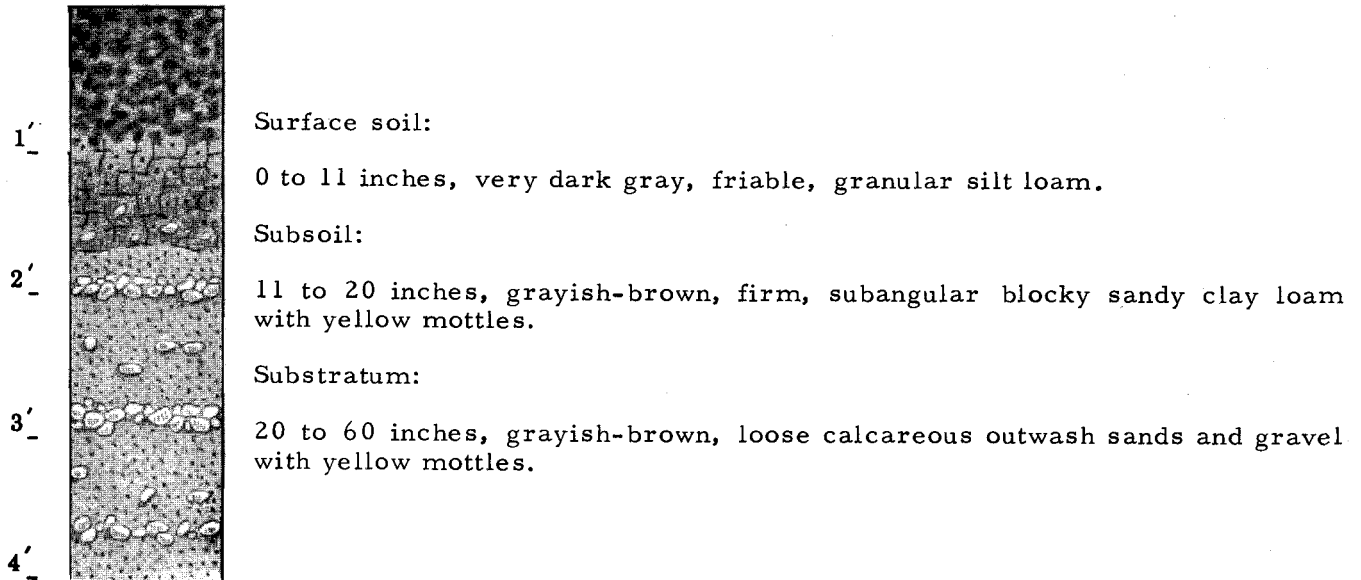
The profile description of this soil is part of the series description. Small areas of Houghton and Palms soils are included in this mapping unit. (Capability Unit Vw-7; Woodland Suitability Group 10.)

MUSSEY SERIES

The poorly to very poorly drained, nearly level to gently sloping soils of the Mussey series have developed in loamy material over calcareous sand and gravel. They occupy low depressions and flats of outwash

plains.

The following profile description of 181-A-1 Mussey silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil textures are silt loam, loam and sandy loam. These soils range from 12 to 20 inches deep.

Mussey soils are subject to ponding and have a high water table. Sloping areas have a water erosion hazard. They are fair cropland soils when adequately drained.

176-A-1 Mussey loam, 0 to 2 percent slopes

This soil differs from 181-A-1 by having a loam surface soil. Small areas of Sebewa and Fabius soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 8.)

176V-A-1 Same as 176-A-1

285-A-1 Same as 176-A-1

287-A-1 Same as 176-A-1

176-B-1 Mussey loam, 2 to 6 percent slopes

This gently sloping soil differs from 181-A-1 by having a loam surface soil. This soil has a slight water erosion hazard. Small areas of Sebewa and Fabius soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 8.)

176-C-1 Same as 176-B-1

285-B-1 Same as 176-B-1

287-B-1 Same as 176-B-1

176Z-A-1 Mussey loam, clay substratum, 0 to 2 percent slopes

This soil is similar to 181-A-1, but it has a loam surface soil and the lower part of the substratum is slowly permeable clay. Small areas of Sebewa and Fabius soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

180-A-1 Mussey sandy loam, 0 to 2 percent slopes

This soil differs from 181-A-1 by having a sandy loam surface soil. Small areas of Sebewa and Fabius soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 8.)

181-A-1 Mussey silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Sebewa and Fabius soils are included in this

mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

286-A-1 Same as 181-A-1

181-B-1 Mussey silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to 181-A-1, but it has a slight water erosion hazard. Small areas of Sebewa and Fabius soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

181-C-1 Mussey silt loam, 6 to 12 percent slopes

This sloping soil is similar to 181-A-1, but it has a moderate water erosion hazard. Small areas of Fabius soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

181Z-A-1 Mussey silt loam, clay substratum, 0 to 2 percent slopes

This soil is similar to 181-A-1, but the substratum is slowly permeable clay. Small areas of Sebewa and Fabius soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

181Y-A-1 Mussey silt loam, loam substratum, 0 to 2 percent slopes

This soil is similar to 181-A-1, but the

lower part of the substratum is loam. Small areas of Sebewa and Fabius soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

181Y-B-1 Mussey silt loam, loam substratum, 2 to 6 percent slopes

This soil is similar to 181-A-1, but the lower part of the substratum is loam. Small areas of Sebewa and Fabius soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

181V-A-1 Mussey silt loam, silt and fine sand substratum, 0 to 2 percent slopes

This soil is similar to 181-A-1, but the lower part of the substratum is silt and fine sand. Small areas of Sebewa and Fabius soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

181V-B-1 Mussey silt loam, silt and fine sand substratum, 0 to 2 percent slopes

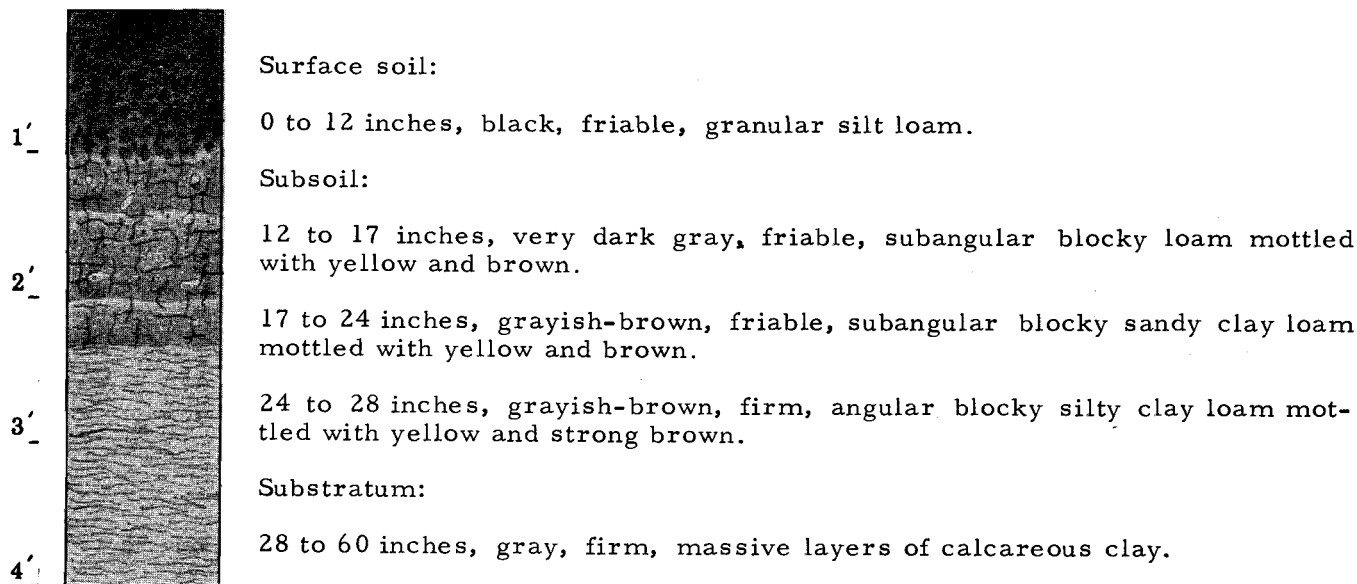
This gently sloping soil is similar to 181-A-1, but the lower part of the substratum is silt and fine sand. This soil has a slight water erosion hazard. Small areas of Sebewa and Fabius soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

NAVAN SERIES

The poorly to very poorly drained, nearly level to gently sloping soils of the Navan series have developed in a thin layer of loamy outwash overlying calcareous clays and silts. They occupy gently sloping depressions and broad flats of glacial lake and

river basins.

The following profile description of 340-A-1 Navan silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil texture varies from silt loam to loam. In places a thin layer of loose sand or gravel occurs in the subsoil. The depth to the underlying clay material ranges from 20 to 36 inches.

These Navan soils are subject to ponding or flooding and have a high water table. They are slowly permeable. Sloping areas have a water erosion hazard. They are good cropland soils when adequately drained.

330-A-1 Navan loam, 0 to 2 percent slopes

This soil is similar to 340-A-1, but it has a loam surface soil. Small areas of Mosel, Colwood and Bono soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

330-B-1 Navan loam, 2 to 6 percent slopes

This gently sloping soil is similar to 340-A-1, but it has a loam surface soil and a slight

water erosion hazard. Small areas of Hebron, Sebewa and Bono soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

340-A-1 Navan silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. It does not have a water erosion hazard. Small areas of Hebron, Sebewa and Bono soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

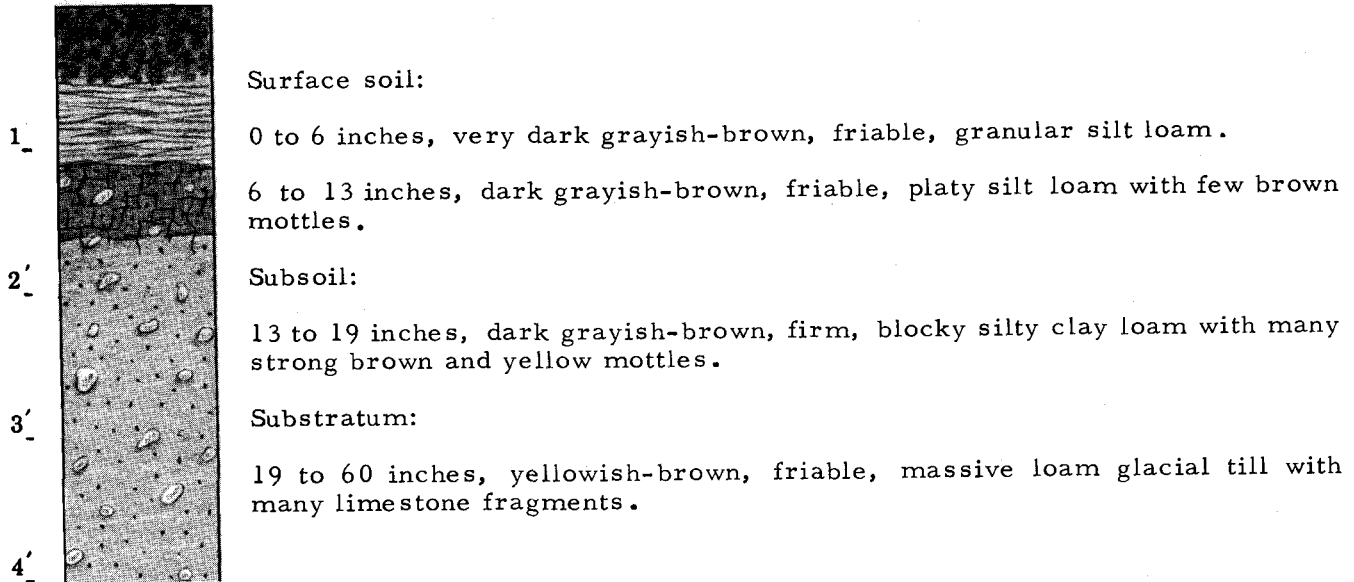
340-B-1 Navan silt loam, 2 to 6 percent slopes

This soil is similar to 340-A-1 but has a slight water erosion hazard. Small areas of Hebron, Mosel, Sebewa and Bono soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

NENNO SERIES

The somewhat poorly drained, nearly level to moderately steep soils of the Nenno series have developed in a thin silt layer over calcareous loam till. They occupy concave slopes and depressions of glacial uplands.

The following profile description of 345-A-1 Nenno silt loam, 0 to 2 percent slopes, is representative of series.



The depth to the bottom of the subsoil ranges from 12 to 20 inches and the substratum ranges from sandy loam to loam in texture.

The Nenno soils are subject to overflow from adjacent uplands. Sloping areas have a water erosion hazard. They are good cropland soils on the more gently relief.

345-A-1 Nenno silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Lamartine and Brookston soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

345-B-1 Nenno silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to 345-A-1, but it has a slight water erosion hazard.

Small areas of Lamartine and Hochheim soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

345-B-2 Nenno silt loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil is similar to 345-A-1, but it has a thinner, lighter colored grayish-brown surface soil. It has a slight water erosion hazard. Small areas of Lamartine and Hochheim soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

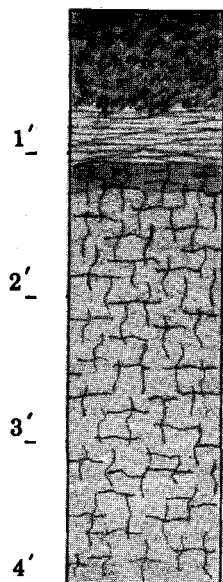
345-C-1 Nenno silt loam, 6 to 12 percent slopes

This sloping soil is similar to 345-A-1, but it has a moderate water erosion hazard. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit IIIe-8; Woodland Suitability Group 7.)

OCKLEY SERIES

The well drained, nearly level to sloping soils of the Ockley series have developed in a thick silt layer over calcareous sand and gravel. They occupy outwash plains and stream terraces.

The following profile description of 84-A-1 Ockley silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, dark grayish-brown, friable, granular silt loam.

8 to 13 inches, brown, friable, platy silt loam.

Subsoil:

13 to 15 inches, dark yellowish-brown, friable, subangular blocky silt loam.

15 to 49 inches, dark yellowish-brown, firm, subangular blocky silty clay loam.

49 to 55 inches, dark brown, friable, subangular blocky gravelly clay loam.

Substratum:

55 to 60 inches, pale brown, loose, calcareous sand and gravel.

Surface soil textures are silt loam, sandy loam and loam. The silt layer ranges from 36 to 60 inches deep. The sandy loam and loam types are the result of thin layers of coarser material over the silt layer.

Sloping areas of this soil have a water erosion hazard. They are good cropland soils.

392-A-1 Ockley loam, 0 to 2 percent slopes

This soil differs from 84-A-1 by having a loam surface soil. Small areas of Fox soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)

392-B-1 Ockley loam, 2 to 6 percent slopes

This soil differs from 84-A-1 by having a loam surface soil and a slight water erosion hazard. Small areas of Fox soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group.)

393-A-1 Ockley sandy loam, 0 to 2 percent slopes

This soil differs from 84-A-1 by having a sandy loam surface soil. Small areas of Fox soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 3.)

393-B-1 Ockley sandy loam, 2 to 6 percent slopes

This soil differs from 84-A-1 by having a sandy loam surface soil and a slight water erosion hazard. Small areas of Fox soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 3.)

84-A-1 Ockley silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Fox and Thackery soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)

84-B-1 Ockley silt loam, 2 to 6 percent slopes

This soil is similar to 84-A-1, but it has a slight water erosion hazard. Small areas of Fox and Thackery soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

84-B-2 Ockley silt loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 84-A-1 by having a

thinner, lighter colored grayish-brown surface soil and a slight water erosion hazard. Small areas of Fox and Thackery soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

84-C-1 Ockley silt loam, 6 to 12 percent slopes

This soil is similar to 84-A-1, but it has a moderate water erosion hazard. Small areas of Fox and Thackery soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

84-C-2 Ockley silt loam, 6 to 12 percent slopes, moderately eroded

This soil is similar to 84-A-1, but it has a thinner, lighter colored grayish-brown surface soil and a moderate water erosion hazard. Small areas of Fox and Thackery soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

84Z-A-1 Ockley silt loam, clay substratum, 0 to 2 percent slopes

This soil is similar to 84-A-1, but the lower part of the substratum is slowly permeable clay. Small areas of Fox and Thackery soils are included in this mapping unit. (Capability Unit IIs-1; Woodland Suitability Group 1.)'

84R-A-1 Ockley silt loam, rock substratum, 0 to 2 percent slopes

This soil is similar to 84-A-1, but it is underlain by dolomite bedrock at depths of 40 to 60 inches. Small areas of Fox and Thackery soils are included in the mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)

84V-B-1 Ockley silt loam, silt and fine sand substratum, 2 to 6 percent slopes

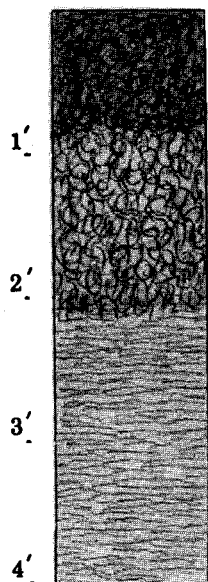
This soil is similar to 84-A-1, but the lower part of the substratum is silt and fine sand. It has a slight water erosion hazard. Small areas of Fox and Thackery soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

OGDEN SERIES

The very poorly drained, nearly level to gently sloping soils of the Ogden series have formed from organic deposits composed of sedges, grasses and reeds overlying clayey material. They occur in old shallow lake

basins and depressions.

The following profile description of 456-A-1 Ogden muck, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 10 inches, very dark brown, friable, granular muck.

Subsoil:

10 to 25 inches, dark yellowish-brown, well decomposed fibrous peat.

Substratum:

25 to 60 inches, light gray, firm, massive silty clay loam.

Surface soil texture ranges from muck to mucky peat. In places up to 30 percent of the organic material is composed of woody fragments. The depth to the substratum varies from 12 to 48 inches. In places there is a layer of dark brown sedimentary peat 3 to 8 inches thick just above the silty clay loam. The texture of the substratum varies from silty clay loam to clay. In some areas there are thin seams of very fine sand or silt in the underlying material.

These Ogden soils are low in phosphorous and potash. Ponding of water occurs frequently and the water table is at or near the surface except where drained. Drained areas have severe wind erosion, subsidence and burning hazards. When adequately drained, they are fair cropland soils.

456-A-1 Ogden muck, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Palms and Brookston soils are included in this mapping unit. (Capability Unit IIIw-8; Woodland Suitability Group 10.)

456-B-1 Ogden muck, 2 to 6 percent slopes

This soil is similar to 456-A-1, but it has slight water erosion hazard. Small areas of Palms and Brookston soils are included in this mapping unit. (Capability Unit IIIw-8; Woodland Suitability Group 10.)

457-A-1 Ogden mucky peat, 0 to 2 percent slopes

This soil is similar to 456-A-1, but the fibrous plant remains are intact and have not decomposed enough to form a granular mucky surface. Small areas of Palms and Brookston soils are included in this mapping unit. (Capability Unit IIIw-9, Woodland Suitability Group 10.)

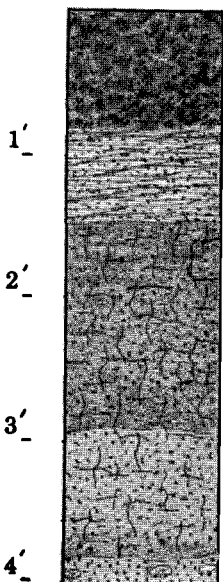
457-B-1 Ogden mucky peat, 2 to 6 percent slopes

This soil is similar to 456-A-1, but the fibrous plant remains are intact and have not decomposed enough to form a granular mucky surface. It has a slight water erosion hazard when cultivated. (Capability Unit IIIw-9; Woodland Suitability Group 10.)

OSHTEMO SERIES

The somewhat excessive to well drained, nearly level to sloping soils of the Oshtemo series have developed in calcareous sand. They occupy outwash plains and terraces.

The following profile description of 315-B-1 Oshtemo loamy sand, 2 to 6 percent slopes, is representative of the series.



Surface soil:

0 to 10 inches, dark grayish-brown, friable, granular loamy sand.

10 to 18 inches, brown, friable coarse platy loamy sand.

Subsoil:

18 to 35 inches, brown, friable, subangular blocky sandy loam.

35 to 46 inches, brown, friable, subangular blocky loamy sand.

Substratum:

46 to 60 inches, pale brown, loose, calcareous sand.

Surface soil textures are loamy sand, loamy fine sand and sandy loam. In places the subsoil ranges from sandy loam to sandy clay loam and from 40 to 60 inches in depth.

The Oshtemo soils have a low natural fertility, are drouthy, and have a wind and water erosion hazard. They are poor to fair cropland soils.

317-A-1 Oshtemo loamy fine sand, 0 to 2 percent slopes

This nearly level soil differs from 315-B-1 by having a loamy fine sand surface soil. It has no water erosion hazard. Small areas of Boyer and Matherton soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

317-B-1 Oshtemo loamy fine sand, 2 to 6 percent slopes

This soil differs from 315-B-1 by having a loamy fine sand surface soil. Small areas of Boyer, Matherton and Fox soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

317-B-2 Oshtemo loamy fine sand, 2 to 6 percent slopes, moderately eroded

This soil differs from 315-B-1 by having a thinner, lighter colored grayish-brown loamy fine sand surface soil. Small areas of Fox and Boyer soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

315-A-1 Oshtemo loamy sand, 0 to 2 percent slopes

This soil is similar to 315-B-1, but it does not have a slight water erosion hazard. Small areas of Boyer, Matherton and Fox soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

315-B-1 Oshtemo loamy sand, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Boyer, Matherton and Fox soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

315-B-2 Oshtemo loamy sand, 2 to 6 percent slopes, moderately eroded

This soil is similar to 315-B-1, but it has a thinner, lighter colored grayish-brown surface soil. Small areas of Boyer, Matherton and Fox soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

320-A-1 Oshtemo sandy loam, 0 to 2 percent slopes

This nearly level soil differs from 315-B-1 by having a sandy loam surface soil. It has no water erosion hazard. Small areas of Boyer, Fox and Matherton soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 3.)

320-B-1 Oshtemo sandy loam, 2 to 6 percent slopes

This soil differs from 315-B-1 by having a sandy loam surface soil. Small areas of Fox, Boyer and Matherton soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

320-B-2 Oshtemo sandy loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 315-B-1 by having a thinner, lighter colored grayish-brown loam surface soil. Small areas of Fox and Boyer soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

320-C-1 Oshtemo sandy loam, 6 to 12 percent slopes

This sloping soil differs from 315-B-1 by having a sandy loam surface soil and a moderate water erosion hazard. Small areas of Casco and Boyer soils are included in this mapping unit. (Capability Unit IIIs-7; Woodland Suitability Group 3.)

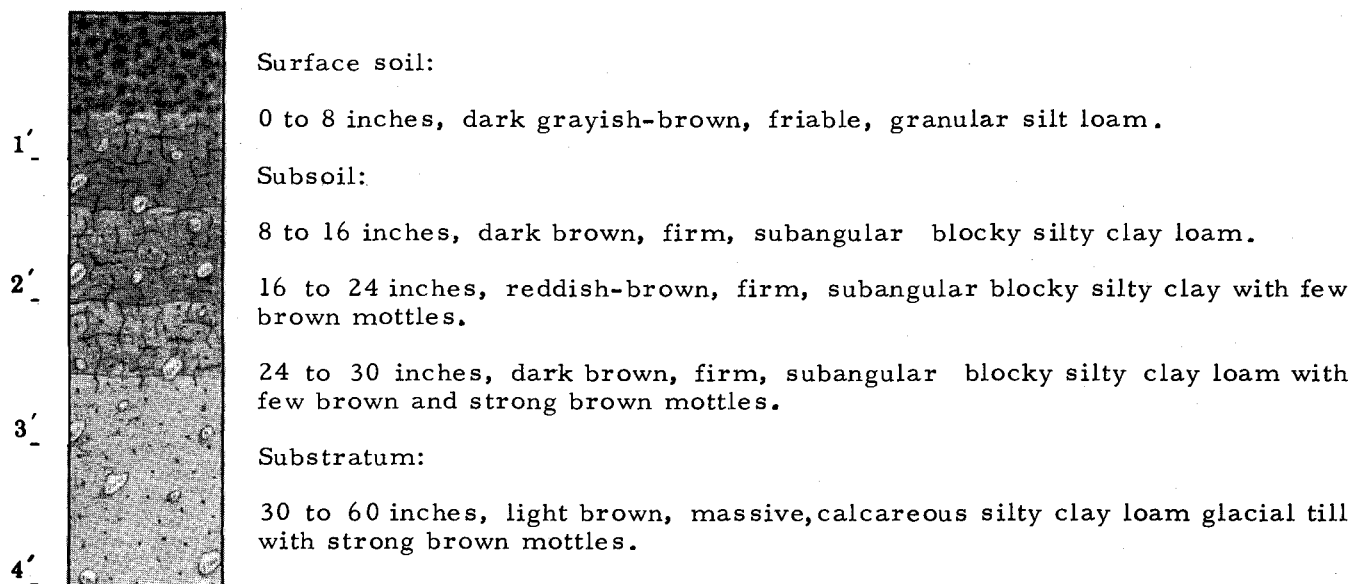
320-D-1 Oshtemo sandy loam, 12 to 20 percent slopes

This moderately steep soil differs from 315-B-1 by having a sandy loam surface and severe water erosion hazard. Small areas of Casco and Boyer soils are included in the mapping unit. (Capability Unit IVs-7; Woodland Suitability Group 3.)

OZAUKEE SERIES

The well to moderately well drained, nearly level to very steep soils of the Ozaukee series have developed in calcareous silty clay loam till. They occupy glacial till uplands.

The following profile description of 397-B-1 Ozaukee silt loam, 2 to 6 percent slopes, is representative of the series.



The subsoil ranges from a clay loam to silty clay and in many places it does not have mottles. The substratum contains pockets and lenses of sand and silt.

These Ozaukee soils have a water erosion hazard on sloping areas and they are slowly permeable. They are good cropland soils on the more gentle slopes.

397-A-1 Ozaukee silt loam, 0 to 2 percent slopes

This nearly level soil is similar to 397-B-1, but it does not have a water erosion hazard. Small areas of Mequon, Morley and Saylesville soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 1.)

397-B-1 Ozaukee silt loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Morley, Mequon and Saylesville soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 1.)

397-B-2 Ozaukee silt loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 397-B-1 by having a thinner, lighter colored grayish-brown surface soil. Small areas of Mequon, Morley and Saylesville soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 1.)

397-C-1 Ozaukee silt loam, 6 to 12 percent slopes

This sloping soil is similar to 397-B-1, but it has a moderate water erosion hazard. Small areas of Mequon, Morley and Saylesville soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 1.)

397-C-2 Ozaukee silt loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 397-B-1 by having a thinner, lighter colored grayish-brown surface soil and a moderate water erosion hazard. Small areas of Mequon, Morley and Saylesville soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 1.)

397-N-2 Same as 397-C-2

397-D-1 Ozaukee silt loam, 12 to 20 percent slopes

This moderately steep soil is similar to 397-B-1, but it has a severe water erosion hazard. Small areas of Morley soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 1.)

397-D-2 Ozaukee silt loam, 12 to 20 percent slopes, moderately eroded

This soil differs from 397-B-1 by having a thinner, lighter colored grayish-brown surface soil and a severe water erosion hazard. Small areas of Morley soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 1.)

397-K-2 Same as 397-D-2

397-E-1 Ozaukee silt loam, 20 to 30 percent slopes

This soil differs from 397-B-1 by having a very severe water erosion hazard. Small areas of Morley soils are included in this mapping unit. (Capability Unit VIe-6; Woodland Suitability Group 1.)

397-E-2 Ozaukee silt loam, 20 to 30 percent slopes, moderately eroded

This soil differs from 397-B-1 by having a thinner, lighter colored, grayish-brown surface soil and a very severe water erosion hazard. Small areas of Morley soils are included in this mapping unit. (Capability Unit VIe-6; Woodland Suitability Group 1.)

397-F-1 Ozaukee silt loam, 30 to 45 percent slopes

This soil differs from 397-B-1 by having a very severe water erosion hazard. It is too steep for the operation of equipment for pasture renovation or woodland purposes. Small areas of Morley soils are included in this mapping unit. (Capability Unit VIIe-6; Woodland Suitability Group 1.)

397-F-2 Ozaukee silt loam, 30 to 45 percent slopes, moderately eroded

This soil differs from 397-B-1 by having a thinner, lighter colored grayish-brown surface soil and a very severe water erosion hazard. It is too steep for the operation of

equipment for pasture renovation or woodland purposes. Small areas of Morley soils are included in this mapping unit. (Capability Unit VIIe-6; Woodland Suitability Group 1.)

397X-B-1 Ozaukee silt loam, gravelly substratum, 2 to 6 percent slopes

This soil is similar to 397-B-1, but the lower part of the substratum is sand and gravel. Small areas of Mequon and Morley soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 1.)

397X-C-2 Ozaukee silt loam, gravelly substratum, 6 to 12 percent slopes, moderately eroded

This soil differs from 397-B-1 by having a thinner, lighter colored grayish-brown surface soil and the lower part of the substratum is sand and gravel. It has a moderate water erosion hazard. Small areas of Mequon and Morley soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 1.)

397Y-B-1 Ozaukee silt loam, loam substratum, 2 to 6 percent slopes

This soil is similar to 397-B-1, but the lower part of the substratum is loam. Small areas of Mequon and Morley soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability group 1.)

397Y-B-2 Ozaukee silt loam, loam substratum, 2 to 6 percent slopes, moderately eroded

This soil is similar to 397-B-1, but it has a thinner, lighter grayish-brown colored surface soil and the lower part of the substratum is loam. Small areas of Mequon and Morley soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 1.)

397R-B-1 Ozaukee silt loam, rock substratum, 2 to 6 percent slopes

This soil is similar to 397-B-1, but the lower part of the substratum is fissured dolomite bedrock. Small areas of Mequon, Morley and Knowles soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 1.)

397V-C-2 Ozaukee silt loam, silt and fine sand substratum, 6 to 12 percent slopes, moderately eroded

This soil differs from 397-B-1 by having a thinner, lighter colored grayish-brown surface soil and the lower part of the substratum is silt and fine sand. Small areas of Sisson, Mequon and Morley soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 1.)

397-C-3 Ozaukee soils, 6 to 12 percent slopes severely eroded

This sloping soil differs from 397-B-1 by having a very thin, light colored grayish-

brown and dark brown surface soil with textures ranging from silt loam to silty clay loam. It has a moderate water erosion hazard. Small areas of Morley soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 1.)

397-D-3 Ozaukee silt loam, 12 to 20 percent slopes, severely eroded

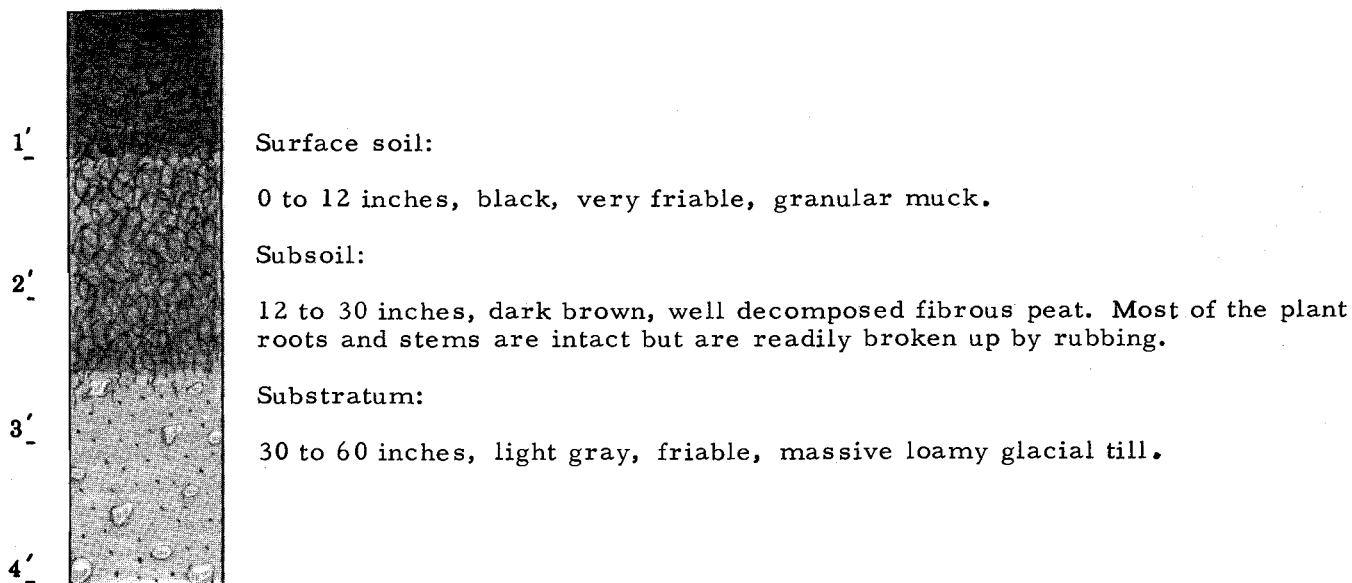
This soil differs from 397-B-1 by having a very thin, light colored grayish-brown and dark brown silt loam to silty clay loam surface soil and a severe water erosion hazard. Small areas of Morley soils are included in this mapping unit. (Capability Unit VIe-6; Woodland Suitability Group 1.)

PALMS SERIES

The very poorly drained, nearly level to sloping soils of the Palms series have formed from fibrous plant remains of grasses, sedges and reeds overlying loamy material. They occupy old shallow lake basins, de-

pressions and stream valleys.

The following profile description of 454-A-1 Palms muck, 0 to 2 percent slopes, is representative of the series.



The texture of the surface soil ranges from muck to mucky peat. In places a few woody fragments occur in the organic portion of the profile. The depth to the substratum in drained areas varies from 12 to 42 inches. The texture of the substratum ranges from sandy loam to loam and in places has pebbles or thin seams of sand or silt.

These soils are low in phosphorous and potash. Ponding of water occurs in most areas

and the watertable is at or near the surface except where they have been drained. Drained areas have a severe wind erosion subsidence and burning hazard. When drained these are good cropland soils.

454-A-1 Palms muck, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Houghton and Brookston soils are included

in this mapping unit. (Capability Unit IIw-8; Woodland Suitability Group 10.)

454-B-1 Palms muck, 2 to 6 percent slopes

This soil is similar to 454-A-1 but has a slight erosion hazard. Small areas of Houghton and Brookston soils are inclusions in this mapping unit. (Capability Unit IIw-8; Woodland Suitability Group 10.)

455-A-1 Palms mucky peat, 0 to 2 percent slopes

This soil is similar to 454-A-1, but the plant remains are intact and have not decomposed to form a granular, mucky surface soil. Small areas of Houghton and Brookston soils are included in this mapping unit. (Capability Unit IIw-8; Woodland Suitability Group 10.)

455-B-1 Palms mucky peat, 2 to 6 percent

slopes

This soil is similar to 454-A-1, but the plant remains are intact and have not decomposed enough to form a granular mucky surface soil. When cultivated it has a slight water erosion hazard. Small areas of Houghton and Brookston soils are included in this mapping unit. (Capability Unit IIw-8; Woodland Suitability Group 10.)

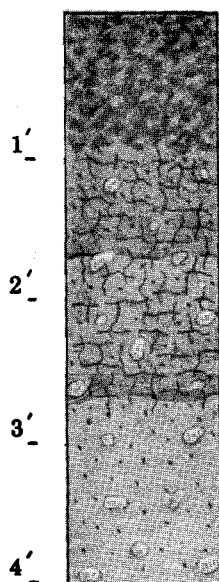
455-C-1 Palms mucky peat, 6 to 12 percent slopes

This soil is similar to 454-A-1, but the plant remains are intact and have not decomposed enough to form a granular mucky surface soil. When cultivated it has a moderate water erosion hazard. Small areas of Houghton and Brookston soils are included in this mapping unit. (Capability Unit IIw-8; Woodland Suitability Group 10.)

PARR SERIES

The well drained, nearly level to moderately steep soils of the Parr series have developed in a loamy mantle over calcareous loam to sandy loam till. They occupy convex slopes in glacial uplands.

The following profile description of 91-B-1 Parr silt loam, 2 to 6 percent slopes, is representative of the series.



Surface soil:

0 to 11 inches, very dark brown, friable, granular silt loam.

Subsoil:

11 to 20 inches, brown, friable, subangular blocky silty clay loam.

20 to 30 inches, yellowish-brown, firm, subangular blocky clay loam.

30 to 32 inches, dark brown, firm, subangular blocky clay loam.

Substratum:

32 to 60 inches, brown, massive loam glacial till.

Surface soil textures are silt loam, loam and sandy loam. Pebbles occur throughout the profile but are more numerous in the lower part. The thickness of the silt mantle ranges from 0 to 24 inches. The sub-

stratum ranges in texture from loam to sandy loam.

The Parr soils have a water erosion hazard on sloping areas. The sandy loam type has

a slight wind erosion hazard. They are good cropland soils on the more gentle relief.

92-A-1 Parr loam, 0 to 2 percent slopes

This nearly level soil differs from 92-B-1 by having a loam surface soil and no water erosion hazard. Small areas of Miami soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 12.)

92N-A-1 Same as 92-A-1

92-B-1 Parr loam, 2 to 6 percent slopes

This soil differs from 91-B-1 by having a loam surface soil. Small areas of Miami soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 12.)

92N-B-1 Same as 92-B-1

92-B-2 Parr loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 91-B-1 by having a thinner, lighter colored very dark gray loam surface soil. Small areas of Miami soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 12.)

92N-D-2 Same as 92-B-2

92-C-1 Parr loam, 6 to 12 percent slopes

This sloping soil differs from 91-B-1 by having a loam surface soil and a moderate water erosion hazard. Small areas of Parr, shallow variant, and Miami soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 12.)

92N-C-1 Same as 92-C-1

92-C-2 Parr loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 91-B-1 by having a thinner, lighter colored very dark gray loam surface soil and a moderate water erosion hazard. Small areas of Parr, shallow variant, and Miami soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 12.)

92N-C-2 Same as 92-C-2

394-B-1 Parr sandy loam, 2 to 6 percent slopes

This soil differs from 91-B-1 by having a sandy loam surface soil. Small areas of Parr, shallow variant, and Miami soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 12.)

394-C-1 Parr sandy loam, 6 to 12 percent slopes

This sloping soil differs from 91-B-1 by having a sandy loam surface soil and a moderate water erosion hazard. Small areas of Parr, shallow variant, and Miami soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 3.)

394-C-2 Parr sandy loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 91-B-1 by having a thinner, lighter colored very dark gray sandy loam surface soil and a moderate water erosion hazard. Small areas of Parr, shallow variant, and Miami soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 3.)

394-D-2 Parr sandy loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 91-B-1 by having a thinner, lighter colored very dark gray sandy loam surface soil and a severe water erosion hazard. Small areas of Parr, shallow variant, and Miami soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 3.)

91-A-1 Parr silt loam, 0 to 2 percent slopes

This nearly level soil is similar to 91-B-1, but it does not have a water erosion hazard. Small areas of Miami soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 12.)

91D-A-1 Same as 91-A-1

91N-A-1 Same as 91-A-1

91-B-1 Parr silt loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Miami soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 12.)

91D-B-1 Same as 91-B-1

91N-B-1 Same as 91-B-1

91-B-2 Parr silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 91-B-1, but it has a thinner, lighter colored very dark gray surface soil. Small areas of Miami soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 12.)

91N-B-2 Same as 91-B-2

91-C-1 Parr silt loam, 6 to 12 percent slopes

This sloping soil is similar to 91-B-1, but it has a moderate water erosion hazard.

Small areas of Parr, shallow variant, and Miami soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 12.)

91N-C-1 Same as 91-C-1

91-C-2 Parr silt loam, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 91-B-1, but it has a thinner, lighter colored very dark gray surface soil and a moderate water erosion hazard. Small areas of Parr, shallow variant, and Miami soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 12.)

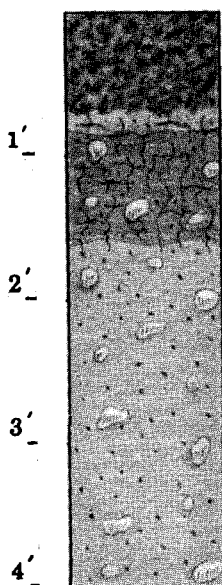
91N-C-2 Same as 91-C-2

PARR SERIES, SHALLOW VARIANT

The well drained, gently sloping to steep soils of the Parr series, shallow variant, have developed in a thin silt mantle overlying calcareous loam and sandy loam till. They occupy short, convex slopes in glacial

uplands.

The following profile description of 191-B-1 Parr silt loam, shallow variant, 2 to 6 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, very dark brown, friable, granular silt loam.

Subsoil:

8 to 10 inches, brown, friable, subangular blocky silt loam.

10 to 19 inches, dark brown, firm, subangular blocky clay loam.

Substratum:

19 to 60 inches, brown, friable, massive glacial loam till.

Pebbles occur throughout the profile and are more numerous in the lower part. The silt layer ranges from 4 to 12 inches in thickness.

The Parr soils, shallow variant, have a water erosion hazard on sloping areas. They are good cropland soils on the more gentle slopes.

191-B-1 Parr silt loam, shallow variant, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Parr and Miami soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 12.)

191-B-2 Parr silt loam, shallow variant, 2 to 6 percent slopes, moderately eroded

This soil is similar to 191-B-1, but it has a thinner, lighter colored dark brown surface soil. Small areas of Parr and Miami soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 12.)

191-C-1 Parr silt loam, shallow variant, 6 to 12 percent slopes

This sloping soil is similar to 191-B-1, but it has a moderate water erosion hazard. Small areas of Parr and Miami soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 12.)

191-C-2 Parr silt loam, shallow variant, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 191-B-1, but it has a thinner, lighter colored dark brown surface soil and a moderate water erosion hazard. Small areas of Parr and Miami soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 12.)

191-D-1 Parr silt loam, shallow variant, 12 to 20 percent slopes

This moderately steep soil is similar to 191-B-1, but it has a severe water erosion hazard. Small areas of Miami soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 12.)

191-D-2 Parr silt loam, shallow variant, 12 to 20 percent slopes, moderately eroded

This moderately steep soil is similar to 191-B-1, but it has a thinner, lighter colored dark brown surface soil and a severe water erosion hazard. Small areas of Miami

soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 12.)

191-E-1 Parr silt loam, shallow variant, 20 to 30 percent slopes

This steep soil is similar to 191-B-1, but it has a very severe water erosion hazard. Small areas of Miami and Hennepin soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 12.)

191-E-2 Parr silt loam, shallow variant, 20 to 30 percent slopes, moderately eroded

This steep soil is similar to 191-B-1, but it has a thinner, lighter colored dark brown surface soil and a very severe water erosion hazard. Small areas of Hennepin and Miami soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 12.)

191-C-3 Parr soils, shallow variant, 6 to 12 percent slopes, severely eroded

This sloping soil is similar to 191-B-1, but it has a very thin, lighter colored dark brown silt loam to clay loam surface soil and a moderate water erosion hazard. Small areas of Miami soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 12.)

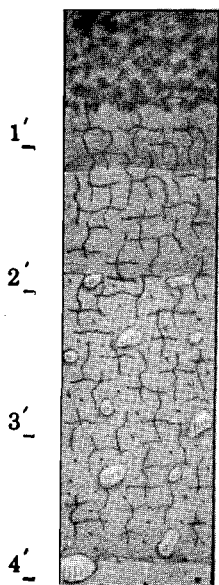
191-D-3 Parr soils, shallow variant, 12 to 20 percent slopes, severely eroded

This moderately steep soil is similar to 191-B-1, but it has a very thin, lighter colored dark brown silt loam to clay loam surface soil and a severe water erosion hazard. Small areas of Miami soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 12.)

PECATONICA SERIES

The well to moderately well drained, nearly level to sloping soils of the Pecatonica series have developed in a silt mantle over loam or sandy loam till. They occupy the high areas of glacial till uplands.

The following profile description of 510-B-1 Pecatonica silt loam, 2 to 6 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, dark grayish-brown, friable, granular silt loam.

Subsoil:

8 to 13 inches, dark brown, friable, subangular, blocky silt loam.

13 to 22 inches, dark brown, firm, subangular blocky silty clay loam.

22 to 46 inches, dark brown, friable, subangular blocky gritty clay loam.

Substratum:

46 to 60 inches, yellowish-brown, friable, massive, calcareous glacial loam till.

The depth of the silt layer ranges from 18 to 40 inches. The subsoil has mottling in the lower part in many places. The substratum ranges from loam to sandy loam.

Sloping areas have a water erosion hazard. These are good cropland soils.

510-A-1 Pecatonica silt loam, 0 to 2 percent slopes

This soil is similar to 510-B-1, but it does not have a water erosion hazard. Small areas of Flagg soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)

508-A-1 Same as 510-A-1

510-B-1 Pecatonica silt loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Flagg soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

508-B-1 Same as 510-B-1

510-B-2 Pecatonica silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 510-B-1, but it has a thinner, lighter colored grayish-brown surface soil. Small areas of Flagg soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

510-C-1 Pecatonica silt loam, 6 to 12 percent slopes

This soil is similar to 510-B-1, but it has a moderate water erosion hazard. Small areas of Flagg soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

508-C-1 Same as 510-C-1

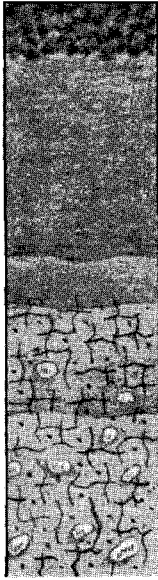
510-C-2 Pecatonica silt loam, 6 to 12 percent slopes, moderately eroded

This soil is similar to 510-B-1, but it has a thinner, lighter colored grayish-brown surface soil and a moderate water erosion hazard. Small areas of Flagg soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

PISTAKEE SERIES

The somewhat poorly drained, nearly level to gently sloping soils of the Pistakee series have formed in recent alluvium over poorly drained mineral soils. They occupy small drainageways and depressions.

The following profile description of 328-A-1 Pistakee silt loam, 0 to 2 percent slopes, is representative of the series.

	Surface soil:
	0 to 4 inches, dark grayish-brown, friable, granular silt loam.
	4 to 21 inches, dark grayish-brown, friable, subangular blocky silt loam with dark olive mottles.
	21 to 25 inches, very dark gray, firm, subangular blocky silty clay loam with olive-gray mottles.
	Subsoil:
	25 to 34 inches, dark gray, firm, subangular blocky clay loam with olive mottles.
	34 to 50 inches, dark gray, firm, subangular blocky sandy clay loam with olive mottles.
	Substratum:
	50 to 60 inches, gray, loose, calcareous outwash sand and gravel.

The recent deposition of loam or silt loam is 18 to 40 inches thick. There are layers of light and dark colored material in many places. The substratum ranges from sand and gravel to clay.

The Pistakee soils are subject to ponding and further deposition. They are good cropland soils when adequately drained.

328-A-1 Pistakee silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of

Juneau soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

328Y-A-1 Same as 328-A-1

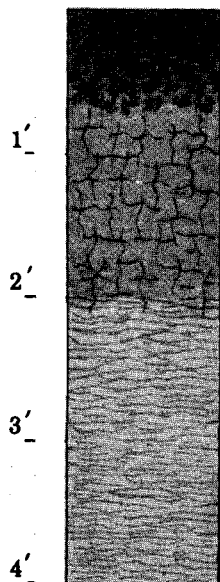
328-B-1 Pistakee silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to 328-A-1, but it has a slight water erosion hazard. Small areas of Juneau soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

POYGAN SERIES

The very poorly drained, nearly level to gently sloping soils of the Poygan series have developed in silty clay loam till. They occupy depressions and broad drainageways in glacial uplands.

The following profile description of 165-A-1 Poygan silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, black, friable, granular silt loam.

Subsoil:

8 to 24 inches, dark gray, firm, angular blocky silty clay with yellowish-brown mottles.

Substratum:

24 to 60 inches, reddish-brown, firm, massive, calcareous silty clay loam glacial till.

The surface soil ranges from silt loam to silty clay loam. The subsoil ranges from 20 to 30 inches in depth. In places the substratum contains lenses of silt and fine sand and dolomite fragments.

These soils have a severe wetness hazard and slow permeability. They are subject to ponding but are good cropland soils when adequately drained.

165-A-1 Poygan silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

165-B-1 Poygan silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to 165-A-1, but it has a slight water erosion hazard. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

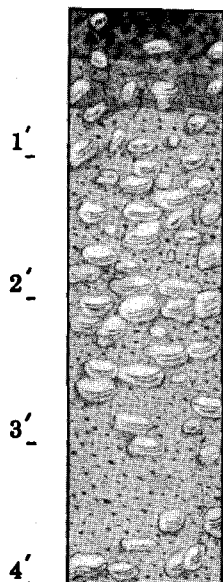
171-A-1 Poygan silty clay loam, 0 to 2 percent slopes

This soil is similar to 165-A-1, but it has a silty clay loam surface soil. Small areas of Manawa soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

RODMAN SERIES

The excessively drained, gently sloping to very steep soils of the Rodman series have developed in calcareous sand and gravel. They occupy glacial recessional and end moraines and steep terrace escarpments.

The following profile description of 75-D-1 Rodman gravelly loam, 12 to 20 percent slopes, is representative of the series.



Surface soil:

0 to 4 inches, very dark brown, friable, granular gravelly loam.

4 to 8 inches, brown, subangular blocky gravelly loam.

Substratum:

8 to 60 inches, pale brown, loose, calcareous sand and gravel with many dolomite cobbles.

The thickness of the surface soil varies from 4 to 15 inches.

These Rodman soils are very drouthy and sloping areas have a water erosion hazard. They are very poor cropland soils.

75-B-1 Rodman gravelly loam, 2 to 6 percent slopes

This gently sloping soil differs from 75-D-1 by having a slight water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit VIs-5; Woodland Suitability Group 6.)

75-B-2 Rodman gravelly loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 75-D-1 by having a thinner, lighter colored brown surface soil and a slight water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit VIs-5; Woodland Suitability Group 6.)

75-M-2 Same as 75-B-2

75-C-1 Rodman gravelly loam, 6 to 12 percent slopes

This sloping soil differs from 75-D-1 by having a moderate water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit VIs-5; Woodland Suitability Group 6.)

75-N-1 Same as 75-C-1

75-C-2 Rodman gravelly loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 75-D-1 by having a thinner, lighter colored brown surface soil and a moderate water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit VIs-5; Woodland Suitability Group 6.)

75-N-2 Same as 75-C-2

75-D-1 Rodman gravelly loam, 12 to 20 percent slopes

The profile description of this soil is part of the series description. It has a severe water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit VIs-5; Woodland Suitability Group 6.)

75-K-1 Same as 75-D-1

75-D-2 Rodman gravelly loam, 12 to 20 percent slopes, moderately eroded

This soil is similar to 75-D-1, but it has a thinner, lighter colored brown surface soil. Small areas of Casco soils are included in this mapping unit. (Capability Unit VIs-5; Woodland Suitability Group 6.)

75-K-2 Same as 75-D-2

75-E-1 Rodman gravelly loam, 20 to 30 percent slopes

This soil is similar to 75-D-1, but it has a very severe water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit VIIs-5; Woodland Suitability Group 6.)

75-E-2 Rodman gravelly loam, 20 to 30 percent slopes, moderately eroded

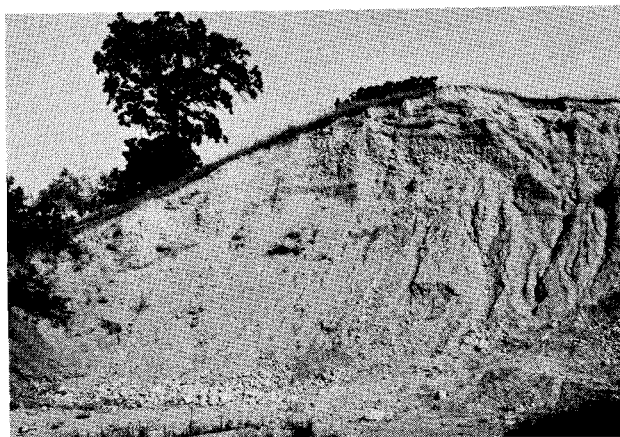
This soil is similar to 75-D-1, but it has a thinner, lighter colored surface soil and a very severe water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit VIIs-5; Woodland Suitability Group 6.)

75-E-1 Rodman gravelly loam, 30 to 45 percent slopes

This soil is similar to 75-D-1, but it has a very severe erosion hazard. Small areas of Casco soils are included in the mapping unit. (Capability Unit VIIs-5; Woodland Suitability Group 6.)

75-F-2 Rodman gravelly loam, 30 to 45 percent slopes, moderately eroded

This soil is similar to 75-D-1, but it has a thin light colored brown surface soil and very severe erosion hazard. Small areas of Casco soils are included in the mapping unit. (Capability Unit VIIs-5; Woodland Suitability Group 6.)



Rodman soils such as these are a good source of sand and gravel for road base material.

75-C-3 Rodman soils, 6 to 12 percent slopes, severely eroded

This sloping soil differs from 75-D-1 by having a very thin, gravelly loamy sand to loam surface soil and a moderate water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit VIIs-5; Woodland Suitability Group 6.)

75-N-3 Same as 75-C-3

75-E-3 Rodman soils, 20 to 30 percent slopes, severely eroded

This soil is similar to 75-D-1, but the surface soil is very thin or entirely missing and it has a very severe water erosion hazard. (Capability Unit VIIs-5; Woodland Suitability Group 6.)

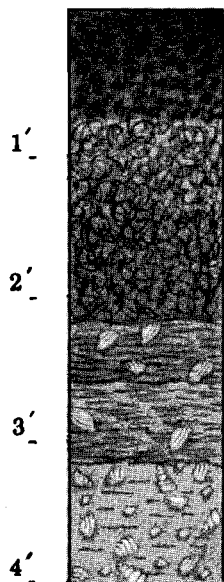
75-F-3 Rodman soils, 30 to 45 percent slopes, severely eroded

This soil is similar to 75-D-1, but the surface soil is very thin or has been entirely removed by erosion. (Capability Unit VIIs-5; Woodland Suitability Group 6.)

ROLLIN SERIES

The poorly drained, nearly level to gently sloping soils of the Rollin series have developed in organic deposits from sedges, reeds and grasses over marl. They occupy glacial lake basins and depressions.

The following profile description of 459-A-1 Rollin muck, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 9 inches, black, friable, granular, well decomposed muck.

9 to 26 inches, very dark brown, friable, granular, well decomposed muck.

Subsoil:

26 to 31 inches, very dark brown, massive, well decomposed muck with a few shell fragments.

31 to 38 inches, dark brown, massive, mixture of muck and marl.

Substratum:

38 to 60 inches, gray, massive, strongly calcareous marl with many shell fragments.

The surface textures are muck and mucky peat. The depth to marl ranges from 24 to 40 inches.

These soils have a severe wetness hazard and sloping areas have an erosion hazard. They are not suited to tile drainage but can be drained by open ditches. They are subject to a wind erosion hazard and subsidence when drained and cultivated. They are fair to poor croplands when the surface layers subside. These soils are very poorly suited for cropland.

459-A-1 Rollin muck, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Houghton soils are included in this mapping unit. (Capability Unit IVw-7; Woodland Suitability Group 10.)

459-B-1 Rollin muck, 2 to 6 percent slopes

This soil is similar to 459-A-1, but it has a slight water erosion hazard when cultivated. Small areas of Houghton soils are included in this mapping unit. (Capability Unit IVw-7; Woodland Suitability Group 10.)

302-B-1 Same as 459-B-1

460-A-1 Rollin mucky peat, 0 to 2 percent slopes

This soil differs from 459-A-1 by having a mucky peat surface soil. Small areas of Houghton soils are included in this mapping unit. (Capability Unit IVw-7; Woodland Suitability Group 10.)

458-A-1 Rollin muck, shallow phase, 0 to 2 percent slopes

This soil differs from 459-A-1 by being 12 to 24 inches deep to marl. Small areas of Houghton soils are included in this mapping unit. (Capability Unit Vw-7; Woodland Suitability Group 10.)

228-A-1 Same as 458-A-1

458-B-1 Rollin muck, shallow phase, 2 to 6 percent slopes

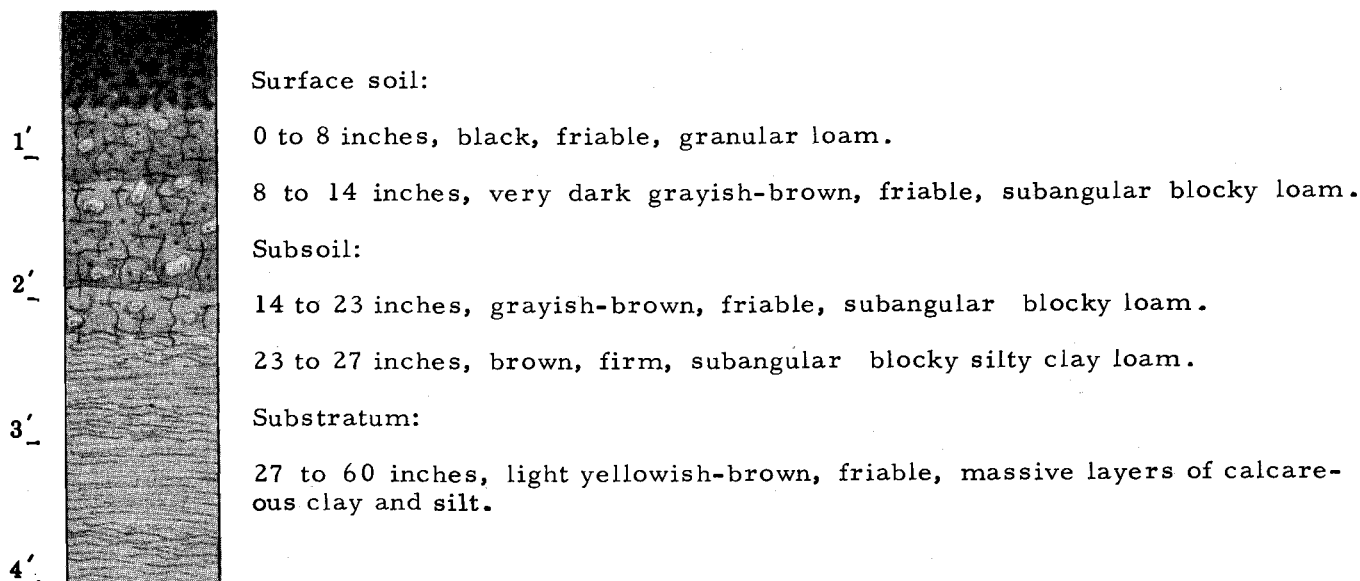
This soil differs from 459-A-1 by being 12 to 24 inches deep to marl. It has a slight water erosion hazard when cultivated. Small areas of Houghton soils are included in this mapping unit. (Capability Unit Vw-7; Woodland Suitability Group 10.)

228-B-1 Same as 458-B-1

ROME SERIES

The well to moderately well drained, nearly level to sloping soils of the Rome series have developed in a thin layer of loamy outwash material overlying lacustrine silt and clay. They occupy glacial lake basins and river terraces.

The following profile description of 31-A-1 Rome loam, 0 to 2 percent slopes, is representative of the series.



Surface soil textures are silt loam, loam and sandy loam. In places, mottles occur in the lower part of the subsoil and the substratum contains layers of fine sand and silt.

The soils of this series have a water erosion hazard on sloping areas. They are good cropland soils.

31-A-1 Rome loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Hebron, Aztalan and Jericho soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 12.)

31-B-1 Rome loam, 2 to 6 percent slopes

This gently sloping soil is similar to 31-A-1, but it has a slight water erosion hazard. Small areas of Hebron, Aztalan and Jericho soils are included in this mapping unit. (Capability Unit IIs-6; Woodland Suitability Group 12.)

31-B-2 Rome loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 31-A-1, but it has a thinner, lighter colored dark grayish-brown surface soil. It has a slight water erosion hazard. Small areas of Hebron, Aztalan and Jericho soils are included in this mapping unit. (Capability Unit IIs-6; Woodland Suitability Group 12.)

32-A-1 Rome sandy loam, 0 to 2 percent slopes

This soil differs from 31-A-1 by having a sandy loam surface soil. Small areas of Hebron and Aztalan soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 3.)

32-B-1 Rome sandy loam, 2 to 6 percent slopes

This soil differs from 31-A-1 by having a sandy loam surface soil and a slight water erosion hazard. Small areas of Hebron and Aztalan soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 3.)

32-C-2 Rome sandy loam, 6 to 12 percent slopes, moderately eroded

This soil differs from 31-A-1 by having a thinner, lighter colored dark grayish-brown sandy loam surface soil. It has a moderate water erosion hazard. Small areas of Hebron soils are included in this mapping unit. (Capability Unit IIIe-7; Woodland Suitability Group 3.)

16-B-1 Rome silt loam, 2 to 6 percent slopes

This gently sloping soil differs from 31-A-1 by having a silt loam surface soil and a slight water erosion hazard. Small areas of Jericho, Hebron and Aztalan soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 12.)

ROUGH BROKEN LAND ¹

This land type consists of reddish-brown silty clay loam glacial till on very steep slopes. Most of this unit is narrow, ribbon-like areas on the lake bluff in Kewaunee soil areas. Slopes range from 30 to 60 percent.

Geologic erosion has occurred so recently that little time has been allowed for soil profile development. Areas raw from erosion are mapped as severely eroded, other areas have some vegetation on them.

Texture of the surface is generally silty clay loam but ranges from silt loam to silty clay. It ranges from mildly alkaline to calcareous in reaction. Runoff is very rapid, and the water erosion hazard is very severe.

1-F-1 Rough broken land

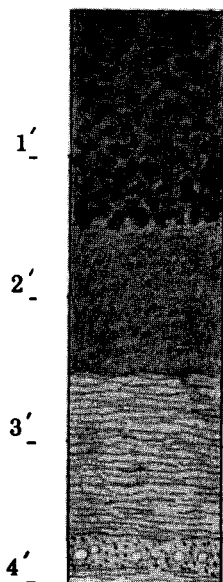
(Capability Unit VIIIs-10; Woodland Suitability Group 13.)

1-F-3 Same as 1-F-1

SAWMILL SERIES

The poorly drained, nearly level soils of the Sawmill series have developed from dark colored silty alluvium. They occupy flood plains of rivers and streams.

The following profile description of 5W-A-1, Sawmill silt loam, is representative of the series.



Surface soil:

0 to 18 inches, black, friable, granular silt loam.

18 to 30 inches, black, slightly plastic, subangular blocky silty clay loam.

Substratum:

30 to 60 inches, dark gray, slightly plastic, massive silty clay loam with many brown and strong brown mottles.

¹ Profile sketches have been omitted because of extreme variability.

The surface soil ranges in thickness from 16 to 30 inches and in places it is mucky. The substratum ranges in color from black to dark gray. Thin layers of sand or gravel occur in the substratum in places.

These Sawmill soils are subject to flooding and stream bank erosion. They are good cropland soils if protected from flooding.

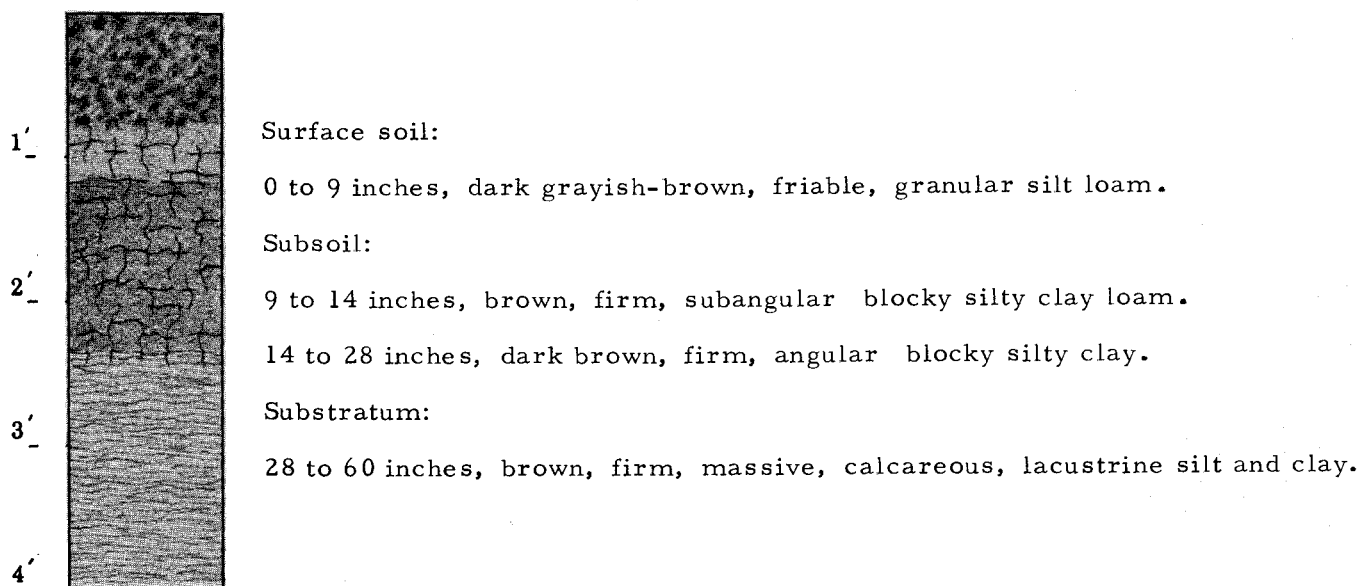
5W-A-1 Sawmill silt loam, 0 to 2 percent slopes

The profile description of this nearly level soil is part of the series description. Small areas of Lawson soils and Alluvial land, wet, are included in this mapping unit. (Capability Unit Vw-14; Woodland Suitability Group 9.)

SAYLESVILLE SERIES

The well to moderately well drained, nearly level to sloping soils of the Saylesville series have developed in silty and loamy material over calcareous lacustrine clay and silt. They occur in glacial lake basins and on stream terraces.

The following profile description of 40-A-1 Saylesville silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil textures are silt loam and loam. In places the substratum contains layers of fine sand and coarse silt and the subsoil contains a few dolomite pebbles.

Sloping areas have a water erosion hazard. Saylesville soils are slowly permeable. They are good cropland soils on the lower slopes.

39-A-1 Saylesville loam, 0 to 2 percent slopes

This soil differs from 40-A-1 by having a loam surface soil. Small areas of Hebron, Morley and Tichigan soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 2.)

39-B-1 Saylesville loam, 2 to 6 percent slopes

This gently sloping soil differs from 40-A-1 by having a loam surface soil and a slight water erosion hazard. Small areas of Hebron, Morley and Tichigan soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 2.)

39-B-2 Saylesville loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 40-A-1 by having a thinner, lighter colored grayish-brown loam surface soil and a slight water erosion hazard. Small areas of He-

bron, Morley and Tichigan soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 2.)

39-M-2 Same as 39-B-2

39-C-1 Saylesville loam, 6 to 12 percent slopes

This soil differs from 40-A-1 by having a loam soil and a moderate water erosion hazard. Small areas of Hebron, Sisson and Morley soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 2.)

39-C-2 Saylesville loam, 6 to 12 percent slopes, moderately eroded

This soil differs from 40-A-1 by having a thinner, lighter colored grayish-brown loam surface soil and a moderate water erosion hazard. Small areas of Hebron, Sisson and Morley soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 2.)

39X-A-1 Saylesville loam, sand and gravel substratum, 0 to 2 percent slopes

This soil is similar to 40-A-1, but the lower part of the substratum is sand and gravel. Small areas of Fox, Hebron and Tichigan soils are included in the mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 2.)

40-A-1 Saylesville silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Hebron, Morley and Tichigan soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 2.)

40-B-1 Saylesville silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to 40-A-1, but it has a slight water erosion hazard. Small areas of Hebron, Sisson, Morley and Tichigan soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 2.)

40-B-2 Saylesville silt loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil is similar to 40-A-1, but it has a thinner, lighter colored gray-

ish-brown surface soil and a slight water erosion hazard. Small areas of Hebron, Sisson, Morley and Tichigan soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 2.)

40-C-1 Saylesville silt loam, 6 to 12 percent slopes

This sloping soil is similar to 40-A-1, but it has a moderate water erosion hazard. Small areas of Hebron, Sisson, Morley and Tichigan soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 2.)

40-C-2 Saylesville silt loam 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 40-A-1, but it has a thinner, lighter colored grayish-brown surface soil and a moderate water erosion hazard. Small areas of Hebron, Sisson and Morley soils are included in this mapping unit. (Capability Unit IIIe-6; Woodland Suitability Group 2.)

40-D-1 Saylesville silt loam, 12 to 20 percent slopes

This moderately steep soil is similar to 40-A-1, but it has a severe water erosion hazard. Small areas of Hebron, Sisson and Morley soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 2.)

40-D-2 Saylesville silt loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil is similar to 40-A-1, but it has a thinner, lighter colored grayish-brown surface soil and a severe water erosion hazard. Small areas of Hebron, Sisson and Morley soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 2.)

40-E-1 Saylesville silt loam, 20 to 30 percent slopes

This steep soil is similar to 40-A-1, but it has a very severe water erosion hazard. Small areas of Morley and Sisson soils are included in this mapping unit. (Capability Unit VIe-6; Woodland Suitability Group 2.)

40-E-2 Saylesville silt loam, 20 to 30 percent slopes, moderately eroded

This steep soil is similar to 40-A-1, but it

has a thinner, lighter colored grayish-brown surface soil and a very severe water erosion hazard. Small areas of Morley and Sisson soils are included in this mapping unit. (Capability Unit VIe-6; Woodland Suitability Group 2.)

40Y-A-1 Saylesville silt loam, loam substratum, 0 to 2 percent slopes

This soil is similar to 40-A-1, but the lower part of the substratum is loam. Small areas of Hebron and Morley soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 2.)

40Y-B-1 Saylesville silt loam, loam substratum, 2 to 6 percent slopes

This soil is similar to 40-A-1, but the lower part of the substratum is loam. This soil has a slight water erosion hazard. Small areas of Morley and Hebron soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 2.)

40Y-B-2 Saylesville silt loam, loam substratum, 2 to 6 percent slopes, moderately eroded

This soil is similar to 40-A-1, but it has a thinner, lighter colored grayish-brown surface soil and the lower part of the underlying material is loam. Small areas of Hebron and Morley soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 2.)

40X-A-1 Saylesville silt loam, sand and gravel substratum, 0 to 2 percent slopes

The soil is similar to 40-A-1, but the low-

er part of the substratum is sand and gravel. (Capability Unit IIs-7; Woodland Suitability Group 2.)

40V-B-1 Saylesville silt loam, silt and fine sand substratum, 2 to 6 percent slopes

This soil is similar to 40-A-1, but the lower part of the substratum is silt and fine sand. This soil has a slight water erosion hazard. Small areas of Sisson, Hebron and Morley soils are included in this mapping unit. (Capability Unit IIe-6; Woodland Suitability Group 2.)

40-C-3 Saylesville soils, 6 to 12 percent slopes, severely eroded

This sloping soil differs from 40-A-1 by having a very thin, light colored grayish-brown silt loam to silty clay loam surface soil and a moderate water erosion hazard. Small areas of Hebron, Sisson and Morley soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 2.)

40-D-3 Saylesville soils, 12 to 20 percent slopes, severely eroded

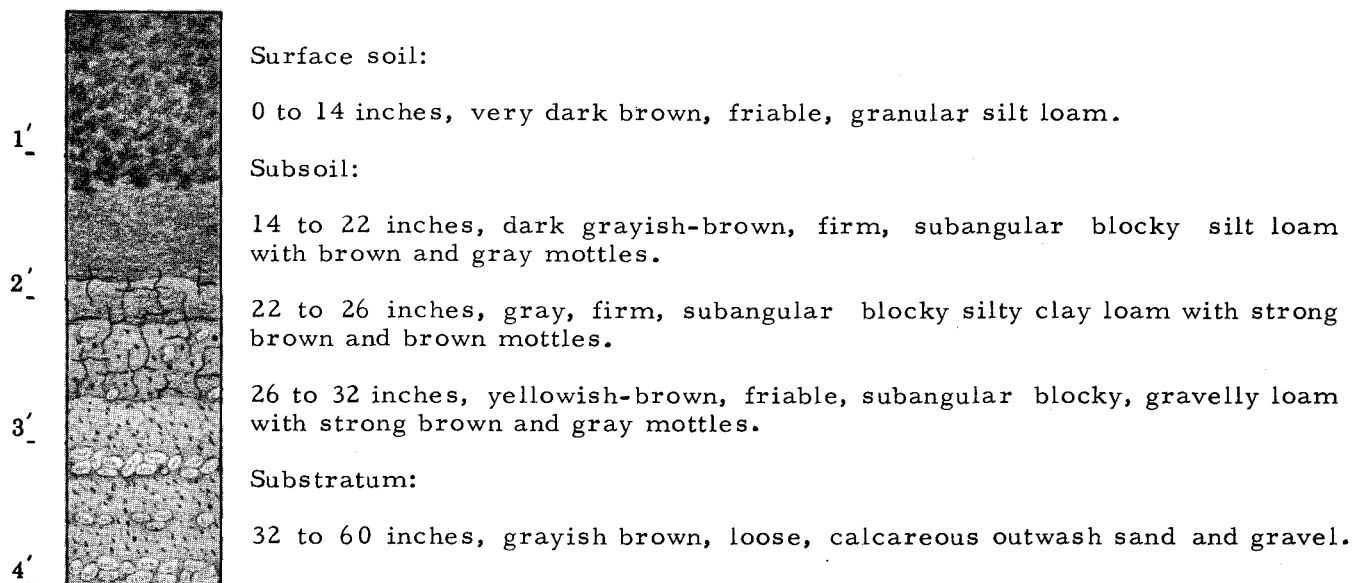
This moderately steep soil is similar to 40-A-1, but it has a very thin, light colored grayish-brown loam to silty clay loam surface soil and a severe water erosion hazard. Small areas of Morley and Sisson soils are included in this mapping unit. (Capability Unit VIe-6; Woodland Suitability Group 2.)

39-D-3 Same as 40-D-3

SEBEWA SERIES

The poorly to very poorly drained, nearly level to gently sloping soils of the Sebewa series have developed in loamy outwash overlying calcareous sand and gravel. They occupy low broad drainageways and depressions of glacial outwash plains and stream terraces.

The following profile description of 76-A-1 Sebewa silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil textures are silt loam, loam and sandy loam. The depth of these soils ranges from 20 to 40 inches. In places the surface soil is mucky.

Sebewa soils are subject to ponding and have a high water table. Sloping areas have a slight water erosion hazard. They are good cropland soils when adequately drained.

80-A-1 Sebewa loam, 0 to 2 percent slopes

This soil differs from 76-A-1 by having a loam surface soil. Small areas of Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

80-B-1 Sebewa loam, 2 to 6 percent slopes

This gently sloping soil differs from 76-A-1 by having a loam surface soil and a slight water erosion hazard. Small areas of Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

80Z-A-1 Sebewa loam, clay substratum, 0 to 2 percent slopes

This soil differs from 76-A-1 by having a loam surface soil. The lower part of the substratum is slowly permeable clay. Small areas of Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

80Y-A-1 Sebewa loam, loam substratum, 0 to 2 percent slopes

This soil differs from 76-A-1 by having a loam surface soil. The lower part of the substratum is loam. Small areas of Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

80V-A-1 Sebewa loam, silt and fine sand substratum, 0 to 2 percent slopes

This soil differs from 76-A-1 by having a loam surface soil and the lower part of the substratum is silt and fine sand. Small areas of Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

80V-B-1 Sebewa loam, silt and fine sand substratum, 2 to 6 percent slopes

This gently sloping soil differs from 76-A-1 by having a loam surface soil. The lower part of the substratum is silt and fine sand. It has a slight water erosion hazard. Small areas of Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

81-A-1 Sebewa sandy loam, 0 to 2 percent slopes

This soil differs from 76-A-1 by having a sandy loam surfate soil. Small areas of Matherton and Mussey soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

81-B-1 Same as 81-A-1

76-A-1 Sebewa silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Matherton, Westland and Abington soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

76-B-1 Sebewa silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to 76-A-1, but it has a slight water erosion hazard. Small areas of Matherton, Westland and Abington soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

76Z-A-1 Sebewa silt loam, clay substratum, 0 to 2 percent slopes

This soil is similar to 76-A-1, but the lower part of the substratum is slowly permeable clay. Small areas of Matherton, Abington and Ehler soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

76Z-B-1 Sebewa silt loam, clay substratum, 2 to 6 percent slopes

This gently sloping soil is similar to 76-A-1, but the lower part of the substratum is

slowly permeable clay. It has a slight water erosion hazard. Small areas of Matherton, Abington and Ehler soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

76Y-A-1 Sebewa silt loam, loam substratum, 0 to 2 percent slopes

This soil is similar to 76-A-1, but the lower part of the substratum is loam. Small areas of Matherton and Brookston soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

76Y-B-1 Sebewa silt loam, loam substratum, 2 to 6 percent slopes

This gently sloping soil is similar to 76-A-1, but the lower part of substratum is loam. It has a slight water erosion hazard. Small areas of Matherton and Brookston soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

76R-A-1 Sebewa silt loam, rock substratum, 0 to 2 percent slopes

The soil is similar to 76-A-1, but the lower part of the substratum is fissured dolomite bedrock. Small areas of Matherton, Westland and Abington soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

76V-A-1 Sebewa silt loam, silt and fine sand substratum, 0 to 2 percent slopes

This soil is similar to 76-A-1, but the lower part of the substratum is silt and fine sand. Small areas of Matherton, Colwood and Westland soils are included in this mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

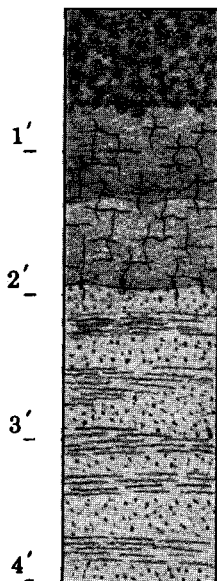
76V-B-1 Sebewa silt loam, silt and fine sand substratum, 2 to 6 percent slopes

This gently sloping soil is similar to 76-A-1, but the lower substratum is silt and fine sand. Small areas of Matherton, Colwood and Westland soils are included in the mapping unit. (Capability Unit IIw-5; Woodland Suitability Group 7.)

SISSON SERIES

The well drained, nearly level to very steep soils of the Sisson series have developed in lacustrine silts and sands. They occur in glacial lake basins, on stream terraces and morainic areas.

The following profile description of 266-A-1 Sisson silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, dark grayish-brown, friable, granular silt loam.

Subsoil:

8 to 16 inches, dark yellowish-brown, firm, subangular blocky silty clay loam.

16 to 23 inches, dark yellowish-brown, friable, subangular blocky silt loam.

Substratum:

23 to 60 inches, yellowish-brown, friable, massive layers of calcareous silt and fine sand.

Surface soil textures are silt loam, loam and fine sandy loam. In places the upper part of the subsoil contains a few pebbles and the substratum has layers of clay.

The Sisson soils are subject to a water erosion hazard on sloping areas. They are good cropland soils on the more gentle slopes.

267-A-1 Sisson fine sandy loam, 0 to 2 percent slopes

This soil differs from 266-A-1 by having a fine sandy loam surface soil. Small areas of Saylesville soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 3.)

33-A-1 Same as 267-A-1

19-A-1 Same as 267-A-1

267-B-1 Sisson fine sandy loam, 2 to 6 percent slopes

This gently sloping soil differs from 266-A-1 by having a fine sandy loam surface soil. This soil has a slight water erosion hazard. Small areas of Fox soils are included in this mapping unit. (Capability Unit IIe-1;

Woodland Suitability Group 3.)

19-B-1 Same as 267-B-1

33-B-1 Same as 267-B-1

267-M-1 Same as 267-B-1

267-B-2 Sisson fine sandy loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 266-A-1 by having a thinner, lighter colored, grayish-brown fine sandy loam surface soil. This soil has a slight water erosion hazard. Small areas of Fox soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 3.)

19-B-2 Same as 267-B-2

33-B-2 Same as 267-B-2

267-M-2 Same as 267-B-2

267-C-1 Sisson fine sandy loam, 6 to 12 percent slopes

This sloping soil differs from 266-A-1 by having a fine sandy loam surface soil. It has a moderate water erosion hazard. Small

areas of Fox soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 3.)

33-C-1 Same as 267-C-1

267-C-2 Sisson fine sandy loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 266-A-1 by having a thinner, lighter colored, grayish-brown fine sandy loam surface soil. It has a moderate water erosion hazard. Small areas of Fox soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 3.)

33-C-2 Same as 267-C-2

267-N-2 Same as 267-C-2

267-D-1 Sisson fine sandy loam, 12 to 20 percent slopes

This moderately steep soil differs from 266-A-1 by having a sandy loam surface soil. It has a severe water erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 3.)

267-D-2 Sisson fine sandy loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil is similar to 266-A-1, but it has a thin, lighter colored grayish-brown fine sandy loam surface soil. It has a severe erosion hazard. Small areas of Casco soils are included in the mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 3.)

33-D-2 Same as 267-D-2

267-E-1 Sisson fine sandy loam, 20 to 30 percent slopes

This steep soil is similar to 266-A-1, but it has a very severe water erosion hazard. Small areas of Casco soils are included in the mapping unit. (Capability Unit VIIe-1; Woodland Suitability Group 3.)

33-E-2 Same as 267-E-1

33Z-A-1 Sisson fine sandy loam, clay substratum, 0 to 2 percent slopes

This soil differs from 266-A-1 by having a fine sandy loam surface soil and the lower part of the substratum is slowly permeable

clay. Small areas of Saylesville soils are included in this mapping unit. (Capability Unit IIe-7; Woodland Suitability Group 3.)

33Z-B-1 Sisson fine sandy loam, clay substratum, 2 to 6 percent slopes

This gently sloping soil differs from 266-A-1 by having a fine sandy loam surface soil. The lower part of the substratum is slowly permeable clay. It has a slight water erosion hazard. Small areas of Saylesville soils are included in this mapping unit. (Capability Unit IIe-7; Woodland Suitability Group 3.)

33Z-C-1 Sisson fine sandy loam, clay substratum, 6 to 12 percent slopes

This sloping soil differs from 266-A-1 by having a fine sandy loam surface soil. The lower part of the substratum is slowly permeable clay. It has a moderate water erosion hazard. Small areas of Saylesville soils are included in this mapping unit. (Capability Unit IIIe-7; Woodland Suitability Group 3.)

33Z-C-2 Sisson fine sandy loam, clay substratum, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 266-A-1 by having a thinner, lighter colored grayish-brown fine sandy loam surface soil. The lower part of the substratum is slowly permeable clay. This soil has a moderate water erosion hazard. Small areas of Saylesville soils are included in this mapping unit. (Capability Unit IIIe-7; Woodland Suitability Group 3.)

33Z-D-2 Sisson fine sandy loam, clay substratum, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 266-A-1 by having a thinner, lighter colored grayish-brown fine sandy loam surface soil. The lower part of the substratum is slowly permeable clay. This soil has a moderate water erosion hazard. Small areas of Saylesville soils are included in this mapping unit. (Capability Unit IVe-7; Woodland Suitability Group 3.)

268-A-1 Sisson loam, 0 to 2 percent slopes

This soil differs from 266-A-1 by having a loam surface soil. (Capability Unit I-1; Woodland Suitability Group 1.)

268-B-1 Sisson loam, 2 to 6 percent slopes

This gently sloping soil differs from 266-A-1 by having a loam surface soil. It has a slight water erosion hazard. Small areas of Fox soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

268-B-2 Sisson loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 266-A-1 by having a thinner, lighter colored grayish-brown loam surface soil and a slight water erosion hazard. Small areas of Fox soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

268-C-1 Sisson loam, 6 to 12 percent slopes

This sloping soil differs from 266-A-1 by having a loam surface soil. It has a moderate water erosion hazard. Small areas of Fox soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

268-C-2 Sisson loam, 6 to 12 percent slopes, moderately eroded

This soil differs from 266-A-1 by having a thinner, lighter colored grayish-brown loam surface soil and a moderate water erosion hazard. Small areas of Fox soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

268-D-1 Sisson loam, 12 to 20 percent slopes

This soil differs from 266-A-1 by having a loam surface soil. It has a severe water erosion hazard. Small areas of Casco are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 1.)

266-A-1 Sisson silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Saylesville soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)

18-A-1 Same as 266-A-1

34-A-1 Same as 266-A-1

266-B-1 Sisson silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to 266-A-1, but it has a slight water erosion hazard. Small areas of Saylesville soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

18-B-1 Same as 266-B-1

34-B-1 Same as 266-B-1

266-M-1 Same as 266-B-1

266-B-2 Sisson silt loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil differs from 266-A-1 by having a thinner, lighter colored grayish-brown surface soil. It has a slight water erosion hazard. Small areas of Saylesville soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

18-B-2 Same as 266-B-2

34-B-2 Same as 266-B-2

266-M-2 Same as 266-B-2

266-C-1 Sisson silt loam, 6 to 12 percent slopes

This sloping soil is similar to 266-A-1, but it has a moderate water erosion hazard. Small areas of Saylesville soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

34-C-1 Same as 266-C-1

266-C-2 Sisson silt loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 266-A-1 by having a thinner, lighter colored grayish-brown surface soil. It has a moderate water erosion hazard. Small areas of Saylesville soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

18-C-2 Same as 266-C-2

34-C-2 Same as 266-C-2

266-D-1 Sisson silt loam, 12 to 20 percent slopes

This moderately steep soil is similar to 266-A-1, but it has a severe water erosion hazard. Small areas of Saylesville soils

are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 1.)

266-D-2 Sisson silt loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 266-A-1 by having a thinner, lighter colored grayish-brown surface soil. It has a severe water erosion hazard. Small areas of Saylesville soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 1.)

34-D-2 Same as 266-D-2

266-E-1 Sisson silt loam, 20 to 30 percent slopes

This steep soil is similar to 266-A-1, but it has a very severe water erosion hazard. Small areas of Saylesville soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 1.)

266-E-2 Sisson silt loam, 20 to 30 percent slopes, moderately eroded

This steep soil differs from 266-A-1 by having a thinner, lighter colored grayish-brown surface soil. It has a very severe water erosion hazard. Small areas of Saylesville soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 1.)

34-E-2 Same as 266-E-2

266Z-B-1 Sisson silt loam, clay substratum, 2 to 6 percent slopes

This gently sloping soil is similar to 266-A-1, but the lower part of the substratum is slowly permeable clay. Small areas of Saylesville soils are included in the mapping unit. (Capability Unit IIe-7; Woodland Suitability Group 3.)

18Y-A-1 Sisson silt loam, loam substratum, 0 to 2 percent slopes

This soil is similar to 266-A-1, but the lower part of the substratum has a loam texture. These soils have a slight water erosion hazard. Small areas of Saylesville soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

266R-A-1 Sisson silt loam, rock substratum, 0 to 2 percent slopes

tum, 0 to 2 percent slopes

This soil is similar to 266-A-1, but the lower part of the substratum is fissured dolomite bedrock. Small areas of Saylesville soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)

266R-B-2 Sisson silt loam, rock substratum, 2 to 6 percent slopes, moderately eroded

This gently sloping soil is similar to 266-A-1, but it has a thinner, lighter colored grayish-brown surface and the lower part of the substratum is fissured dolomite bedrock. It has a slight water erosion hazard. Small areas of Knowles soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

266X-B-2 Sisson silt loam, sand and gravel substratum, 2 to 6 percent slopes, moderately eroded

This gently sloping soil is similar to 266-A-1, but it has a thinner, lighter colored grayish-brown surface soil and the lower part of the substratum is sand and gravel. It has a moderate water erosion hazard. Small areas of Fox and Saylesville soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

267-C-3 Sisson soils, 6 to 12 percent slopes, severely eroded

This sloping soil differs from 266-A-1 by having a very thin, light colored grayish-brown sandy loam to clay loam surface soil and a moderate water erosion hazard. Small areas of Fox soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 3.)

33-C-3 Same as 267-C-3

267-D-3 Sisson soils, 12 to 20 percent slopes, severely eroded

This moderately steep soil differs from 266-A-1 by having a very thin, light colored, grayish-brown sandy clay to silty clay loam surface soil. It has a severe erosion hazard. Small areas of Casco soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 3.)

266-E-3 Sisson soils, 20 to 30 percent slopes, severely eroded

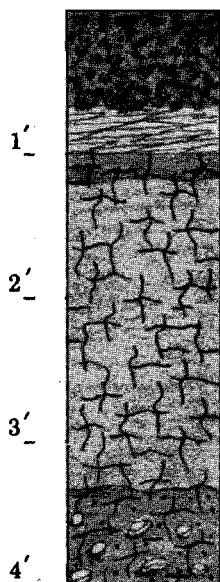
This steep soil differs from 266-A-1 by having a very thin, lighter colored, grayish-brown silt loam and silty clay loam surface soils. It has a very severe water erosion

hazard. Small areas of Saylesville soils are included in this mapping unit. (Capability Unit VIIe-1; Woodland Suitability Group 1.)

SLEETH SERIES

The somewhat poorly drained, nearly level to gently sloping soils of the Sleeth series have developed in a silt layer over calcareous sand and gravel. They occupy depressions and drainageways of outwash plains and stream terraces.

The following profile description of 87-A-1 Sleeth silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 8 inches, dark grayish-brown, friable, granular silt loam.

8 to 12 inches, brown, friable, platy silt loam.

Subsoil:

12 to 14 inches, dark yellowish-brown, friable, subangular blocky silt loam.

14 to 40 inches, dark yellowish-brown, firm, subangular blocky silty clay loam with yellow and strong brown mottles in the lower portion.

40 to 49 inches, dark brown, friable, subangular blocky, gravelly clay loam with strong brown mottles.

Substratum:

49 to 60 inches, pale brown, loose, calcareous sands and gravels.

This soil is more than 40 inches deep.

These Sleeth soils are subject to ponding and have a high water table. Sloping areas have a water erosion hazard. They are good cropland soils when adequately drained.

87-A-1 Sleeth silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Thackery, Westland and Matherton soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

87-B-1 Sleeth silt loam, 2 to 6 percent slopes

This soil is similar to 87-A-1, but it has a slight water erosion hazard. Small areas of Thackery, Westland and Matherton soils

are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

87-B-2 Sleeth silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 87-A-1, but it has a thinner, lighter colored grayish-brown surface soil and a slight water erosion hazard. Small areas of Thackery and Westland Soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

87-C-1 Sleeth silt loam, 6 to 12 percent slopes

This sloping soil is similar to 87-A-1, but it has a moderate erosion hazard. Small areas of Thackery and Westland soils are included in the mapping unit. (Capability Unit IIIe-8; Woodland Suitability Group 7.)

87Z-A-1 Sleeth silt loam, clay substratum,
0 to 2 percent slopes

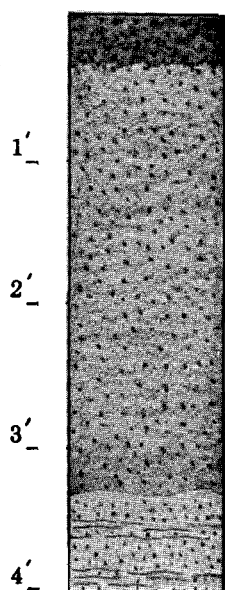
This soil is similar to 87-A-1, but it has a

slowly permeable clay substratum. Small areas of Thackery and Westland soils are included in the mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

SPINKS SERIES

The excessively to well drained, nearly level to steep soils of the Spinks series have developed in sand. They occupy glacial outwash plains and stream terraces and morainic areas.

The following profile description of 133-C-1 Spinks fine sand, 6 to 12 percent slopes, is representative of the series.



Surface soil:

0 to 4 inches, very dark, grayish-brown, friable, granular fine sand.

Subsoil:

4 to 40 inches, yellowish-brown, loose fine sand.

40 to 56 inches, yellowish-brown, loose sand with thin layers (1/8 to 1/2 inch thick) of sandy loam to loamy sand.

Substratum:

56 to 60 inches, light yellowish-brown, loose calcareous fine sand.

Surface soil textures are fine sand and loamy fine sand. The layers of loamy sand and sandy loam in the subsoil occur from 30 to 60 inches in depth.

These Spinks soils are drouthy and have low natural fertility. They have a wind erosion hazard and sloping areas are subject to a water erosion hazard. They are poor cropland soils.

133-A-1 Spinks fine sand, 0 to 2 percent slopes

This nearly level soil is similar to 133-C-1, but it has no water erosion hazard. Small areas of Hackett soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

133-B-1 Spinks fine sand, 2 to 6 percent slopes

This gently sloping soil is similar to 133-C-1,

but it has a slight water erosion hazard. Small areas of Hackett soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

133-C-1 Spinks fine sand, 6 to 12 percent slopes

The profile description of this soil is part of the series description. It has a wind and moderate water erosion hazard. Small areas of Hackett soils are included in this mapping unit. (Capability Unit IVe-9; Woodland Suitability Group 4.)

133-C-2 Spinks fine sand, 6 to 12 percent slopes, moderately eroded

This soil is similar to 133-C-1, but it has a thinner, lighter colored grayish-brown surface soil. Small areas of Hackett soils are included in this mapping unit. (Capability Unit IVe-9; Woodland Suitability Group 4.)

133-C-3 Spinks fine sand, 6 to 12 percent slopes, severely eroded

This soil is similar to 133-C-1, but the surface soil is very thin and in some places all of it has been removed by erosion. Small areas of Hackett soils and sand dunes are included in this mapping unit. (Capability Unit VIe-9; Woodland Suitability Group 4.)

133-D-1 Spinks fine sand, 12 to 20 percent slopes

This moderately steep soil is similar to 133-C-1, but it has a severe water erosion hazard. Small areas of Hackett soils are included in this mapping unit. (Capability Unit VIe-9; Woodland Suitability Group 4.)

133-D-2 Spinks fine sand, 12 to 20 percent slopes, moderately eroded

This soil is similar to 133-C-1, but it has a thinner, lighter colored grayish-brown surface soil and a severe water erosion hazard. Small areas of Hackett soils and sand dunes are included in this mapping unit. (Capability Unit VIe-9; Woodland Suitability Group 4.)

133-E-1 Spinks fine sand, 20 to 30 percent slopes

This soil is similar to 133-C-1, but it has a very severe water erosion hazard. Small areas of Hackett soils are included in this mapping unit. (Capability Unit VIIe-9; Woodland Suitability Group 4.)

133-E-2 Spinks fine sand, 20 to 30 percent slopes, moderately eroded

This soil is similar to 133-C-1, but it has a thinner, lighter colored grayish-brown surface soil. Small areas of Hackett soils and sand dunes are included in this mapping unit. (Capability Unit VIIe-9; Woodland Suitability Group 4.)

411-B-1 Spinks fine sand, silty substratum, 2 to 6 percent slopes

This soil is similar to 133-C-1, but the lower part of the underlying material is silt. Small areas of Hackett soils are included in this mapping unit. (Capability Unit VIIs-3; Woodland Suitability Group 4.)

134-A-1 Spinks loamy fine sand, 0 to 2 percent slopes

This nearly level soil differs from 133-C-1 by having a loamy fine sand surface soil and no water erosion hazard. Small areas of Hackett soils are included in this mapping unit. (Capability Unit IVe-9; Woodland Suitability Group 4.)

410-A-1 Same as 134-A-1

134-B-1 Spinks loamy fine sand, 2 to 6 percent slopes

This gently sloping soil differs from 133-C-1 by having a loamy fine sand surface soil and a slight water erosion hazard. Small areas of Hackett soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

410-B-1 Same as 134-B-1

134-B-2 Spinks loamy fine sand, 2 to 6 percent slopes, moderately eroded

This soil differs from 133-C-1 by having a thinner, lighter colored grayish-brown loamy sand surface soil and a slight water erosion hazard. Small areas of Hackett soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

134-C-2 Spinks loamy fine sand, 6 to 12 percent slopes, moderately eroded

This soil differs from 133-C-1 by having a thinner, lighter colored grayish-brown loamy fine sand surface soil. Small areas of Hackett soils are included in this mapping unit. (Capability Unit IVe-9; Woodland Suitability Group 4.)

410-C-2 Same as 134-C-2

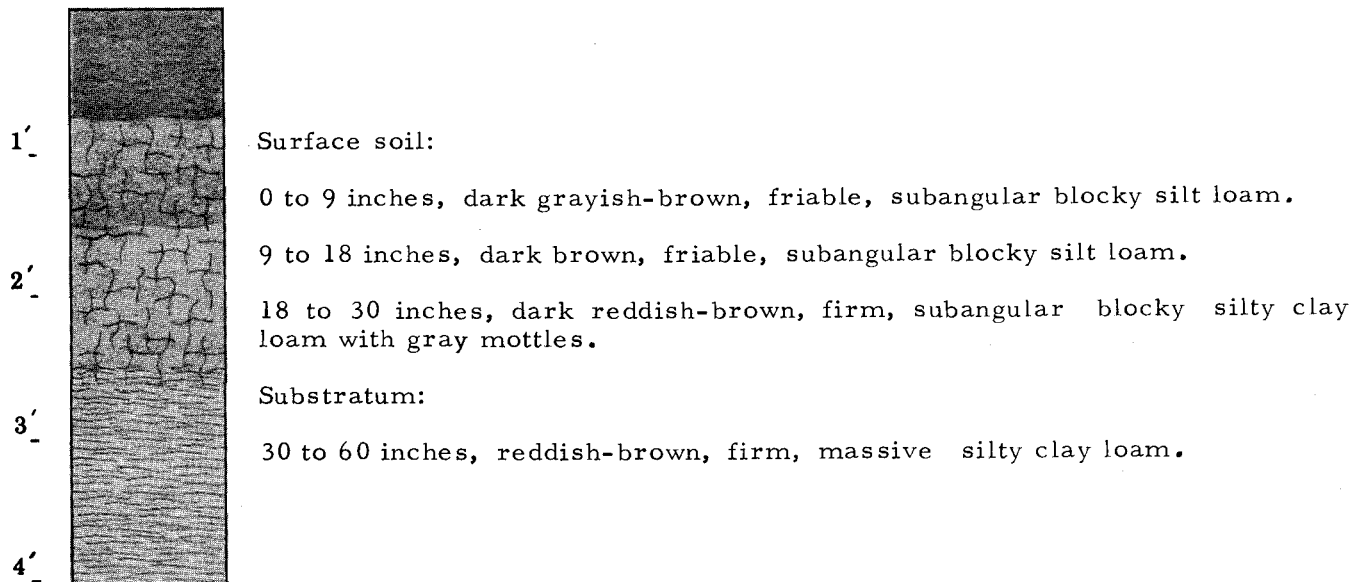
134-D-3 Spinks soils, 12 to 20 percent slopes, severely eroded

This soil differs from 133-C-1 by having a very thin, light colored dark grayish-brown loamy fine sand to sand surface soil. Small areas of Hackett soils are included in this mapping unit. (Capability Unit VIe-9; Woodland Suitability Group 4.)

STINSON SERIES

The somewhat poorly drained, nearly level soils of the Stinson series have developed in alluvial material from Kewaunee soil areas. They occupy low lying stream bottomlands.

The following profile description of 2-A-1 Stinson silt loam, 0 to 2 percent slopes, is representative of the series.



The surface soil ranges from 12 to 30 inches thick and includes layers of coarser textured material in places.

The Stinson soils are slowly permeable. They are subject to overflow and have a seasonal high water table. They are good cropland soils when drained and protected from stream overflow.

2-A-1 Stinson silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Pistakee soils are included in this mapping unit. (Capability Unit IIw-13; Woodland Suitability Group 7.)

STONY COLLUVIUM ¹

This land type consists of gravel, stones and mixed soil material. These are on foot-slopes and the lower ends of raw gullies.

These areas are too stony to use for crop-

land but are suited for pasture or wildlife areas.

3-B-1 Stony colluvium

These are gently sloping and sloping areas of stony colluvium. (Capability Unit VIs-6; Woodland Suitability Group 13.)

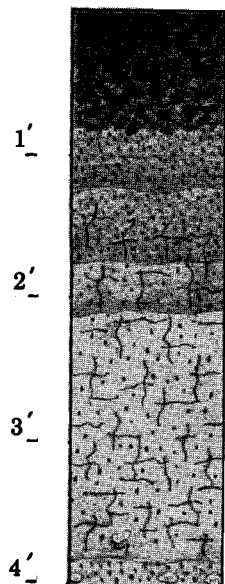
3-C-1 Same as 3-B-1

¹ Profile sketches have been omitted because of extreme variability.

SUMNER SERIES

The excessively drained, gently sloping soils of the Sumner series have developed in sandy material over loose sand and gravel. They occupy convex slopes of outwash plains and stream terraces.

The following profile description of 380-B-1 Sumner loamy sand, 2 to 6 percent slopes, is representative of the series.



Surface soil:

0 to 10 inches, black, friable, granular loamy sand.

10 to 15 inches, very dark grayish-brown, friable, granular loamy sand.

Subsoil:

15 to 21 inches, strong brown, friable, subangular blocky loamy sand.

21 to 25 inches, strong brown, friable, subangular blocky sandy clay loam.

25 to 46 inches, strong brown, friable, subangular blocky sandy loam.

Substratum:

46 to 60 inches, pale brown, loose, single grained sand and gravel.

The depth to loose sand and gravel ranges from 40 to 60 inches.

The Sumner soils have a drouth and wind erosion hazard, and the sloping areas have a water erosion hazard. They have low natural fertility and are fair to poor cropland soils.

380-B-1 Sumner loamy sand, 2 to 6 percent slopes

The profile description of this soil is a part of the series description. The soil has a slight water erosion hazard. Small areas of Warsaw and Casco soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

314-B-1 Same as 380-B-1

380Z-A-1 Sumner loamy sand, clay substratum, 0 to 2 percent slopes

This soil is similar to 380-B-1, but the lower part of the substratum is slowly permeable clay. It does not have a water erosion hazard. Small areas of Casco, Warsaw and Tustin soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

277-A-1 Sumner sandy loam, 0 to 2 percent slopes

This nearly level soil differs from 380-B-1 by having a sandy loam surface soil. It does not have a water erosion hazard. Small areas of Casco and Warsaw soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 3.)

277-B-1 Sumner sandy loam, 2 to 6 percent slopes

This soil differs from 380-B-1 by having a sandy loam surface soil. Small areas of Casco and Warsaw soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 3.)

277-B-2 Sumner sandy loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 380-B-1 by having a thinner sandy loam surface soil. Small areas of Casco and Warsaw soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 3.)

277-D-1 Sumner sandy loam, 12 to 20 percent slopes

This steep soil differs from 380-B-1 by having a sandy loam surface soil and a very severe water erosion hazard. Small areas of Warsaw and Casco soils are included in this mapping unit. (Capability Unit VIIe-4; Woodland Suitability Group 3.)

277Z-B-1 Sumner sandy loam, clay substratum, 2 to 6 percent slopes

This soil differs from 380-B-1 by having a sandy loam surface soil. The lower part of the substratum is clay. Small areas of Hebron, Warsaw and Casco soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 3.)

277Y-A-1 Sumner sandy loam, loam substratum, 0 to 2 percent slopes

This nearly level soil differs from 380-A-1 by having a sandy loam surface soil. The lower part of the substratum is loam. It does not have a water erosion hazard. Small

areas of Casco and Warsaw soils are included in this mapping unit. (Capability Unit IIIs-2; Woodland Suitability Group 3.)

277Y-B-1 Sumner sandy loam, loam substratum, 2 to 6 percent slopes

This soil differs from 380-B-1 by having a sandy loam surface soil. The lower part of the substratum is loam. Small areas of Casco and Warsaw soils are included in this mapping unit. (Capability Unit IIIe-4; Woodland Suitability Group 3.)

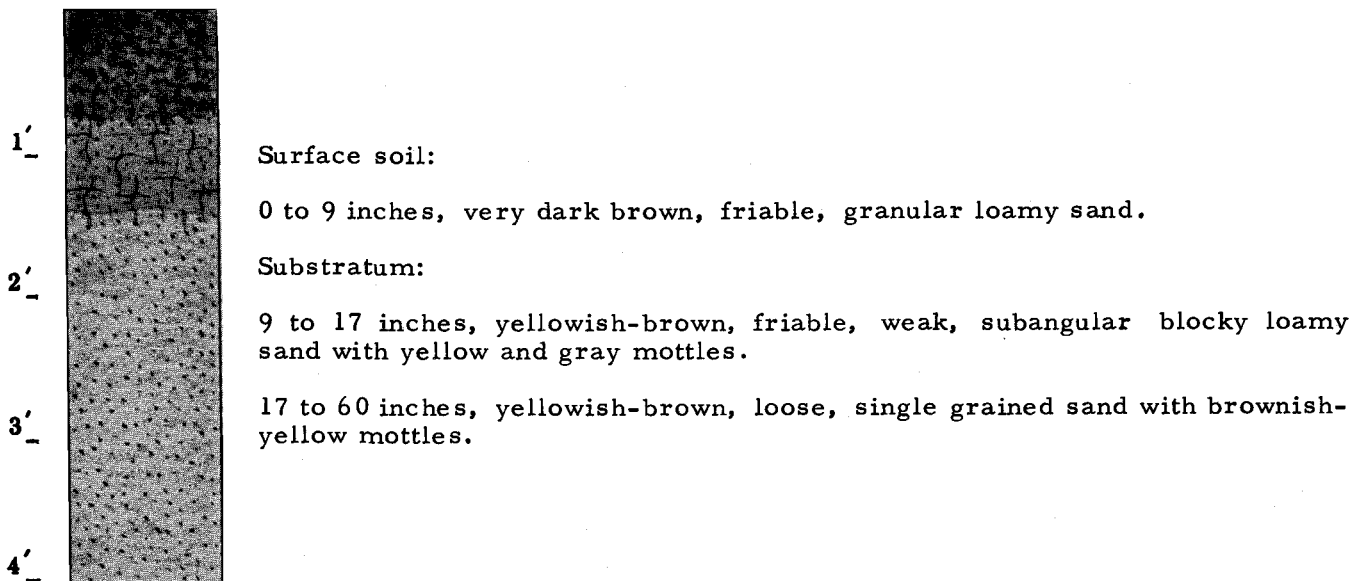
277Y-C-1 Sumner sandy loam, loam substratum, 6 to 12 percent slopes

This sloping soil differs from 380-B-1 by having a sandy loam surface soil. The lower part of the substratum is loam. It has a moderate water erosion hazard. Small areas of Casco and Warsaw soils are included in this mapping unit. (Capability Unit IVe-4; Woodland Suitability Group 3.)

TEDROW SERIES

The somewhat poorly drained, nearly level to gently sloping soils of the Tedrow series have developed in stratified sandy material. They occupy sandy nearly level and gently sloping old beaches.

The following profile description of 250-B-1 Tedrow sandy loam, 2 to 6 percent slopes, is representative of the series.



Surface soil textures are sandy loam and loamy sand. They range from 5 to 12 inches thick.

These Tedrow soils have a high water table and low natural fertility. They have a wind erosion hazard, and sloping areas have a

water erosion hazard. They are fair cropland soils.

251-A-1 Tedrow loamy sand, 0 to 2 percent slopes

This nearly level soil differs from 250-B-1 by having a loamy sand surface soil and no water erosion hazard. Small areas of Crestview and Granby soils are included in this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

251-B-1 Tedrow loamy sand, 2 to 6 percent slopes

This soil differs from 250-B-1 by having a loamy sand surface soil. Small areas of Crestview and Granby soils are included in this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

251Z-A-1 Tedrow loamy sand, clay substratum, 0 to 2 percent slopes

This soil differs from 250-B-1 by having a loamy sand surface soil. The lower part of the substratum is slowly permeable clay. Small areas of Crestview, Mosel and Granby soils are included in this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

251Z-B-1 Tedrow loamy sand, clay substratum, 2 to 6 percent slopes

This soil differs from 250-B-1 by having a loamy sand surface soil. The lower part of the substratum is slowly permeable clay. Small areas of Crestview, Mosel and Granby soils are included in this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

251Y-A-1 Tedrow loamy sand, loam substratum, 0 to 2 percent slopes

This nearly level soil differs from 250-B-1 by having a loamy sand surface soil. The lower part of the substratum is loam. It does not have a water erosion hazard. Small areas of Crestview and Granby soils are included in this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

251Y-B-1 Tedrow loamy sand, loam substratum, 2 to 6 percent slopes

This soil differs from 250-B-1 by having a loamy sand surface soil. The lower part of the substratum is loam. Small areas of Crestview and Granby soils are included in

this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

250-A-1 Tedrow sandy loam, 0 to 2 percent slopes

This soil is similar to 250-B-1, but it does not have a water erosion hazard. Small areas of Crestview and Granby soils are included in this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

250-B-1 Tedrow sandy loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Crestview and Granby soils are included in this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

250Z-A-1 Tedrow sandy loam, clay substratum, 0 to 2 percent slopes

This nearly level soil is similar to 250-B-1, but the lower part of the substratum is slowly permeable clay and it does not have a water erosion hazard. Small areas of Crestview, Granby and Mosel soils are included in this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

250Z-B-1 Tedrow sandy loam, clay substratum, 2 to 6 percent slopes

This soil is similar to 250-B-1, but the lower part of the substratum is slowly permeable clay. Small areas of Crestview and Mosel soils are included in this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

250Y-A-1 Tedrow sandy loam, loam substratum, 0 to 2 percent slopes

This nearly level soil is similar to 250-B-1, but the lower part of the substratum is loam. Small areas of Crestview and Granby soils are included in this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

250V-A-1 Tedrow sandy loam, silt and fine sand substratum, 0 to 2 percent slopes

This soil is similar to 250-B-1, but the lower substratum is silt and fine sand. Small areas of Crestview and Granby soils are included in this mapping unit. (Capability Unit IVw-5; Woodland Suitability Group 8.)

TERRACE ESCARPMENTS ¹

These are steep areas underlain by calcareous glacial till or by sand and gravel outwash.

416-D-1 Terrace escarpments (clayey)

This mapping unit includes calcareous glacial till areas along streams. The substratum is generally a clay loam texture but ranges to heavy loam or to silty clay. Slopes range from 15 to 35 percent.

Because of steepness and severe erosion hazard, these areas are not suitable for crops. Their best use is for pasture, woodland or wildlife areas. (Capability Unit VIIe-6; Woodland Suitability Group 13.)

416-E-1 Same as 416-D-1

416-F-1 Same as 416-D-1

417-D-1 Terrace escarpments (gravelly)

This mapping unit includes sand and gravel outwash material along the steep edges of outwash plains. The substratum is generally stratified sand and gravel. Cobblestones are common in places. Slopes range from 20 to 45 percent.

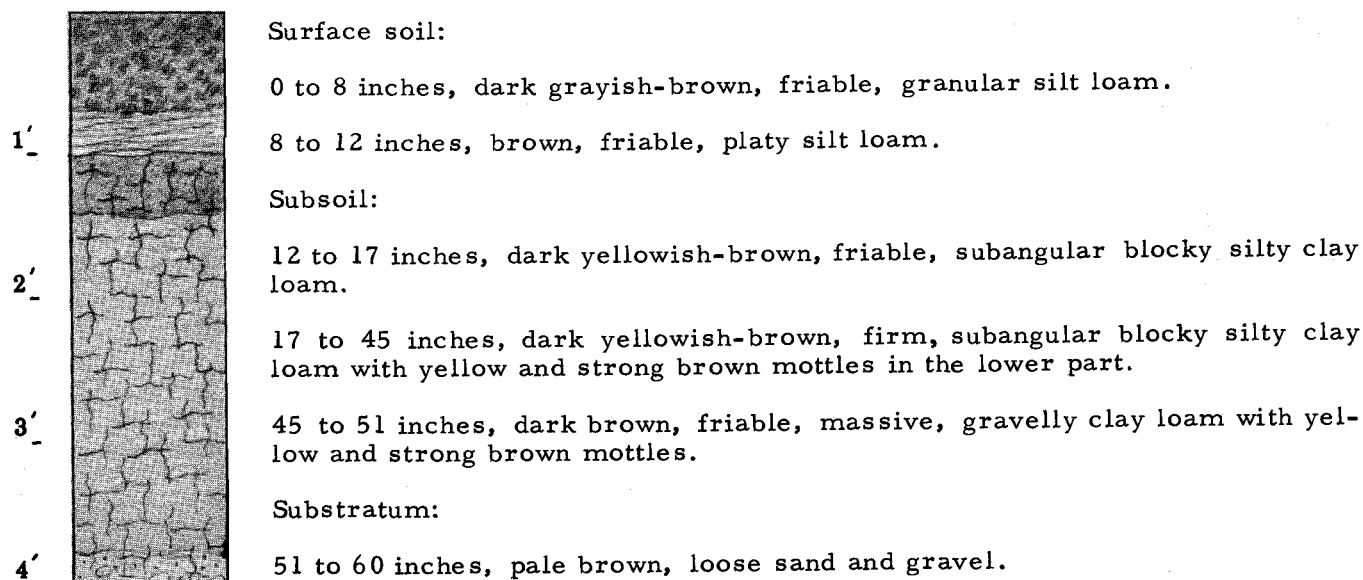
Because of steepness and severe erosion hazard, these areas are not suitable for crops. Their best use is for permanent pasture, woodland or wildlife. (Capability Unit VIIs-5; Woodland Suitability Group 13.)

417-E-1 Same as 417-D-1

THACKERY SERIES

The moderately well drained, nearly level to sloping soils of the Thackery series have developed in a deep silt layer over calcareous sand and gravel. They occupy nearly level to gently sloping areas on outwash plains and stream terraces.

The following profile description of 86-A-1 Thackery silt loam, 0 to 2 percent slopes, is representative of the series.



The silt layer in these Thackery soils ranges from 36 to 60 inches thick.

Sloping areas have a water erosion hazard. They are good cropland soils.

¹ Profile sketches have been omitted because of extreme variability.

86-A-1 Thackery silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Ockley, Sleeth and Ionia soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)

86-B-1 Thackery silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to 86-A-1, but it has a slight water erosion hazard. Small areas of Ockley, Sleeth and Ionia soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

86-B-2 Thackery silt loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil is similar to 86-A-1, but it has a thinner, lighter colored grayish-brown surface soil and a slight water erosion hazard. Small areas of Ockley, Sleeth and Ionia soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

86-C-1 Thackery silt loam, 6 to 12 percent slopes

This sloping soil is similar to 86-A-1, but it has a moderate water erosion hazard. Small areas of Ockley, Sleeth and Ionia soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

86-C-2 Thackery silt loam, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 86-A-1, but it has a thinner, lighter colored grayish-brown surface soil and a moderate water erosion hazard. Small areas of Ockley, Sleeth and Ionia soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

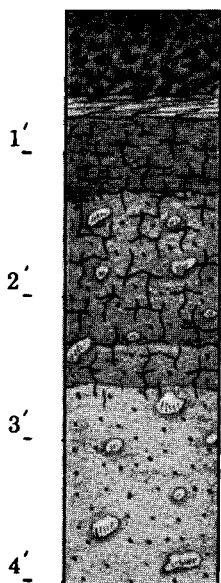
86V-B-1 Thackery silt loam, silt and fine sand substratum, 2 to 6 percent slopes

This slope is similar to 86-A-1, but the lower part of the substratum is silt and fine sand. Small areas of Ockley, Sleeth and Ionia soils are included in the mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

THERESA SERIES

The well drained, nearly level to moderately steep soils of the Theresa series have developed in a silt mantle over calcareous loam till. They occupy convex slopes of glacial uplands.

The following profile description of 362-B-1 Theresa silt loam, 2 to 6 percent slopes, is representative of the series.



Surface soil:

0 to 7 inches, dark grayish-brown, friable, granular silt loam.

7 to 9 inches, brown, friable, platy silt loam.

Subsoil:

9 to 15 inches, dark brown, friable, subangular, blocky silt loam.

15 to 28 inches, dark brown, firm, subangular, blocky clay loam.

28 to 31 inches, dark yellowish-brown, friable, subangular blocky clay loam.

Substratum:

31 to 60 inches, light yellowish-brown, friable, calcareous massive loam glacial till with many dolomite fragments.

The silt layer ranges from 12 to 24 inches thick.

Theresa soils are subject to a water erosion hazard on sloping areas. They are good cropland soils on the lower soils.

362-A-1 Theresa silt loam, 0 to 2 percent slopes

This nearly level soil is similar to 362-B-1, but it has no water erosion hazard. Small areas of Dodge and Mayville soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)



The sloping Theresa soils in the background overlook Lamartine soils on the lower slopes and poorly drained Ehler soils in the nearly level foreground.

362-B-1 Theresa silt loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Mayville, Hochheim and Dodge soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

362-M-1 Same as 362-B-1

362-B-2 Theresa silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 362-B-1, but it has a thinner, lighter colored grayish-brown surface soil and a slight water erosion hazard. Small areas of Hochheim, Mayville and Dodge soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

362-M-2 Same as 362-B-2

362-C-1 Theresa silt loam, 6 to 12 percent slopes

This sloping soil is similar to 362-B-1, but it has a moderate water erosion hazard. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

343-C-1 Same as 362-C-1

362-N-1 Same as 362-C-1

362-C-2 Theresa silt loam, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 362-B-1, but it has a thinner, lighter colored grayish-brown surface soil and a moderate water erosion hazard. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

343-C-2 Same as 362-C-2

362-C-3 Theresa silt loam, 6 to 12 percent slopes, severely eroded

This sloping soil is similar to 362-B-1, but it has a very thin, lighter colored surface soil and a moderate water erosion hazard. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 1.)

362-D-1 Theresa silt loam, 12 to 20 percent slopes

This moderately steep soil is similar to 362-B-1, but it has a severe water erosion hazard. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 1.)

362-K-1 Same as 362-D-1

362-D-2 Theresa silt loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil is similar to 362-B-1, but it has a thinner, lighter colored grayish-brown surface soil and a severe water erosion hazard. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 1.)

343-D-2 Same as 362-D-2

362-E-2 Theresa silt loam, 20 to 30 percent slopes, moderately eroded

This steep soil is similar to 362-B-1, but it has a thinner, lighter colored grayish-brown surface soil and a very severe water erosion hazard. Small areas of Hochheim soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 1.)

362Z-B-1 Theresa silt loam, clay substratum, 2 to 6 percent slopes

This soil is similar to 362-B-1, but the lower part of the substratum is clay. It has a slight water erosion hazard. Small areas of Morley, Saylesville, and Hochheim soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

362X-B-1 Theresa silt loam, gravelly substratum, 2 to 6 percent slopes

This soil is similar to 362-B-1, but the lower part of the substratum is loose sand and gravel. It has a slight water erosion hazard. Small areas of Fox and Hochheim soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

362X-M-1 Same as 362X-B-1

362X-B-2 Theresa silt loam, gravelly substratum, 2 to 6 percent slopes, moderately eroded

This soil is similar to 362-B-1, but it has a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is loose sand and gravel. It has a slight water erosion hazard. Small areas of Fox and Hochheim soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

362X-C-1 Theresa silt loam, gravelly substratum, 6 to 12 percent slopes

This sloping soil is similar to 362-B-1, but the lower part of the substratum is sand and gravel. It has a moderate water erosion hazard. Small areas of Hochheim and Fox soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

362X-C-2 Theresa silt loam, gravelly substratum, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 362-B-1, but it has a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is loose sand and gravel. It has a moderate water erosion hazard. Small areas of Fox and Hochheim soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

362R-A-1 Theresa silt loam, rock substratum, 0 to 2 percent slopes

This nearly level soil is similar to 362-B-1, but the lower part of the substratum is fissured dolomite bedrock and it has no erosion hazard. Small areas of Knowles and Dodge soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 1.)

362R-B-1 Theresa silt loam, rock substratum, 2 to 6 percent slopes

This gently sloping soil is similar to 362-B-1, but the lower part of the substratum is fissured dolomite bedrock. It has a slight water erosion hazard. Small areas of Knowles and Dodge soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

362R-B-2 Theresa silt loam, rock substratum, 2 to 6 percent slopes, moderately eroded

This soil is similar to 362-B-1, but it has a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is fissured dolomite bedrock. It has a slight water erosion hazard. Small areas of Knowles, Hochheim and Dodge soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

362R-C-2 Theresa silt loam, rock substratum, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 362-B-1, but it has a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is fissured dolomite bedrock. It has a moderate water erosion hazard. Small areas of Knowles and Hochheim soils are included in this mapping unit. (Capa-

bility Unit IIIe-1; Woodland Suitability Group 1.)

362V-B-2 Theresa silt loam, silt and fine sand substratum, 2 to 6 percent slopes, moderately eroded

This soil is similar to 362-B-1, but it has a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is silt and fine sand. It has a slight water erosion hazard. Small areas of Sisson, Hochheim and Dodge soils are included in this mapping unit. (Capability Unit IIe-1;

Woodland Suitability Group 1.)

362V-C-2 Theresa silt loam, silt and fine sand substratum, 6 to 12 percent slopes, moderately eroded

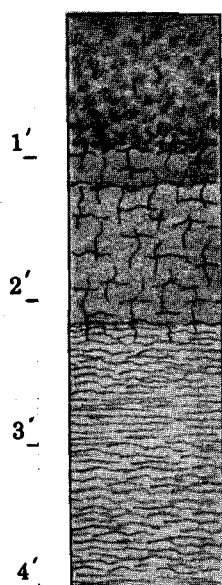
This sloping soil is similar to 362-B-1, but it has a thinner, lighter colored grayish-brown surface soil. The lower part of the substratum is silt and fine sand. It has a moderate water erosion hazard. Small areas of Knowles and Hochheim soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

TICHIGAN SERIES

The somewhat poorly drained, nearly level to gently sloping soils of the Tichigan series have developed in calcareous lacustrine silt and clay. They occupy drainageways, broad flats and slight depressions of glacial lake

basins and stream terraces.

The following profile description of 42-A-1 Tichigan silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 11 inches, very dark grayish-brown, friable, weak, granular silt loam.

Subsoil:

11 to 14 inches, dark yellowish-brown, friable, subangular, blocky silt loam with yellowish-brown and gray mottles.

14 to 26 inches, dark yellowish-brown, firm, subangular blocky silty clay with yellowish-brown and gray mottles.

Substratum:

26 to 60 inches, brown, firm, massive calcareous layers of clay and silt.

In places the upper part of the subsoil contains a few pebbles and the substratum contains layers of fine sand and silt.

The Tichigan soils are subject to ponding, have a seasonal high water table and are slowly permeable. Sloping areas have a water erosion hazard. They are good cropland soils when adequately drained.

42-A-1 Tichigan silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of

Ehler, Mosel and Blount soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

41-A-1 Same as 42-A-1

42-B-1 Tichigan silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to 42-A-1, but it has a slight water erosion hazard. Small areas of Saylesville and Bono soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

41-B-1 Same as 42-B-1

42-M-1 Same as 42-B-1

42-B-2 Tichigan silt loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil is similar to 42-A-1, but it has a thinner, lighter colored dark grayish-brown surface soil. It has a slight water erosion hazard. Small areas of Saylesville and Bono soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

42-C-1 Tichigan silt loam, 6 to 12 percent slopes

This sloping soil is similar to 42-A-1, but it has a moderate water erosion hazard. Small areas of Saylesville and Bono soils are included in the mapping unit. (Capability Unit IIIe-8; Woodland Suitability Group 7.)

42-C-2 Tichigan silt loam, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 42-A-1, but it has a thinner, lighter colored dark grayish-brown surface soil. It has a moderate erosion hazard. Small areas of Saylesville and Beecher soils are included in this mapping unit. (Capability Unit IIIe-8; Woodland Suitability Group 7.)

42-D-2 Tichigan silt loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil is similar to 42-A-1, but it has a thinner, dark grayish-brown surface soil. It has a severe water erosion hazard. Small areas of Saylesville and Beecher soils are included in this mapping unit. (Capability Unit IVe-6; Woodland Suitability Group 7.)

42X-A-1 Tichigan silt loam, gravelly substratum, 0 to 2 percent slopes

This soil is similar to 42-A-1, but the lower part of the substratum is sand and gravel. Small areas of Matherton and Ehler soils are included in this mapping unit. (Ca-

pability Unit IIw-2; Woodland Suitability Group 7.)

42X-B-1 Tichigan silt loam, gravelly substratum, 2 to 6 percent slopes

This gently sloping soil is similar to 42-A-1, but the lower part of the substratum is sand and gravel and it has a slight water erosion hazard. Small areas of Matherton and Saylesville soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

42Y-A-1 Tichigan silt loam, loam substratum, 0 to 2 percent slopes

This soil is similar to 42-A-1, but the lower part of the substratum is loam. Small areas of Lamartine and Ehler soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

42Y-B-1 Tichigan silt loam, loam substratum, 2 to 6 percent slopes

This gently sloping soil is similar to 42-A-1, but the lower part of the substratum is loam and it has a slight water erosion hazard. Small areas of Lamartine and Ehler soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

42R-A-1 Tichigan silt loam, rock substratum, 0 to 2 percent slopes

This soil is similar to 42-A-1, but the lower part of the substratum is fissured dolomite bedrock. Small areas of Knowles and Ehler soils are included in this mapping unit. (Capability Unit IIw-3; Woodland Suitability Group 7.)

42V-B-1 Tichigan silt loam, silt and fine sand substratum, 0 to 2 percent slopes

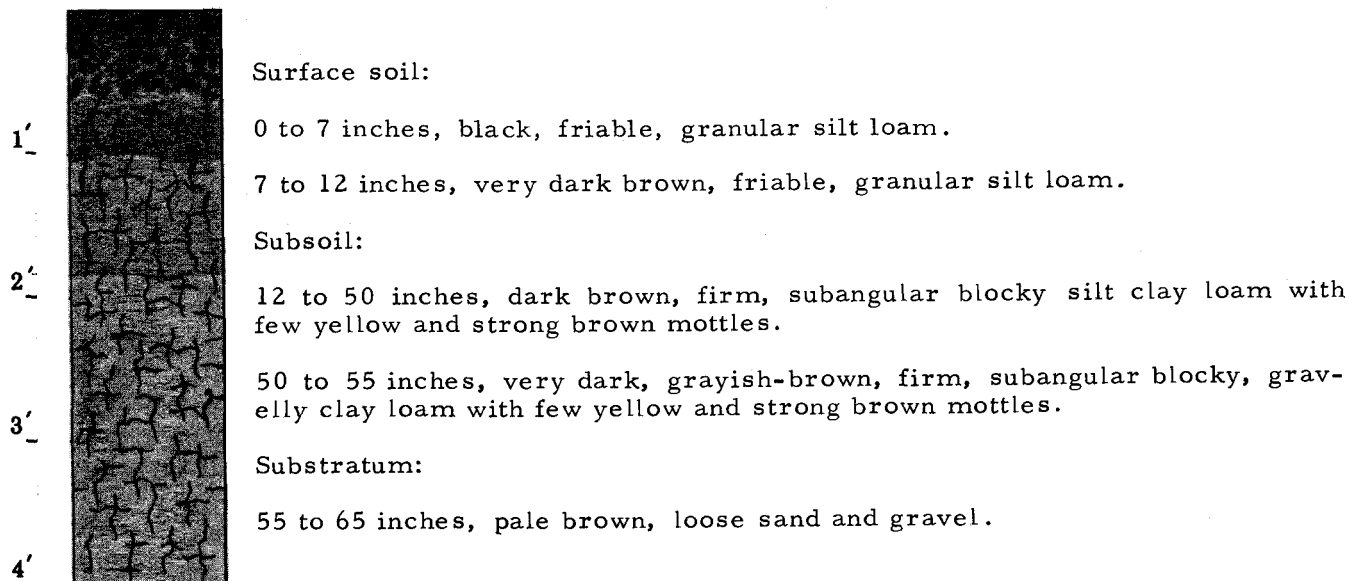
This gently sloping soil is similar to 42-A-1, but the lower part of the substratum is silt and fine sand. It has a slight water erosion hazard. Small areas of Wauconda, Saylesville and Mosel soils are included in this mapping unit. (Capability Unit IIw-2; Woodland Suitability Group 7.)

TIPPECANOE SERIES

The moderately well drained, nearly level to gently sloping soils of the Tippecanoe series have developed in a thick silt mantle over calcareous, loose sand and gravel. They occupy slight depressions and drain-

ageways in outwash plains.

The following profile description of 123-A-1 Tippecanoe silt loam, 0 to 2 percent slopes, is representative of the series.



The depth to loose sand and gravel ranges from 40 to 65 inches.

These Tippecanoe soils have an erosion hazard on sloping areas. They are good cropland soils.

123-A-1 Tippecanoe silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Wea and Crane soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 12.)

123-B-1 Tippecanoe silt loam, 2 to 6 percent slopes

This soil is similar to 123-A-1, but it has a slight water erosion hazard. Small areas

of Wea soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 12.)

123Z-A-1 Tippecanoe silt loam, clay substratum, 0 to 2 percent slopes

This soil is similar to 123-A-1, but the lower substratum is clay. Small areas of Wea soils are included in the mapping unit. (Capability Unit IIs-1; Woodland Suitability Group 12.)

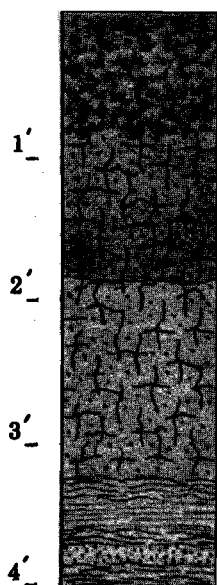
123V-A-1 Tippecanoe silt loam, silt and fine sand substratum, 0 to 2 percent slopes

This soil is similar to 123-A-1, but the lower substratum is silt and fine sand. Small areas of Wea soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 12.)

TUSTIN SERIES

The excessively well to well drained, nearly level to sloping soils of the Tustin series have developed in sandy material over calcareous clay. They occupy old beaches.

The following description of 254-B-1 Tustin sandy loam, 2 to 6 percent slopes, is representative of the series.



Surface soil:

0 to 10 inches, dark brown, friable, granular sandy loam.

Subsoil:

10 to 22 inches, dark yellowish-brown, friable, subangular blocky sandy loam.

22 to 39 inches, dark brown, friable, subangular blocky sandy clay loam.

Substratum:

39 to 60 inches, reddish-brown, firm, laminated silt, silty clay and thin bands of fine sand with strong brown mottles.

Surface soil textures are sandy loam and loamy fine sand. The thickness of the sandy material ranges from 20 to 40 inches. The substratum is silty clay loam till in places.

These Tustin soils are drouthy, but the underlying material is slowly permeable. They have a wind erosion hazard and sloping areas have a water erosion hazard. They are good to fair cropland soils.

272-A-1 Tustin loamy fine sand, 0 to 2 percent slopes

This soil differs from 254-B-1 by having a loamy fine sand surface soil and no water erosion hazard. Small areas of Hackett soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 4.)

272-B-1 Tustin loamy fine sand, 2 to 6 percent slopes

This soil differs from 254-B-1 by having a loamy fine sand surface soil. Small areas of Hackett soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 4.)

272-B-2 Tustin loamy fine sand, 2 to 6 percent slopes, moderately eroded

This soil is similar to 254-B-1, but it has a thinner, lighter colored surface soil. Small areas of Crestview soils are included in this mapping unit. (Capability Unit IIe-7; Woodland Suitability Group 3.)

254-A-1 Tustin sandy loam, 0 to 2 percent slopes

This soil is similar to 254-B-1, but it does not have a water erosion hazard. Small areas of Crestview soils are included in this mapping unit. (Capability Unit IIs-7; Woodland Suitability Group 3.)

254-B-1 Tustin sandy loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Crestview soils are included in this mapping unit. (Capability Unit IIe-7; Woodland Suitability Group 3.)

254-C-1 Tustin sandy loam, 6 to 12 percent slopes

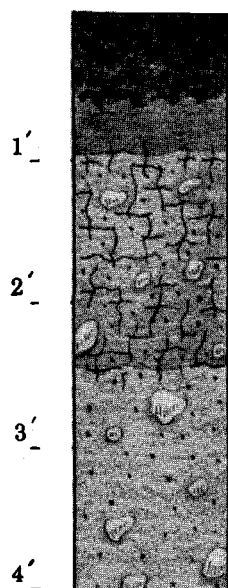
This soil is similar to 254-B-1, but it has a moderate water erosion hazard. Small areas of Crestview soils are included in this mapping unit. (Capability Unit IIHe-7; Woodland Suitability Group 3.)

VARNA SERIES

The well to moderately well drained, nearly level to sloping soils of the Varna series have developed in a thin silt layer over calcareous silty clay loam till. They occupy

convex slopes of glacial uplands.

The following profile description of 325-B-1 Varna silt loam, 2 to 6 percent slopes, is representative of the series.



0 to 7 inches, very dark brown to black, friable, granular silt loam.

7 to 11 inches, very dark grayish-brown, friable, granular silty clay loam.

Subsoil:

11 to 29 inches, dark brown, firm, subangular blocky silty clay loam.

Substratum:

29 to 60 inches, grayish-brown, firm, massive, calcareous silty clay loam glacial till.

In places the lower part of the subsoil has mottles. The substratum may contain large boulders, numerous cobblestones and pockets or lenses of silt and sand.

The Varna soils are slowly permeable. Sloping areas have a water erosion hazard. They are good cropland soils.

325-A-1 Varna silt loam, 0 to 2 percent slopes

This nearly level soil is similar to 325-B-1, but it does not have a water erosion hazard. Small areas of Elliott and Markham soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 12.)

325-B-1 Varna silt loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Elliott and Markham soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 12.)

325-B-2 Varna silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 325-B-1, but it has

a thinner, lighter colored dark brown surface soil and a slight water erosion hazard. Small areas of Elliott and Markham soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 12.)

325-C-1 Varna silt loam, 6 to 12 percent slopes

This sloping soil is similar to 325-B-1, but it has a moderate water erosion hazard. Small areas of Markham and Morley soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 12.)

325-C-2 Varna silt loam, 6 to 12 percent slopes, moderately eroded

This soil is similar to 325-B-1, but it has a thinner, lighter colored dark brown surface soil and a moderate water erosion hazard. Small areas of Markham and Morley soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 12.)

325-C-3 Varna soils, 6 to 12 percent slopes, severely eroded

This soil is similar to 325-B-1, but it has

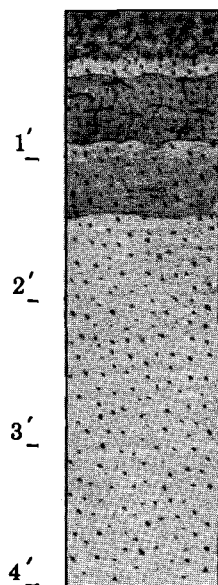
a very thin, dark brown silt loam and silty clay loam surface soil. It has a moderate water erosion hazard. Small areas of Mark-

ham and Morley soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 12.)

VILAS SERIES

The somewhat excessively drained, nearly level to gently sloping soils of the Vilas series have developed in acid sand and gravel. They occupy low sandy old lake beaches.

This profile description of 102-A-1 Vilas loamy sand, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 4 inches, very dark gray, loose, granular sand.

4 to 6 inches, light brownish-gray, loose, single grain fine sand.

Subsoil:

6 to 11 inches, dark reddish-brown, loose, subangular blocky coherent medium sand.

11 to 17 inches, brown to dark brown, loose, single grain, fine and medium sand.

Substratum:

17 to 60 inches, yellowish-brown, loose, single grain, fine and medium sand.

The surface soil ranges from 3 to 6 inches thick. In places the substratum is alkaline below 36 inches.

These Vilas soils have low natural fertility and are drouthy. They have a wind erosion hazard and sloping areas are subject to a water erosion hazard. They are poor cropland soils.

102-A-1 Vilas loamy sand, 0 to 2 percent slopes

The profile description of this soil is part

of the series description. Small areas of Tedrow soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

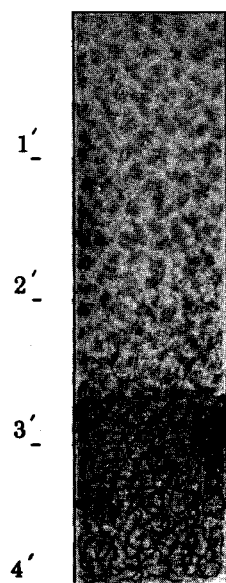
102-B-1 Vilas loamy sand, 2 to 6 percent slopes

This gently sloping soil is similar to 102-A-1, but it has a slight water erosion hazard. Small areas of Tedrow soils are included in this mapping unit. (Capability Unit IVs-3; Woodland Suitability Group 4.)

WALLKILL SERIES

The poorly drained, nearly level to sloping soils of the Wallkill series have developed from a silty alluvium over organic deposits. They occupy low depressions and nearly level areas.

The following profile description of 327-A-1 Wallkill silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 32 inches, very dark grayish-brown, friable, granular silt loam; the lower part is subangular blocky with a few gray and strong brown mottles.

Substratum:

32 to 60 inches, black, friable muck grading into peat.

The surface soil generally varies in thickness from 15 to 40 inches. The substratum is generally compressed and in places has a blocky structure in the upper part. It ranges from muck to peat.

These Wallkill soils are subject to further deposition from the surrounding uplands. They are subject to ponding or flooding and have a high water table. Sloping areas have a water erosion hazard. They are good cropland soils when adequately drained.

327-A-1 Wallkill silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Houghton muck and adjacent mineral soils are included in this mapping unit. (Capability Unit IIw-13; Woodland Suitability Group 9.)

327-B-1 Wallkill silt loam, 2 to 6 percent slopes

This soil is similar to 327-A-1, but it has a slight water erosion hazard. Small areas of Houghton muck and adjacent mineral soils are included in this mapping unit. (Capability Unit IIw-13; Woodland Suitability Group 9.)

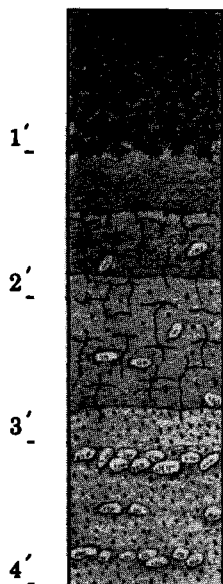
327-C-1 Wallkill silt loam, 6 to 12 percent slopes

This soil is similar to 327-A-1, but it has a moderate water erosion hazard. Small areas of Houghton muck and adjacent mineral soils are included in this mapping unit. (Capability Unit IIw-13; Woodland Suitability Group 9.)

WARSAW SERIES

The well drained, nearly level to steep soils of the Warsaw series have developed in a loamy outwash over calcareous sand and gravel. They occupy outwash plains and stream terraces.

The following profile description of 119-B-1 Warsaw silt loam, 2 to 6 percent slopes, is representative of the series.



Surface soil:

0 to 12 inches, black, friable, granular silt loam.

Subsoil:

12 to 17 inches, dark brown, friable, subangular blocky silt loam.

17 to 22 inches, dark brown, firm, subangular blocky clay loam.

22 to 33 inches, dark brown, firm, subangular blocky sandy clay loam.

Substratum:

33 to 60 inches, pale brown, loose, calcareous outwash sand and gravel.

Surface soil textures are silt loam, loam and sandy loam. The depth of these soils ranges from 20 to 40 inches. Where the sandy loam type is mapped, the subsoil is heavy sandy loam to sandy clay loam.

Sloping areas have a water erosion hazard. They are good cropland soils on the lower slopes.

120-A-1 Warsaw loam, 0 to 2 percent slopes

This nearly level soil differs from 119-B-1 by having a loam surface soil. It does not have a water erosion hazard. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IIs-1; Woodland Suitability Group 12.)

334-A-1 Same as 120-A-1

120-B-1 Warsaw loam, 2 to 6 percent slopes

This soil differs from 119-B-1 by having a loam surface soil. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IIs-2; Woodland Suitability Group 12.)

334-A-1 Same as 120-B-1



Warsaw silt loam, such as that in the foreground, typically occurs on nearly level glacial outwash plains. Lapeer soils occupy the sloping ground moraine in the background.

120-B-2 Warsaw loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 119-B-1 by having a thinner, lighter colored dark brown loam surface soil. Small areas of Fox and Lorenzo soils are included in this mapping

unit. (Capability Unit IIe-2; Woodland Suitability Group 12.)

120-C-1 Warsaw loam, 6 to 12 percent slopes

This sloping soil differs from 119-B-1 by having a loam surface soil and a moderate water erosion hazard. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 12.)

334-C-1 Same as 120-C-1

120-C-2 Warsaw loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 119-B-1 by having a thinner, lighter colored dark brown loam surface soil and a moderate water erosion hazard. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 12.)

120-D-1 Warsaw loam, 12 to 20 percent slopes

This moderately steep soil differs from 119-B-1 by having a loam surface soil and a severe water erosion hazard. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IVe-2; Woodland Suitability Group 12.)

120-D-2 Warsaw loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 119-B-1 by having a thinner, lighter colored dark brown loam surface soil and a severe water erosion hazard. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IVe-2; Woodland Suitability Group 12.)

120Z-B-1 Warsaw loam, clay substratum, 2 to 6 percent slopes

This soil differs from 119-B-1 by having a loam surface soil. The lower part of the substratum is slowly permeable clay. Small areas of Fox, Rome and Lorenzo soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 12.)

120Z-B-2 Warsaw loam, clay substratum, 2 to 6 percent slopes, moderately eroded

This soil is similar to 119-B-1, but it has

a thinner, lighter colored, dark brown surface soil. Small areas of Fox, Rome and Lorenzo soils are included in the mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 12.)

120Y-B-1 Warsaw loam, loam substratum, 2 to 6 percent slopes

This soil differs from 119-B-1 by having a loam surface soil. The lower part of the substratum is loam. Small areas of Fox, Wea and Lorenzo soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 12.)

120Y-C-1 Warsaw loam, loam substratum, 6 to 12 percent slopes

This sloping soil differs from 119-B-1 by having a loam surface soil. The lower part of the substratum is loam. It has a moderate water erosion hazard. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 12.)

269-A-1 Warsaw sandy loam, 0 to 2 percent slopes

This nearly level soil differs from 119-B-1 by having a sandy loam surface soil and having no water erosion hazard. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

269-B-1 Warsaw sandy loam, 2 to 6 percent slopes.

This soil differs from 119-B-1 by having a sandy loam surface soil. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

269-B-2 Warsaw sandy loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 119-B-1 by having a thinner, lighter colored, dark brown, sandy loam surface soil. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IIIs-4; Woodland Suitability Group 3.)

269-C-2 Warsaw Sandy loam, 6 to 12 percent slopes, moderately eroded

This sloping soil differs from 119-B-1 by having a thinner, lighter colored dark brown

sandy loam surface soil and a moderate water erosion hazard. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IIIe-7; Woodland Suitability Group 3.)

269-C-3 Warsaw sandy loam, 6 to 12 percent slopes, severely eroded

This sloping soil is similar to 119-B-1, but it has a very thin lighter colored, dark brown surface soil. Small areas of Fox and Lorenzo soils are included in the mapping unit. (Capability Unit IVe-2; Woodland Suitability Group 12.)

269-E-1 Warsaw sandy loam, 20 to 30 percent slopes

This moderately steep soil differs from 119-B-1 by having a sandy loam surface soil and a very severe water erosion hazard. Small areas of Lorenzo soils are included in this mapping unit. (Capability Unit VIe-7; Woodland Suitability Group 3.)

119-A-1 Warsaw silt loam, 0 to 2 percent slopes

This nearly level soil is similar to 119-B-1, but it does not have a water erosion hazard. Small areas of Wea, Lorenzo and Fox soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 12.)

119-B-1 Warsaw silt loam, 2 to 6 percent slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Wea, Lorenzo and Fox soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 12.)

119-B-2 Warsaw silt loam, 2 to 6 percent slopes, moderately eroded

This soil is similar to 119-B-1, but it has a thinner, lighter colored dark brown surface soil. Small areas of Wea, Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 12.)

119-B-3 Same as 119-B-2

119-C-1 Warsaw silt loam, 6 to 12 percent slopes

This sloping soil is similar to 119-B-1, but it has a moderate water erosion hazard. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 12.)

333-C-1 Same as 119-C-1

119-C-2 Warsaw silt loam, 6 to 12 percent slopes, moderately eroded

This sloping soil is similar to 119-B-1, but it has a thinner, lighter colored dark brown surface soil and a moderate water erosion hazard. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IIIe-2; Woodland Suitability Group 12.)

119-D-1 Warsaw silt loam, 12 to 20 percent slopes

This moderately steep soil differs from 119-B-1 by having a severe water erosion hazard. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IVe-2; Woodland Suitability Group 12.)

119-D-2 Warsaw silt loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 119-B-1 by having a thinner, lighter colored dark brown surface soil and severe water erosion hazard. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IVe-2; Woodland Suitability Group 12.)

119Z-A-1 Warsaw silt loam, clay substratum, 0 to 2 percent slopes

This nearly level soil is similar to 119-B-1, but the lower part of the substratum is slowly permeable clay. It does not have a water erosion hazard. Small areas of Rome and Fox soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 12.)

333Z-A-1 Same as 119Z-A-1

119Z-B-1 Warsaw silt loam, clay substratum, 2 to 6 percent slopes

This soil is similar to 119-B-1, but the lower part of the substratum is slowly permeable clay. Small areas of Rome, Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suit-

ability Group 12.)

119Y-A-1 Warsaw silt loam, loam substratum, 0 to 2 percent slopes

This nearly level soil is similar to 119-B-1, but the lower part of the substratum is loam. It does not have a water erosion hazard. Small areas of Fox, Wea and Lorenzo soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 12.)

333Y-A-1 Same as 119Y-A-1

119Y-B-1 Warsaw silt loam, loam substratum, 2 to 6 percent slopes

This soil is similar to 119-B-1, but the lower part of the substratum is loam. Small areas of Wea, Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 12.)

333Y-B-1 Same as 119Y-A-1

119V-B-1 Warsaw silt loam, silt and fine sand substratum, 2 to 6 percent slopes

This soil is similar to 119-B-1, but the lower part of the substratum is silt and fine sand. Small areas of Fox, Wea and Lorenzo soils are included in this mapping unit. (Capability Unit IIe-2; Woodland Suitability Group 12.)

119-C-3 Warsaw soils, 6 to 12 percent slopes, severely eroded

This sloping soil differs from 119-B-1 by having a lighter colored dark brown silt loam to clay loam surface soil and a moderate water erosion hazard. Small areas of Fox and Lorenzo soils are included in this mapping unit. (Capability Unit IVe-2; Woodland Suitability Group 12.)

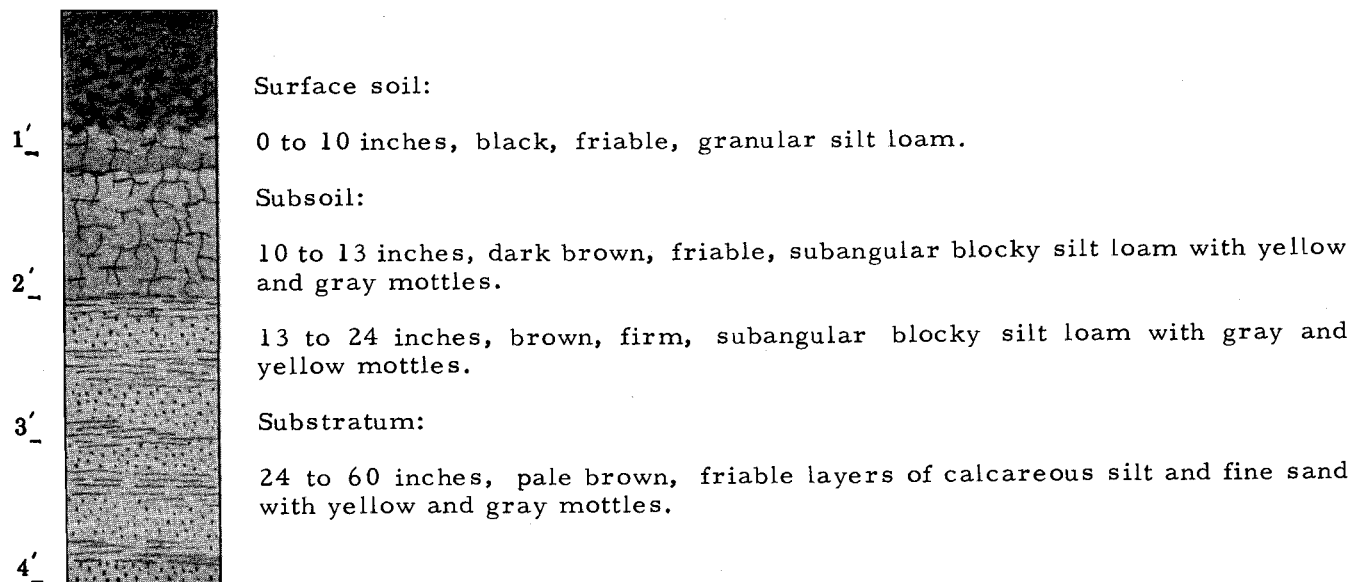
120-C-3 Same as 119-C-3

WAUCONDA SERIES

The somewhat poorly drained, nearly level to gently sloping soils of the Wauconda series have developed in stratified silt and fine sand. They occupy slight depressions and drainageways of glacial lake basins and

stream terraces.

The following profile description of 27-A-1 Wauconda silt loam, 0 to 2 percent slopes, is representative of the series.



Surface soil textures are silt loam and fine sandy loam. The subsoil ranges from silty clay loam to sandy loam. In places there are thin layers of clay in the substratum.

These Wauconda soils are subject to ponding and have a seasonal high water table. They are fair cropland soils when adequately drained.

26-A-1 Wauconda fine sandy loam, 0 to 2 percent slopes

This soil differs from 27-A-1 by having a sandy loam surface soil. Small areas of Kibbie, Tichigan and Yahara soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 12.)

26-B-1 Wauconda fine sandy loam, 2 to 6 percent slopes

This soil differs from 27-A-1 by having a sandy loam surface soil and a slight water erosion hazard. Small areas of Kibbie, Tichigan and Yahara soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 12.)

27-A-1 Wauconda silt loam, 0 to 2 percent slopes

The profile description of this soil is part

of the series description. Small areas of Kibbie, Tichigan and Yahara soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 12.)

27-B-1 Wauconda silt loam, 2 to 6 percent slopes

This soil is similar to 27-A-1, but it has a slight water erosion hazard. Small areas of Kibbie, Tichigan and Yahara soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 12.)

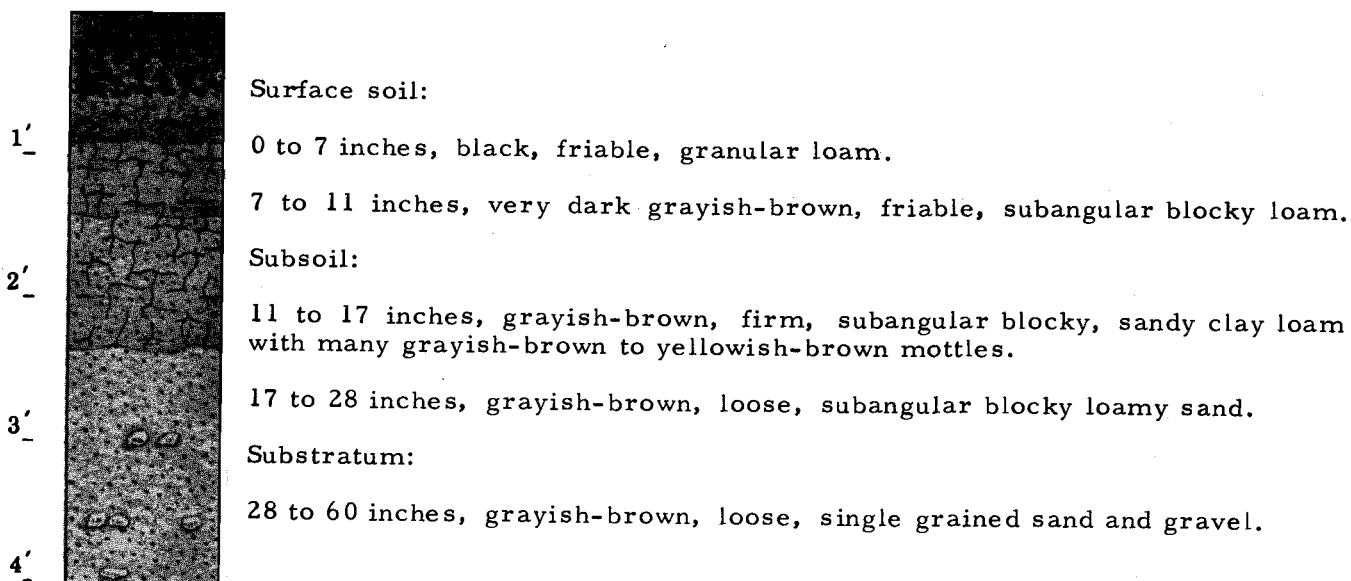
27Z-A-1 Wauconda silt loam, clay substratum, 0 to 2 percent slopes

This soil is similar to 27-A-1, but the lower part of the substratum is slowly permeable clay. Small areas of Aztalan, Tichigan and Yahara soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 12.)

WAUKECHON SERIES

The poorly drained, nearly level to gently sloping soils of the Waukechon series have developed in loamy deposits over loose sand and gravel. They occupy depressions and terraces in outwash plains.

The following profile description of 79-A-1 Waukechon loam, 0 to 2 percent slopes, is representative of the series.



In places the surface soil has a mucky surface. Depth to loose sand and gravel ranges from 24 to 40 inches.

These Waukechon soils have a low natural fertility and a severe wetness hazard. They

are subject to ponding but are fair cropland soils when adequately drained.

79-A-1 Waukechon loam, 0 to 2 percent slopes

The profile description of this soil is a part of the series description. Small areas of Seweba and Granby soils are included in this mapping unit. (Capability Unit IIIw-5; Woodland Suitability Group 9.)

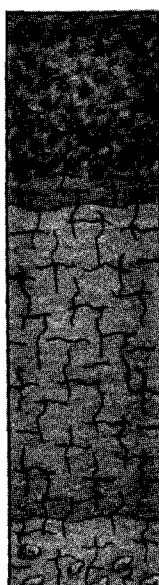
79-B-1 Waukechon loam, 2 to 6 percent slopes

This gently sloping soil is similar to 79-A-1, but it has a slight water erosion hazard. Small areas of Sebewa, Dousman and Granby soils are included in this mapping unit. (Capability Unit IIIw-5; Woodland Suitability Group 9.)

WEA SERIES

The well drained, nearly level to moderately steep soils of the Wea series have developed in thick loamy material overlying calcareous sand and gravel. They occupy glacial outwash plains and stream terraces.

The following profile description of 12-A-1 Wea silt loam, 0 to 2 percent slopes, is representative of the series.

	Surface soil:
	0 to 13 inches, very dark gray, friable, granular silt loam.
	Subsoil:
	13 to 16 inches, dark brown, friable, subangular blocky silt loam.
	16 to 42 inches, dark yellowish-brown, firm, subangular blocky silty clay loam.
	42 to 49 inches, dark brown, friable, subangular blocky, gravelly clay loam.
	Substratum:
	49 to 60 inches, pale brown, loose, calcareous sand and gravel.

Surface soil textures are silt loam and sandy loam. The depth to calcareous sand and gravel ranges from 40 to 60 inches.

The Wea soils of this series have a water erosion hazard on sloping areas. They are good cropland soils on the lower slopes.

391-A-1 Wea sandy loam, 0 to 2 percent slopes

This soil differs from 12-A-1 by having a sandy loam surface soil. Small areas of Warsaw soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 3.)

391-D-2 Wea sandy loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil differs from 12-A-1 by having a thinner, lighter colored

dark gray sandy loam surface soil and a severe water erosion hazard. Small areas of Warsaw soils are included in this mapping unit. (Capability Unit IVE-1; Woodland Suitability Group 3.)

12-A-1 Wea silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Ockley, Warsaw and Tippecanoe soils are included in this mapping unit. (Capability Unit I-1; Woodland Suitability Group 12.)

12-B-1 Wea silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to 12-A-1, but it has a slight water erosion hazard. Small areas of Ockley, Warsaw and Tippecanoe soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 12.)

12-C-2 Wea silt loam, 6 to 12 percent slopes, moderately eroded

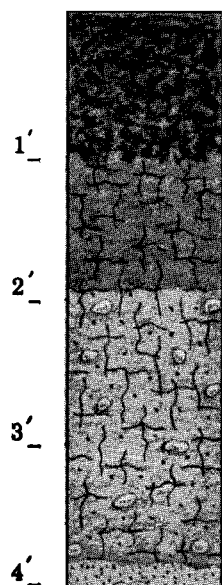
This moderately steep soil is similar to 12-A-1, but it has a thinner, lighter color-

ed dark gray surface soil and a moderate water erosion hazard. Small areas of Warsaw and Ockley soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 12.)

WESTLAND SERIES

The poorly drained, nearly level to gently sloping soils of the Westland series have developed in a silt layer over calcareous sand and gravel. They occupy broad low nearly level areas and depressions of glacial outwash plains.

The following profile description of 126-A-1 Westland silt loam 0 to 2 percent slopes, is representative of the series.



Surface soil:

0 to 12 inches, black, friable, granular silt loam.

Subsoil:

12 to 23 inches, dark gray, firm, subangular, blocky, silty clay loam with yellow mottles.

23 to 46 inches, grayish-brown, friable, subangular blocky loam with strong brown and yellow mottles.

Substratum:

46 to 60 inches, light olive-brown, loose calcareous outwash sand and gravel.

These soils are more than 40 inches deep. In places the surface soil is a silty clay loam or mucky silt loam.

The Westland soils are subject to ponding and overflow from adjacent uplands. Sloping areas have a water erosion hazard. These soils have a high water table but are good cropland soils when adequately drained.

126-A-1 Westland silt loam, 0 to 2 percent slopes

The profile description of this soil is part of the series description. Small areas of Abington, Sebewa and Sleeth soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

126-B-1 Westland silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to 126-A-1, but it has a slight water erosion hazard. Small areas of Abington, Sebewa and Sleeth soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

126Z-A-1 Westland silt loam, clay substratum, 0 to 2 percent slopes

This soil is similar to 126-A-1, but the lower part of the substratum is slowly permeable clay. Small areas of Sebewa, Abington and Sleeth soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

126Y-A-1 Westland silt loam, loam substratum, 0 to 2 percent slopes

This soil is similar to 126-A-1, but the lower part of the substratum is loam. Small

areas of Abington, Sebewa, Brookston and Sleeth soils are included in this mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

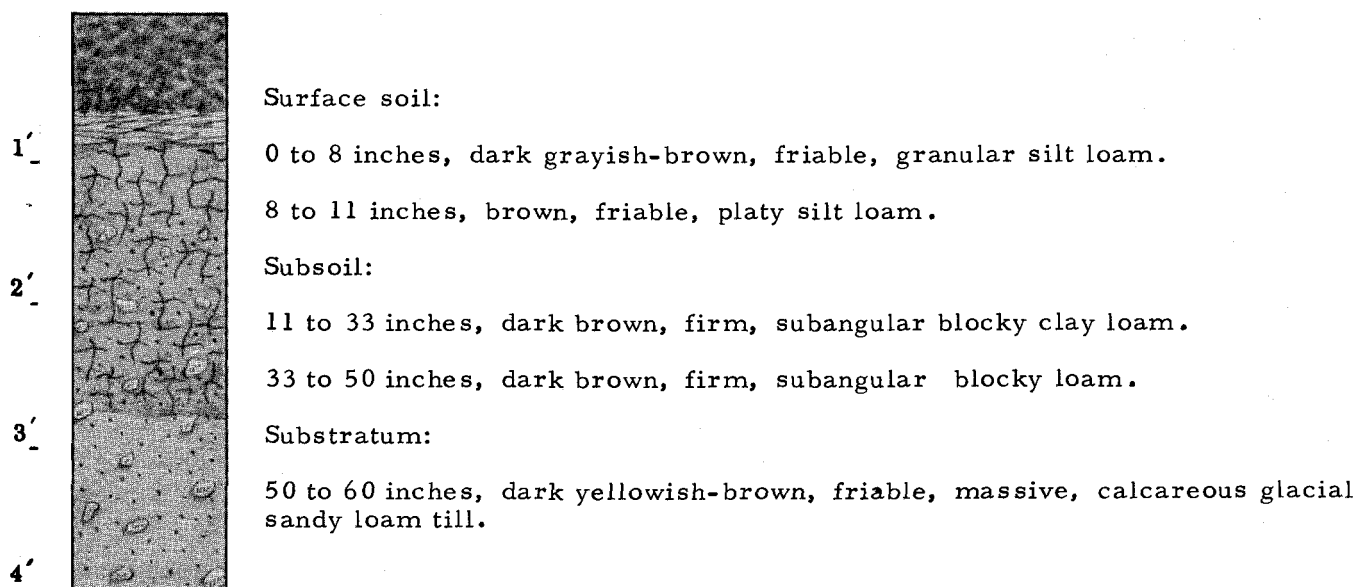
126V-A-1 Westland silt loam, silt and fine sand substratum, 0 to 2 percent slopes

This soil is similar to 126-A-1, but the lower part of the substratum is silt and fine sand. Small areas of Abington, Sebewa and Sleeth soils are included in the mapping unit. (Capability Unit IIw-1; Woodland Suitability Group 7.)

WESTVILLE SERIES

The well drained, gently sloping to very steep soils of the Westville series have developed in a thin silt layer over loam to sandy loam till. They occupy the higher areas of glacial uplands.

The following profile description of 516-C-1 Westville silt loam, 6 to 12 percent slopes, is representative of the series.



The silt layer is less than 15 inches deep. The substratum ranges from sandy loam to loam in texture.

Sloping areas have a water erosion hazard. These are good cropland soils on the lower slopes.

516-B-1 Westville silt loam, 2 to 6 percent slopes

This gently sloping soil is similar to 516-C-1, but it has a slight water erosion hazard. Small areas of Pecatonica soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

516-B-2 Westville silt loam, 2 to 6 percent slopes, moderately eroded

This gently sloping soil is similar to 516-

C-1, but it has a thinner, lighter colored grayish-brown surface soil and a slight water erosion hazard. Small areas of Pecatonica soils are included in this mapping unit. (Capability Unit IIe-1; Woodland Suitability Group 1.)

516-C-1 Westville silt loam, 6 to 12 percent slopes

The profile description of this soil is part of the series description. It has a moderate water erosion hazard. Small areas of Pecatonica soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

516-C-2 Westville silt loam, 6 to 12 percent slopes, moderately eroded

This soil is similar to 516-C-1, but it has

a thinner, lighter colored grayish-brown surface soil. Small areas of Pecatonica soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

514-C-2 Same as 516-C-2

516-D-1 Westville silt loam, 12 to 20 percent slopes

This moderately steep soil is similar to 516-C-1, but it has a severe water erosion hazard. Small areas of Pecatonica soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 1.)

516-D-2 Westville silt loam, 12 to 20 percent slopes, moderately eroded

This moderately steep soil is similar to 516-C-1, but it has a thinner, lighter colored grayish-brown silt loam surface soil and a severe water erosion hazard. Small areas of Pecatonica soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 1.)

514-D-2 Same as 516-D-2

516-E-1 Westville silt loam, 20 to 30 percent slopes

This steep soil is similar to 516-C-1, but it has a very severe water erosion hazard. Small areas of Pecatonica soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 1.)

514-E-1 Same as 516-E-1

516-E-2 Westville silt loam, 20 to 30 percent slopes, moderately eroded

This steep soil is similar to 516-C-1, but it has a thinner, grayish-brown lighter colored surface soil and a very severe water erosion hazard. Small areas of Pecatonica soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 1.)

514-E-2 Same as 516-E-2

516-B-3 Westville soils, 2 to 6 percent slopes, severely eroded

This gently sloping soil differs from 516-C-1 by having a very thin, light colored grayish-brown silt loam to clay loam surface soil and a slight water erosion hazard. Small areas of Pecatonica soils are included in this mapping unit. (Capability Unit IIIe-1; Woodland Suitability Group 1.)

516-C-3 Westville soils, 6 to 12 percent slopes, severely eroded

This soil differs from 516-C-1 by having a very thin, light colored grayish-brown silt loam to clay loam surface soil. Small areas of Pecatonica soils are included in this mapping unit. (Capability Unit IVe-1; Woodland Suitability Group 1.)

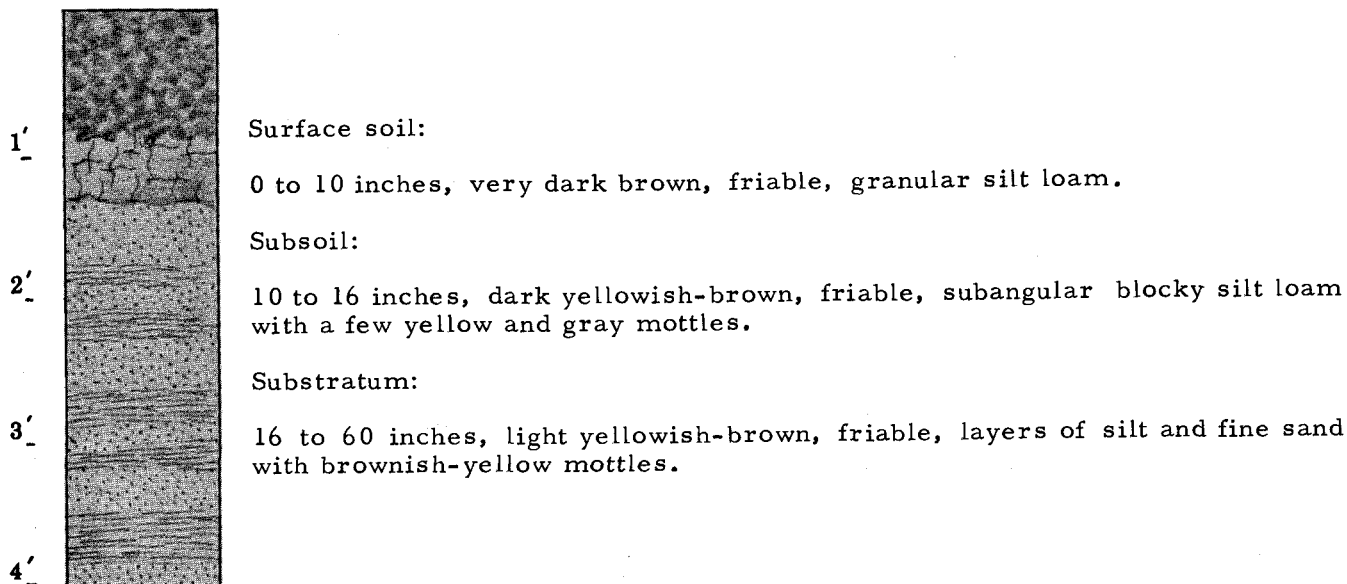
516-D-3 Westville soils, 12 to 20 percent slopes, severely eroded

This moderately steep soil differs from 516-C-1 by having a very thin, light colored grayish-brown silt loam to clay loam surface soil. It has a severe water erosion hazard. Small areas of Pecatonica soils are included in this mapping unit. (Capability Unit VIe-1; Woodland Suitability Group 1.)

YAHARA SERIES

The somewhat poorly drained, nearly level to sloping soils of the Yahara series have developed in calcareous layers of silt and fine sand. They occupy glacial lake basins and stream terraces.

The following profile description of 46-B-1 Yahara silt loam, 2 to 6 percent slopes, is representative of the series.



Surface soil textures are silt loam, loam and very fine sandy loam. Surface soil color ranges from very dark grayish-brown to black and is 9 to 14 inches thick.

The Yahara soils have a seasonal high water table. The substratum liquefies and flows readily when wet. They are good cropland soils when adequately drained by field ditches. They are not suitable for tile drainage.

47-A-1 Yahara loam, 0 to 2 percent slopes

This nearly level soil differs from 46-B-1 by having a loam surface soil and no water erosion hazard. Small areas of Wauconda and Keowns soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

47-B-1 Yahara loam, 2 to 6 percent slopes

This soil differs from 46-B-1 by having a loam surface soil. Small areas of Wauconda, Sisson and Keowns soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

47-B-2 Yahara loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 46-B-1 by having a thinner, lighter colored dark brown loam surface soil. Small areas of Wauconda, Sisson and Keowns soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

47Z-A-1 Yahara loam, clay substratum, 0 to 2 percent slopes

This nearly level soil differs from 46-B-1 by having a loam surface soil. The lower part of the substratum is slowly permeable clay. Small areas of Wauconda, Sisson and Keowns soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

46-A-1 Yahara silt loam, 0 to 2 percent slopes

This nearly level soil is similar to 46-B-1, but it does not have a water erosion hazard. Small areas of Wauconda, Sisson and Keowns soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

36-A-1 Same as 46-A-1

46-B-1 Yahara silt loam, 2 to 6 percent

slopes

The profile description of this soil is part of the series description. It has a slight water erosion hazard. Small areas of Wauconda, Sisson and Keowns soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

36-B-1 Same as 46-B-1

46-B-2 Yahara silt loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 36-A-1 by having a thinner, lighter colored dark brown surface soil and a slight water erosion hazard. Small areas of Wauconda, Sisson and Keowns soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

36-B-2 Same as 46-B-2

45-A-1 Yahara very fine sandy loam, 0 to 2 percent slopes

This nearly level soil differs from 46-B-1 by having a very fine sandy loam surface soil and no water erosion hazard. Small areas of Wauconda, Sisson and Keowns soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

35-A-1 Same as 45-A-1

45-B-1 Yahara very fine sandy loam, 2 to 6 percent slopes

This soil differs from 46-B-1 by having a very fine sandy loam surface soil. Small areas of Wauconda, Sisson and Keowns soils are included in this mapping unit. (Capa-

bility Unit IIIw-3; Woodland Suitability Group 7.)

35-B-1 Same as 45-B-1

45-B-2 Yahara very fine sandy loam, 2 to 6 percent slopes, moderately eroded

This soil differs from 46-B-1 by having a thinner, lighter colored dark brown fine sandy loam surface soil and a slight water erosion hazard. Small areas of Wauconda, Sisson and Keowns soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

35-B-2 Same as 45-B-2

45Z-A-1 Yahara very fine sandy loam, clay substratum, 0 to 2 percent slopes, slightly eroded

This nearly level soil differs from 46-B-1 by having a very fine sandy loam surface soil. The lower part of the substratum is slowly permeable clay. Small areas of Wauconda, Sisson and Keowns soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

35Z-A-1 Same as 45Z-A-1

45Z-B-1 Yahara very fine sandy loam, clay substratum, 2 to 6 percent slopes

This soil differs from 46-B-1 by having a fine sandy loam surface soil. The lower part of the substratum is slowly permeable clay. This soil has a slight water erosion hazard. Small areas of Wauconda, Sisson and Keowns soils are included in this mapping unit. (Capability Unit IIIw-3; Woodland Suitability Group 7.)

35Z-B-2 Same as 45Z-B-1

Chapter V

ENGINEERING PROPERTIES AND INTERPRETATIONS

Some soil properties are of special interest to engineers because they affect the construction and maintenance of roads, airports, pipelines, building foundations, facilities for water storage, erosion control structures, drainage systems, and sewage disposal systems. The properties most important to the engineer are permeability to water, shear strength, compaction characteristics, soil drainage, shrink-swell characteristics, grain size, plasticity, and soil reaction or pH. Depth to water table, bedrock and topography also are important.

Information in this report can be used in conjunction with the soil survey maps to:

1. Make soil and land-use studies that will aid in selecting and developing industrial, business, residential and recreational sites in the preparation of various kinds of site plans, including land subdivision layouts.
2. Make preliminary evaluation of soil and ground conditions that will aid in selecting highway, airport, pipeline and cable route locations and designs.
3. Plan detailed foundation investigations at selected locations along transportation routes and at sites of major engineering structures.
4. Locate probable sources of gravel and other construction materials.
5. Correlate performance of engineering structures with soil types to develop information that will be useful in designing and maintaining certain engineering structures.
6. Determine the suitability of soil types for cross-country movement of vehicles and construction equipment.
7. Make preliminary estimates of the engineering properties of soils in the planning and design of agricultural drainage systems, farm ponds, irrigation systems, and diversion terraces.
8. Supplement the information obtained from

other published maps and reports, and aerial photographs to prepare feasibility studies for various types of public works construction including the preparation of preliminary cost estimates for construction purposes pertinent to the particular area.

Used with the soil map to identify the soils, the engineering interpretations in this section can be useful for many purposes. It should be emphasized that the interpretations do not eliminate the need for soil sampling and testing at the site of specific engineering works involving heavy loads or where the excavations are deeper than the depths of layers here reported. Nevertheless, even in such situations, the soil map is useful for planning more detailed field investigations and for indicating the kinds of problems that may be expected.

Some of the terms used by the soil scientist may be unfamiliar to the engineer, and some words, for example, soil, clay silt and sand may have somewhat different meanings to the soil scientist than to the engineer. These and other special terms used herein are defined in the Glossary appended to this report.

Engineering interpretations for each soil mapped in the Region are presented in Tables 4, 5, 6, and 7. The first column in these tables and others in the report contains the soil number and soil name. During final checking of the field work it was determined that certain soils at first thought to be different, were actually quite similar to other soils within the Region and that the total land area covered by some similar soils was too small to justify separate tabulation. Thus the soil mapped as number 5, Huntsville silt loam, has the same characteristics as the soil mapped as No. 54, Lawson silt loam. In the first column of the tables the note, "Same as No. 54, Lawson silt loam", has been placed beside number 5. Throughout the tables two or more very similar soils are, for the same reason, treated in the same manner.

The interpretive ratings of soils in this

report can be expressed either in terms of their suitability for various uses or more commonly in terms of the degree of limitations and hazards connected with the use. The basis for the hazard ratings are explained under the various use headings. Most interpretative ratings in this report have

been expressed as *very slight, slight, moderate, severe or very severe*.

In Table 6, however, the ratings of soils as sources of topsoil, sand and gravel have been expressed in terms of suitability because it is difficult and impractical to express ratings for these uses in terms of limitations.

<i>LIMITATIONS</i>	<i>SUITABILITY</i>	<i>DEFINITION</i>
VERY SLIGHT	VERY GOOD OR EXCELLENT	Few or no limitations for use.
SLIGHT	GOOD	Slight limitations that are easy to overcome.
MODERATE	FAIR	Moderate limitations that can normally be overcome with correct planning, careful design and good management.
SEVERE	POOR	Limitations that are difficult to overcome. Careful planning and above average design and management are required.
SEVERE TO VERY SEVERE	QUESTIONABLE	Sites are variable and limitations range from severe to very severe. On-site investigations are generally needed.
VERY SEVERE	VERY POOR OR UNSUITABLE	Problems and limitations are very difficult to overcome and costs are generally prohibitive. Major soil reclamation work is generally required.

CHEMICAL AND PHYSICAL PROPERTIES OF SOILS OF THE REGION

The chemical and physical properties of the soils of southeastern Wisconsin are set forth in Table 4. These data are the principal basis for many of the other soil interpretations in this report. Some of the data are the results of laboratory determinations that have been made on soil samples taken from sites located within the Region or nearby. These are indicated by footnote 2 in the table. The estimated data are interpolations of the measured data for similar soils.

Soil numbers and soil names are listed in the first column. The number of each soil type, such as Stinson silt loam, or land type, such as Rough, broken land, has been placed on the field sheet to indicate the kind of soil within a soil delineation. In this table the numbers are used to help identify the soil with the data. Soils are listed numer-

ically by the number symbol used on the soil survey field sheets.

Soil horizons and their depths are listed for each soil. Only horizons for which data are given are shown. The explanation of horizon symbols is given in Identification and Nomenclature section of Chapter IV.

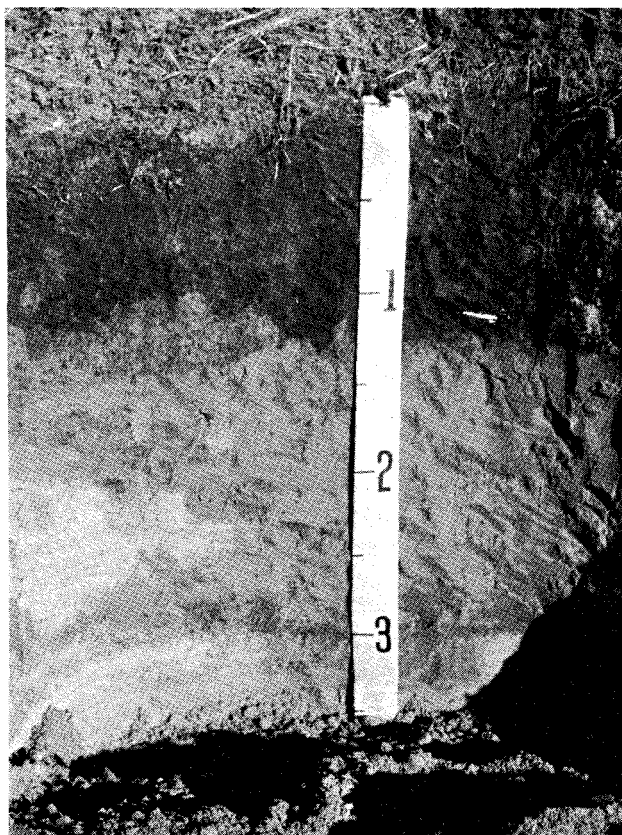
Classification of soils by the U. S. Department of Agriculture, American Association of State Highway Officials and the Unified U. S. Army Corps of Engineers) soil classification systems are given. The USDA system of classifying soil texture is used by agricultural scientists. In this system the textural class of a soil is based on the proportions of sand, silt and clay in the soil. In some ways this system of classifying soils is comparable to the systems engineers use in classifying soils.

Most highway engineers classify soil materials in accordance with the system approved by the American Association of State High-

way Officials designated in this table as AASHO. In this system soil materials are classified in seven principal groups based on the gradation, liquid limit and plasticity index of the soils. The groups are designated as A-1 through A-7. The best soils for subgrades, gravelly soils of high bearing capacity, are classified as A-1, the next best, A-2; and so on to the poorest, A-7, which are clay soils having low bearing capacity when wet. Within each group, the relative engineering value of the soil material is indicated by a group index number. Group index numbers range from 0 for the best materials to 20 for the poorest.

In the Unified system soils are identified on the basis of texture and plasticity and on their performance as material for engineering construction. The soil materials are identified as coarse grained, 8 classes; fine grained, 6 classes; and highly organic.

Mechanical analysis data are important to engineering studies and helpful in placing



The sandy Sumner soils have high bearing capacity, low shrink-swell potential, high percolation rates and a very slight frost hazard.

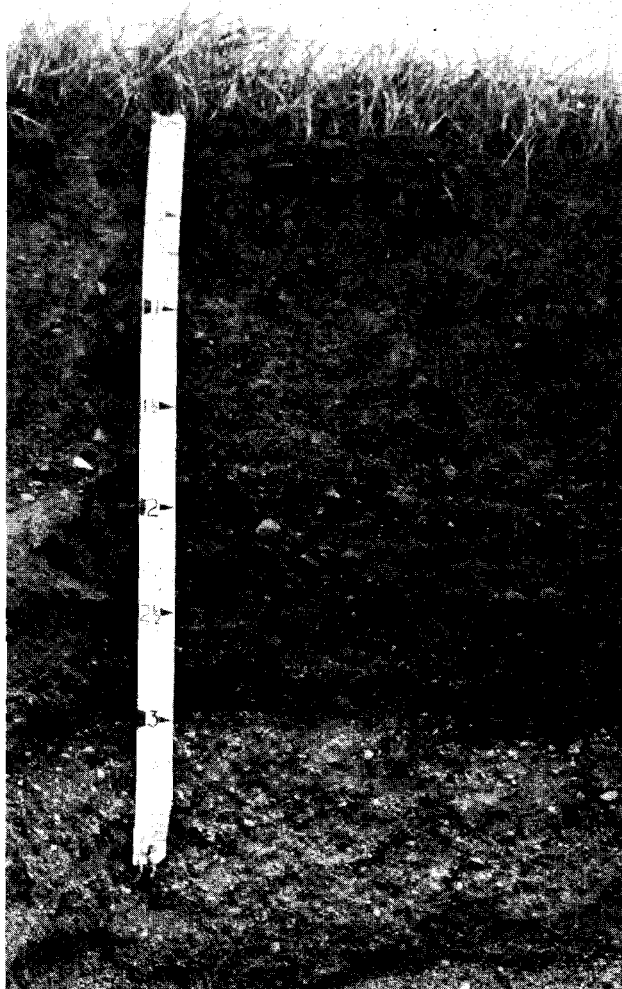
soils into classification systems. The soil material passing through the No. 200 sieve is the approximate silt and clay content of the soil sample. The material passing through the No. 10 sieve is the total of sand, silt and clay. The percent of sand can be determined by subtracting the percent passing sieve No. 200 from the percent passing sieve No. 10. The material passing through sieve No. 4 is the total of the fine gravel, sand, silt and clay in the sample. The percent of fine gravel can be determined by subtracting the percent passing through sieve No. 10 from the percent passing through sieve No. 4. The material remaining on sieve No. 4 is coarse gravel.

Maximum dry density is defined as the maximum volume weight, in pounds per cubic foot of oven dry soil, obtainable with a specific compaction effort. The value is useful in helping to determine the bearing capacity of soils.

Optimum moisture content is the moisture content, in percent, at which soil compaction is greatest. This percentage value is also used in determining the bearing capacity of soils.



The silty Knowles soils are underlain by dolomite bedrock at less than 3 feet. The soil material has low bearing capacity, moderate to high shrink-swell capacity, a low percolation rate and a moderate frost hazard.



The clay loam subsoil of Fox silt loam differs in properties and interpretations from their gravelly substratum.

Liquid limit values of soils are the moisture content, in percent, at which soils pass from the plastic to the liquid state. A soil with a high liquid limit value is generally clayey and has a low load carrying capacity.

Plasticity index is the numerical difference between the liquid limit value and the plastic limit value in soils. The plastic limit is the moisture content at which a soil changes from a semi-solid to a plastic state. It is determined largely by the clay content. Some sandy soils low in clay content have no plastic limit and are termed non-plastic. A small plasticity index, such as 5, indicates that a small increase in the water content will change the soil from semi-solid to a liquid state. A large plasticity index

indicates that a large amount of water is needed to change the soil to a liquid state. In this report plasticity indexes of 0 to 12 will be considered low. Plasticity indexes of 10 to 20 will be considered medium, indexes of 20 to 30 will be considered high and more than 30 will be considered very high.

Bearing strength of a soil, in tons per square feet, represents the load that can be safely applied to a soil without damaging settlement of a building or structure.

Shrink-swell potential ratings indicate the shrink-swell behavior or the volume change of soils with a change in moisture content. Building foundations, roads and other structures on soils with high shrink-swell potentials can be damaged by the large pressures exerted upon drying and wetting. The kind and amount of clay in soils influence the shrink-swell value.

Percolation rates expressed in minutes per inch indicate the number of minutes required for water to move one inch downward through a saturated or near saturated soil. They can be used to determine the suitability of soils for septic tank installation. The limitations ratings of soils for urban development without public sewers are mainly based on percolation rates and permeability rates.

Soil permeability in inches per hour is the rate at which soils transmit water.

Soil reaction is the degree of acidity or alkalinity. It is expressed as pH. Following are the terms used to describe pH value ranges:

EXTREMELY ACID-----	below 4.5
VERY STRONGLY ACID-----	4.6-5.0
STRONGLY ACID-----	5.1-5.5
MEDIUM ACID-----	5.6-6.0
SLIGHTLY ACID-----	6.1-6.5
NEUTRAL-----	6.6-7.3
MILDLY ALKALINE-----	7.4-7.8
MODERATELY ALKALINE-----	7.9-8.4
STRONGLY ALKALINE-----	8.5-9.0
VERY STRONGLY ALKALINE--	9.1 or higher

Frost hazard ratings indicate the susceptibility of soils to frost action or frost heaving. The ratings correspond roughly as follows to the classification used in the State Highway Commission of Wisconsin Soils Manual.

RATING (THIS REPORT)	CLASSIFICATION (SHCW)
VERY SLIGHT	F - 0 non - frost susceptible materials. Generally A - 1 and A - 3 groups.
SLIGHT	F - 1 generally finer A - 1 groups.
MODERATE	F - 2 generally A - 1 sand, finer A - 3 sand and A - 2 sand.
SEVERE	F - 3 generally A - 2 and A - 4 bordering on A - 2 groups and medium to heavy A - 6 and A - 7 groups.
VERY SEVERE	Silt and sandy silt, silty sand and clay with plasticity index of 12 or less. Generally A - 4, A - 5 and light A - 6 groups.

The *depth to the watertable* influences the use of soils for septic tanks, urban development, susceptibility to frost action, suitability for woodland and suitability for cropland. It is expressed in depth in feet to free water in the soil. Seasonal fluctuation of water tables may be expected.

Depth to bedrock is important to most engineering, urban and rural interpretations. Most of the soils in southeastern Wisconsin are more than 5 feet deep to bedrock.

Erosion hazard ratings indicating the susceptibility of soils to erosion are generally controlled by the soil slope. The soil texture and depth, however, also affect ratings.

The terms *slight*, *moderate* and *severe* are used in this report to compare erosion susceptibility of soils.



Poor drainage limits the use of Mussey loam for engineering purposes. The light colored grayish-brown subsoil that contrasts sharply with the surface soil is visible evidence of wetness for long periods of time.

TABLE 4.
CHEMICAL AND PHYSICAL PROPERTIES OF SOILS

Soil Number And Soil Name	Brief Description	Soil Horizon		Classification			Mechanical Analysis Percent Passing Size			Maximum Dry Density (lbs. per cu. ft.)	Optimum Moisture Content (percent)	Liquid Limit	Plasticity Index	Bearing Capacity (Tons per Sq. Ft.)	Shrink-Swell Potential	Percolation (Estimated, minutes per inch)	Permeability (Estimated, inches per hour)	Reaction (pH Value)	Frost Heaved ^{1/}	Water Table (Estimated depth in feet) ^{2/}	Bedrock (Estimated depth in feet) ^{3/}	Erosion Hazard ^{4/}
		Symbol	Depth (Inches)	USDA	UNIFIED	AASHO	No. 4 (4.75mm)	No. 10 (2.0mm)	No. 20 (85µm)													
1 Rough broken land	Steep, raw clay banks near Lake Michigan.	C	10+	cl	CL	A-6	100	98	??	119	13	26	11	1 to 2	MODERATE	61-120	0.2-0.8	5.6-7.3	1/	5 plus	1/	SEVERE on all slopes
2 Stinson silt loam	Silty alluvium over reddish brown clayey deposits	A B C	0-10 18-30	silt sicl	ML-CL CL	A-4 A-6	100 100	100 100	95 97	104 117	19 15	32 32	10 15	1 to 2 1 to 2	MODERATE MODERATE	31-60 4/ 121-360	0.8-2.5 0.2-0.8	6.4-7.3 7.4-8.4	SEVERE	1 to 3	5 plus	SLIGHT on 0-2% slopes MODERATE on 2-5% slopes
3 Stony Colluvium	Cobbly fan deposits at the ends of gullies	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/
4 Marsh	Cattail swamps	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	0 to 1	5 plus	SLIGHT on 0-2% slopes
5 Same as No. 54, Lawson silt loam																						
5W Sawmill silt loam	Silty alluvium over stratified silt, sand and clay	A C	18-30 30-60	silt 1/	ML-CL 1/	A-4 1/	100 1/	100 1/	96 1/	104 1/	19 1/	32 1/	10 1/	1 to 2 1/	LOW TO MODERATE	31-60 4/ 31-60	0.8-2.5 0.8-2.5	6.1-7.3 6.6-8.4	VERY SEVERE	0 to 1	5 plus	SLIGHT on 0-2% slopes; MODERATE on 2-5% slopes
7 Dorchester silt loam	Silty alluvium deposits over stratified silt and sand	A B C	10-24 36+	silt 1/	ML-CL 1/	A-4 1/	100 1/	100 1/	96 1/	104 1/	19 1/	32 1/	10 1/	1 to 2 1/	LOW TO MODERATE	31-60 31-60	0.8-2.5 0.8-2.5	7.4-8.4 7.4-8.4	SEVERE	3 to 5	5 plus	SLIGHT on 0-2% slopes
7W Same as No. 54, Lawson silt loam																						
10 Same as No. 11, Alluvial land																						
10W Same as No. 11W, Alluvial land, wet																						
11 Alluvial land	Mixed silty and sandy alluvium near streams	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	3 to 5	5 plus	SLIGHT on 0-2% slopes MODERATE on 2-6% slopes
11W Alluvial land, wet	Mixed silty and sandy alluvium near streams	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	0 to 1	5 plus	SLIGHT on 0-2% slopes MODERATE on 2-6% slopes
11WY Same as No. 11W, Alluvial land, wet																						
12 Wea silt loam	Silty alluvium over stratified sand and gravel	A B C	- 16-42 40-54	silt sicl sgr	CL CP	A-6 A-1-a	97 44	75 36	58 3	99 135	22 9	42 1/	23 NP	1 to 2 2 to 4	MODERATE TO HIGH VERY LOW	60-120 60-120 Less than 10	0.8-2.5 0.8-2.5 10 plus	5.6-6.5 5.1-6.0 7.4-8.4	SEVERE	5 plus	5 plus	SLIGHT on 0-2% slopes MODERATE on 2-6% slopes
14 Same as No. 414, Crestview loamy fine sand																						
15 Hillside acreage	Partly disintegrated organic deposits over loams	C	24-36	sl	SM	A-2-4	100	85	33	145	6	1/	NP	1/	1/	1/	1/	1/	1/	0 to 1	5 plus	SEVERE on all slopes
16 Rome silt loam	Loamy soils over stratified silt and clay	A B C	- 14-23 36-48	- silt sicl	CL CL	A-6 A-6	100 100	100 100	58 96	121 113	12 17	31 30	15 18	1 to 2 1 to 2	MODERATE MODERATE	31-60 31-60 300 plus	0.8-2.5 0.8-2.5 .05-6.2	5.1-6.5 5.1-6.5 7.4-8.4	SEVERE	3 to 5	5 plus	SLIGHT on 0-2% slopes MODERATE on 2-6% slopes

TABLE 4.
CHEMICAL AND PHYSICAL PROPERTIES OF SOILS (Continued)

Soil Number And Soil Name	Brief Description	Soil Horizon		Classification			Mechanical Analysis			Maximum Dry Density (lbs. per cu. ft.)	Optimum Moisture Content (percent)	Liquid Limit	Plasticity Index	Bearing Capacity (Tons per Sq. Ft.)	Shrink- Swell Potential	Percolation (Estimated, minutes per inch)	Permeability (Estimated, inches per hour)	Reaction (pH Value)	Frost Hazard ^{2/}	Water Table (Estimated depth in feet) ^{2/}	Bedrock (Estimated depth in feet) ^{2/}	Erosion Hazard ^{3/}
		Symbol	Depth (Inches)	USDA	UNIFIED	AASHTO	No. 4 (4.75mm)	No. 10 (2.0mm)	No. 200 (.075mm)													
30	Same as No. 29, Colwood silt loam																					
31	Rome loam	Loamy soils over silt and clay	A 14-23 B 36-48 C	1 sic	CL	A-6 A-6	100 100	58 109	121 96	12 13	31 17	15 36	18	1 to 2 1 to 2	MODERATE MODERATE	31-60 31-60 300 plus	0.8-2.5 0.8-2.5 .05-0.2	5.1-6.5 5.1-6.5 7.4-8.4	MODERATE	3 to 5	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
32	Rome sandy loam	Loamy soils over silt, clay and sand	A 12-28 B 32-48 C	sl sic	SC CL	A-2 A-6	100 100	55 106	28 96	121 113	12 17	22 36	18	1-1/2 to 2-1/2 1 to 2	LOW MODERATE	10-30 31-60 300 plus	2.5-5.0 0.8-2.5 .05-0.2	5.1-6.5 5.1-6.5 7.4-8.4	MODERATE	3 to 5	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
33	Same as No. 267, Sisson fine sandy loam																					
33Z	Same as No. 22, Hebron sandy loam																					
34	Same as No. 266, Sisson silt loam																					
35	Same as No. 45, Yahara very fine sandy loam																					
35Z	Same as No. 370, Mosel sandy loam																					
36	Same as No. 46, Yahara silt loam																					
37	Kibbie fine sandy loam	Loamy soils over silt, fine sand and clay	A 10-21 B 28-40 C	1 1	CL CL-ML	A-6 A-6	100 100	66 82	110 113	16 16	39 26	22 6	11	1 to 2 1 to 2	MODERATE LOW	31-60 4/ 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	5.6-7.3 5.6-7.3 7.4-8.4	SEVERE	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
37Z	Same as No. 370, Mosel sandy loam																					
38	Kibbie silt loam ^{2/}	Silty soils over silt, fine sand and clay	A 17-20 B 44-52 C	sl sic	CL ML	A-6 A-6	100 100	53 79	111 120	16 11	29 -	11 NP	11	1 to 2 1 to 2	MODERATE VERY LOW	31-60 4/ 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	5.6-7.3 5.6-7.3 7.4-8.4	VERY SEVERE	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
38R	Same as No. 306, Knowles silt loam, wet variant																					
38Z	Same as No. 369, Mosel silt loam																					
39	Saylesville loam ^{2/}	Loamy over clayey soils underlain by silt and clay	A 6-15 B 31-60 C	sl sicl	CH CL	A-7-6 A-6	100 100	85 96	98 111	23 18	55 30	31 11	11	1/2 to 1 1 to 2	HIGH MODERATE TO HIGH	31-60 121-300 300 plus	0.8-2.5 0.2-0.8 .05-0.2	5.6-7.3 5.6-7.3 7.4-8.4	SEVERE	3 to 5	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
39X	Same as No. 72, Fox loam																					
40	Saylesville silt loam ^{2/}	Silty loam over clayey soils un- derlain by silt and clay	A 9-17 B 21-48 C	- sic	CH CL	A-7-6 A-6	100 100	97 99	98 111	23 18	57 39	32 21	11	1/2 to 1 1 to 2	HIGH MODERATE	31-60 121-300 300 plus	0.8-2.5 0.2-0.8 .05-0.2	5.6-7.3 5.6-7.3 7.4-8.4	SEVERE	3 to 5	5 plus	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-30% slopes
40V	Same as No. 266, Sisson silt loam																					
40X	Same as No. 73, Fox silt loam																					
40Y	Same as No. 161, Dodge silt loam																					
41	Same as No. 42, Tichigan silt loam																					
42	Tichigan silt loam ^{2/}	Silty over clayey soils underlain by silt and clay	A 14-24 B 26-60 C	c sicl	CL CL	A-7-6 A-6	100 100	82 94	104 107	20 18	43 30	23 13	13	2 to 2 1 to 2	MODERATE TO HIGH MODERATE TO HIGH	31-60 4/ 120-300 300 plus	0.8-2.5 0.2-0.8 .05-0.2	5.6-7.3 5.6-7.3 7.4-8.4	SEVERE	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
42R	Same as No. 306, Knowles silt loam, wet variant																					
42V	Same as No. 38, Kibbie silt loam																					
42X	Same as No. 87, Sleigh silt loam																					
42Y	Same as No. 364, Lamartine silt loam																					
44	Jerocho silt loam	Silty over clayey soils underlain by silt and clay	A 9-17 B 21-48 C	c sic	CH CL	A-7-6 A-6	100 100	97 99	98 111	23 18	57 39	32 21	11	1/2 to 1 1 to 2	HIGH MODERATE TO HIGH	31-60 120-300 300 plus	0.8-2.5 0.2-0.8 .05-0.2	5.6-6.5 5.6-6.5 7.4-8.4	SEVERE	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
45	Yahara very fine sandy loam	Loamy soils over silt and sand	A 12-24 B 30-60 C	sl fal	ML-CL ML	A-4 A-4	100 100	88 67	112 110	13 15	28 17	6 NP	11	1 to 2 1 to 2	LOW TO MODERATE VERY LOW	31-60 4/ 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	5.6-6.5 5.1-6.0 7.4-8.4	SEVERE	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
45Z	Same as No. 370, Mosel sandy loam																					
46	Yahara silt loam	Silty soils over silt and sand	A 12-24 B 30-60 C	sl fal	ML-CL ML	A-4 A-4	100 100	88 67	112 110	13 15	28 17	6 NP	11	1 to 2 1 to 2	LOW TO MODERATE VERY LOW	31-60 4/ 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	5.6-6.5 5.1-6.0 7.4-8.4	SEVERE	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-20% slopes
47	Yahara loam	Loamy soils over silt and sand	Data are the same as No. 45, Yahara very fine sandy loam																			
47Z	Same as No. 369, Mosel silt loam																					
48	Keowee silt loam	Silt loam over loamy soils underlain by coarse silt and sand	A 12-24 B 30-60 C	- fal	ML-CL ML	A-4 A-4	100 100	88 67	112 110	13 15	28 17	6 NP	11	1 to 2 1 to 2	LOW TO MODERATE VERY LOW	31-60 4/ 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	5.6-7.3 5.6-7.3 7.4-8.4	VERY SEVERE	0 to 1	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
48Z	Same as No. 330, Navan loam																					

^{1/} Values cannot be determined or are too variable for a reasonably accurate estimate.

^{2/} Measured data--samples were taken from sites within the seven-county Southeastern Wisconsin Region or nearby. "Data for other soils are estimated."

^{3/} Data in these columns apply to the whole soil.

^{4/} Estimated percolation rates are for drained soils and do not apply to areas with high water tables.

- Data for the A horizon has been omitted because this part of the soil profile is generally removed from soils that are used for engineering purposes.

TABLE 4.
CHEMICAL AND PHYSICAL PROPERTIES OF SOILS (Continued)

[illegible]

TABLE 4.
CHEMICAL AND PHYSICAL PROPERTIES OF SOILS (Continued)

Soil Number And Soil Name	Brief Description	Soil Horizon		Classification			Mechanical Analysis Percent Passing Sieve			Maximum Dry Density (lbs. per cu. ft.)	Optimum Moisture Content (percent)	Liquid Limit	Plasticity Index	Bearing Capacity (Tons per Sq. Ft.)	Shrink- Swell Potential	Percolation (Estimated, minutes per inch)	Permeability (Estimated, inches per hour)	Reaction (pH Value)	Frost Hazard ^{3/}	Water Table (Estimated depth in feet) ^{3/}	Bedrock (Estimated depth in feet) ^{3/}	Erosion Hazard ^{3/}	
		Symbol	Depth (Inches)	USDA	UNIFIED	AASHO	No. 4 (4.75mm)	No. 10 (2.00mm)	No. 200 (.075mm)														
77	Same as No. 59, Dousman sandy loam																						
77Z	Same as No. 52, Astalan sandy loam																						
78	Dousman loam	Loamy deposits over stratified sand	A B C	18-30 30-48	1 fa	SM-SC SP	A-4 A-3	100 100	49 2	128 106	10 13	21 1/	5 NP	1-1/2 to 2-1/2 1-1/2 to 2-1/2	LOW VERY LOW	31-60 4/ 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	5.1-6.5 4.6-5.5 7.4-8.4	MODERATE	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes	
78V	Same as No. 38, Kibbie silt loam																						
78Y	Same as No. 178, Crosby silt loam																						
79	Waukechon loam	Loamy soils over stratified sands	A B C	18-30 30-48	1 fa	SM-SC SP	A-4 A-3	100 100	49 2	128 106	10 13	21 1/	5 NP	1-1/2 to 2-1/2 1-1/2 to 2-1/2	LOW VERY LOW	31-60 4/ 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	5.6-7.3 5.6-7.3 7.4-8.4	SEVERE	0 to 1	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes	
80	Sebawa loam	Loamy soils over stratified sand and gravel	A B C	18-32 45-54	cl s&gr	CL GW-GM	A-7-6 A-1-a	97 42	93 22	58 9	99 132	22 9	42 1/	21 NP	1 to 2 2 to 5	MODERATE TO HIGH VERY LOW	31-60 4/ 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	6.6-7.3 6.6-7.3 7.4-8.4	MODERATE	0 to 1	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
80V	Same as No. 29, Colwood silt loam																						
80Y	Same as No. 231, Brookston silt loam																						
80Z	Same as No. 330, Navan loam																						
81	Sebawa sandy loam	Loamy soils over stratified sand and gravel	A B C	18-32 42-54	scl s&gr	CL SP-SM	A-6 A-1-a	100 63	100 44	40 5	128 132	10 9	25 1/	12 NP	1 to 2 2 to 4	MODERATE VERY LOW	10-30 4/ 31-60 Less than 10	2.5-5.0 0.8-2.5 10 plus	6.6-7.3 6.6-7.3 6.6-7.3	MODERATE	0 to 1	5 plus	SLIGHT on 0-2% slopes
82	Junesa silt loam	Silty soils over sandy loam till ^{1/}	A Bb	0-20 24-42	sil sicl	ML-CL CH	A-4 A-7-6	100 100	96 97	104 98	19 23	32 57	10 32	1 to 2 1/2 to 1	MODERATE HIGH	31-60 31-60	0.8-2.5 0.8-2.5	5.6-7.3 5.6-6.5	VERY SEVERE	3 to 5	5 plus	SLIGHT on 0-2% slopes; MODERATE on 2-12% slopes	
84	Ochley silt loam ^{2/}	Silty soils over stratified sand and gravel	A B C	20-30 40-54	sicl s&gr	CL SW-SM	A-7-6 A-2-4	100 86	100 80	98 12	101 128	21 8	46 1/	25 NP	1 to 2 2 to 5	MODERATE TO HIGH VERY LOW	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	5.6-6.5 5.1-6.5 7.4-8.4	SEVERE	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
84R	Same as No. 204, Knowles loam																						
84V	Same as No. 266, Sisson silt loam																						
84Z	Same as No. 16, Rome silt loam																						
86	Thackery silt loam ^{2/}	Silty soils over stratified sand and gravel	A B C	20-30 40-54	sicl s&gr	CL SW-SM	A-7-6 A-2-4	100 86	100 80	98 12	101 128	21 8	46 1/	25 NP	1 to 2 2 to 5	MODERATE TO HIGH VERY LOW	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	5.6-6.5 5.1-6.5 7.4-8.4	SEVERE	3 to 5	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
86V	Same as No. 266, Sisson silt loam																						
87	Sleeth silt loam ^{2/}	Silty soils over stratified sand and gravel	A B C	20-30 40-54	sicl s&gr	CL SW-SM	A-7-6 A-2-4	100 86	100 80	98 12	101 128	21 8	46 1/	25 NP	1 to 2 2 to 5	MODERATE TO HIGH VERY LOW	31-60 4/ 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	5.6-6.5 5.1-6.5 7.4-8.4	VERY SEVERE	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
87Z	Same as No. 369, Mosel silt loam																						
89	Briggsville silty clay ^{2/}	Clayey soils over silt and clays	A B C	15-28 42-54	sic sicl	CH CL	A-7-6 A-7-6	100 100	97 99	100 105	21 19	62 42	37 22	1/2 to 1 1 to 2	HIGH MODERATE TO HIGH	31-60 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	6.6-7.3 5.6-7.3 7.4-8.4	SEVERE	5 plus	5 plus	SLIGHT on 0-2% slopes	
91	Parr silt loam ^{2/}	Silty soils over gravelly loam till	A B C	18-20 42-54	sicl sl	ML-CL SM	A-6 A-4	100 72	100 84	98 36	107 146	18 6	35 14	13 I	1 to 2 1-1/2 to 2-1/2	MODERATE LOW	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	5.6-6.5 5.1-6.5 7.4-8.4	MODERATE	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
91D	Same as No. 91, Parr silt loam																						
92	Parr loam	Loamy soils over gravelly loam till	Data are the same as No. 91, Parr silt loam																				
92N	Same as No. 91, Parr silt loam																						
97	Same as No. 288, Hackett loamy sand																						
99	Kewaunee soils	Clayey soils over reddish-brown clay till	Data are the same as No. 100, Kewaunee silt loam																				
100	Kewaunee silt loam ^{2/}	Silt loam over clay soils underlain by reddish-brown clay till	A B C	12-18 24-42	cl sicl	CL CL	A-7-6 A-6	96 100	95 98	77 77	104 119	19 13	48 26	27 11	1 to 2 1 to 2	MODERATE TO HIGH MODERATE	31-60 121-300 300 plus	0.8-2.5 0.2-0.8 .05-0.2	5.6-7.3 5.6-7.3 7.4-8.4	SEVERE	3 to 5	5 plus	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes
101	Kewaunee sandy loam ^{2/}	Sandy loam over clay- ey soils underlain by reddish-brown clay till	Data are the same as No. 100, Kewaunee silt loam																				
102	Vilas loamy sand ^{2/}	Loamy sand over loose acid sand	A B C	6-12 24-36	ls s	SM SP-SM	A-2-4 A-3	100 100	25 5	120 110	9 12	1/	NP NP	1-1/2 to 2-1/2 1-1/2 to 2-1/2	VERY LOW VERY LOW	Less than 10 Less than 10	5 to 10 10 plus	5.1-6.0 4.6-5.5	VERY SLIGHT	5 plus	5 plus	MODERATE on 0-2% slopes	
103	Kewaunee loam	Loamy over clayey soils underlain by reddish-brown clay till	Data are the same as No. 100, Kewaunee silt loam																				
106	Lorenzo silt loam ^{2/}	Loamy soils over stratified sand and gravel	A B C	12-24 36-48	cl s&gr	CL GP	A-7-6 A-1-a	97 56	93 53	58 4	99 136	22 8	42 1/	21 NP	1 to 2 2 to 4	MODERATE TO HIGH VERY LOW	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	5.6-6.5 5.1-6.0 7.4-8.4	MODERATE	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes
106Z	Same as No. 31, Rome loam																						

CHEMICAL AND PHYSICAL PROPERTIES OF SOILS (Continued)

Soil Number And Soil Name	Brief Description	Soil Horizon		Classification		Mechanical Analysis Percent Passing Size			Maximum Dry Density (lbs. per cu. ft.)	Optimum Moisture Content (percent)	Liquid Limit	Plasticity Index	Bearing Capacity (Tons per Sq. Ft.)	Shrink- Swell Potential	Percolation (Estimated, minutes per inch)	Permeability (Estimated, inches per hour)	Reaction (pH Value)	Frost Hazard ^{3/}	Water Table (Estimated depth in feet) ^{2/}	Bedrock (Estimated depth in feet) ^{2/}	Erosion Hazard ^{2/}		
		Symbol	Depth (Inches)	USDA	UNIFIED	AASHTO	No. 4 (4.75mm)	No. 10 (2.0mm)														No. 200 (.075mm)	
108	Lorenzo-Rodman loams																						
109	Same as No. 174, Fabius loam																						
109V	Same as No. 38, Kibbie silt loam																						
109Y	Same as No. 369, M sel silt loam																						
109Z	Same as No. 369, Mosel silt loam																						
110	Lorenzo loam	Loamy soils over stratified sand and gravel	Data are the same as No. 106, Lorenzo silt loam																				
110R	Same as No. 204, Knowles loam																						
110Y	Same as No. 91, Parr silt loam																						
110Z	Same as No. 16, Rome silt loam																						
111	Same as No. 161, Dodge silt loam																						
112	Same as No. 243, Calamus silt loam																						
113	Same as No. 278, Clyman silt loam																						
114	Same as No. 358, Miami loam																						
116	Same as No. 343, Gelina silt loam, nearly level to gently sloping																						
118	Same as No. 178, Crosby silt loam																						
119	Warsaw silt loam ^{2/}	Loamy soils over stratified sand and gravel	A B C	20-27 40-48	cl slgr	CL GP	A-7-6 A-1-a	97 44	93 36	58 3	99 135	22 9	42 1/ ₂	21 NP	1 to 2 2 to 4	Moderate to High Very Low	31-60 31-90 Less than 10	0.8-2.5 0.8-2.5 10 plus	5.6-6.5 5.1-6.0 7.4-8.4	Moderate	5 plus	5 plus	Slight on 0-2%; Moderate on 2-12%; Severe on 12-20% slopes
119V	Same as No. 266, Sisson silt loam																						
119Y	Same as No. 91, Parr silt loam																						
119Z	Same as No. 16, Rome silt loam																						
120	Warsaw loam	Loamy soils over stratified sand and gravel	A B C	20-27 40-48	cl slgr	CL GP	A-7-6 A-1-a	97 44	93 36	58 3	99 135	22 9	42 1/ ₂	21 NP	1 to 2 2 to 4	Moderate to High Very Low	31-60 31-90 Less than 10	0.8-2.5 0.8-2.5 10 plus	5.6-6.5 5.1-6.0 7.4-8.4	Slight	5 plus	5 plus	Slight on 0-2%; Moderate on 2-12%; Severe on 12-20% slopes
120Y	Same as No. 91, Parr silt loam																						
120Z	Same as No. 16, Rome silt loam																						
121	Same as No. 106, Lorenzo silt loam																						
122	Same as No. 106, Lorenzo silt loam																						
123	Tippecanoe silt loam	Silty soils over stratified sand and gravel	A B C	20-30 40-54	cl slgr	CL GP	A-7-6 A-1-a	100 44	100 36	98 3	101 135	21 9	46 1/ ₂	25 NP	1 to 2 2 to 4	Moderate to High Very Low	31-60 31-90 Less than 10	0.8-2.5 0.8-2.5 10 plus	5.6-6.5 5.1-6.0 7.4-8.4	Severe	3 to 5	5 plus	Slight on 0-2%; Moderate on 2-12% slopes
123V	Same as No. 266, Sisson silt loam																						
123Z	Same as No. 16, Rome silt loam																						
124	Crane silt loam	Silty soils over stratified sand and gravel	A B C	20-30 40-54	cl slgr	CL GP	A-7-6 A-1-a	100 44	100 36	98 3	101 135	21 9	46 1/ ₂	24 NP	1 to 2 2 to 4	Moderate to High Very Low	31-60 4/ 31-60 7/ Less than 10	0.8-2.5 0.8-2.5 10 plus	5.6-6.5 5.1-6.0 7.4-8.4	Severe	1 to 3	5 plus	Slight on 0-2%; Moderate on 2-12% slopes
125	Same as No. 204, Knowles loam																						
126	Westland silt loam	Silty soils over stratified sand and gravel	A B C	18-36 54-72	cl slgr	CL GW-GM	A-7-6 A-1-a	97 42	93 22	58 9	99 132	22 9	42 1/ ₂	21 NP	1 to 2 2 to 5	Moderate to High Very Low	31-60 4/ 31-60 7/ Less than 10	0.8-2.5 0.8-2.5 10 plus	5.6-6.5 5.1-6.0 7.4-8.4	Very Severe	0 to 1	5 plus	Slight on 0-2%; Moderate on 2-6% slopes
126V	Same as No. 29, Colwood silt loam																						
126Y	Same as No. 212, Ehler silt loam																						
126Z	Same as No. 330, Nevan loam																						
133	Spinks fine sand ^{2/}	Sandy soils with thin loamy layers over sand	A B-A C	15-39 39-75	s s	SP-SM A-3	A-3	100 100	100 6	108 107	13 12	1/ 1/ ₂	NP NP	1-1/2 to 2-1/2 2-1/2 to 4-1/2	Very Low Very Low	Less than 10 Less than 10 Less than 10	2-10 2-10 5-10	5.6-7.3 6.1-7.3 6.6-7.3	Very Slight	5 plus	5 plus	Severe on 12-20% slopes	
134	Spinks loamy fine sand	Sandy soils with thin loamy layers over sand	A B-A C	15-39 39-75	sls sls	SP-SM A-2-4	A-2-4	100 100	100 8	110 110	15 15	1/ 1/ ₂	NP NP	1-1/2 to 2-1/2 2-1/2 to 4-1/2	Very Low Very Low	10-10 10-30 Less than 10	2.5-5.0 2.5-5.0 5-10	5.6-7.3 6.1-7.3 6.6-7.8	Very Slight	5 plus	5 plus	Slight on 0-6%; Moderate on 6-12% slopes	
142	Manawa silt loam ^{2/}	Silty soils over reddish-brown clay till	A B C	12-24 30-42	s cl	CL	A-7-6 A-6	95 87	95 87	80 69	103 124	19 11	54 35	28 18	1/2 to 1 1 to 2	High Moderate	31-60 4/ 121-305 300 plus	0.8-2.5 0.2-0.8 0.05-0.2	6.1-7.3 6.6-7.3 7.4-8.4	Severe	1 to 3	5 plus	Slight on 0-2%; Moderate on 2-6% slopes
144	Same as No. 369, Mosel silt loam																						
152	Lapeer loam, shallow vari- ant	Loamy soils over sandy loam till	Data are the same as No. 153, Lapeer loam																				

TABLE 4

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TABLE 4.
CHEMICAL AND PHYSICAL PROPERTIES OF SOILS (Continued)

Soil Number And Soil Name	Brief Description	Soil Horizon		Classification			Mechanical Analysis Percent Passage Sieve			Maximum Dry Density (lbs. per cu. ft.)	Optimum Moisture Content (percent)	Liquid Limit	Plasticity Index	Bearing Capacity (Tons per Sq. Ft.)	Shrink- Swell Potential	Percolation (Estimated, minutes per inch)	Permeability (Estimated, inches per hour)	Reaction (pH Value)	Frost Hazard ^{2/}	Water Table (Estimated depth in feet) ^{2/}	Bedrock (Estimated depth in feet) ^{2/}	Erosion Hazard ^{2/}	
		Symbol	Depth (Inches)	USDA	UNIFIED	AASHO	No. 4	No. 10	No. 200														
							(4.75mm)	(2.00mm)	(.075mm)														
181	Masey silt loam	A B C	- 10-20 30-42	- slcl shgr	- CL OW-GM	- A-7-6 A-1-a	- 100 42	- 100 22	- 94 9	- 102 132	- 21 9	- 46 11	- 24 NP	- 1 to 2 2 to 5	- MODERATE TO HIGH VERY LOW	- 31-60 4/ 31-60 Less than 10	- 0.8-2.5 0.8-2.5 10 plus	- 6.6-7.3 6.6-7.3 7.4-8.4	- SEVERE	- 0 to 1	- 5 plus	- SLIGHT on 0-2%; MODERATE on 2-12% slopes	
181V	Same as No. 29, Colwood silt loam																						
181Y	Same as No. 231, Brookston silt loam																						
181Z	Same as No. 330, Navan loam																						
182	Fabius silt loam	A B C	- 10-20 30-42	- slcl shgr	- CL OW-GM	- A-7-6 A-1-a	- 100 42	- 100 22	- 94 9	- 102 132	- 21 9	- 46 11	- 24 NP	- 1 to 2 2 to 5	- MODERATE TO HIGH VERY LOW	- 31-60 4/ 31-60 Less than 10	- 0.8-2.5 0.8-2.5 10 plus	- 6.6-7.3 5.1-6.5 7.4-8.4	- MODERATE	- 1 to 3	- 5 plus	- SLIGHT on 0-2%; MODERATE on 2-6% slopes	
182V	Same as No. 38, Kibbie silt loam																						
182Y	Same as No. 178, Crosby silt loam																						
182Z	Same as No. 369, Mosel silt loam																						
188	Same as No. 178, Crosby silt loam																						
189	Bristol silt loam ^{2/}	A B C	- 20-36 48-60	- slcl si	- CH SM	- A-7-6 A-4	- 100 78	- 100 78	- 97 43	- 102 145	- 21 6	- 54 14	- 33 3	- 1/2 to 1 1-1/2 to 2-1/2	- HIGH LOW	- 31-60 4/ 31-60 31-60	- 0.8-2.5 0.8-2.5 0.8-2.5	- 5.6-6.5 5.1-6.5 7.4-8.4	- SEVERE	- 1 to 3	- 5 plus	- SLIGHT on 0-2%; MODERATE on 2-6% slopes	
191	Parr silt loam, shallow variant	Silty soils over gravelly loam till	Data are the same as No. 91, Parr silt loam																				
195	Same as No. 288, Hackett loamy sand																						
195V	Same as No. 267, Saxon fine sandy loam																						
195Y	Same as No. 156, Lapeer sandy loam																						
195Z	Same as No. 22, Hebron sandy loam																						
203	Matherton loam	Loamy soils over stratified sand and gravel	Data are the same as No. 174, Fabius loam																				
203V	Same as No. 38, Kibbie silt loam																						
203Y	Same as No. 178, Crosby silt loam																						
203Z	Same as No. 369, Mosel silt loam																						
204	Knowles loam	Loamy soils over dolomite	A B C	- 24-32 48-60	- cl si	- CH SM	- A-7-6 A-4	- 100 78	- 100 78	- 71 43	- 98 145	- 25 6	- 46 14	- 25 3	- 1/2 to 1 1-1/2 to 2-1/2	- MODERATE TO HIGH LOW	- 31-60 61-120 31-60	- 0.8-2.5 0.2-0.8 0.8-2.5	- 5.6-7.3 5.6-7.3 7.4-8.4	- MODERATE	- 5 plus	- 2 to 5	- SLIGHT on 0-2%; MODERATE on 2-12% slopes
206	Knowles silt loam, shallow variant	Loamy soils over dolomite	Data are the same as No. 204, Knowles loam																				
208	Knowles silt loam ^{2/}	Loamy soils over dolomite	Data are the same as No. 204, Knowles loam																				
212	Ehler silt loam	Silty soils over stratified silt, fine sand and clay	A B C	- 12-18 30-36	- slcl slcl-sil	- CH CL	- A-7-6 A-7-6	- 100 100	- 100 100	- 99 97	- 102 106	- 21 16	- 54 43	- 30 23	- 1/2 to 1 1 to 2	- HIGH MODERATE TO HIGH	- 10-30 4/ 31-60 61-120	- 2.5-5.0 0.2-0.8 0.2-0.8	- 4.6-7.3 6.6-7.3 7.4-8.4	- VERY SEVERE	- 0 to 1	- 5 plus	- SLIGHT on 0-2%; MODERATE on 2-6% slopes
212R	Ehler silt loam, rock substratum	Silty soils over dolomite	A B R	- 18-30 Dolomite bedrock	- cl	- CH	- A-7-6	- 99	- 99	- 69	- 107	- 76	- 53	- 35	- 1/2 to 1	- HIGH	- 10-30 4/ 61-120	- 2.5-5.0 0.2-0.8	- 4.6-7.3 6.6-7.3	- VERY SEVERE	- 0 to 1	- Less than 2	- SLIGHT on 0-2% slopes
212X	Same as No. 126, Westland silt loam																						
212Y	Same as No. 212, Ehler silt loam																						
213	Same as No. 212, Ehler silt loam																						
213R	Same as No. 212R, Ehler silt loam, rock substratum																						
213V	Same as No. 29, Colwood silt loam																						
214	Same as No. 212, Ehler silt loam																						
215	Same as No. 212, Ehler silt loam																						
216	Same as No. 212, Ehler silt loam																						
217	Bono silty clay loam ^{2/}	Clayey soils over silt and clay	A B C	- 18-18 36-48	- slcl slcl	- CL CL	- A-6 A-6	- 100 100	- 100 100	- 100 100	- 107 110	- 18 18	- 39 35	- 20 17	- 1 to 2 1 to 2	- MODERATE TO HIGH MODERATE	- 121-300 4/ 121-300 300 plus	- 0.2-0.8 0.2-0.8 .05-0.2	- 6.6-7.3 6.6-8.4 7.4-8.4	- VERY SEVERE	- 0 to 1	- 5 plus	- SLIGHT on 0-2%; MODERATE on 2-6% slopes
218	Same as No. 217, Bono silty clay loam																						
218V	Same as No. 212, Ehler silt loam																						
218Y	Same as No. 212, Ehler silt loam																						
226	Same as No. 226D, Keyser silt loam																						
226D	Keyser silt loam till	Silty soils over loam till	A B C	- 30-42 60 plus	- slcl sl	- CL SM	- A-7-6 A-4	- 100 78	- 100 73	- 99 43	- 108 145	- 19 6	- 41 14	- 20 3	- 1 to 2 1-1/2 to 2-1/2	- MODERATE TO HIGH LOW	- 31-60 31-60	- 0.8-2.5 0.8-2.5	- 5.6-6.5 7.4-8.4	- SEVERE	- 3 to 5	- 5 plus	- SLIGHT on 0-2%; MODERATE on 2-6% slopes

TABLE 4.
CHEMICAL AND PHYSICAL PROPERTIES OF SOILS (Continued)

Soil Number And Soil Name	Brief Description	Soil Horizon		Classification			Mechanical Analysis Percent Passing Sieve			Maximum Dry Density (lbs. per cu. ft.)	Optimum Moisture Content (percent)	Liquid Limit	Plasticity Index	Bearing Capacity (Tons per Sq. Ft.)	Shrink- Swell Potential	Percolation (Estimated, minutes per inch)	Permeability (Estimated, inches per hour)	Reaction (pH Value)	Frost Hazard ^{2/}	Water Table (Estimated depth in feet) ^{3/}	Bedrock (Estimated depth in feet) ^{3/}	Erosion Hazard ^{3/}
		Symbol	Depth (Inches)	USDA	UNIFIED	AASHO	No. 4 (4.75mm)	No. 10 (2.0mm)	No. 200 (0.075mm)													
228	Same as No. 458, Rollin silt, shallow phase																					
231	Brockton silt loam	A B C	20-30 36-48	scl i	CH CL	A-7-6 A-4	100 95	100 90	99 99	102 129	21 9	54 19	30 7	1/2 to 1 1 to 2	HIGH LOW	31-60 4/ 61-120 ⁵ 31-60	0.8-2.5 0.8-0.8 0.8-2.5	5.6-7.3 6.6-7.3 7.4-8.4	VERY SEVERE	0 to 1	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
231Z	Same as No. 298, Ashburn silt clay loam																					
233	Matherton silt loam	A B C	18-27 32-54	scl s&gr	CL GW-GM	A-7-6 A-1-4	100 92	100 22	94 9	102 132	21 9	46 17	24 NP	1 to 2 2 to 5	MODERATE TO HIGH VERY LOW	31-60 4/ 61-120 ⁵ Less than 10	0.8-2.5 0.8-0.8 0 plus	5.6-6.5 5.1-6.5 7.4-8.4	SEVERE	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
233V	Same as No. 38, Kibbie silt loam																					
233Y	Same as No. 178, Crosby silt loam																					
233Z	Same as No. 369, Mosel silt loam																					
234	Matherton sandy loam	A B C	18-27 40-54	scl s&gr	SC GP-GM	A-7-6 A-1-2	87 37	83 31	37 5	112 136	16 8	42 17	24 NP	1-1/2 to 2-1/2 2 to 4	MODERATE TO HIGH VERY LOW	10-30 4/ 31-60 Less than 10	2.5-5.0 0.8-2.5 10 plus	5.1-6.5 5.1-6.5 7.4-8.4	SLIGHT	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
234V	Same as No. 37, Kibbie fine sandy loam																					
234Y	Same as No. 178, Crosby silt loam																					
243	Calamus silt loam	A B C	20-36 48-60	scl sl	CH SC	A-7-6 A-4	100 82	100 76	92 36	103 130	20 9	50 20	29 7	1/2 to 1 1-1/2 to 2-1/2	MODERATE TO HIGH LOW	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	5.6-6.5 5.1-5.5 7.4-8.4	MODERATE	3 to 5	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
250	Tedrow sandy loam	A C	20-30	fa	SP-SM	A-3	100	100	5	110	12	17	NP	1-1/2 to 2-1/2	VERY LOW	10-30 4/ Less than 10	2.5-5.0 5-10	6.1-7.3 6.1-7.3	VERY SLIGHT	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
250V	Same as No. 250, Tedrow sandy loam																					
250Y	Same as No. 250, Tedrow sandy loam																					
250Z	Same as No. 370, Mosel sandy loam																					
251	Tedrow loamy sand																					
251Y	Same as No. 250, Tedrow sandy loam																					
251Z	Same as No. 52, Astalan sandy loam																					
254	Tustin sandy loam	A B C	20-36 42-48	ls scl	SP-SM CL	A-2-4 A-7-6	100 100	100 99	12 99	120 105	9 19	17 42	NP 22	1-1/2 to 2-1/2 1 to 2	VERY LOW MODERATE TO HIGH	10-30 Less than 10 121-300	2.5-5.0 5-10 0.2-0.8	5.6-6.5 5.1-6.0 7.4-8.4	VERY SLIGHT	5 plus	5 plus	MODERATE on 2-6%; SEVERE on 6-12% slopes
261	Hackett sandy loam, wet variant	A B C	12-20 30-48	i s	SM-SC SP	A-2-4 A-3	100 100	100 100	49 2	128 106	10 13	21 17	5 NP	1-1/2 to 2-1/2 1-1/2 to 2-1/2	LOW VERY LOW	10-30 4/ 11-60 ⁵ Less than 10	2.5-5.0 0.8-2.5 10 plus	5.6-6.5 5.1-6.5 7.4-8.4	SLIGHT	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
262	Hackett loamy sand, wet variant	A B C	12-20 30-48	sl s	SC SP	A-2-6 A-3	90 100	89 100	33 2	119 106	12 13	27 17	12 NP	1-1/2 to 2-1/2 1-1/2 to 2-1/2	LOW VERY LOW	Less than 10 4/ Less than 10 Less than 10	5-10 5-10 10 plus	5.6-6.5 5.1-6.5 7.4-8.4	SLIGHT	1 to 3	5 plus	MODERATE on 2-6% slopes
264	Sisson silt loam ^{2/}	A B C	10-21 28-40	cl i	CL ML	A-7-6 A-4	100 100	100 100	76 70	103 125	20 12	46 19	26 3	1 to 2 1 to 2	MODERATE TO HIGH LOW	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	5.6-6.5 5.6-6.5 7.4-8.4	MODERATE	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-30% slopes
266R	Same as No. 204, Knowles loam																					
266X	Same as No. 266, Sisson silt loam																					
266Z	Same as No. 16, Rome silt loam																					
267	Sisson fine sandy loam ^{2/}	A B C	10-21 28-40	i s	CL CL-ML	A-6 A-4	100 100	100 82	66 82	110 113	16 16	39 26	22 6	1 to 2 1 to 2	MODERATE LOW	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	5.6-7.3 5.6-7.3 7.4-8.4	SLIGHT	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-30% slopes
268	Sisson loam	A B C																				
269	Warsaw sandy loam	A B C	18-32 40-54	scl s&gr	SC GP-GM	A-7-6 A-1-a	87 37	83 31	37 5	112 136	16 8	42 17	24 NP	1-1/2 to 2-1/2 2 to 4	MODERATE TO HIGH VERY LOW	10-30 31-60 Less than 10	2.5-5.0 0.8-2.5 10 plus	5.6-6.5 5.1-6.0 7.4-8.4	MODERATE	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-30% slopes
270	Same as No. 289, Hackett sandy loam																					
270V	Same as No. 267, Sisson fine sandy loam																					
271	Same as No. 288, Hackett loamy sand																					
272	Tustin loamy fine sand																					
276	Boyer sandy loam	A B C	18-30 36-48	sl s	SC-SM SP	A-2-4 A-3	87 97	83 90	22 2	110 106	12 13	21 17	4 NP	1-1/2 to 2-1/2 1-1/2 to 2-1/2	LOW VERY LOW	10-30 31-60 Less than 10	2.5-5.0 0.8-2.5 10 plus	5.1-6.5 4.6-6.5 7.4-8.4	VERY SLIGHT	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-20% slopes
276Y	Same as No. 156, Lapeer sandy loam																					
276Z	Same as No. 254, Tustin sandy loam																					

TABLE 4.
CHEMICAL AND PHYSICAL PROPERTIES OF SOILS (Continued)

Soil Number And Soil Name	Brief Description	Soil Horizon		Classification			Mechanical Analysis Percent Passing Sieve			Maximum Dry Density (lbs. per cu. ft.)	Optimum Moisture Content (percent)	Liquid Limit	Plasticity Index	Bearing Capacity (Tons per Sq. Ft.)	Shrink- Swell Potential	Percolation (Estimated, minutes per inch)	Permeability (Estimated, inches per hour)	Reaction (pH Value)	Frost Hazard ^{3/}	Water Table (Estimated depth in feet) ^{2/}	Bedrock (Estimated depth in feet) ^{3/}	Erosion Hazard ^{3/}	
		Symbol	Depth (Inches)	USDA	UNIFIED	AASHO	No. 4 (# 75mm)	No. 10 (# 2.0mm)	No. 200 (# 0.075mm)														
277	Summer sandy loam	Loamy soils over stratified sand	A B C	18-30 36-48	s sl	SM-SC SP	A-4 A-3	100 100	49 2	128 106	10 13	21 17	5 NP	1-1/2 to 2-1/2 1-1/2 to 2-1/2	LOW VERY LOW	10-30 31-60 Less than 10	2.5-5.0 0.8-2.5 10 plus	5.6-6.5 5.1-6.5 7.4-8.4	VERY SLIGHT	5 plus	5 plus	SLIGHT on 0-2% MODERATE on 2-12% SEVERE on 12-20% slopes	
2777	Same as No. 156, Lapeer sandy loam																						
2772	Same as No. 254, Tustin sandy loam																						
278	Clyman silt loam	Silty soils over light loam till	A B C	20-36 48-60	sicl sl	GH SC	A-7-6 A-4	100 92	160 76	92 36	103 110	20 9	50 20	29 7	1/2 to 1 1-1/2 to 2-1/2	MODERATE TO HIGH LOW	31-60 4/ 61-120 31-60	0.8-2.5 0.2-0.8 0.8-2.5	5.6-6.5 5.1-6.5 7.4-8.4	VERY SEVERE	1 to 3	5 plus	SLIGHT on 0-2% MODERATE on 2-12% slopes
279	Same as No. 276, Boyer sandy loam																						
280	Same as No. 316, Boyer loamy sand																						
281	Hackett loam	Loamy soils over stratified sand	A B C	12-20 30-48	sicl sl	SC SP	A-7-6 A-3	87 100	83 100	37 2	112 106	16 13	42 17	24 NP	1-1/2 to 2-1/2 1-1/2 to 2-1/2	LOW VERY LOW	31-60 61-120 Less than 10	0.8-2.5 0.2-0.8 10 plus	5.6-6.5 5.1-6.5 7.4-8.4	SLIGHT	5 plus	5 plus	MODERATE on 2-12% SEVERE on 12-20% slopes
282	Casco-Rodman loams	Casco part -- same as No. 173, Casco silt loam Rodman part -- same as No. 75, Rodman gravelly loam																					
283	Same as No. 370, Moxel sandy loam																						
284	Same as No. 370, Moxel sandy loam																						
285	Same as No. 176, Mussey loam																						
286	Same as No. 181, Mussey silt loam																						
287	Same as No. 176, Mussey loam																						
288	Hackett loamy sand	Loamy sand over stratified sand	A B C	12-20 30-48	sl s	SC SP	A-2-6 A-3	90 100	89 100	55 2	119 106	12 13	27 17	12 NP	1-1/2 to 2-1/2 1-1/2 to 2-1/2	MODERATE VERY LOW	Less than 10 Less than 10 Less than 10	5-10 5-10 10 plus	5.6-6.5 5.6-7.3 7.4-8.4	SLIGHT	5 plus	5 plus	MODERATE on 0-6% SEVERE on 6-45% slopes
288V	Same as No. 267, Sisson fine sandy loam																						
289	Hackett sandy loam	Loamy soils over stratified sand	A B C	12-20 30-48	sic sl	SM-SC SP	A-4 A-3	100 100	49 2	128 106	10 13	21 17	5 NP	1-1/2 to 2-1/2 1-1/2 to 2-1/2	LOW VERY LOW	10-30 31-60 Less than 10	2.5-5.0 0.8-2.5 10 plus	5.1-6.5 4.6-6.5 7.4-8.4	SLIGHT	5 plus	5 plus	SLIGHT on 0-2% MODERATE on 2-12% SEVERE on 12-45% slopes	
2897	Same as No. 156, Lapeer sandy loam																						
2892	Same as No. 254, Tustin sandy loam																						
295	Morley-Beecher silt loam	Morley part -- same as No. 297, Morley silt loam Beecher part -- same as No. 3361, Beecher silt loam																					
297	Morley silt loam ^{2/}	Silty soils over clayey till	A B C	10-20 24-36	sic sicl	CH CL	A-6 A-6	100 100	100 100	97 90	100 111	22 18	62 34	37 17	1/2 to 1 1 to 2	HIGH MODERATE TO HIGH	31-60 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	6.6-7.3 6.6-7.3 7.4-8.4	SEVERE	3 to 5	5 plus	SLIGHT on 0-2% MODERATE on 2-12% SEVERE on 12-45% slopes
2975	Same as No. 297, Morley silt loam																						
297V	Same as No. 266, Sisson silt loam																						
297X	Same as No. 73, Fox silt loam																						
297Y	Same as No. 297, Morley silt loam																						
298	Ashkum silty clay loam	Silty soils over clayey till	A B C	10-20 24-36	sic sicl	CH CL	A-7-6 A-6	100 100	100 100	100 90	100 111	22 18	62 34	37 17	1/2 to 1 1 to 2	HIGH MODERATE	31-60 4/ 121-200 ^{4/} 300 plus	0.8-2.5 0.2-0.8 0.5-0.2	6.6-7.3 6.6-7.3 7.4-8.4	VERY SEVERE	0 to 1	5 plus	SLIGHT on 0-2% MODERATE on 2-12% slopes
299	Blount silt loam ^{2/}	Silty soils over clayey till	A B C	10-20 24-36	sic sicl	CH CL	A-6 A-6	100 100	100 100	92 90	100 111	22 18	60 34	35 17	1/2 to 1 1 to 2	HIGH MODERATE TO HIGH	31-60 4/ 61-120 ^{4/} 61-120	0.8-2.5 0.2-0.8 0.2-0.8	5.6-7.3 5.6-7.3 7.4-8.4	SEVERE	1 to 3	5 plus	SLIGHT on 0-2% MODERATE on 2-6% slopes
300	Ashkum-Beecher silt loam	Ashkum part -- same as No. 298, Ashkum silt clay loam Beecher part -- same as No. 3361, Beecher silt loam																					
302	Same as No. 459, Rollin muck																						
303	Alluvial land, sandy substratum	Mixed silty and sandy deposits over dolomite	C	1/ 1/	Dolomite bedrock	1/ 1/	1/ 1/	1/ 1/	1/ 1/	1/ 1/	1/ 1/	1/ 1/	1/ 1/	1/ 1/	1/ 1/	1/ 1/	1/ 1/	1/ 1/	VERY SEVERE	0 to 1	Less than 2	VARIABLE	
305	Same as No. 204, Knowles loam																						
306	Knowles silt loam, wet variant	Loamy soils over dolomite	A B R	18-30	cl Dolomite bedrock	CH	A-7-6	100	100	71	98	25	46	25	1/2 to 1	MODERATE TO HIGH	31-60 4/ 31-60 ^{4/}	0.8-2.5 0.8-2.5	5.6-6.5 5.1-6.0	SEVERE	1 to 3	2 to 5	SLIGHT on 0-2% MODERATE on 2-12% slopes
307	Same as No. 306, Knowles silt loam, wet variant																						
308	Same as No. 204, Knowles loam																						
311	Manawa loam	Loamy soils over reddish clay till	A B C	12-24 30-42	c cl	CH CL	A-7-6 A-6	95 87	95 87	80 69	103 124	19 11	54 35	28 18	1/2 to 1 1 to 2	HIGH MODERATE	31-60 4/ 121-200 ^{4/} 300 plus	0.8-2.5 0.2-0.8 0.5-0.2	6.1-7.3 5.6-7.3 7.4-8.4	SEVERE	1 to 3	MODERATE	SLIGHT on 0-2% MODERATE on 2-6% slopes
314	Same as No. 380, Summer loamy sand																						
315	Oshkemo loamy sand	Sandy soils over stratified sand	Same data as No. 316, Boyer loamy sand																				

TABLE 4.
CHEMICAL AND PHYSICAL PROPERTIES OF SOILS (Continued)

Soil Number And Soil Name	Brief Description	Soil Horizon		Classification			Mechanical Analysis Percent Passing Sieve			Maximum Dry Density (lbs. per cu. ft.)	Optimum Moisture Content (percent)	Liquid Limit	Plasticity Index	Bearing Capacity (Tons per Sq. Ft.)	Shrink- Swell Potential	Percolation (Estimated, minutes per inch)	Permeability (Estimated, inches per hour)	Reaction (pH Value)	Frost Hazard ^{2/}	Water Table (Estimated depth in feet) ^{2/}	Bedrock (Estimated depth in feet) ^{2/}	Erosion Hazard ^{3/}
		Symbol	Depth (Inches)	USDA	UNIFIED	AASHO	No. 4 (4.75mm)	No. 10 (2.00mm)	No. 200 (.075mm)													
316	Boyer loamy sand Sandy soils over stratified sand	A B C	18-30 30-48 -	si s s	SC SP SP	A-2-6 A-3 A-3	90 100 100	89 100 100	33 2 -	119 106 -	12 13 -	27 1/	12 NP	1-1/2 to 2-1/2 1-1/2 to 2-1/2	LOW VERY LOW	Less than 10 Less than 10 Less than 10	5-10 5-10 10 plus	5.1-6.5 5.1-7.3 7.4-8.4	VERY SLIGHT	5 plus	5 plus	MODERATE on 2-6%; SEVERE on 6-10% slopes
316Y	Same as No. 156, Lapeer sandy loam																					
316Z	Same as No. 254, Tusin sandy loam																					
317	Oshkosh loamy fine sand Sandy soils over stratified sand																					
320	Oshkosh sandy loam Loamy soils over stratified sand	A B C	28-42 48-60 -	s s s	SM-SC SP SP	A-4 A-3 A-3	100 100 100	100 100 100	49 2 -	128 106 -	10 13 -	21 1/	5 NP	1-1/2 to 2-1/2 1-1/2 to 2-1/2	LOW VERY LOW	10-30 10-30 Less than 10	2.5-5.0 2.5-5.0 10 plus	5.1-6.5 4.6-6.5 7.4-8.4	SLIGHT	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
323	Ionia sandy loam Loamy soils over stratified sand and gravel	A B C	18-32 32-44 44-54	scl scl sgr	SC GP-GM GP-GM	A-7-6 A-1-a A-1-a	97 37 63	93 81 44	58 37 5	99 112 136	22 16 8	42 42 1/	21 24 NP	1-1/2 to 2-1/2 1-1/2 to 2-1/2 2 to 4	MODERATE TO HIGH VERY LOW	10-30 31-60 Less than 10	2.5-5.0 0.8-2.5 10 plus	5.1-6.5 5.1-6.5 7.4-8.4	MODERATE	3 to 5	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
323V	Same as No. 267, Sisson fine sandy loam																					
324	Ionia loam ^{2/} Loamy soils over stratified sand and gravel	A B C	18-27 27-42 42-54	scl scl sgr	SC GP-GM GP-GM	A-6 A-1-a A-1-a	100 63 -	98 44 -	41 5 -	120 132 -	12 13 -	32 1/	19 NP	1-1/2 to 2-1/2 2 to 4	MODERATE VERY LOW	31-60 31-120 Less than 10	0.8-2.5 0.2-0.8 10 plus	5.1-6.5 5.1-6.5 7.4-8.4	MODERATE	3 to 5	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
324V	Same as No. 266, Sisson silt loam																					
324Y	Same as No. 345, Celina silt loam, nearly level to gently sloping																					
324Z	Same as No. 21, Hebron loam																					
325	Varna silt loam ^{2/} Silty soils over clayey till	A B C	12-18 18-24 24-40	sic sic scl	CL CL CL	A-7-6 A-6 A-6	100 95 93	100 93 83	87 93 83	100 111 -	22 18 -	51 32	26 14	1 to 2 1 to 2	HIGH MODERATE	31-60 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	5.6-6.5 5.6-7.3 7.4-8.4	SEVERE	3 to 5	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
326	Abington silt loam Loamy soils over stratified sand and gravel	A B C	36-54 54-60 60 plus	cl cl sgr	CL GP-GM GP-GM	A-7-6 A-1-a A-1-a	97 63 -	93 44 -	58 5 -	99 132 -	22 9 -	42 1/	21 NP	1 to 2 1-1/2 to 2-1/2	MODERATE TO HIGH VERY LOW	31-60 4/ 61-120 Less than 10	0.8-2.5 0.2-0.8 10 plus	5.6-6.5 5.6-6.5 7.4-8.4	VERY SEVERE	0 to 1	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
326Z	Same as No. 212, Ehler silt loam																					
327	Walhill silt loam Silty soils over organic deposits	A Ab	12-20 Organic material - not suitable for engineering uses	sic -	ML-CL -	A-4 -	100 -	100 -	96 -	104 -	19 -	32 -	10 -	1 to 2 -	LOW TO MODERATE	31-60 4/ 61-120	0.8-2.5 0.2-0.8	5.6-7.3 5.1-6.0	SEVERE	0 to 1	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
328	Pistakee silt loam Silty soils over loam till	A B C	12-18 18-36 36-60	sic scl 1/	ML-CL CH 1/	A-4 A-7-6 1/	100 100 1/	100 100 1/	96 99 1/	104 102 1/	19 21 1/	32 34 1/	10 10 1/	1 to 2 1/2 to 1	MODERATE HIGH	31-60 4/ 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.5	5.6-6.5 5.6-6.5 7.4-8.4	VERY SEVERE	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
328Y	Same as No. 328, Pistakee silt loam																					
330	Navan loam Loam over silt and clay	A B C	12-28 28-44 44-60	cl scl sic	CL CL CL	A-6 A-6 A-6	100 100 100	100 100 100	58 96 96	121 113 -	12 17 -	31 36 18	15 18	1 to 2 1 to 2	MODERATE MODERATE	31-60 4/ 31-60 300 plus	0.8-2.5 0.8-2.5 .05-0.2	6.1-7.3 6.6-8.4 7.4-8.4	VERY SEVERE	0 to 1	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
331	Markham-Elliott silt loam Markham part -- same as No. 336, Markham silt loam Elliott part -- same as No. 3251, Elliott silt loam																					
332	Kane silt loam Loamy soils over stratified sand and gravel	A B C	20-27 27-40 40-48	cl cl sgr	CL GP GP	A-7-6 A-1-a A-1-a	97 44 -	93 36 -	58 3 -	99 135 -	22 9 -	42 1/	21 NP	1 to 2 2 to 4	MODERATE TO HIGH VERY LOW	31-60 4/ 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	5.6-6.5 5.1-6.0 7.4-8.4	SEVERE	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
332V	Same as No. 27, Wauconda silt loam																					
332Y	Same as No. 178, Crosby silt loam																					
332Z	Same as No. 51, Actalan loam																					
333	Eagle silt loam Loamy soils over stratified sand and gravel	A B C	20-27 27-40 40-48	cl cl sgr	CL GP GP	A-7-6 A-1-a A-1-a	97 44 -	93 36 -	58 3 -	99 135 -	22 9 -	42 1/	21 NP	1 to 2 2 to 4	MODERATE TO HIGH VERY LOW	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	5.6-6.5 5.1-6.0 7.4-8.4	MODERATE	3 to 5	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
333Y	Same as No. 91, Perry silt loam																					
333Z	Same as No. 16, Rome silt loam																					
334	Same as No. 119, Warsaw silt loam																					
335	Ionia silt loam Loamy soils over stratified sand and gravel	A B C	18-27 27-40 42-54	sic scl sgr	CL GP-GM GP-GM	A-7-6 A-1-a A-1-a	100 42 -	100 22 -	94 9 -	102 132 -	21 9 -	46 1/	24 NP	1 to 2 2 to 5	MODERATE TO HIGH VERY LOW	31-60 61-120 Less than 10	0.8-2.5 0.2-0.8 10 plus	5.6-6.5 5.1-6.5 7.4-8.4	SEVERE	3 to 5	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
335Y	Same as No. 345, Celina silt loam nearly level to gently sloping																					
335Z	Same as No. 16, Rome silt loam																					
336	Markham silt loam Silty soils over clayey till	A B C	12-24 24-38 38-42	c scl sic	CH CL CL	A-6 A-6 A-6	100 100 100	100 100 100	92 90 -	100 111 -	22 18 -	60 34	35 17	1/2 to 1 1 to 2	HIGH MODERATE TO HIGH	31-60 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	5.6-7.3 5.6-7.3 7.4-8.4	SEVERE	3 to 5	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
338	Same as No. 298, Ashmun silty clay loam																					
339	Abington silty clay loam Silty soils over stratified sand and gravel	A B C	36-54 54-60 60 plus	cl cl sgr	CL GP-GM GP-GM	A-7-6 A-1-a A-1-a	97 42 -	93 22 -	58 9 -	99 132 -	22 9 -	42 1/	21 NP	1 to 2 2 to 5	MODERATE TO HIGH VERY LOW	31-60 4/ 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	5.6-6.5 6.6-7.3 7.4-8.4	VERY SEVERE	0 to 1	5 plus	SLIGHT on 0-2% slopes
340	Navan silt loam Loamy deposits over silt and clay																					

TABLE 4.
CHEMICAL AND PHYSICAL PROPERTIES OF SOILS (Continued)

Soil Number And Soil Name	Brief Description	Soil Horizon		Classification			Mechanical Analysis			Maximum Dry Density (lbs. per cu. ft.)	Optimum Moisture Content (percent)	Liquid Limit	Plasticity Index	Bearing Capacity (Tons per Sq. Ft.)	Shrink- Swell Potential	Percolation (Estimated, minutes per inch)	Permeability (Estimated, inches per hour)	Reaction (pH Value)	Frost Hazard ^{2/}	Water Table (Estimated depth in feet) ^{2/}	Bedrock (Estimated depth in feet) ^{2/}	Erosion Hazard ^{2/}
		Symbol	Depth (Inches)	USDA	UNIFIED	AASHO	No. 4 (6.75mm)	Percent Passing No. 10 (2.00mm)	No. 200 (0.075mm)													
343	Celina silt loam, nearly level to gently sloping	A B C	12-24 36-42	cl sl	CH SM	A-7-6 A-4	99 78	99 73	69 43	109 145	16 6	83 14	35 3	1/2 to 1 1-1/2 to 2-1/2	HIGH LOW	31-60 61-120 31-60	0.8-2.5 0.2-0.8 0.8-2.5	5.6-6.5 5.6-6.5 7.4-8.4	SEVERE	3 to 5	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
343	Sloping to moderately steep -- same as No. 362, Theresa silt loam																					
344	Ashford silt loam	A B C	12-24 20-30	cl sl	CL SM	A-7-6 A-4	100 86	97 80	64 41	109 130	17 9	42 19	21 4	1 to 2 1-1/2 to 2-1/2	MODERATE TO HIGH LOW	31-60 61-120 31-60	0.8-2.5 0.2-0.8 0.8-2.5	5.6-7.3 5.6-7.3 7.4-8.4	SEVERE	3 to 5	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
345	Nenao silt loam	A B C	12-24 20-30	cl sl	CL SM	A-7-6 A-4	100 86	97 80	64 41	109 130	17 9	42 19	21 4	1 to 2 1-1/2 to 2-1/2	MODERATE TO HIGH LOW	31-60 4/ 31-60 Less than 10	0.8-2.5 0.2-0.8 10 plus	5.6-6.5 5.1-6.0 7.4-8.4	SEVERE	1 to 3	5 plus	SLIGHT on 0-2%; MOD- ERATE on 2-12%; and SEVERE on 12-25% slopes
346	Kane loam	A B C	12-24 40-48	cl sl	CL CP	A-7-6 A-1-a	97 44	93 36	58 5	99 135	22 9	42 1/	21 NP	1 to 2 2 to 4	MODERATE TO HIGH VERY LOW	31-60 4/ 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	5.6-6.5 5.1-6.0 7.4-8.4	MODERATE	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
346 Y	Same as No. 178, Crosby silt loam																					
346 Z	Same as No. 51, Astalan loam																					
352	Same as No. 153, Lapeer loam																					
355	Same as No. 156, Lapeer sandy loam																					
356	Same as No. 156, Lapeer sandy loam																					
357	Hochheim loam ^{2/}	A B C	8-17 21-69	cl sl	CL SM	A-7-6 A-2-4	96 74	93 57	57 35	106 140	19 6	42 14	21 2	1 to 2 1-1/2 to 2-1/2	MODERATE TO HIGH LOW	31-60 61-120 31-60	0.8-2.5 0.2-0.8 0.8-2.5	5.6-7.3 5.1-6.0 7.4-8.4	SLIGHT	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
357 R	Same as No. 204, Knowles loam																					
357 X	Same as No. 173, Casco silt loam																					
358	Miami loam	A B C	14-20 24-36	sl cl	CH CL	A-7-6 A-4	92 95	90 90	57 59	101 129	19 9	54 19	31 7	1/2 to 1 1 to 2	HIGH LOW	31-60 61-120 31-60	0.8-2.5 0.2-0.8 0.8-2.5	5.6-6.5 5.1-6.0 7.4-8.4	MODERATE	5 plus	5 plus	MODERATE on 2-12%; SEVERE on 12-15% slopes
359	Hennepin loam ^{2/}	A B C	24-36	sl	SM	A-2-4	74	67	35	140	6	14	2	1-1/2 to 2-1/2	LOW	31-60 31-60	0.8-2.5 0.8-2.5	6.1-7.3 7.4-8.4	SLIGHT	5 plus	5 plus	MODERATE on 2-12%; SEVERE on 12-45% slopes
360	Hochheim silt loam ^{2/}	A B C	12-20 20-30	cl sl	CL SM	A-7-6 A-4	100 86	97 80	64 41	109 131	17 9	42 19	21 4	1 to 2 1-1/2 to 2-1/2	MODERATE TO HIGH LOW	31-60 61-120 31-60	0.8-2.5 0.2-0.8 0.8-2.5	5.6-7.3 5.6-7.3 7.4-8.4	MODERATE	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes
360 R	Same as No. 204, Knowles loam																					
360 V	Same as No. 266, Sisson silt loam																					
360 X	Same as No. 173, Casco silt loam																					
361	Miami silt loam ^{2/}	Data are the same as No. 358, Miami loam																				
362	Theresa silt loam ^{2/}	A B C	17-27 27-42	cl sl	CL SM	A-7-6 A-2-4	100 89	100 65	63 32	105 140	20 7	50 18	29 4	1 to 2 1-1/2 to 2-1/2	MODERATE VERY LOW	31-60 61-120 31-60	0.8-2.5 0.2-0.8 0.8-2.5	6.1-7.3 6.1-6.5 7.4-8.4	MODERATE	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes
362 R	Same as No. 204, Knowles loam																					
362 V	Same as No. 266, Sisson silt loam																					
362 X	Same as No. 73, Fox silt loam																					
362 Z	Same as No. 16, Rome silt loam																					
363	Mayville silt loam	A B C	14-24 30-42	sl cl	CL SC-SM	A-7-6 A-4	100 85	100 80	91 44	101 132	20 9	50 18	29 4	1 to 2 1-1/2 to 2-1/2	MODERATE TO HIGH LOW	31-60 61-120 31-60	0.8-2.5 0.2-0.8 0.8-2.5	5.6-6.5 5.1-6.5 7.4-8.4	SEVERE	3 to 5	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
363 R	Same as No. 306, Knowles silt loam, wet variant																					
363 X	Same as No. 335, Ionia silt loam																					
363 Y	Same as No. 363, Mayville silt loam																					
363 Z	Same as No. 16, Rome silt loam																					
364	Lamarline silt loam ^{2/}	A B C	14-24 30-42	sl cl	CL SC-SM	A-7-6 A-4	100 85	100 80	91 44	101 132	20 9	50 18	29 4	1 to 2 1-1/2 to 2-1/2	MODERATE TO HIGH LOW	31-60 4/ 61-120 31-60	0.8-2.5 0.2-0.8 0.8-2.5	5.6-6.5 5.1-6.5 7.4-8.4	SEVERE	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
364 V	Same as No. 38, Kibbie silt loam																					
364 X	Same as No. 233, Matherton silt loam																					
364 Z	Same as No. 369, Mosei silt loam																					
365	Hochheim-Henne- pin loams	Hochheim part -- same as No. 357, Hochheim loam Hennepin part -- same as No. 357, Hochheim loam																				
365 X	Hochheim-Henne- pin loams, gravely sub- stratum	Hochheim part -- same as 173, Casco silt loam Hennepin part -- same as No. 359, Hennepin loam																				

TABLE 1.
CHEMICAL AND PHYSICAL PROPERTIES OF SOILS (Continued)

Soil Number And Soil Name	Brief Description	Soil Horizon		Classification			Mechanical Analysis Percent Passing Sieve			Maximum Dry Density (lbs. per cu. ft.)	Optimum Moisture Content (percent)	Liquid Limit	Plasticity Index	Bearing Capacity (Tons per Sq. Ft.)	Shrink- Swell Potential	Percolation (Estimated, minutes per inch)	Permeability (Estimated, inches per hour)	Reaction (pH Value)	Frost Hazard ^{3/}	Water Table (Estimated depth in feet) ^{3/}	Bedrock (Estimated depth in feet) ^{3/}	Erosion Hazard ^{3/}	
		Symbol	Depth (Inches)	USDA	UNIFIED	AASHO	No. 4 (# 75mm)	No. 10 (# 2.0mm)	No. 200 (# .075mm)														
366	Hochheim-Theresa Theresa loams	Hochheim part -- same as No. 357, Hochheim loam Theresa part -- same as No. 362, Theresa silt loam																					
367	Hochheim fine sandy loam	Loamy soils over loam till	A B C	12-20 20-30	scl sl	SC SM	A-7-6 A-4	87 86	93 89	37 41	112 131	16 9	42 19	24 4	1-1/2 to 2-1/2 1-1/2 to 2-1/2	MODERATE TO HIGH LOW	10-30 61-120 31-60	2.5-5.0 0.2-0.8 0.8-2.5	5.1-6.5 5.5-7.3 7.4-8.4	SLIGHT	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
369	Mosel silt loam	Loamy soils over silt and clay	A B C	12-28 36-48	cl scl	CL CL	A-6 A-6	100 100	100 100	58 96	121 113	12 17	31 36	15 18	1 to 2 1 to 2	MODERATE MODERATE	31-60/ 31-60 300 plus	0.8-2.5 0.8-2.5 .08-0.2	5.6-7.3 6.1-7.3 7.4-8.4	VERY SEVERE	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
370	Mosel sandy loam	Loamy soils over silt and clay	A B C	12-28 32-48	sl scl	SC CL	A-2 A-6	100 100	95 100	28 96	121 113	12 17	22 36	8 18	1-1/2 to 2-1/2 1 to 2	LOW MODERATE	10-30/ 31-60 300 plus	2.5-5.0 0.8-2.5 0.8-2.5	5.1-6.5 6.1-7.3 7.4-8.4	MODERATE	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
371	Mosel loam	Loamy soils over sand, gravel, silt and clay	Data are the same as No. 369, Mosel silt loam																				
380	Sumner loamy sand	Sandy soils over stratified sand	A B C	18-36 36-48	sl s	SC SP	A-2-6 A-3	90 100	89 100	33 2	119 106	12 13	27 1/	12 NP	1-1/2 to 2-1/2 1-1/2 to 2-1/2	LOW VERY LOW	Less than 10 Less than 10 Less than 10	5-10 3-10 10 plus	5.1-6.5 5.1-6.5 7.4-8.4	VERY SLIGHT	5 plus	5 plus	MODERATE on 2-6% slopes
386	Granby fine sandy loam	Loamy deposits over stratified sand	A C	24-36	fs	SP-SM	A-3	100	100	5	110	12	1/	NP	1-1/2 to 2-1/2	VERY LOW	10-30/ Less than 10	2.5-5.0 5-10	5.6-6.5 6.6-8.4	SLIGHT	0 to 1	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
386 Y	Same as No. 386, Granby fine sandy loam																						
386 Z	Same as No. 310, Navan loam																						
387	Granby loamy sand	Loamy sand over stratified sand	Data are the same as No. 386, Granby fine sandy loam																				
387 V	Same as No. 26, Wauconda fine sandy loam																						
391	Wea sandy loam	Loamy soils over stratified sand and gravel	A B C	20-30 40-54	scl skgr	SC GP-GM	A-7-6 A-1-a	87 37	93 31	37 5	112 136	16 8	42 1/	24 NP	1-1/2 to 2-1/2 2 to 4	MODERATE TO HIGH VERY LOW	10-30 31-60 Less than 10	2.5-5.0 0.8-2.5 10 plus	5.6-6.5 5.1-6.0 7.4-8.4	MODERATE	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 12-20% slopes
392	Ockley loam	Loamy over silty soils underlain by stratified sand and gravel	A B C	20-30 40-54	scl sgr	CL SW-SM	A-7-6 A-2-4	100 96	100 80	98 12	101 128	21 8	46 1/	25 NP	1 to 2 1-1/2 to 3	MODERATE TO HIGH VERY LOW	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	5.6-6.5 5.1-6.5 7.4-8.4	MODERATE	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
393	Ockley sandy loam	Data are the same as No. 392, Ockley loam																					
394	Parr sandy loam	Loamy soils over gravelly loam till	A B C	20-36 42-54	scl 1-kl	SC SM	A-7-6 A-2-4	87 100	83 85	37 78	112 135	16 9	42 1/	24 NP	1-1/2 to 2-1/2 1-1/2 to 2-1/2	MODERATE TO HIGH VERY LOW	10-30 31-60 31-60	2.5-5.0 0.8-2.5 0.8-2.5	5.6-6.5 5.1-6.5 7.4-8.4	SLIGHT	5 plus	5 plus	MODERATE on 2-12%; SEVERE on 12-20% slopes
397	Ozaukee silt loam ^{2/}	Silty deposits over clayey till	A B C	14-22 22-60	c scl	CH CL	A-7-6 A-6	100 100	100 92	93 107	97 107	24 19	52 38	28 19	1/2 to 1 1 to 2	HIGH MODERATE TO HIGH	31-60 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	5.6-7.3 5.6-7.3 7.4-8.4	SEVERE	3 to 5	5 plus	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes
397 R	Same as No. 204, Knowles loam																						
397 V	Same as No. 397, Ozaukee silt loam																						
397 X	Same as No. 73, Fox silt loam																						
397 Y	Same as No. 397, Ozaukee silt loam																						
398	Same as No. 298, Ashkum silty clay loam																						
399	Maquon silt loam ^{2/}	Silty soils over clayey till	A B C	10-20 24-36	c scl	CL CL	A-7-6 A-6	100 100	100 92	97 92	103 109	16 15	46 28	25 12	1 to 2 1 to 2	MODERATE TO HIGH MODERATE	31-60/ 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	5.6-7.3 5.6-7.3 7.4-8.4	VERY SEVERE	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
410	Same as No. 134, Spinks loamy fine sand																						
411	Spinks fine sand, silty substratum	Loamy soils over stratified silt and fine sand	A B C	5-22 40 plus	1 1	SP-SM CL-ML	A-2-4 A-4	100 100	100 82	12 82	120 113	9 16	1/	NP 6	1-1/2 to 2-1/2 1 to 2	VERY LOW LOW	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	5.6-7.3 5.6-7.3 7.4-8.4	VERY SLIGHT	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-30% slopes
413	Crestview fine sandy loam	Loamy soils over neutral sand	A C	20-30	fs	SP-SM	A-3	100	100	5	110	12	1/	NP	1-1/2 to 2-1/2	VERY LOW	10-30 Less than 10	2.5-5.0 5-10	5.6-6.5 6.1-7.3	VERY SLIGHT	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
422 Z	Same as No. 254, Tutin sandy loam																						
414	Crestview loamy fine sand	Loamy sand over neutral sand	A C	20-30	fs	SP-SM	A-3	100	100	5	110	12	1/	NP	1-1/2 to 2-1/2	MODERATE	Less than 10 Less than 10	5-10 5-10	5.6-6.5 6.0-7.3	VERY SLIGHT	5 plus	5 plus	MODERATE on 0-6%; HIGH on 6-15%
416	Terrace escarp- ments, till	Steep front of till pinnas-clayey	C	10 plus	scl	CL	A-6	100	100	90	111	18	34	17	1 to 2	MODERATE TO HIGH	61-120	0.2-0.8	7.4-8.4	1/	5 plus	1/	SEVERE on 12-20% slopes
417	Terrace escarp- ments, outwash	Steep front of terraces, gravelly	C	10 plus	skgr	GW-GM	A-1-a	42	22	9	132	9	1/	NP	2 to 5	VERY LOW	Less than 10	10 plus	7.4-8.4	1/	5 plus	1/	SEVERE on 12-20% slopes
419	Beach sand	Beach sand and gravel	Data are the same as No. 417, terrace escarpments, outwash																				
420	Same as No. 358, Miami loam																						
421	Same as No. 161, Dodge silt loam																						
431	Knowles stony silt loam, shallow variant	Silty soils over dolomite. Stony surface	A R	0-10	sil Dolomite bedrock	ML-CL	A-4	100	100	98	106	17	31	7	1 to 2		31-60	0.8-2.5	6.6-7.3	MODERATE	5 plus	Less than 2	MODERATE on 2-12%; SEVERE on 12-20% slopes

TABLE 1.
 CHEMICAL AND PHYSICAL PROPERTIES OF SOILS (Continued)

Soil Number And Soil Name	Brief Description	Soil Horizon		Classification			Mechanical Analysis Percent Passing Sieve			Maximum Dry Density (lbs. per cu. ft.)	Optimum Moisture Content (percent)	Liquid Limit	Plasticity Index	Bearing Capacity (Tons per Sq. Ft.)	Shrink-Swell Potential	Percolation (Estimated, minutes per inch)	Permeability (Estimated, inches per hour)	Reaction (pH Value)	Frost Hazard ^{3/}	Water Table (Estimated depth in feet) ^{3/}	Bedrock (Estimated depth in feet) ^{3/}	Erosion Hazard ^{3/}	
		Symbol	Depth (inches)	USDA	UNIFIED	AASHTO	No. 4 (4.75mm)	No. 10 (2.0mm)	No. 200 (0.075mm)														
449	Same as No. 451, Houghton mucky peat																						
450	Houghton muck	Disintegrated organic soils	A		Organic material - not suitable for engineering use										VERY HIGH	10-304/	2.5-5.0	6.1-7.8	SLIGHT	0 to 1	5 plus	MODERATE on 0-6%; SEVERE on 6-20% slopes	
451	Houghton mucky peat	Organic soils	A		Organic material - not suitable for engineering use										VERY HIGH	10-304/	2.5-5.0	6.1-7.8	SLIGHT	0 to 1	5 plus	MODERATE on 0-6%; SEVERE on 6-12% slopes	
452	Adrian muck	Organic soils over sand	A	24-36	el	SP	A-3	100	100	2	106	13	1/	NP	2 to 4	VERY HIGH VERY LOW	10-304/ Less than 10	2.4-5.0 5-10	5.6-7.3 6.1-7.3	SLIGHT	0 to 1	5 plus	MODERATE on 2-6% slopes
452Z	Same as No. 454, Palms Muck																						
453	Adrian mucky peat	Organic soils over sand			Data are the same as No. 452, Adrian muck																		
454	Palms muck	Organic soils over loam	A	24-36	el	SM	A-2-4	100	85	33	145	6	1/	NP	1-1/2 to 2-1/2	VERY HIGH VERY LOW	10-304/ Less than 10	2.5-5.0 0.2-0.8	5.6-7.3 7.8-8.4	SLIGHT	0 to 1	5 plus	MODERATE on 2-6% slopes
455	Palms mucky peat	Organic soils over loam			Data are the same as No. 454, Palms muck																		
456	Ogden muck	Organic soils over clay	A	24-36	cl	CL	A-6	87	87	69	124	11	35	18	1 to 2	VERY HIGH MODERATE	10-304/ 300 plus	2.5-5.0 Less than .05	6.1-7.8 7.3-7.8	SLIGHT	0 to 1	5 plus	MODERATE on 2-6% slopes
457	Ogden mucky peat	Organic soils over clay			Data are the same as No. 456, Ogden muck																		
458	Rollin muck, shallow	Organic soils over marl	A	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	VERY HIGH	10-304/ 300 plus	2.5-5.0 .05-0.2	6.6-7.8 7.8-8.4	SLIGHT	0 to 1	5 plus	MODERATE on 2-6% slopes
459	Rollin muck	Organic soils over marl	A	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	VERY HIGH	10-304/ 300 plus	2.5-5.0 .05-0.2	6.6-7.3 7.4-8.4	SLIGHT	0 to 1	5 plus	MODERATE on 2-6% slopes
460	Rollin mucky peat	Organic soils over marl	A	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	VERY HIGH	10-304/ 300 plus	2.5-5.0 .05-0.2	6.6-7.3 7.4-8.4	SLIGHT	0 to 1	5 plus	MODERATE on 2-6% slopes
461	Muskego muck	Organic soils over sedimentary peat	A		Organic material - not suitable for engineering use											VERY HIGH	10-304/ 300 plus	2.5-5.0 Less than .05	6.6-7.3 7.4-8.4	SLIGHT	0 to 1	5 plus	MODERATE on 2-6% slopes
462	Houghton peat, acid variant	Organic soils	A		Organic material - not suitable for engineering use											VERY HIGH	10-304/	2.5-5.0	4.1-5.6	SLIGHT	0 to 1	5 plus	MODERATE on 2-6% slopes
502	Same as No. 504, Flagg silt loam																						
504	Flagg silt loam	Silty soils over sandy loam to loam till	A B C	30-40 54-60	el scl	CH CL	A-7-6 A-6	100 100	100 100	92 66	103 116	20 15	50 37	29 20	1/2 to 1 1 to 2	MODERATE TO HIGH MODERATE TO HIGH	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	5.6-6.5 5.1-6.0 7.4-8.4	SEVERE	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-6% slopes
505	Flagg silt loam, wet variant	Silty soils over sandy loam to loam till	A B C																				
508	Same as No. 510, Pecatonica silt loam																						
510	Pecatonica silt loam ^{2/}	Silty soils over loam till	A B C	24-36 36-54	cl cl	CL CL	A-6 A-6	100 100	100 100	62 62	117 116	13 15	36 37	20 20	1 to 2 1 to 2	MODERATE TO HIGH MODERATE TO HIGH	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	5.6-6.5 5.1-6.0 7.4-8.4	SEVERE	5 plus	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
511	Same as No. 504, Flagg silt loam																						
514	Same as No. 516, Westville silt loam																						
516	Westville silt loam ^{2/}	Loamy soils over sandy loam to loam till	A B C	24-30 52 plus	cl cl	CL SM	A-6 A-4	100 80	100 77	64 38	111 132	17 8	35 17	35 NP	1 to 2 1-1/2 to 2-1/2	MODERATE TO HIGH VERY LOW	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	5.6-6.5 5.1-6.0 7.4-8.4	SEVERE	5 plus	5 plus	MODERATE on 2-12%; SEVERE on 12-65% slopes
550	Same as No. 212R, Ehler silt loam, rock substratum																						
557	Same as No. 358, Miami loam																						
560	Same as No. 358, Miami loam																						
325I	Elliott silt loam ^{2/}	Silty soils over clayey till	A B C	12-18 25-60	el scl	CL CL	A-7-6 A-6	100 95	100 93	87 83	100 111	22 18	35 51	35 26 14	1 to 2 1 to 2	MODERATE TO HIGH HIGH MODERATE TO HIGH	31-604/ 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	5.6-6.5 5.6-7.3 7.4-8.4	SEVERE	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes
325IV	Same as No. 325I, Elliott silt loam																						
336I	Beecher silt loam	Silty soils over clayey till	A B C	12-24 30-42	el scl	CH CL	A-6 A-6	100 100	100 90	92 90	100 111	22 18	35 60 17	35 NP	1/2 to 1 1 to 2	MODERATE TO HIGH MODERATE TO HIGH	31-604/ 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	5.6-6.5 5.6-6.5 7.4-8.5	SEVERE	1 to 3	5 plus	SLIGHT on 0-2%; MODERATE on 2-12% slopes

WATER MANAGEMENT CHARACTERISTICS OF SOILS

Data and interpretations important to management of water on or in the soil are given in Table 5. The information presented in this table can be used to estimate runoff from watersheds, determine the degree of hydrologic limitations affecting urban development, determine the suitability of soils for drainage and irrigation and to determine the suitability of soils for reservoirs and embankments.

Soil number and soil name of each soil recognized in the Region is listed numerically by the soil number used in field mapping.

Hydrologic soil groups reflect the ability of soils to restrain runoff from a heavy storm after they have been thoroughly wetted.

Group A - Soils with high infiltration rates consisting mainly of well and excessively drained sandy or gravelly soils. These soils have a high rate of water transmission and a low runoff potential.

Group B - Soils with moderate infiltration rates consisting mainly of moderately well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

Group C - Moderately fine or fine textured soils with slow infiltration rates or soils with layers that impede the downward movement of water. These soils have a slow rate of water transmission.

Group D - Soils with very slow infiltration rates consisting mainly of (1) clay soils with high shrink-swell potential; (2) soils with a high permanent water table; (3) soils with a claypan or clay layer at or near the surface; and (4) shallow soils over nearly impervious substrata. The soils have a very slow rate of water transmission.

Soil horizons are designated by letter symbols. The representative depth of the principal soil horizons are given for each soil. Horizon designations and depths apply only to columns showing percolation, permeability and available water capacity.

Percolation rates are given for each principal soil horizon of each soil. They are expressed as minutes per inch and represent the number of minutes required for

water to move a distance of one inch downward through a saturated or near saturated soil.

Permeability, expressed in inches per hour, is the rate of water movement through a saturated soil. A range of permeability rates is given for each main horizon in each soil.

Available water capacity values measure the ability of soils to store water for plant use. Quantitatively it is the amount of water held at field capacity minus that amount of water held at wilting point. In this table it is expressed as the depth in inches of water held in a vertical depth of one inch of soil. Values are given for the principal horizons in each soil.

Water table data are expressed as depth to free water below the soil surface. Depths are given as 0 to 1 feet, 1 to 3 feet, 3 to 5 feet and more than 5 feet. These minimal depths fluctuate with wet and dry climatic periods.

Frost hazard ratings indicate the susceptibility of soils to frost action or frost heaving. The ratings correspond roughly as follows to the classification used in the State Highway Commission of Wisconsin Soils Manual.

Rating (This report) Classification (SHCW)

VERY SLIGHT	F-0 non-frost susceptible materials. Generally A-1 and A-3 groups.
SLIGHT	F-1 generally finer A-1 groups.
MODERATE	F-2 generally A-1 sand, finer A-3 sand and A-2 sand.
SEVERE	F-3 generally A-2 and A-4 bordering on A-2 groups and medium to heavy A-6 and A-7 groups.
VERY SEVERE	Silt and sandy silt, silty sand and clay with plasticity index of 12 or less. Generally A-4, A-5 and light A-6 groups.



Frost heaving is a real hazard in silty, somewhat poorly drained soils. Frost boils turn to mud holes such as this.

Erosion hazard ratings indicating the susceptibility of soils to erosion are generally controlled by the soil slope. The soil texture and depth, however, also affect ratings. Soil slopes as they occur in the landscape are indicated for each rating. The terms *slight*, *moderate* and *severe* are used in this report to compare erosion susceptibility of soils.

Flooding hazard ratings generally indicate the expected frequency of flooding. Ponding is noted for some soils. Flooding hazards are rated as *none* for upland soils in positions that receive little or no runoff, *moderate* where the soils are occasionally flooded or ponded and *severe* where flooding is frequent such as for soils in lower parts of stream flood plains.

Drainage requirements express the need or lack of a need for drainage and generally

indicate the kind of drainage system suitable for each soil.

Limitations of soils for irrigation are mainly determined by soil slope, soil permeability, available water holding capacity and soil drainage.

Limitations of soils for reservoir areas are based mainly on the ability of soils to restrict water movement through them. Rapidly permeable soil material such as sand and gravel generally have severe limitations for reservoir areas.

Limitations of soils for embankments is based on the ability of soils to restrain water flow when compacted. Embankments built with soils that have high shrink-swell potentials will crack on drying and have severe to very severe limitations for embankments. Soils that disperse easily are susceptible to piping and are rated as *moderate* to *very severe*.



An embankment that failed because of soil piping.

TABLE 5.
WATER MANAGEMENT CHARACTERISTICS OF SOILS

Soil Number & Soil Name	Hydro- logic Soil Group	1/ Soil Horizon		Percolation (Estimated) (Minutes Per Inch)	Permeability (Estimated) (Inches Per Hour)	Available Water Capacity (in./in.)	Water Table (Depth) in ft.)	Frost Hazard	Erosion	Flooding Hazard	Drain- age Require- ments	Limitations of Soils for		
		Sym- bol	Depth (Inches)									Irrigation	Reservoir Areas	Embankments
1 Rough broken land	B	C	3/	61-120	0.2-0.8	.18	5 plus	2/	SEVERE on all slopes	None	None	VERY SEVERE on all slopes	SLIGHT TO MODERATE - semi-pervious; high runoff and active geologic erosion.	SLIGHT TO MOD- ERATE - medium to low stability; high shrink- swell potential.
2 Stinson silt loam	C	A Ab	0-18 18-30	31-60 4/ 121-300	0.8-2.5 0.2-0.8	.20 .18	1 to 3	SEVERE	SLIGHT on 0-2% slopes	SEVERE - frequent flooding.	Surface drainage is bene- ficial	MODERATE on 0-2% slopes.	SLIGHT - semi- pervious; suit- able for dugout ponds.	SLIGHT TO MOD- ERATE - medium to low stability; high shrink- swell potential.
3 Stony Colluvium	B	3/	3/	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/
4 Marsh	D	3/	3/	2/	2/	2/	2/	2/	2/	Perennially wet.	Subsur- face or surface drainage or both are gen- erally not feasible.	SEVERE - needs drainage	SEVERE - characteristics variable; re- quires on-site investigation.	VERY SEVERE - characteristics variable; make on-site investi- gation.
5 Same as No. 54, Lawson silt loam														
5W Sawmill silt loam	D	A Ab C	0-18 18-32 32-60+	31-60 4/ 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.25 .22 .20	0 to 1	VERY SEVERE	SLIGHT on 0-2% slopes; MODERATE on 2-6% slopes	SEVERE - frequent flooding.	Subsur- face or surface drainage or both are needed	SEVERE on all slopes	SLIGHT - per- vious to semi- pervious, high water table, suitable for dug- out pond.	SLIGHT TO MOD- ERATE - medium stability; sus- ceptible to piping.
7 Dorchester silt loam	B	A Ab C	0-20 20-36 36-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.20 .18 .18	3 to 5	SEVERE	SLIGHT on 0-2% slopes.	SEVERE - frequent flooding.	None	MODERATE on 0-2% slopes.	MODERATE - pervious to semi-pervious; bottom will need compac- tion.	MODERATE - medium to low stability; med- ium shrink- swell potential.
7W Same as No. 54, Lawson silt loam														
10 Same as No. 11, Alluvial land														
10W Same as No. 11W, Alluvial land, wet														
11 Alluvial land	B	3/	3/	2/	2/	2/	2/	2/	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	SEVERE - frequent flooding.	None	MODERATE TO VERY SE- VERE 2/	MODERATE TO VERY SEVERE 2/	MODERATE TO VERY SEVERE 2/
11W Alluvial land, wet	D	3/	3/	2/	2/	2/	0 to 1	2/	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	SEVERE	Surface drainage is needed.	MODERATE TO VERY SE- VERE 2/	MODERATE TO VERY SEVERE 2/	MODERATE TO VERY SEVERE 2/
12 Wea silt loam	B	A B C	0-13 13-49 49-60+	61-120 61-120 Less than 10	0.8-2.5 0.8-2.5 10 plus	.24 .20 .02	5 plus	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	SLIGHT on 0-2% MOD- ERATE on 2-6% SEVERE on 6-12% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; bottom may need compac- tion.	SLIGHT TO MOD- ERATE - subsoil has medium sta- bility; high shrink-swell po- tential; substrat- um has high stability; and low shrink-swell potential.
14 Same as No. 414, Crestview loamy fine sand														
15 Hillside seepage	D	3/	3/	2/	2/	2/	0 to 1	SLIGHT	SEVERE on all slopes	MODERATE - ponding and occasional flooding.	Subsur- face or surface drainage or both are need- ed.	2/	MODERATE TO SEVERE - pervious, high water table; suit- able for dugout ponds; suitable for reservoirs if organic materi- al is re- moved.	VERY SEVERE - organic materi- al has low sta- bility.
16 Rome silt loam	B	A B C	0-14 14-27 27-60+	31-60 31-60 300 plus	0.8-2.5 0.8-2.5 .05-0.2	.22 .14 .18	3 to 5	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	MODERATE - occasional flooding	None	MODERATE on 0-6% SEVERE on 6-12% slopes.	SLIGHT TO MODERATE - pervious bot- tom requires a seal blanket.	SLIGHT TO MOD- ERATE - subsoil has high stability and moderate shrink-swell po- tential; clayey substratum has medium stability.
18 Same as No. 266, Sisson silt loam														
18Y Same as No. 266, Sisson silt loam														
19 Same as No. 267, Sisson fine sandy loam														
21 Hebron loam	B	A B C	0-9 9-30 30-60+	31-60 31-60 300 plus	0.8-2.5 0.8-2.5 .05-0.2	.16 .14 .16	3 to 5	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12% SEVERE on 12-20% slopes.	None	None	MODERATE on 0-6% SEVERE on 6-12% VERY SEVERE on 12-20% slopes.	MODERATE - pervious to semi-pervious; slight where excavated to clayey substrat- um.	SLIGHT TO MOD- ERATE - low stability; medium shrink-swell po- tential; substrat- um has high shrink-swell potential.
21Y Same as No. 21, Hebron loam														
22 Hebron sandy loam	B	A B C	0-9 9-30 30-60+	10-30 31-60 300 plus	2.5-5.0 0.8-2.5 .05-0.2	.12 .16 .16	3 to 5	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12% SEVERE on 12-20% slopes.	None	None	MODERATE on 0-6% SEVERE on 6-12% VERY SEVERE on 12-20% slopes.	MODERATE - pervious; bot- tom needs a seal blanket; slight where ex- cavated to clay- ey substratum.	SLIGHT TO MOD- ERATE - subsoil has high stability and low shrink- swell potential; clayey substratum has medium sta- bility and high shrink-swell po- tential.
23 Same as No. 54, Lawson silt loam														
24 Same as No. 21, Hebron loam														
26 Wauconda fine sandy loam	C	A B C	0-10 10-24 24-60+	31-60 4/ 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.20 .16 .16	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - subject to oc- casional flood- ing.	Surface drainage is bene- ficial.	MODERATE on 0-6% slopes.	MODERATE - pervious to semi-pervious; bottom needs compaction.	MODERATE TO SEVERE - sub- soil has medium to low stability and medium to low shrink-swell po- tential; susceptible to piping.

1/ Horizon depths coincide with depths used in describing soils (Chapter IV).

2/ Values and ratings cannot be determined or are too variable for a reasonably accurate estimate. On-site investigation is needed.

3/ No profile description.

4/ Estimated percolation rates are for drained soils and do not apply to areas with high water tables.

TABLE 5.
WATER MANAGEMENT CHARACTERISTICS OF SOILS (Continued)

Soil Number & Soil Name	Hydro- logic Soil Group	1/ Soil Horizon		Percolation (Estimated) (Minutes Per Inch)	Permeability (Estimated) (Inches Per Hour)	Available Water Capacity (In./In.)	Water Table (Depth) in ft.)	Frost Hazard	Erosion Hazard	Flooding Hazard	Drain- age Require- ments	Limitations of Soils for		
		Sym- bol	Depth (Inches)									Irrigation	Reservoir Areas	Embankments
27 Wauconda silt loam	C	A B C	0-10 10-24 24-60+	31-60 ^{4/} 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.22 .18 .16	1 to 3	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - subject to oc- casional flooding.	Surface drainage is bene- ficial.	MODERATE on 0-6% slopes.	MODERATE - pervious to semi-pervious; bottom needs compaction.	MODERATE TO SEVERE - subsoil has medium sta- bility and shrink- swell potential; substratum has low stability and low shrink-swell potential; suscep- tible to piping.
27Z Same as No. 53, Astalan silt loam														
28 Colwood fine sandy loam	D	A B C	0-12 12-27 27-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.20 .18 .16	0 to 1	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - ponding and occasional flooding.	Surface drainage is bene- ficial.	MODERATE on 0-6% slopes.	MODERATE TO SEVERE - pervious to semi-pervious; high water table; suitable for dug- out ponds.	SEVERE - very low stability; low shrink-swell po- tential; suscep- tible to piping.
28Z Same as No. 330, Navan loam														
29 Colwood silt loam	D	A B C	0-12 12-27 27-60+	31-60 ^{4/} 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.25 .20 .16	0 to 1	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - ponding and occasional flooding.	Surface drainage is bene- ficial.	MODERATE on 0-6% slopes.	MODERATE - pervious to semi-pervious; high water table; suitable for dug- out ponds.	MODERATE TO SEVERE - semi- pervious to im- pervious; low stability and low shrink-swell po- tential; suscep- tible to piping.
29V Same as No. 29, Colwood silt loam														
29X Same as No. 76, Sebews silt loam														
29Z Same as No. 340, Navan silt loam														
30 Same as No. 29, Colwood silt loam														
31 Rome loam	B	A B C	0-14 14-27 27-60+	31-60 31-60 300 plus	0.8-2.5 0.8-2.5 .05-0.2	.20 .14 .18	3 to 5	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12% slopes.	MODERATE - semi-pervious to impervious; bottom needs a seal blanket; slight where excavated to clayey substratum.	SLIGHT TO MOD- ERATE - semi- pervious to im- pervious; subsoil has medium sta- bility and shrink- swell potential; substratum has low stability and high shrink-swell potential.
32 Rome sandy loam	B	A B C	0-14 14-27 27-60+	10-30 31-60 300 plus	2.5-5.0 0.8-2.5 0.5-0.2	.16 .16 .16	3 to 5	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12% slopes.	SLIGHT TO MOD- ERATE - pervious, needs seal blanket where excavation less than 30 inches.	SLIGHT TO MOD- ERATE - Subsoil has high sta- bility and low shrink-swell po- tential; substratum has medium stability and high shrink-swell po- tential.
33 Same as No. 267, Sisson fine sandy loam														
33Z Same as No. 21, Hebron loam														
34 Same as No. 266, Sisson silt loam														
35 Same as No. 46, Yahara silt loam														
35Z Same as No. 370, Mosel sandy loam														
36 Same as No. 46, Yahara silt loam														
37 Kibbie fine sandy loam	C	A B C	0-15 15-47 47-60+	31-60 ^{4/} 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.18 .18 .16	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	MODERATE - occasional flooding.	Surface drainage is bene- ficial.	MODERATE on 0-6%; SEVERE on 6-12% slopes.	MODERATE - pervious to semi-pervious; bottom needs compaction.	MODERATE TO SEVERE - sub- soil - medium stability and medium shrink- swell potential; substratum has low stability and low shrink-swell potential; suscep- tible to piping.
37Z Same as No. 370, Mosel sandy loam.														
38 Kibbie silt loam	C	A B C	0-15 15-47 47-60+	31-60 ^{4/} 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.18 .18 .16	1 to 3	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Surface drainage is bene- ficial.	MODERATE on 0-6% slopes.	MODERATE - pervious to semi-pervious; bottom needs compaction.	MODERATE TO SEVERE - sub- soil - medium stability and medium shrink-swell po- tential; substratum has low stability and low shrink- swell potential; susceptible to piping.
38R Same as No. 306, Knowles silt loam, wet variant														
38Z Same as No. 369, Mosel silt loam														
39 Saylesville loam	C	A B C	0-9 9-28 28-60+	31-60 121-300 300 plus	0.8-2.5 0.2-0.8 .05-0.2	.18 .18 .16	3 to 5	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-20% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-20% slopes.	SLIGHT - semi- pervious; bot- tom needs com- paction.	SLIGHT TO MOD- ERATE - medium to low stability; high shrink-swell potential; sandy layers in substratum are susceptible to piping.
39X Same as No. 72, Fox loam														
40 Saylesville silt loam	Same as No. 39, Saylesville loam													
40V Same as No. 266, Sisson silt loam														
40Y Same as No. 161, Dodge silt loam														
40X Same as No. 73, Fox silt loam														
41 Same as No. 42, Tichigan silt loam														
42 Tichigan silt loam	C	A B C	0-11 11-26 26-60+	31-60 ^{4/} 121-300 300 plus	0.8-2.5 0.2-0.8 .05-0.2	.20 .18 .16	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE occasional flooding.	Subsur- face drain- age is beneficial.	MODERATE on 0-6% slopes.	SLIGHT - semi- pervious; bot- tom may need compaction.	SLIGHT TO MOD- ERATE - medium stability; high to moderate shrink- swell potential.
42R Same as No. 306, Knowles silt loam, wet variant														
42V Same as No. 38, Kibbie silt loam														
42X Same as No. 87, Sleeth silt loam														
42Y Same as No. 364, Lamartine silt loam														

TABLE 5.
WATER MANAGEMENT CHARACTERISTICS OF SOILS (Continued)

Soil Number & Soil Name	Hydro-logic Soil Group	Soil Horizon		Percolation (Estimated) (Minutes Per Inch)	Permeability (Estimated) (Inches Per Hour)	Available Water Capacity (in/in.)	Water Table (Depth) (in ft.)	Frost Hazard	Erosion Hazard	Flooding Hazard	Drainage Requirements	Limitations of Soils for		
		Sym- bol	Depth (Inches)									Irrigation	Reservoir Areas	Embankments
44 Jericho silt loam	B	A	0-9	31-60	0.8-2.5	.24	3 to 5	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	None	None	MODERATE on 0-6% slopes.	SLIGHT - semi-pervious; bottom may need to be compacted.	SLIGHT TO MODERATE - medium stability; high shrink-swell potential.
45 Same as No. 46, Yahara silt loam														
45Z Same as No. 370, Mosel sandy loam														
46 Yahara silt loam	C	A	0-10	31-60 1/2	0.8-2.5	.22	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - ponding and occasional flooding.	Surface drainage is beneficial.	MODERATE on 0-6% slopes.	MODERATE TO SEVERE - pervious; bottom needs to be scarified and compacted; suitable for dug-out ponds.	MODERATE TO SEVERE - low stability; low shrink-swell potential; susceptible to piping; banks very erosive.
47 Same as No. 46, Yahara silt loam														
47Z Same as No. 371, Mosel loam														
48 Keowna silt loam	D	A	0-12	31-60 1/2	0.8-2.5	.24	0 to 1	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - ponding and occasional flooding.	Surface drainage is needed.	MODERATE on 0-6% slopes.	MODERATE TO SEVERE - pervious; high water table; suitable for dug-out ponds with low side slopes.	MODERATE TO SEVERE - low stability; low shrink-swell potential; susceptible to piping; banks very erosive.
48Z Same as No. 340, Navan silt loam														
49 Keowna fine sandy loam	D	A	0-12	31-60 1/2	0.8-2.5	.20	0 to 1	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - on 2-6% slopes.	Surface drainage is needed.	MODERATE on 0-6% slopes.	MODERATE TO SEVERE - pervious to semi-pervious; high water table; suitable for dug-out ponds with low side slopes.	SEVERE - low stability; low shrink-swell potential; susceptible to piping.
49Y Same as No. 49, Keowna fine sandy loam														
51 Astalan loam	C	A	0-9	31-60 1/2	0.8-2.5	.20	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Subsurface drainage is needed.	MODERATE on 0-6% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious.	SLIGHT TO MODERATE - subsoil has high stability and moderate shrink-swell potential; substratum has low stability.
52 Astalan sandy loam	C	A	0-9	10-30 1/2	2.5-5.0	.16	1 to 3	MODERATE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Subsurface drainage is needed.	MODERATE on 0-6% slopes.	SLIGHT TO MODERATE - pervious subsoil and semi-pervious substratum.	SLIGHT TO MODERATE - subsoil has high stability and low shrink-swell potential; substratum has low stability and high shrink-swell potential.
53 Astalan silt loam	C	A	0-9	31-60	0.8-2.5	.22	1 to 3	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	MODERATE - occasional flooding.	Subsurface drainage is needed.	MODERATE on 0-6%; SEVERE on 6-12% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious.	SLIGHT TO MODERATE - subsoil has high stability and low shrink-swell potential; substratum has low stability and high shrink-swell potential.
54 Lawson silt loam	D	A	0-25	31-60 1/2	0.8-2.5	.24	1 to 3	VERY SEVERE	SLIGHT	SEVERE - frequent flooding.	Surface drainage is beneficial.	MODERATE on 0-2% slopes.	MODERATE - pervious to semi-pervious; bottom should be compacted.	SEVERE - low stability and medium shrink-swell potential; high organic matter content.
59 Dousman sandy loam	D	A	0-13	10-30 1/2	2.5-5.0	.16	1 to 3	MODERATE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	None	Surface drainage is beneficial.	MODERATE on 0-6% slopes.	SEVERE - pervious; bottom requires a seal blanket where sandy substratum is exposed.	MODERATE TO SEVERE - semi-pervious; high stability and low shrink-swell potential.
59Z Same as No. 52, Astalan sandy loam														
60 Dousman loam	C	A	0-13	31-60	0.8-2.5	.18	1 to 3	MODERATE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	None	Surface drainage is beneficial.	MODERATE on 0-6% slopes.	MODERATE TO SEVERE - pervious; bottom needs to be scarified and compacted; bottom requires a seal blanket where sandy substratum is exposed.	MODERATE TO SEVERE - high stability and low shrink-swell potential.
60Z Same as No. 51, Astalan loam														
63 Same as No. 231, Brookston silt loam														
64 Same as No. 231, Brookston silt loam														
66 Same as No. 386, Granby fine sandy loam														
67 Same as No. 386, Granby fine sandy loam														
69 Casco part -- same as No. 173, Casco silt loam Fox part -- same as No. 73, Fox silt loam														
70 Fox sandy loam	B	A	0-10	10-30	2.5-5.0	.12	5 plus	SLIGHT	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	Moderate on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-45% slopes.	SEVERE - where sandy layers are exposed; needs seal blanket; MODERATE where excavation is less than 3 feet.	MODERATE - high stability and low shrink-swell potential.
70V Same as No. 267, Sisson fine sandy loam														
70Y Same as No. 367, Hochheim fine sandy loam														
70Z Same as No. 21, Hebron loam														
71 Casco-Fox loams														

TABLE 5.
WATER MANAGEMENT CHARACTERISTICS OF SOILS (Continued)

Soil Number & Soil Name	Hydro- logic Soil Group	1/ Soil Horizon		Percolation (Estimated) (Minutes Per Inch)	Permeability (Estimated) (Inches Per Hour)	Available Water Capacity (in/in.)	Water Table (Depth) in ft.)	Frost Hazard	Erosion Hazard	Flooding Hazard	Drain- age Require- ments	Limitations of Soils for		
		Sym- bol	Depth (Inches)									Irrigation	Reservoir Areas	Embankments
72 Fox loam	B	A B C	0-10 10-34 34-60+	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.16 .16 .02	5 plus	SLIGHT	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-30% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12%; VERY SEVERE on 12-30% slopes.	SEVERE where sandy layers are exposed; needs seal blan- ket; MODERATE where excava- tion is less than 3 feet.	MODERATE - medium stability and moderate shrink-swell po- tential.
72R Same as No. 204, Knowles loam														
72V Same as No. 268, Sisson loam														
72Y Same as No. 358, Miami loam														
72Z Same as No. 21, Hebron loam														
73 Fox silt loam	B	A B C	0-10 10-34 34-60	31-60 61-120 Less than 10	0.8-2.5 0.2-0.8 10 plus	.20 .18 .02	5 plus	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; VERY SEVERE on 12-45% slopes.	MODERATE - pervious to semi-pervious; SEVERE where sandy layers are exposed; needs seal blanket; MODERATE where excava- tion is less than 3 feet.	MODERATE - medium stability and medium shrink-swell po- tential.
73R Same as No. 208, Knowles silt loam														
73V Same as No. 266, Sisson silt loam														
73Y Same as No. 358, Miami loam														
73Z Same as No. 21, Hebron loam														
75 Rodman gravelly loam	A	A C	0-8 8-60+	Less than 10 Less than 10	10 plus 10 plus	.02 .02	5 plus	VERY SLIGHT	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes.	None	None	VERY SEVERE - very low avail- able water capacity.	VERY SEVERE - extremely per- vious.	VERY SEVERE - extremely per- vious.
76 Sebewa silt loam	D	A B C	0-14 14-32 32-60	31-60 ^{4/} 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.24 .18 .02	0 to 1	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - ponding.	Surface drainage is needed.	MODERATE on 0-6% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; high ground wa- ter table; suit- able for dugout ponds.	SLIGHT TO MOD- ERATE - subsoil has medium sta- bility and medium shrink-swell po- tential; substra- tum has high sta- bility and low shrink-swell po- tential.
76R Same as No. 212R, Ehler silt loam, rock substratum														
76V Same as No. 29, Colwood silt loam														
76Y Same as No. 231, Brookston silt loam														
76Z Same as No. 340, Navan silt loam														
77 Same as No. 59, Dousman sandy loam														
77Z Same as No. 370, Mosel sandy loam														
78 Dousman loam	C	A B C	0-13 13-28 28-60+	31-60 ^{4/} 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.16 .16 .04	1 to 3	MODERATE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Surface drainage is bene- ficial.	MODERATE on 0-6% slopes.	SEVERE per- vious; bottom needs to be scarified and compacted; bot- tom needs a seal blanket where sandy substratum is exposed.	MODERATE TO SEVERE - high stability and low shrink-swell po- tential.
78V Same as No. 38, Kibbie silt loam														
78Y Same as No. 178, Crosby silt loam														
79 Waukechon loam	D	A B C	0-11 11-28 28-60+	31-60 ^{4/} 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.20 .16 .04	0 to 1	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE	Surface drainage is needed.	MODERATE on 0-6% slopes.	MODERATE TO SEVERE - per- vious to semi- pervious; high water table; suitable for dug- out ponds.	MODERATE TO SEVERE - high stability; low shrink-swell po- tential; suscepti- ble to piping.
80 Sebewa loam	D	A B C	0-14 14-32 32-60+	31-60 ^{4/} 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.20 .18 .02	0 to 1	MODERATE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - ponding and occasional flooding.	Surface drainage is needed.	MODERATE on 0-6% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; high ground wa- ter table; substra- tum has high sta- bility and low shrink-swell po- tential.	SLIGHT TO MOD- ERATE - subsoil has medium sta- bility and medium shrink-swell po- tential; substra- tum has high sta- bility and low shrink-swell po- tential.
80V Same as No. 29, Colwood silt loam														
80Y Same as No. 231, Brookston silt loam														
80Z Same as No. 330, Navan loam														
81 Sebewa sandy loam	D	A B C	0-14 14-32 32-60+	10-30 ^{4/} 31-60 Less than 10	2.5-5.0 0.8-2.5 10 plus	.10 .16 .02	0 to 1	MODERATE	SLIGHT	MODERATE - ponding.	Surface drainage is needed.	MODERATE on 0-2% slopes.	MODERATE - pervious to semi-pervious; high ground wa- ter table; suit- able for dugout ponds.	MODERATE TO SEVERE - high stability and low shrink-swell po- tential.
82 Juneau silt loam	C	A B C	0-26 26-40 40-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.20 .18 .18	3 to 5	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	MODERATE - occasional flooding.	None	MODERATE on 2-6%; SEVERE on 6-12% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; bottom needs to be scarified and compacted.	MODERATE - medium stability and shrink-swell potential; low in subsoil and high in substratum.
84 Ockley silt loam	B	A B C	0-13 13-55 55-60+	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.20 .18 .02	5 plus	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12% slopes.	SLIGHT TO MOD- ERATE - subsoil has medium sta- bility and high shrink-swell po- tential; substra- tum has high sta- bility and low shrink-swell po- tential.	SLIGHT TO MOD- ERATE - subsoil has medium sta- bility and high shrink-swell po- tential; substra- tum has high sta- bility and low shrink-swell po- tential.
84V Same as No. 266, Sisson silt loam														
84Z Same as No. 24, Hebron silt loam														
84R Same as No. 208, Knowles silt loam														

TABLE 3.
WATER MANAGEMENT CHARACTERISTICS OF SOILS (Continued)

Soil Number & Soil Name	Hydro- logic Soil Group	1/ Soil Horizon		Percolation (Estimated) (Minutes Per Inch)	Permeability (Estimated) (Inches Per Hour)	Available Water Capacity (in/in.)	Water Table (Depth) (in ft.)	Frost Hazard	Erosion Hazard	Flooding Hazard	Drain- age Require- ments	Limitations of Soils for		
		Sym- bol	Depth (Inches)									Irrigation	Reservoir Areas	Embankments
86 Thackery silt loam	B	A B C	0-12 12-51 51-60+	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.20 .18 .02	3 to 5	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12% slopes.	SLIGHT TO MOD- ERATE - subsoil to semi-pervious; bottom may need to be compacted; bottom needs a seal blanket where sandy layers are exposed.	SLIGHT TO MOD- ERATE - subsoil has medium sta- bility and high shrink-swell po- tential; substra- tum has high sta- bility and low shrink-swell po- tential.
86V Same as No. 266, Sisson silt loam														
87 Sleeth silt loam	C	A B C	0-12 12-49 40-60+	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.20 .18 .02	1 to 3	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Subsur- face, sur- face drain- age, or both, are beneficial.	MODERATE on 0-6% slopes.	SLIGHT TO MOD- ERATE - pervious to semi-pervious; bottom may need to be com- pacted; bottom needs a seal blanket where sandy layers are exposed.	SLIGHT TO MOD- ERATE - subsoil has medium sta- bility; high shrink-swell po- tential; substra- tum has high sta- bility; low shrink- swell potential.
87Z Same as No. 371, Mosel loam														
89 Briggsville silty clay	C	A B C	0-9 9-36 36-60+	31-60 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	.20 .18 .16	5 plus	SEVERE	SLIGHT	None	None	MODERATE on 0-2% slopes.	SLIGHT - semi- pervious; bot- tom may need to be compacted.	SLIGHT TO MOD- ERATE - medium to low stability; high shrink-swell potential; in some places sandy sub- stratum suscepti- ble to piping.
91 Parr silt loam	B	A B C	0-11 11-32 32-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.24 .20 .10	5 plus	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12% slopes.	SLIGHT TO MOD- ERATE - pervious to semi-pervious; bottom may need compaction.	SLIGHT TO MOD- ERATE - semi- pervious to im- pervious; subsoil has low to med- ium stability and moderate shrink- swell potential; substratum has high stability and low shrink-swell potential; stony in places.
91D Same as No. 91, Parr silt loam														
92 Same as No. 91, Parr silt loam														
92N Same as No. 91, Parr silt loam														
97 Same as No. 288, Hackett loamy sand														
99 Kewaunee silty clay loam	B	A B C	0-8 8-26 26-60+	61-120 121-300 300 plus	0.2-0.8 0.2-0.8 .05-0.2	.18 .18 .16	3 to 5	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes.	None	None	SEVERE on 0-12%; VERY SEVERE on 12-45% slopes.	SLIGHT - semi- pervious; may be suitable for dugout ponds.	SLIGHT TO MOD- ERATE - medium to low stability; moderate shrink- swell potential.
100 Kewaunee silt loam	B	A B C	0-8 8-26 26-60+	31-60 121-300 300 plus	0.8-2.5 0.2-0.8 .05-0.2	.20 .18 .16	3 to 5	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-45% slopes.	SLIGHT - semi- pervious; bottom may need to be compacted.	SLIGHT TO MOD- ERATE - medium stability; moder- ate high shrink- swell potential.
101 Kewaunee sandy loam	B	A B C	0-8 8-26 26-60+	10-30 121-300 300 plus	2.5-5.0 0.2-0.8 .05-0.2	.12 .18 .16	3 to 5	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-20% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-20% slopes.	SLIGHT TO MOD- ERATE - pervious to semi-pervious; bottom needs a seal blanket unless all sandy material is re- moved.	SLIGHT TO MOD- ERATE - medium to low stability; moderate shrink- swell potential.
102 Vilas loamy sand	A	A C	0-6 6-60+	Less than 10 Less than 10	5-10 10 plus	.07 .03	5 plus	VERY SLIGHT	MODERATE	None	None	MODERATE 0-6% slopes.	VERY SEVERE - pervious bottom requires a seal blanket.	SEVERE - high stability; low shrink-swell po- tential; suscepti- ble to piping.
103 Kewaunee loam	Same as No. 100, Kewaunee silt loam													
106 Lorenzo silt loam	B	A B C	0-8 8-19 19-60+	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.20 .10 .02	5 plus	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12%; VERY SEVERE on 12-45% slopes.	SLIGHT TO MOD- ERATE - pervious to semi-pervious; bottom needs a seal blanket where sandy layers are ex- posed.	SLIGHT TO MOD- ERATE - subsoil has moderate shrink-swell po- tential; substra- tum has high sta- bility and low shrink-swell po- tential.
106Z Same as No. 31, Rome loam														
108 Lorenzo- Rodman loams	Lorenzo part -- same as No. 110, Lorenzo loam Rodman part -- same as No. 75, Rodman gravelly loam													
109 Same as No. 174, Faldus loam														
109V Same as No. 38, Kibbie silt loam														
109Y Same as No. 371, Mosel loam														
109Z Same as No. 369, Mosel silt loam														
110 Same as No. 106, Lorenzo silt loam														
110R Same as No. 208, Knowles silt loam														
110Y Same as No. 191, Parr silt loam, shallow variant														
110Z Same as No. 16, Rome loam														
111 Same as No. 161, Dodge silt loam														
112 Same as No. 243, Calamus silt loam														
113 Same as No. 278, Clyman silt loam														
114 Same as No. 358, Miami loam														
116 Same as No. 343, Celina silt loam, nearly level to gently sloping														
118 Same as No. 178, Crosby silt loam														
119 Warsaw silt loam	B	A B C	0-12 12-33 33-60+	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.20 .10 .02	5 plus	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-20% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12%; VERY SEVERE on 12-20% slopes.	SEVERE where sandy layers are exposed; needs seal blanket; MODERATE where excava- tion is less than 3 feet.	SLIGHT TO MOD- ERATE - subsoil has medium sta- bility and moder- ate shrink-swell potential; substra- tum has high sta- bility and low shrink-swell po- tential.

TABLE 5.
WATER MANAGEMENT CHARACTERISTICS OF SOILS (Continued)

Soil Number & Soil Name	Hydro-logic Soil Group	1/ Soil Horizon		Percolation (Estimated) (Minutes Per Inch)	Permeability (Estimated) (Inches Per Hour)	Available Water Capacity (in./in.)	Water Table (Depth) in ft.)	Frost Hazard	Erosion Hazard	Flooding Hazard	Drainage Requirements	Limitations of Soils for		
		Sym- bol	Depth (Inches)									Irrigation	Reservoir Areas	Embankments
119V	Same as No. 266, Sisson silt loam													
119Y	Same as No. 91, Parr silt loam													
119Z	Same as No. 16, Rome silt loam													
120	Same as No. 119, Warsaw silt loam except frost hazard							SLIGHT						
120Y	Same as No. 91, Parr silt loam													
120Z	Same as No. 31, Rome loam													
121	Same as No. 106, Lorenzo silt loam													
122	Same as No. 106, Lorenzo silt loam													
123	Tippecanoe silt loam	B	A 0-12 B 12-55 C 55-60+	31-60 4/ 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.24 .20 .02	3 to 5	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; bottom may need to be compacted; bottom needs a seal blanket where sandy layers are exposed.	SLIGHT TO MODERATE - subsoil has medium stability and medium shrink-swell potential; substratum has high stability and low shrink-swell potential.
123V	Same as No. 266, Sisson silt loam													
123Z	Same as No. 21, Hebron loam													
124	Crane silt loam	C	A 0-10 B 10-46 C 46-60+	31-60 4/ 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.24 .20 .02	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE occasional flooding.	Subsurface, surface drainage, or both are needed.	MODERATE on 0-6% slopes.	SLIGHT - pervious to semi-pervious; bottom may need compaction.	SLIGHT TO MODERATE - subsoil has medium stability and moderate shrink-swell potential; substratum has low shrink-swell potential.
125	Same as No. 206, Knowles silt loam, shallow variant													
126	Westland silt loam	D	A 0-12 B 12-46 C 46-60+	31-60 4/ 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.24 .20 .02	0 to 1	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - pervious to semi-pervious; occasional flooding.	Subsurface drainage, or both, are beneficial.	MODERATE on 0-6% slopes.	SLIGHT - pervious to semi-pervious; high water table; suitable for dug-out ponds.	SLIGHT TO MODERATE - subsoil has a medium stability; moderate shrink-swell potential; substratum has high stability; low shrink-swell potential.
126Y	Same as No. 212, Ehler silt loam													
126Z	Same as No. 340, Navan silt loam													
126V	Same as No. 29, Colwood silt loam													
133	Spinks fine sand	A	A 0-4 BA 4-56 C 56-60+	Less than 10 Less than 10 Less than 10	5-10 5-10 5-10	.04 .04 .04	5 plus	VERY SLIGHT	SEVERE on all slopes.	None	None	SEVERE on 0-12%; VERY SEVERE on 12-45% slopes.	VERY SEVERE - very pervious; bottom requires a seal blanket.	SEVERE - very pervious; severe piping hazard.
134	Spinks loamy fine sand	A	A 0-4 BA 4-56 C 56-60+	10-30 10-30 Less than 10	2.5-5 2.5-5 5-10	.12 .12 .04	5 plus	VERY SLIGHT	SLIGHT on 0-2%; MODERATE on 6-12% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12% slopes.	VERY SEVERE - very pervious; bottom requires a seal blanket.	SEVERE - very pervious; severe piping hazard.
142	Manawa silt loam	C	A 0-12 B 12-24 C 24-60+	31-60 4/ 121-300 300 plus	0.8-2.5 0.2-0.8 .05-0.2	.20 .18 .16	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Subsurface, surface drainage, or both, are beneficial.	MODERATE on 0-6% slopes.	SLIGHT - semi-pervious; bottom may need compaction.	SLIGHT TO MODERATE - subsoil has medium stability and high shrink-swell potential.
144	Same as No. 371, Mosel loam													
152	Lapeer loam, shallow variant	Same as No. 153, Lapeer loam												
153	Lapeer loam	B	A 0-12 B 12-30 C 30-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.16 .08 .07	5 plus	SLIGHT	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12%; VERY SEVERE on 12-45% slopes.	MODERATE - pervious to semi-pervious; bottom needs to be scarified and compacted; bottom requires a seal blanket where sandy layers are exposed.	SLIGHT TO MODERATE - high stability and low shrink-swell potential; stony in places.
154	Same as No. 155, McHenry silt loam													
155	McHenry silt loam	B	A 0-13 B 13-37 C 37-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.20 .18 .07	5 plus	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-30% slopes.	None	None	SLIGHT on 0-2%; SEVERE on 2-12%; VERY SEVERE on 12-30% slopes.	SLIGHT - pervious to semi-pervious; bottom should be scarified and compacted; bottom may require a seal blanket where loamy substratum is exposed.	SLIGHT TO MODERATE - medium stability and low shrink-swell potential.
156	Lapeer sandy loam	B	A 0-12 B 12-30 C 30-60+	10-30 10-30 10-30	2.5-5.0 2.5-5.0 2.5-5.0	.12 .08 .07	5 plus	SLIGHT	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12% slopes.	MODERATE TO SEVERE - pervious to semi-pervious; bottom requires a seal blanket.	MODERATE - high stability; low shrink-swell potential in places.
157	Same as No. 156, Lapeer sandy loam													
160	Hochheim-Casco-Sisson loams	Hochheim part -- same as No. 357, Hochheim loam Casco part -- same as No. 172, Casco loam Sisson part -- same as No. 268, Sisson loam												
161	Dodge silt loam	B	A 0-12 B 12-39 C 39-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.20 .18 .10	5 plus	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	SLIGHT - on 0-2%; MODERATE on 2-6%; SEVERE on 6-12% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; bottom should be compacted; bottom may require a seal blanket where loamy substratum is exposed.	SLIGHT TO MODERATE - subsoil has medium stability and moderate shrink-swell potential; substratum has high stability and low shrink-swell potential.
161R	Same as No. 208, Knowles silt loam													
165	Poygan silt loam	D	A 0-8 B 8-24 C 24-60+	31-60 4/ 121-300 300 plus	0.8-2.5 0.2-0.8 .05-0.2	.24 .18 .16	0 to 1	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - ponding and occasional flooding.	Subsurface and surface drainage are needed.	MODERATE on 0-6% slopes.	SLIGHT - semi-pervious; high water table; suitable for dug-out ponds.	SLIGHT TO MODERATE - medium to low stability; high shrink-swell potential.

TABLE 5.
WATER MANAGEMENT CHARACTERISTICS OF SOILS (Continued)

Soil Number & Soil Name	Hydro-logic Soil Group	1/ Soil 16191011		Percolation (Estimated) (Minutes Per Inch)	Permeability (Estimated) (Inches Per Hour)	Available Water Capacity (in/in.)	Water Table (Depth in ft.)	Frost Hazard	Erosion Hazard	Flooding Hazard	Drainage Requirements	Limitations of Soils for		
		Sym- Sol	Depth (Inches)									Irrigation	Reservoir Areas	Embankments
170 Casco sandy loam	B	A B C	0-9 9-18 18-60+	10-30 10-30 Less than 10	2.5-5.0 2.5-5.0 10 plus	.12 .12 .02	5 plus	VERY SLIGHT	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-45% slopes.	MODERATE TO SEVERE - pervious bottom requires a seal blanket where sandy layers are exposed.	SLIGHT TO MODERATE - pervious; high stability; low shrink-swell potential.
170V Same as No. 267, Sisson fine sandy loam														
170Y Same as No. 22, Hebron sandy loam														
170Z Same as No. 22, Hebron sandy loam														
171 Same as No. 165, Poygan silt loam														
172 Casco loam	B	A B C	0-9 9-18 18-60+	31-60 61-120 Less than 10	0.8-2.5 0.2-0.5 10 plus	.16 .18 .02	5 plus	SLIGHT	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-45% slopes.	MODERATE - pervious to semi-pervious; bottom needs a seal blanket where sandy layers are exposed.	MODERATE - medium to high stability and low shrink-swell potential.
172R Same as No. 204, Knowles loam														
172V Same as No. 268, Sisson loam														
172Y Same as No. 357, Hochheim loam														
172Z Same as No. 21, Hebron loam														
173 Casco silt loam	B	A B C	0-9 9-18 18-60+	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.20 .18 .02	5 plus	SLIGHT	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-45% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; needs a seal blanket where sandy layers are exposed.	SLIGHT TO MODERATE - subsoil has medium to high stability and low shrink-swell potential.
173V Same as No. 266, Sisson silt loam														
173Y Same as No. 360, Hochheim silt loam														
173Z Same as No. 21, Hebron loam														
174 Fabius loam	C	A B C	0-9 9-19 19-60+	31-60 4/ 61-120 Less than 10	0.8-2.5 0.2-0.8 10 plus	.16 .18 .02	1 to 3	SLIGHT	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	MODERATE - occasional flooding.	Surface drainage is beneficial.	MODERATE on 0-6%; SEVERE on 6-12% slopes.	MODERATE - pervious to semi-pervious; bottom needs a seal blanket where sandy layers are exposed.	MODERATE - subsoil has medium to high stability and low shrink-swell potential; substratum has high stability and low shrink-swell potential.
175 Fabius sandy loam	C	A B C	0-9 9-19 19-60+	10-30 4/ 10-30 Less than 10	2.5-5.0 2.5-5.0 10 plus	.12 .12 .02	1 to 3	SLIGHT	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-20% slopes.	MODERATE - occasional flooding.	Surface drainage is beneficial.	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-20% slopes.	MODERATE TO SEVERE - pervious; bottom needs a seal blanket where sandy layers are exposed.	MODERATE TO SEVERE - high stability and low shrink-swell potential.
175Z Same as No. 370, Mosel sandy loam														
176 Mussey loam	D	A B C	0-18 18-26 26-60+	31-60 4/ 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.20 .18 .02	0 to 1	MODERATE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - ponding and occasional flooding.	Surface drainage is needed.	MODERATE on 0-6% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; high water table; suitable for dugout ponds.	SLIGHT TO MODERATE - subsoil has medium stability and moderate shrink-swell potential; substratum has high stability and very low shrink-swell potential.
176Z Same as No. 330, Navan loam														
176V Same as No. 176, Mussey loam														
178 Crosby silt loam	C	A B C	0-10 10-33 33-60+	31-60 4/ 61-120 31-60	0.8-2.5 0.2-0.8 0.8-2.5	.18 .18 .10	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12% slopes.	MODERATE - occasional flooding.	Subsurface, surface drainage, or both, are beneficial.	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12 to 20% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; bottom may need to be scarified and compacted.	SLIGHT TO MODERATE - subsoil has medium stability and high shrink-swell potential; substratum has high stability and low shrink-swell potential.
179 Same as No. 231, Brookston silt loam														
180 Mussey sandy loam	D	A B C	0-18 18-26 26-60+	10-30 4/ 31-60 Less than 10	2.5-5.0 0.8-2.5 10 plus	.10 .16 .02	0 to 1	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	MODERATE - ponding.	Surface drainage is needed.	MODERATE on 0-2% slopes.	MODERATE - pervious; bottom needs a seal blanket.	MODERATE TO SEVERE - subsoil has high stability and moderate shrink-swell potential; susceptible to piping; substratum has low shrink-swell potential.
181 Mussey silt loam	D	A B C	0-18 18-26 26-60	31-60 4/ 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.24 .18 .02	0 to 1	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	MODERATE - ponding and occasional flooding.	Surface drainage is needed.	MODERATE on 0-6% slopes; SEVERE on 6-12% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; high water table; suitable for dugout ponds.	SLIGHT TO MODERATE - subsoil has medium stability and medium shrink-swell potential; substratum has high stability and low shrink-swell potential.
181V Same as No. 29, Colwood silt loam														
181Y Same as No. 231, Brookston silt loam														
181Z Same as No. 340, Navan silt loam														
182 Fabius silt loam	C	A B C	0-9 9-19 19-60+	31-60 4/ 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.20 .18 .02	1 to 3	MODERATE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Surface drainage is beneficial.	MODERATE on 0-6% slopes.	MODERATE - pervious to semi-pervious; bottom needs a seal blanket where sandy layers are exposed.	MODERATE - subsoil has moderate shrink-swell potential; substratum has high stability; very low shrink-swell potential.
182V Same as No. 38, Kibbie silt loam														
182Y Same as No. 178, Crosby silt loam														
182Z Same as No. 369, Mosel silt loam														
188 Same as No. 178, Crosby silt loam														

TABLE 5.
WATER MANAGEMENT CHARACTERISTICS OF SOILS (Continued)

Soil Number & Soil Name	Hydro-logic Soil Group	1/ Soil Horizon		Percolation (Estimated) (Minutes Per Inch)	Permeability (Estimated) (Inches Per Hour)	Available Water Capacity (in/in.)	Water Table (Depth) (in ft.)	Frost Hazard	Erosion Hazard	Flooding Hazard	Drainage Requirements	Limitations of Soils for		
		Sym- bol	Depth (Inches)									Irrigation	Reservoir Areas	Embankments
189 Bristol silt loam	C	A B C	0-16 16-45 45-60+	31-60 $\frac{4}{1}$ 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.24 .18 .10	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Subsur- face, sur- face drain- age, or both, are beneficial.	MODERATE on 0-6% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; bottom may need to be scarified and compacted.	SLIGHT - subsoil has medium sta- bility and high shrink-swell po- tential; substratum has high stability and low shrink-swell potential.
191 Parr silt loam, shallow variant	B	A B C	0-8 8-19 19-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.24 .18 .10	5 plus	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-30% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12%; VERY SEVERE on 12-30% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; should be com- pacted.	SLIGHT TO MOD- ERATE - subsoil has low to medium stability and medium shrink-swell po- tential; substratum has high stability and low shrink-swell potential.
195 Same as No. 288, Hackett loamy sand														
195Y Same as No. 156, Lapeer sandy loam														
195V Same as No. 267, Sison fine sandy loam														
195Z Same as No. 22, Hebron sandy loam														
203 Matherton loam	C	A B C	0-11 11-35 35-60+	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.16 .12 .02	1 to 3	MODERATE	SLIGHT	MODERATE - occasional flooding.	Subsur- face or surface drainage, or both, are bene- ficial.	MODERATE on 0-6% slopes.	MODERATE - pervious to semi-pervious; bottom needs to be scarified and compacted; bot- tom needs a seal blanket where sandy layers are exposed.	SLIGHT TO MOD- ERATE - subsoil has medium sta- bility and medium shrink-swell po- tential; substratum has high stability and low shrink-swell potential.
203V Same as No. 38, Kibbie silt loam														
203Y Same as No. 178, Crosby silt loam														
203Z Same as No. 371, Mosel loam														
204 Knowles loam	B	A B R	0-9 9-33 33-60+	31-60 61-120 Variable	0.8-2.5 0.2-0.8 Variable	.16 .18 -	5 plus	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12% slopes.	MODERATE - pervious to semi-pervious; bottom needs a seal blanket where bedrock is ex- posed.	SLIGHT TO MOD- ERATE - subsoil has medium sta- bility; moderate shrink-swell po- tential; dolomite bedrock at 20 to 42".
206 Knowles silt loam, shallow variant	B	A B R	0-7 7-15 15-60+	31-60 31-60 Variable	0.8-2.5 0.8-2.5 Variable	.20 .14 -	5 plus	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-20% slopes.	None	None	SEVERE on 0-12%; VERY SEVERE on 12-20% slopes.	SEVERE - per- vious to semi-pervious above bedrock; bottom needs a seal blanket where bedrock is ex- posed.	SEVERE TO MOD- ERATE - medium stability and shrink-swell po- tential; less than 20 inches to dolomite bedrock.
208 Knowles silt loam	B	A B R	0-9 9-33 33-60+	31-60 31-60 Variables	0.8-2.5 0.8-2.5 Variable	.20 .14 -	5 plus	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-20% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-20% slopes.	MODERATE - pervious to semi-pervious; bottom needs a seal blanket where bedrock is exposed.	MODERATE TO SLIGHT - subsoil has medium sta- bility and shrink-swell potential; dolomite bedrock at 20 to 42 inches.
212 Ehler silt loam	D	A B C	0-10 10-33 33-60+	10-30 $\frac{4}{1}$ 61-120 61-120	2.5-5.0 0.2-0.8 0.2-0.8	.24 .20 .18	0 to 1	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - ponding - oc- casional flooding.	Subsur- face drain- age is needed.	MODERATE on 0-6% slopes.	SLIGHT - per- vious to semi-pervious; high water table; suitable for dug-out ponds.	SLIGHT TO MOD- ERATE - medium stability and high shrink-swell po- tential; susceptible to piping.
212X Same as No. 126, Westland silt loam														
212Y Same as No. 212, Ehler silt loam														
212R Ehler silt loam, rock substratum	D	A B R	0-10 10-33 33-60+	10-30 $\frac{4}{1}$ 61-120 Variable	2.5-5.0 0.2-0.8 Variable	.24 .20 -	0 to 1	VERY SEVERE	SLIGHT on 0-2% slopes.	MODERATE - ponding.	Surface drainage is needed.	MODERATE on 0-2% slopes.	SEVERE - per- vious to semi-pervious above bedrock; bottom requires a seal blanket where bedrock is ex- posed.	SEVERE TO MOD- ERATE - medium stability and shrink-swell po- tential; bedrock less than 24 in- ches.
213 Same as No. 212, Ehler silt loam														
213V Same as No. 29, Colwood silt loam														
213R Same as No. 212R, Ehler silt loam, rock substratum														
214 Same as No. 212, Ehler silt loam														
215 Same as No. 212, Ehler silt loam														
216 Same as No. 212, Ehler silt loam														
217 Bono silty clay loam	D	A B C	0-18 18-34 34-60+	121-300 $\frac{4}{1}$ 121-300 300 plus	0.2-0.8 0.2-0.8 .05-0.2	.20 .18 .16	0 to 1	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - ponding.	Subsur- face drain- age is needed.	SEVERE on 0-6% slopes.	SLIGHT - semi-pervious; high water table; suitable for dug-out ponds.	SLIGHT TO MOD- ERATE - medium to low sta- bility and high shrink-swell potential.
218 Same as No. 217, Bono silty clay loam														
218V Same as No. 212, Ehler silt loam														
218Y Same as No. 212, Ehler silt loam														
226 Same as No. 226D, Keyser silt loam														
226D Keyser silt loam	B	A B C	0-15 15-47 47-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.24 .20 .10	3 to 5	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; bottom may need to be scarified and compacted.	SLIGHT TO MOD- ERATE - medium stability and med- ium shrink-swell potential.
228 Same as No. 458, Rollin muck, shallow														
231 Brookston silt loam	D	A B C	0-12 12-40 40-60+	31-60 $\frac{4}{1}$ 61-120 31-60	0.8-2.5 0.2-0.8 0.8-2.5	.24 .20 .10	0 to 1	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	MODERATE - ponding and occasional flooding.	Subsur- face drain- age is needed.	MODERATE on 0-6%; SEVERE on 6-12% slopes.	SLIGHT - per- vious to semi-pervious; high ground water table; suitable for dugout ponds.	SLIGHT TO MOD- ERATE - subsoil has low stability and high shrink-swell potential; substratum has high stability and low shrink-swell potential.
231Z Same as No. 298, Ashburn silty clay loam														

TABLE 5.
WATER MANAGEMENT CHARACTERISTICS OF SOILS (Continued)

Soil Number & Soil Name	Hydro-logic Soil Group	Soil Horizon		Percolation (Estimated) (Minutes Per Inch)	Permeability (Estimated) (Inches Per Hour)	Available Water Capacity (in./in.)	Water Table (Depth) (in ft.)	Frost Hazard	Erosion Hazard	Flooding Hazard	Drainage Requirements	Limitations of Soils for		
		Sym- bol	Depth (Inches)									Irrigation	Reservoir Areas	Embankments
233 Matherton silt loam	C	A B C	0-11 11-35 35-60+	31-60 $\frac{4}{1}$ 61-120 Less than 10	0.8-2.5 0.2-0.8 10 plus	.20 .18 .02	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	MODERATE - occasional flooding.	Subsur- face, sur- face drainage, or both, are bene- ficial.	MODERATE on 0-6%; SEVERE on 6-12% slopes.	MODERATE - pervious to semi-pervious; bottom needs to be scarified and compacted; bot- tom requires a seal blanket where sandy layers are ex- posed.	SLIGHT TO MOD- ERATE - subsoil has medium sta- bility and high shrink-swell po- tential; substra- tum has high sta- bility and low shrink-swell po- tential; very per- vious.
233V Same as No. 38, Kibbie silt loam														
233Y Same as No. 178, Crosby silt loam														
233Z Same as No. 369, Mosel silt loam														
234 Matherton sandy loam	C	A B C	0-11 11-35 35-60+	10-30 $\frac{4}{1}$ 10-30 Less than 10	2.5-5.0 2.5-5.0 10 plus	.12 .12 .02	1 to 3	SLIGHT	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Subsur- face or surface drainage, or both, are bene- ficial.	MODERATE on 0-6% slopes.	MODERATE TO SEVERE - per- vious; bottom needs to be scarified and compacted; bot- tom requires a seal blanket where sandy layers are ex- posed.	MODERATE TO SEVERE - high stability and low shrink-swell po- tential; substra- tum very pervious.
234V Same as No. 37, Kibbie fine sandy loam														
234Y Same as No. 178, Crosby silt loam														
243 Calamus silt loam	B	A B C	0-10 10-45 45-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.20 .18 .10	3 to 5	MODERATE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; bottom requires a seal blanket where loamy substratum is exposed.	SLIGHT - medium stability and me- dium shrink-swell potential.
250 Tedrow sandy loam	A	A C	0-9 9-60+	10-30 $\frac{3}{1}$ Less than 10	2.5-5.0 5 to 10	.16 .04	1 to 3	VERY SLIGHT	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Surface drainage is bene- ficial.	MODERATE on 0-6% slopes.	SEVERE - per- vious; bottom requires a seal blanket; may be suitable for dug- out ponds.	SEVERE - medium to high stability and low shrink-swell potential; susceptible to piping.
250Z Same as No. 370, Mosel sandy loam														
250V Same as No. 250, Tedrow sandy loam														
250Y Same as No. 250, Tedrow sandy loam														
251 Tedrow loamy sand	A	A C	0-9 9-60+	Less than 10 Less than 10	5 to 10 5 to 10	.08 .04	1 to 3	VERY SLIGHT	MODERATE	MODERATE - occasional flooding.	Surface drainage is bene- ficial.	MODERATE on 0-6% slopes.	VERY SEVERE - pervious; bottom requires a seal blanket; may be suitable for dug- out ponds.	SEVERE - high stability and low shrink-swell po- tential; suscepti- ble to piping.
251Y Same as No. 251, Tedrow loamy sand														
251Z Same as No. 52, Astalan sandy loam														
254 Tustin sandy loam	B	A B C	0-10 10-39 39-60+	10-30 Less than 10 121-300	2.5-5.0 5-10 0.2-0.8	.10 .06 .16	5 plus	VERY SLIGHT	MODERATE on 0-6%; SEVERE on 6-12% slopes.	MODERATE - occasional flooding.	None	MODERATE on 0-6%; SEVERE on 6-12% slopes.	MODERATE - pervious sandy subsoil requires a seal blanket unless removed to clayey sub- stratum.	MODERATE - semi-pervious; sandy material has high stability and low shrink-swell potential; clayey substratum has medium sta- bility and high shrink-swell po- tential.
261 Hackett sandy loam, wet variant	B	A B C	0-13 13-19 19-60	10-30 $\frac{4}{1}$ Less than 10 Less than 10	2.5-5.0 10 plus 10 plus	.16 .04	1 to 3	SLIGHT	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Surface drainage is beneficial.	MODERATE on 0-6% slopes.	SEVERE - per- vious to semi-pervious; bottom requires a seal blanket.	MODERATE - susceptible to piping; compacts readily.
262 Hackett loamy sand, wet variant	B	A B C	0-13 13-19 19-60+	Less than 10 $\frac{4}{1}$ Less than 10 Less than 10	5-10 5-10 10 plus	.10 .07 .04	1 to 3	SLIGHT	MODERATE	MODERATE - occasional flooding.	Surface drainage is beneficial.	MODERATE on 0-6% slopes.	SEVERE - per- vious; bottom requires a seal blanket.	SEVERE - per- vious; susceptible to piping.
266 Sisson silt loam	B	A B C	0-8 8-23 23-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.22 .18 .16	5 plus	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-30% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12%; VERY SEVERE on 12-45% slopes.	MODERATE - pervious to semi-pervious; bottom needs to be scarified and compacted.	MODERATE - low medium stability; medium shrink-swell potential.
266X Same as No. 266, Sisson silt loam														
266Z Same as No. 21, Hebron loam														
266R Same as No. 208, Knowles silt loam														
267 Sisson fine sandy loam	B	A B C	0-8 8-23 23-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.18 .18 .16	5 plus	SLIGHT	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-30% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12%; VERY SEVERE on 12-30% slopes.	MODERATE TO SEVERE - per- vious to semi-pervious; bottom needs to be scarified and compacted.	MODERATE - low to medium stability and medium shrink-swell po- tential.
268 Sisson loam	B	A B C	0-8 8-23 23-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.20 .18 .16	5 plus	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12%; VERY SEVERE on 12-45% slopes.	MODERATE - pervious to semi-pervious; bottom should be compacted.	MODERATE - semi-pervious to impervious; me- dium stability and high shrink-swell potential; substra- tum susceptible to piping.
269 Warsaw sandy loam	B	A B C	0-12 12-33 33-60+	10-30 31-60 Less than 10	2.5-5.0 0.8-2.5 10 plus	.16 .16 .02	5 plus	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-30% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-30% slopes.	MODERATE TO SEVERE - per- vious; bottom needs to be scarified and compacted; re- quires a seal blanket where sandy layers are exposed.	MODERATE - high stability and low shrink-swell potential.
270 Same as No. 289, Hackett sandy loam														
270V Same as No. 267, Sisson fine sandy loam														
271 Same as No. 288, Hackett loamy sand														

TABLE 5.
WATER MANAGEMENT CHARACTERISTICS OF SOILS (Continued)

Soil Number & Soil Name	Hydro-logic Soil Group	1/ Soil Horizon		Percolation (Estimated) (Minutes Per Inch)	Permeability (Estimated) (Inches Per Hour)	Available Water Capacity (In./in.)	Water Table (Depth) (in. ft.)	Frost Hazard	Erosion Hazard	Flooding Hazard	Drainage Requirements	Limitations of Soils for		
		Sym- bol	Depth (Inches)									Irrigation	Reservoir Areas	Embankments
272 Tustin loamy fine sand	B	A B C	0-10 10-39 39-60+	Less than 10 Less than 10 121-300	5-10 5-10 .02-0.8	.08 .04 .16	5 plus	VERY SLIGHT	MODERATE on 0-6%; SEVERE on 6-12% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12% slopes.	SEVERE - pervious sandy subsoil; bottom requires a seal blanket unless removed down to clayey substratum.	MODERATE TO SEVERE - subsoil has high stability and low shrink-swell potential; susceptible to piping; clayey substratum has medium stability and high shrink-swell potential.
276 Boyer sandy loam	B	A B C	0-13 13-30 30-60+	10-30 31-60 Less than 10	2.5-5.0 0.8-2.5 10 plus	.09 .14 .04	5 plus	VERY SLIGHT	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-20% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-20% slopes.	SEVERE - pervious; bottom requires a seal blanket where sandy substratum is exposed.	MODERATE TO SEVERE - high stability and low shrink-swell potential.
276Y Same as No. 156, Lapeer sandy loam														
276Z Same as No. 254, Tustin sandy loam														
277 Sumner sandy loam	B	A B C	0-15 15-46 46-60+	10-30 31-60 Less than 10	2.5-5.0 0.8-2.5 10 plus	.16 .14 .04	5 plus	VERY SLIGHT	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12%; VERY SEVERE on 12-10% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-10% slopes.	SEVERE - pervious to semi-pervious; bottom requires a seal blanket where sandy layers are exposed.	MODERATE TO SEVERE - high stability and low shrink-swell potential.
277Y Same as No. 156, Lapeer sandy loam														
277Z Same as No. 254, Tustin sandy loam														
278 Clyman silt loam	C	A B C	0-12 12-48 48-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.20 .18 .10	1 to 3	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	MODERATE - occasional flooding.	Subsurface or surface drainage, or both, are beneficial.	MODERATE on 0-6%; SEVERE on 6-12% slopes.	SLIGHT - pervious to semi-pervious; bottom should be compacted.	SLIGHT TO MODERATE - medium stability and moderate shrink-swell potential; stony in places.
279 Same as No. 276, Boyer sandy loam														
280 Same as No. 316, Boyer loamy sand														
281 Hackett loam	A	A B C	0-14 14-17 17-60+	31-60 61-120 Less than 10	0.8-2.5 0.2-0.8 10 plus	.16 .18 .02	5 plus	SLIGHT	MODERATE on 2-12%; SEVERE on 12-20% slopes.	None	None	MODERATE on 2-6%; SEVERE on 6-12%; VERY SEVERE on 12-20% slopes.	MODERATE TO SEVERE - pervious to semi-pervious; bottom requires a seal blanket where sandy substratum is exposed.	SLIGHT TO MODERATE - medium to high stability; low shrink-swell potential.
282 Casco-Rodman loams	Casco part -- same as No. 172, Casco loam Rodman part -- same as No. 75, Rodman gravelly loam													
283 Same as No. 370, Mosel sandy loam														
284 Same as No. 370, Mosel sandy loam														
285 Same as No. 176, Mussey loam														
286 Same as No. 181, Mussey silt loam														
287 Same as No. 176, Mussey loam														
288 Hackett loamy sand	A	A B C	0-14 14-17 17-60+	Less than 10 Less than 10 Less than 10	5-10 5-10 10 plus	.07 .07 .04	5 plus	SLIGHT	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-45% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-45% slopes.	SEVERE - pervious; bottom requires a seal blanket.	SEVERE - low shrink-swell potential; susceptible to piping.
288Y Same as No. 267, Sisson fine sandy loam														
289 Hackett sandy loam	A	A B C	0-14 14-17 17-60+	10-30 Less than 10 Less than 10	2.5-5.0 0.8-2.5 10 plus	.09 .14 .04	5 plus	VERY SLIGHT	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-30% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-30% slopes.	SEVERE - pervious to semi-pervious; bottom requires a seal blanket.	MODERATE - high stability and low shrink-swell potential; susceptible to piping.
289Y Same as No. 156, Lapeer sandy loam														
289Z Same as No. 254, Tustin sandy loam														
295 Morley-Beecher silt loam	Morley part -- same as No. 297, Morley silt loam Beecher part -- same as No. 3361, Beecher silt loam													
297 Morley silt loam	C	A B C	0-8 8-28 28-60+	31-60 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	.20 .18 .16	3 to 5	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-45% slopes.	SLIGHT - semi-pervious; bottom should be compacted.	SLIGHT TO MODERATE - low stability and high shrink-swell potential.
297S Same as No. 297, Morley silt loam														
297V Same as No. 266, Sisson silt loam														
297X Same as No. 73, Fox silt loam														
297Y Same as No. 297, Morley silt loam														
298 Ashkum silty clay loam	D	A B C	0-13 13-32 32-60+	31-60 121-300 300 plus	0.8-2.5 0.2-0.8 .05-0.2	.20 .18 .18	0 to 1	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	MODERATE - ponding; occasional flooding.	Subsurface drainage is needed.	SEVERE on 0-12% slopes.	SLIGHT - semi-pervious; bottom suitable for dug-out ponds.	MODERATE - low stability; high shrink-swell potential.
299 Blount silt loam	C	A B C	0-11 11-29 29-60+	31-60 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	.20 .18 .16	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Subsurface drainage, or both, are beneficial.	MODERATE on 0-6% slopes.	SLIGHT - semi-pervious; bottom should be compacted.	SLIGHT TO MODERATE - low stability; high shrink-swell potential.
300 Ashkum-Beecher silt loams	Ashkum part -- same as No. 298, Ashkum silty clay loam Beecher part -- same as No. 3361, Beecher silt loam													
302 Same as No. 459, Rollin muck														
303 Alluvial land, rock substratum	D	3/ 3/ 3/	3/ 3/ 3/	2/ 2/ 2/	2/ 2/ 2/	2/ 2/ 2/	0 to 1	2/ 2/ 2/	2/ 2/ 2/	SEVERE	Surface drainage is needed.	MODERATE TO VERY SEVERE	2/ 2/ 2/	2/ 2/ 2/
305 Same as No. 208, Knowles silt loam														

TABLE 5.
WATER MANAGEMENT CHARACTERISTICS OF SOILS (Continued).

Soil Number & Soil Name	Hydro-logic Soil Group	Soil Horizon		Percolation (Estimated) (Minutes Per Inch)	Permeability (Estimated) (Inches Per Hour)	Available Water Capacity (In./in.)	Water Table (Depth) (in ft.)	Frost Hazard	Erosion Hazard	Flooding Hazard	Drainage Requirements	Limitations of Soils for		
		Sym- bol	Depth (Inches)									Irrigation	Reservoir Areas	Embankments
306 Knowles silt loam, wet variant	C	A B C	0-10 10-34 34-60+	31-60 $\frac{4}{1}$ 31-60 Variable	0.8-2.5 0.8-2.5 Variable	.20 .14	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	MODERATE - occasional flooding.	Surface drainage is beneficial.	MODERATE on 0-6%; SEVERE on 6-12% slopes.	MODERATE - pervious to semi-pervious above bedrock; a seal blanket needed where bedrock is exposed.	MODERATE TO SLIGHT - subsoil has medium stability and shrink-swell potential; bedrock at 20 to 42 inches.
307 Same as No. 306, Knowles silt loam, wet variant														
308 Same as No. 206, Knowles silt loam, shallow variant														
311 Manawa loam	C	A B C	0-12 12-24 24-60+	31-60 $\frac{4}{1}$ 121-300 300 plus	0.8-2.5 0.2-0.8 .05-0.2	.20 .18 .16	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Subsurface, surface, drainage, or both, are beneficial.	MODERATE on 0-6% slopes.	SLIGHT - semi-pervious; bottom may need to be compacted.	SLIGHT TO MODERATE - medium stability and high shrink-swell potential.
314 Same as No. 380, Sumner loamy sand														
315 Oshtemo loamy sand	B	A B C	0-18 18-46 46-60+	Less than 10 Less than 10 Less than 10	5-10 5-10 10 plus	.07 .07 .04	5 plus	VERY SLIGHT	MODERATE on 0-6% slopes.	None	None	MODERATE on 0-6% slopes.	SEVERE - pervious bottom requires a seal blanket where sandy substratum is exposed.	SEVERE - susceptible to piping; very pervious.
316 Boyer loamy sand	B	A B C	0-13 13-30 30-60+	Less than 10 Less than 10 Less than 10	5-10 5-10 10 plus	.07 .07 .04	5 plus	VERY SLIGHT	MODERATE on 0-6%; SEVERE on 6-12% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-30% slopes.	SEVERE - pervious; bottom requires a seal blanket where sandy substratum is exposed.	SEVERE - susceptible to piping; very pervious.
316Y Same as No. 156, Lapeer sandy loam														
316Z Same as No. 272, Tustin loamy sand														
317 Oshtemo loamy fine sand	B	A B C	0-18 18-46 46-60+	Less than 10 Less than 10 Less than 10	5-10 5-10 10 plus	.09 .09 .04	5 plus	VERY SLIGHT	MODERATE on 0-6%; SEVERE on 6-12% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12% slopes.	SEVERE - pervious; bottom requires a seal blanket where sandy substratum is exposed.	SEVERE - very pervious; susceptible to piping.
320 Oshtemo sandy loam	B	A B C	0-18 18-46 46-60+	10-30 31-60 Less than 10	2.5-5.0 0.8-2.5 10 plus	.09 .14 .04	5 plus	SLIGHT	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12% slopes.	SEVERE - pervious to semi-pervious; bottom requires a seal blanket where sandy substratum is exposed.	MODERATE TO SEVERE - very permeable; susceptible to piping.
323 Ionia sandy loam	B	A B C	0-10 10-33 33-60+	10-30 10-30 Less than 10	2.5-5.0 2.5-5.0 10 plus	.12 .12 .02	3 to 5	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12% slopes.	MODERATE TO SEVERE - pervious bottom should be scarified and compacted; seal blanket needed where sandy layers are exposed.	MODERATE TO SEVERE - high stability and low shrink-swell potential.
323V Same as No. 267, Sisson fine sandy loam														
324 Ionia loam	B	A B C	0-10 10-33 33-60+	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.16 .12 .02	3 to 5	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12% slopes.	MODERATE - pervious to semi-pervious; bottom may need a seal blanket.	MODERATE - subsoil has medium stability and high shrink-swell potential; substratum has high stability and high shrink-swell potential.
324Y Same as No. 343, Celina silt loam, nearly level to gently sloping														
324Z Same as No. 21, Hebron loam														
324V Same as No. 268, Sisson loam														
325 Varna silt loam	B	A B C	0-11 11-29 29-60+	31-60 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	.22 .18 .18	3 to 5	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12% slopes.	SLIGHT - semi-pervious; bottom should be compacted.	SLIGHT TO MODERATE - low stability and high shrink-swell potential.
326 Abington silt loam	D	A B C	0-18 18-45 45-60+	31-60 $\frac{4}{1}$ 61-120 Less than 10	0.8-2.5 0.2-0.8 10 plus	.24 .20 .02	0 to 1	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - ponding; occasional flooding.	Subsurface, surface drainage, or both, are needed.	MODERATE on 0-6% slopes.	SLIGHT - pervious to semi-pervious; high ground water table; suitable for dugout ponds.	SLIGHT TO MODERATE - subsoil has low stability; substratum has high stability and low shrink-swell potential.
326Z Same as No. 212, Ehler silt loam														
327 Walkkill silt loam	D	A AB	0-32 32-60+	31-60 $\frac{4}{1}$ 10-30	0.8-2.5 2.5-5.0	.20 .20	0 to 1	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	MODERATE - ponding; occasional flooding.	Subsurface, surface drainage, or both, are needed.	MODERATE on 0-6%; SEVERE on 6-12% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; high water table; organic material should be removed; suitable for dugout ponds.	MODERATE - mineral material has medium stability; high shrink-swell potential; organic material has low stability.
328 Pistakee silt loam	C	A B C	0-25 25-50 50-60+	31-60 $\frac{4}{1}$ 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	.22 .18 .18	1 to 3	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Subsurface drainage is beneficial.	MODERATE on 0-6% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; bottom may need to be compacted.	SLIGHT TO MODERATE - medium stability and high shrink-swell potential.
328Y Same as No. 328, Pistakee silt loam														
330 Navan loam	D	A B C	0-12 12-28 28-60	31-60 $\frac{4}{1}$ 31-60 300 plus	0.8-2.5 0.8-2.5 .05-0.2	.20 .14 .18	0 to 1	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - ponding; occasional flooding.	Subsurface, surface drainage, or both, are needed.	MODERATE on 0-6% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; high water table; suitable for dugout ponds.	SLIGHT TO MODERATE - medium to low stability; high shrink-swell potential.
331 Markham-Elliott silt loam	Markham part -- same as No. 336, Markham silt loam Elliott part -- same as No. 3251, Elliott silt loam													
332 Kane silt loam	C	A B C	0-13 13-32 32-60+	31-60 $\frac{4}{1}$ 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.20 .10 .02	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Subsurface or surface drainage, or both, are beneficial.	MODERATE on 0-6% slopes.	MODERATE - pervious to semi-pervious; bottom should be scarified and compacted; a seal blanket is needed where sandy layers are exposed.	SLIGHT TO MODERATE - subsoil has medium stability and medium shrink-swell potential; substratum has high stability and low shrink-swell potential.

TABLE 5.
WATER MANAGEMENT CHARACTERISTICS OF SOILS (Continued)

Soil Number & Soil Name	Hydro-logic Soil Group	Soil Horizon		Percolation (Estimated) (Minutes Per Inch)	Permeability (Estimated) (Inches Per Hour)	Available Water Capacity (in./in.)	Water Table (Depth) (in ft.)	Frost Hazard	Erosion Hazard	Flooding Hazard	Drainage Requirements	Limitations of Soils for		
		Sym- bol	Depth (Inches)									Irrigation	Reservoir Areas	Embankments
332V	Same as No. 27, Wauconda silt loam													
332Y	Same as No. 178, Crosby silt loam													
332Z	Same as No. 53, Aztalan silt loam													
333	Eagle silt loam	B	A 0-12 B 12-31 C 31-60+	31-60 31-60 Less than 10	0.8-2.5 0.2-0.8 10 plus	.20 .10 .02	3 to 5	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12% slopes.	MODERATE - pervious to semi-pervious; bottom should be scarified and compacted; bottom requires a seal blanket where sandy layers are exposed.	SLIGHT TO MODERATE - semi-pervious subsoil that has medium stability and medium shrink-swell potential; substratum has high stability and low shrink-swell potential.
333Y	Same as No. 91, Parr silt loam													
333Z	Same as No. 16, Rome silt loam													
334	Same as No. 119, Warsaw silt loam													
335	Ionia silt loam	B	A 0-10 B 10-33 C 33-60+	31-60 61-120 Less than 10	0.8-2.5 0.2-0.8 10 plus	.20 .18 .02	3 to 5	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12% slopes.	MODERATE - pervious to semi-pervious; bottom may require a seal blanket.	MODERATE - subsoil has medium stability and shrink-swell potential; substratum has high stability and low shrink-swell potential.
335Y	Same as No. 343, Celina silt loam, nearly level to gently sloping													
335Z	Same as No. 21, Hebron loam													
336	Markham silt loam	C	A 0-11 B 11-29 C 29-60+	31-60 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	.20 .18 .18	3 to 5	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-20% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-20% slopes.	SLIGHT - semi-pervious; bottom should be compacted.	MODERATE - low stability and high shrink-swell potential.
338	Same as No. 298, Ashkum silty clay loam													
339	Abington silty clay loam	D	A 0-18 B 18-45 C 45-60	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.20 .20 .02	0 to 1	VERY SEVERE	SLIGHT	MODERATE - ponding.	Subsurface or surface drainage, or both, are needed.	SEVERE on 0-2% slopes.	SLIGHT - pervious to semi-pervious above gravelly substratum; high ground water table; suitable for dugout ponds.	SLIGHT TO MODERATE - subsoil has low stability; substratum has high stability and low shrink-swell potential.
340	Navan silt loam	D	A 0-12 B 12-28 C 28-60+	31-60 31-60 300 plus	0.8-2.5 0.8-2.5 .05-0.2	.22 .18	0 to 1	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - ponding; occasional flooding.	Subsurface or surface drainage, or both, are needed.	MODERATE on 0-6% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; high water table; suitable for dugout ponds.	SLIGHT TO MODERATE - medium to low stability and medium shrink-swell potential.
343	Celina silt loam (nearly level to gently sloping)	B	A 0-12 B 12-34 C 34-60+	31-60 61-120 31-60	0.8-2.5 0.2-0.8 0.8-2.5	.18 .18 .10	3 to 5	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-20% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; bottom may need a seal blanket where loamy substratum is expected.	SLIGHT TO MODERATE - subsoil has medium stability and high shrink-swell potential; substratum has high stability and low shrink-swell potential.
343	Celina silt loam (sloping to moderately steep)	Same as No. 362, Theresa silt loam												
344	Ashford silt loam	B	A 0-11 B 11-20 C 20-60+	31-60 61-120 31-60	0.8-2.5 0.2-0.8 0.8-2.5	.18 .18 .12	3 to 5	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; bottom may need a seal blanket where loamy substratum is exposed.	SLIGHT TO MODERATE - subsoil has medium stability and shrink-swell potential; substratum has high stability and low shrink-swell potential.
345	Nanno silt loam	C	A 0-13 B 13-19 C 19-60+	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.20 .20 .02	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-20% slopes.	MODERATE - occasional flooding.	Subsurface or surface drainage, or both, are beneficial.	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-20% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; may need to be scarified and compacted.	SLIGHT TO MODERATE - subsoil has medium stability and shrink-swell potential; substratum has high stability and low shrink-swell potential.
346	Kane loam	C	A 0-13 B 13-32 C 32-60+	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.20 .10 .02	1 to 3	MODERATE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - flooding.	Subsurface or surface drainage, or both, are beneficial.	MODERATE on 0-6% slopes.	MODERATE - semi-pervious; bottom should be scarified and compacted; needs a seal blanket where sandy layers are exposed.	SLIGHT TO MODERATE - subsoil has medium stability and shrink-swell potential; substratum has high stability and very low shrink-swell potential.
346Y	Same as No. 178, Crosby silt loam													
352	Same as No. 153, Lapeer loam													
355	Same as No. 156, Lapeer sandy loam													
356	Same as No. 156, Lapeer sandy loam													
357	Hochheim loam	B	A 0-9 B 9-18 C 18-60+	31-60 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	.16 .18 .12	5 plus	SLIGHT	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12%; VERY SEVERE on 12-45% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; bottom needs to be compacted.	SLIGHT TO MODERATE - subsoil has medium stability and shrink-swell potential; substratum has high stability and low shrink-swell potential.
357R	Same as No. 204, Knowles loam													
357X	Same as No. 172, Casco loam													
358	Miami loam	B	A 0-11 B 11-27 C 27-60+	31-60 61-120 31-60	0.8-2.5 0.2-0.8 0.8-2.5	.16 .18 .10	5 plus	SLIGHT	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-30% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12%; VERY SEVERE on 12-30% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; bottom should be compacted.	SLIGHT TO MODERATE - subsoil has medium stability and shrink-swell potential; substratum has high stability and low shrink-swell potential.

TABLE 5.
WATER MANAGEMENT CHARACTERISTICS OF SOILS (Continued)

Soil Number & Soil Name	Hydro-logic Soil Group	Soil Horizon		Percolation (Estimated) (Minutes Per Inch)	Permeability (Estimated) (Inches Per Hour)	Available Water Capacity (in/in.)	Water Table (Depth) (in ft.)	Frost Hazard	Erosion Hazard	Flooding Hazard	Drainage Requirements	Limitations of Soils for		
		Sym- bol	Depth (Inches)									Irrigation	Reservoir Areas	Embankments
359 Hennepin loam	B	A C	0-8 8-60+	31-60 31-60	0.8-2.5 0.8-2.5	.16 .10	5 plus	SLIGHT	SEVERE on all slopes.	None	None	VERY SEVERE on all slopes.	MODERATE - pervious to semi-pervious; bottom should be scarified and compacted; bottom may need a seal blanket where loamy substratum is exposed.	SLIGHT TO MODERATE - high stability and low shrink-swell potential; stony in places.
360 Hochheim silt loam	B	A B C	0-9 9-18 18-60+	31-60 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	.18 .18 .12	5 plus	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12%; VERY SEVERE on 12-45% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; bottom needs to be compacted.	SLIGHT TO MODERATE - subsoil has medium stability and shrink-swell potential; substratum has high stability and low shrink-swell potential.
360R Same as No. 208, Knowles silt loam														
360V Same as No. 266, Sisson silt loam														
360X Same as No. 173, Casco silt loam														
361 Miami silt loam	Same as No. 358, Miami loam													
362 Theresa silt loam	B	A B C	0-9 9-31 31-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.20 .20 .12	5 plus	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12%; VERY SEVERE on 12-45% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; bottom should be compacted.	SLIGHT TO MODERATE - subsoil has medium stability and shrink-swell potential; substratum has high stability and low shrink-swell potential.
362R Same as No. 208, Knowles silt loam														
362V Same as No. 266, Sisson silt loam														
362X Same as No. 73, Fox silt loam														
362Z Same as No. 21, Hebron loam														
363 Mayville silt loam	B	A B C	0-11 11-36 36-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.20 .18 .10	3 to 5	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6% slopes; SEVERE on 6-12% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; bottom may need a seal blanket where loamy substratum is exposed.	SLIGHT TO MODERATE - subsoil has medium stability and shrink-swell potential; substratum has high stability and low shrink-swell potential.
363Y Same as No. 363, Mayville silt loam														
363R Same as No. 306, Knowles silt loam, wet variant														
363X Same as No. 335, Ionia silt loam														
363Z Same as No. 21, Hebron loam														
364 Lamartine silt loam	C	A B C	0-12 12-30 30-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.20 .18 .10	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	MODERATE - occasional flooding.	Subsurface or surface drainage, or both, are beneficial.	MODERATE on 0-6%; SEVERE on 6-12% slopes.	SLIGHT - pervious to semi-pervious; bottom may need to be scarified and compacted.	SLIGHT TO MODERATE - subsoil has medium stability and shrink-swell potential; substratum has high stability and low shrink-swell potential.
364V Same as No. 38, Kibbie silt loam														
364X Same as No. 233, Matherton silt loam														
364Z Same as No. 369, Mosel silt loam														
365 Hochheim-Hennepin loams	Hochheim part -- same as No. 357, Hochheim loam Hennepin part -- same as No. 359, Hennepin loam													
365X Hochheim-Hennepin loams, gravelly substratum	Hochheim part -- same as No. 172, Casco loam Hennepin part -- same as No. 359, Hennepin loam													
366 Hochheim-Theresa loams	Hochheim part -- same as No. 357, Hochheim loam Theresa part -- same as No. 362, Theresa silt loam													
367 Hochheim fine sandy loam	B	A B C	0-9 9-18 18-60+	10-30 61-120 61-120	2.5-5.0 0.2-0.8 0.2-0.8	.12 .18 .12	5 plus	SLIGHT	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE TO SEVERE - pervious to semi-pervious; bottom may need a seal blanket where loamy substratum is exposed.	MODERATE - subsoil has medium stability and moderate shrink-swell potential; substratum has high stability and low shrink-swell potential.
369 Mosel silt loam	C	A B C	0-13 13-29 29-60	31-60 31-60 300 plus	0.8-2.5 0.8-2.5 .05-0.2	.20 .18 .18	1 to 3	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Subsurface drainage is beneficial.	MODERATE on 0-6% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious.	SLIGHT TO MODERATE - subsoil has high stability and moderate shrink-swell potential; substratum has low stability and moderate shrink-swell potential.
370 Mosel sandy loam	C	A B C	0-13 13-29 29-60+	10-30 31-60 300 plus	2.5-5.0 0.8-2.5 .05-0.2	.12 .16 .18	1 to 3	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	MODERATE - occasional flooding.	Subsurface drainage is beneficial.	MODERATE on 0-6%; SEVERE on 6-12% slopes.	MODERATE - pervious to semi-pervious.	MODERATE - subsoil has high stability and low shrink-swell potential; substratum has low stability and high shrink-swell potential.
371 Mosel loam	C	A B C	0-13 13-29 29-60+	31-60 31-60 300 plus	0.8-2.5 0.8-2.5 .05-0.2	.16 .14 .18	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Subsurface drainage is beneficial.	MODERATE on 0-6% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious.	SLIGHT TO MODERATE - subsoil has high stability and moderate shrink-swell potential; substratum has low stability and moderate shrink-swell potential.

TABLE 5.
WATER MANAGEMENT CHARACTERISTICS OF SOILS (Continued)

Soil Number & Soil Name	Hydro- logic Soil Group	1/ Soil Horizon		Percolation (Estimated) (Minutes Per Inch)	Permeability (Estimated) (Inches Per Hour)	Available Water Capacity (in./in.)	Water Table (Depth) (in ft.)	Frost Hazard	Erosion Hazard	Flooding Hazard	Drain- age Require- ments	Limitations of Soils for		
		Sym- bol	Depth (Inches)									Irrigation	Reservoir Areas	Embankments
380 Sumner loamy sand	B	A B C	0-15 15-46 46-60+	Less than 10 Less than 10 Less than 10	5-10 5-10 10 plus	.10 .07 .04	5 plus	VERY SLIGHT	MODERATE	None	None	MODERATE on 2-6% slopes.	SEVERE - per- vious; bottom needs a seal blanket where sandy substratum is exposed.	SEVERE - per- vious; suscep- tible to piping.
386 Granby fine sandy loam	D	A C	0-12 12-60+	10-30 ^{4/} Less than 10	2.5-5.0 5-10	.10 .04	0 to 1	SLIGHT	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - ponding; occa- sional flooding.	Surface drainage is needed.	MODERATE on 0-6% slopes.	SEVERE - per- vious; high wa- ter table; bottom needs a seal blanket; suitable for dugout ponds.	SEVERE - very pervious; suscep- tible to piping.
386Y Same as No. 386, Granby fine sandy loam														
386Z Same as No. 330, Navan loam														
387 Granby loamy sand	D	A C	0-12 12-60+	Less than 10 Less than 10	5-10 10 plus	.08 .04	0 to 1	SLIGHT	MODERATE	MODERATE - ponding; occa- sional flooding.	Surface drainage is needed.	MODERATE on 0-6% slopes.	VERY SEVERE - very pervious; bottom needs a seal blanket.	SEVERE - very pervious; high stability.
387Y Same as No. 26, Wauconda fine sandy loam														
391 Wea sandy loam	B	A B C	0-13 13-49 49-60+	10-30 31-60 Less than 10	2.5-5.0 0.8-2.5 10 plus	.16 .16 .02	5 plus	MODERATE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-20% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-20% slopes.	MODERATE - pervious to semi- pervious; bottom should be com- pacted; bottom needs a seal blanket where sandy layers are exposed.	SLIGHT TO MOD- ERATE - high stability and low shrink-swell po- tential.
392 Oakley loam	B	A B C	0-13 13-55 55-60+	31-60 31-60 Less than 10	0.8-2.5 0.8-2.5 10 plus	.20 .16 .02	5 plus	MODERATE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	SLIGHT TO MOD- ERATE - pervious to semi- pervious; bottom needs to be scarified and substratum has low shrink-swell potential.	MODERATE - me- dium stability and medium shrink- swell potential.
393 Oakley sandy loam	B	A B C	0-13 13-55 55-60+	10-30 31-60 Less than 10	2.5-5.0 0.8-2.5 10 plus	.12 .16 .02	5 plus	MODERATE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	None	None	MODERATE on 0-6% slopes.	MODERATE TO SEVERE - per- vious to semi- pervious; bottom should be com- pacted; bottom needs a seal blanket where sandy layers are exposed.	MODERATE - high stability and low shrink-swell potential.
394 Farr sandy loam	B	A B C	0-11 11-32 32-60+	10-30 31-60 31-60	2.5-5.0 0.8-2.5 0.8-2.5	.16 .16 .10	5 plus	SLIGHT	MODERATE on 2-12%; SEVERE on 12-20% slopes.	None	None	MODERATE on 2-6%; SEVERE on 6-12%; VERY SEVERE on 12-20% slopes.	MODERATE - pervious to semi- pervious; bottom should be compacted.	MODERATE - sub- soil has low to me- dium stability and medium shrink- swell potential; substratum has high stability and low shrink-swell potential; stony in places.
397 Ozaukee silt loam	C	A B C	0-8 8-30 30-60+	31-60 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	.20 .18 .16	5 plus	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-45% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12%; VERY SEVERE on 12-45% slopes.	SLIGHT - semi- pervious; bottom should be com- pacted.	SLIGHT TO MOD- ERATE - low sta- bility and medium volume change.
397Y Same as No. 397, Ozaukee silt loam														
397V Same as No. 397, Ozaukee silt loam														
397R Same as No. 208, Knowles silt loam														
397X Same as No. 73, Fox silt loam														
398 Same as No. 298, Ashkum silty clay loam														
399 Mequon silt loam	C	A B C	0-8 8-27 27-60+	31-60 ^{4/} 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	.20 .18 .18	1 to 3	VERY SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE - occasional flooding.	Subsurface or surface drainage, or both, are bene- ficial.	MODERATE on 0-6% slopes.	SLIGHT - semi- pervious; bottom should be com- pacted.	SLIGHT TO MOD- ERATE - low sta- bility and high shrink-swell po- tential.
410 Same as No. 134, Spinks loamy sand														
411 Spinks fine sand, silty substratum	A	A B C	0-4 4-56 56-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.18 .18 .16	5 plus	VERY SLIGHT	SLIGHT on 0-2%; MODERATE on 2-12%; SEVERE on 12-30% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12%; VERY SEVERE on 12-30% slopes.	SEVERE - per- vious; requires a seal blanket.	SEVERE - very pervious; suscep- tible to piping.
413 Crestview fine sandy loam	A	A C	0-15 15-60+	10-30 Less than 10	2.5-5.0 5-10	.10 .05	5 plus	VERY SLIGHT	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	None	None	MODERATE on 0-6% slopes.	SEVERE - per- vious; bottom requires a seal blanket.	SEVERE - very pervious; suscep- tible to piping.
413Z Same as No. 254, Tustin sandy loam														
414 Crestview loamy fine sand	A	A C	0-15 15-60+	Less than 10 Less than 10	5-10 5-10	.08 .05	5 plus	VERY SLIGHT	MODERATE on 0-6%; SEVERE on 6-12% slopes.	None	None	MODERATE on 0-6%; SEVERE on 6-12% slopes.	VERY SEVERE - pervious; bottom requires a seal blanket.	SEVERE - very pervious; suscep- tible to piping.
416 Terrace escarpment, till	C	C	3/	61-120	0.2-0.8	.16	5 plus	VARIABLE	SEVERE on all slopes.	None	None	SEVERE TO VERY SEVERE - generally steep.	SEVERE - var- iable	SEVERE - variable
417 Terrace es- carpment, outwash	B	C	3/	Less than 10	10 plus	.02	5 plus	VARIABLE	SEVERE on all slopes.	None	None	SEVERE TO VERY SEVERE - generally steep.	SEVERE - var- iable	SEVERE - variable.
419 Beach sand	A	C	3/	Less than 10	10 plus	.02	VARIABLE	SLIGHT	SEVERE on all slopes.	SLIGHT - governed by lake level	Drainage impractic- al	VERY SEVERE	VERY SEVERE - very pervious; fluctuating lake water levels affects ground water table.	VERY SEVERE - very pervious; high stability and low shrink-swell potential.
420 Same as No. 358, Miami loam														
421 Same as No. 161, Dodge silt loam														
431 Same as No. 206, Knowles silt loam, shallow variant														
449 Same as No. 451, Houghton mucky peat														
450 Houghton muck														

TABLE 5.
WATER MANAGEMENT CHARACTERISTICS OF SOILS (Continued)

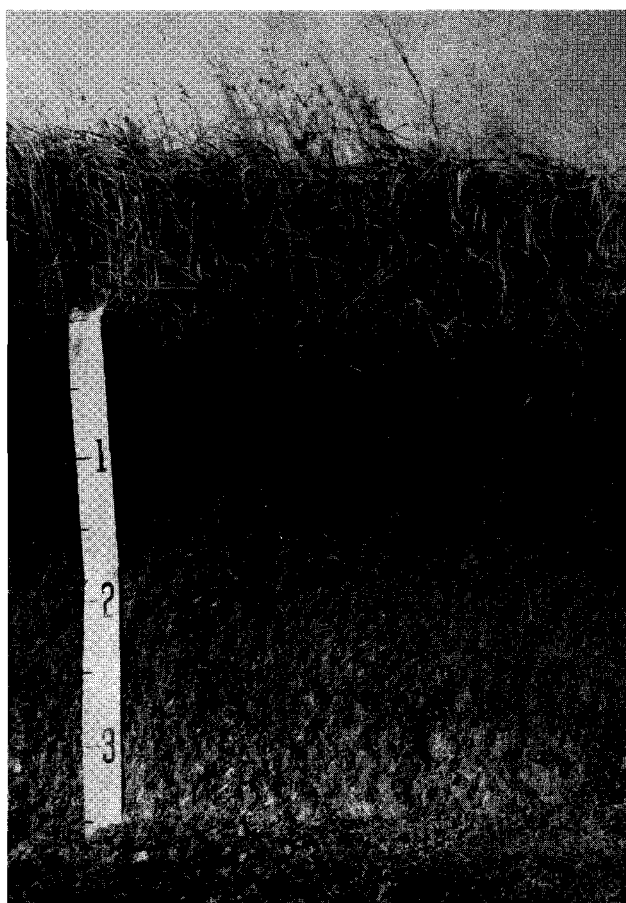
Soil Number & Soil Name	Hydro-logic Soil Group	Soil Horizon		Percolation (Estimated) (Minutes Per Inch)	Permeability (Estimated) (Inches Per Hour)	Available Water Capacity (in/in.)	Water Table (Depth) (in ft.)	Frost Hazard	Erosion Hazard	Flooding Hazard	Drainage Requirements	Limitations of Soils for		
		Sym- bol	Depth (Inches)									Irrigation	Reservoir Areas	Embankments
451 Houghton mucky peat	D	A	0-60+	10-30 $\frac{4}{1}$	2.5-5.0	.20	0 to 1	SLIGHT	MODERATE on 0-6%; SEVERE on 6-12% slopes.	MODERATE ponding; occasional flooding.	Subsurface or surface drainage, or both, are needed.	MODERATE on 0-6%; SEVERE on 6-12% slopes.	SEVERE - pervious; high water table; suitable for dugout ponds; flotation of organic material may occur.	SEVERE - pervious; low stability; suitable for low embankments.
452 Adrian muck	D	A C	0-26 26-60+	10-30 $\frac{4}{1}$ Less than 10	2.5-5.0 5-10	.20+ .04	0 to 1	SLIGHT	MODERATE	MODERATE ponding; occasional flooding.	Drainage impractical.	MODERATE on 0-6% slopes.	SEVERE - pervious; high water table; suitable for dugout ponds; bottom needs a seal blanket.	SEVERE - pervious; organic surface has low stability; may be used for low embankments; substratum has stability but is susceptible to piping.
452Z Same as No. 454, Palms muck														
453 Adrian mucky peat	Same as No. 452, Adrian muck													
454 Palms muck	D	A C	0-30 30-60+	10-30 $\frac{4}{1}$ Less than 10	2.5-5.0 0.2-0.8	.20+ .14	0 to 1	SLIGHT	MODERATE	MODERATE ponding; occasional flooding.	Subsurface or surface drainage, or both, are needed.	MODERATE on 0-6% slopes.	MODERATE TO SEVERE - pervious; high water table; suitable for dugout ponds; suitable for reservoirs if organic material is removed.	SEVERE - organic material has low stability; may be used for low embankments.
455 Same as No. 454, Palms muck														
456 Ogden muck	D	A C	0-25 25-60+	10-30 $\frac{4}{1}$ 300 plus	2.5-5.0 Less than .05	.20+ .16	0 to 1	SLIGHT	MODERATE	MODERATE ponding; occasional flooding.	Subsurface or surface drainage, or both, are needed.	MODERATE on 0-6% slopes.	MODERATE TO SEVERE - pervious; high water table; suitable for dugout ponds; suitable for reservoirs if organic material is removed.	SEVERE - organic material has low stability; may be used for low embankments.
457 Ogden mucky peat	Same as No. 456, Ogden muck													
458 Rollin muck, shallow	D	A C	0-24 24-60+	10-30 $\frac{4}{1}$ 300 plus	2.5-5.0 .05-0.2	.20+ .16	0 to 1	SLIGHT	MODERATE	MODERATE ponding; occasional flooding.	Subsurface or surface drainage, or both, are needed.	MODERATE on 0-6% slopes.	MODERATE TO SEVERE - pervious; high water table; suitable for dugout ponds; substratum suitable for reservoirs.	SEVERE - pervious; low stability; suitable for low embankments.
459 Rollin muck	D	A C	0-38 38-60+	10-30 $\frac{4}{1}$ 300 plus	2.5-5.0 .05-0.2	.20+ .16	0 to 1	SLIGHT	MODERATE	MODERATE ponding; occasional flooding.	Subsurface or surface drainage, or both, are needed.	MODERATE on 0-6% slopes.	MODERATE TO SEVERE - pervious; high water table; suitable for dugout ponds; substratum suitable for reservoirs.	SEVERE - pervious; low stability; suitable for low embankments.
460 Same as No. 459, Rollin muck														
461 Same as No. 456, Ogden muck														
462 Houghton peat, acid variant	D	A	0-60+	10-30 $\frac{4}{1}$	2.5-5.0	.20+	0 to 1	SLIGHT	MODERATE	MODERATE subject to ponding.	Subsurface or surface drainage, or both, are needed.	MODERATE on 0-2% slopes.	MODERATE TO SEVERE - pervious; high water table; suitable for dugout ponds; substratum suitable for reservoirs.	SEVERE - pervious; suitable for low embankments.
502 Same as No. 504, Flagg silt loam														
504 Flagg silt loam	B	A B C	0-12 12-52 52-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.20 .18 .12	5 plus	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	SLIGHT - pervious to semi-pervious; reservoir bottom may need to be compacted.	SLIGHT TO MODERATE - medium stability and shrink-swell potential.
505 Flagg silt loam, wet variant	C	A B C	0-12 12-52 52-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.22 .18 .12	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	MODERATE ponding; occasional flooding.	Subsurface or surface drainage, or both, are beneficial.	MODERATE on 0-6%; SEVERE on 6-12% slopes.	SLIGHT - pervious to semi-pervious; bottom may need to be compacted.	SLIGHT TO MODERATE - medium stability and shrink-swell potential.
508 Same as No. 510, Pecatonica silt loam														
510 Pecatonica silt loam	B	A B C	0-8 8-46 46-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.20 .18 .12	5 plus	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	None	None	SLIGHT on 0-2%; MODERATE on 2-6%; SEVERE on 6-12% slopes.	SLIGHT - pervious to semi-pervious; bottom should be compacted.	SLIGHT TO MODERATE - medium stability and shrink-swell potential.
511 Same as No. 505, Flagg silt loam, wet variant														
514 Same as No. 516, Westville silt loam														
516 Westville silt loam	B	A B C	0-11 11-50 50-60+	31-60 31-60 31-60	0.8-2.5 0.8-2.5 0.8-2.5	.16 .10 .10	5 plus	SEVERE	MODERATE on 2-12%; SEVERE on 12-45% slopes.	None	None	MODERATE on 2-6%; SEVERE on 6-12%; VERY SEVERE on 12-45% slopes.	SLIGHT TO MODERATE - pervious to semi-pervious; bottom may need to be compacted; seal blanket needed where loamy substratum is exposed.	SLIGHT TO MODERATE - medium stability and shrink-swell potential.
550 Same as No. 212R, Ehler silt loam, rock substratum														
557 Same as No. 358, Miami loam														
560 Same as No. 358, Miami loam														
3251 Elliott silt loam	C	A B C	0-10 10-23 23-60+	31-60 $\frac{4}{1}$ 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	.24 .20 .18	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-12% slopes.	MODERATE ponding; occasional flooding.	Subsurface or surface drainage, or both, are beneficial.	MODERATE on 0-6%; SEVERE on 6-12% slopes.	SLIGHT - semi-pervious; bottom should be compacted.	SLIGHT TO MODERATE - impermeable; medium stability and high shrink-swell potential.
3251V Same as No. 3251, Elliott silt loam														
3361 Beecher silt loam	C	A B C	0-13 13-31 31-60+	31-60 $\frac{4}{1}$ 61-120 61-120	0.8-2.5 0.2-0.8 0.2-0.8	.20 .18 .18	1 to 3	SEVERE	SLIGHT on 0-2%; MODERATE on 2-6% slopes.	MODERATE ponding; occasional flooding.	Subsurface or surface drainage, or both, are beneficial.	MODERATE on 0-6% slopes.	SLIGHT - semi-pervious; bottom should be compacted.	SLIGHT TO MODERATE - impermeable; medium stability and high shrink-swell potential.

THE USE OF SOILS FOR SPECIFIC ENGINEERING PURPOSES

Table 6 contains information about the suitability of soils as a source of topsoil or sand and gravel; the depth to bedrock; the limitations of soils for road subgrades and foundations for low buildings and the corrosivity class of soils where metal and concrete conduits are buried in the substratum.

Suitability of soils for topsoil is affected mainly by the nature of the surface soil and subsoil.

The ratings are *very good*, *good*, *fair*, *poor* and *very poor*. The texture of the soil, soil depth and the content of organic matter are the principal factors considered in determining suitability ratings.



The dark colored thick surface soil of Varna silt loam is a good source of topsoil. The clayey subsoil is poorly suited for this purpose.

For example, a medium textured soil high in organic matter generally has a suitability rating of good. A clay soil or a coarse textured soil that is low in organic matter is generally rated as poor or very poor. Both surface soil and subsoil are rated. When subsoils are used as topsoil material, they need to be treated with fertilizer or other amendments.

Suitability of soils for sand and gravel depends mainly on the nature of the soil substratum. Outwash materials are generally better suited for concrete because they contain less fine textured materials than the glacial drift. Ratings do not include materials below a depth of 5 feet. Ratings are *very good*, *good*, *fair*, *poor* and *very poor*.

Depth to bedrock is given for each soil in terms of depth ranges. These are less than 2 feet, 2 to 5 feet, or more than 5 feet (5 feet plus). Greater depths are not given because soil scientists usually inspect soils only to a depth of 5 feet. Map 14, however, shows the areas in the Region where bedrock generally occurs at depths of less than



Poor shear strength and bearing capacity and high shrink-swell potential in soils can crumble foundations and topple buildings.

20 feet. The combined information in Table 6 and Map 14 will provide a general indication of the depth to bedrock where it is less than 20 feet.

Limitations of soils for road subgrades are mainly affected by soil stability, bearing capacity and the shrink-swell potential of subsoils and substrata. Surface soils are generally removed during road or building construction and are not considered in the ratings. The ratings for road subgrades are determined mainly from soil test data. The influence of other factors such as surface drainage and depth of frost penetration should be considered locally for each site.

Foundations for low buildings are generally placed in the soil substratum below the average frost penetration. The limitations rating, therefore, refers only to the soil substratum. Soil stability, compressibility and shrink-swell potential are important in determining the limitations of soil substrata for foundations for buildings.

Soil corrosivity ratings are given for both metal and concrete conduits. Factors affecting ratings for metal pipe are electrical conductivity or resistivity, total acidity, soil drainage and soil texture. Factors affecting ratings for concrete conduits are soil texture, soil acidity, the amount of sodium sulfate or magnesium sulfate or both in the soil, the amount of sodium chloride in the soil and soil drainage. In general soils with poor aeration, high pH values, high electrical conductivity (indicating a high salt content) and high moisture content have a high metal corrosivity. Soils with very low pH values, high sulfate content and high moisture content also have a high metal corrosivity. In southeastern Wisconsin only certain organic soils have these conditions. The mineral soils are generally low in sulfates and sodium chloride. Thus in this report, pH, soil texture and soil drainage are the only factors considered for concrete conduit corrosivity. Soils with low pH values generally have a high corrosivity for concrete conduit.

TABLE 6.
THE USE OF SOILS FOR SPECIFIC ENGINEERING PURPOSES

Soil Number and Soil Name	Suitability as a Source of		Depth to Bedrock (in ft.)	Limitations For		Soil Corrosivity For Conduits
	Topsoil	Sand & Gravel		Road Subgrades	Foundations for Low Buildings	
1 Rough broken land	VERY POOR - very high clay content.	VERY POOR - no sand and gravel present.	5 plus	SEVERE - high shrink-swell potential; low bearing capacity.	VERY SEVERE - very steep; high shrink-swell potential.	Metal - MODERATE Concrete - LOW
2 Stinson silt loam	Surface soil - GOOD. Subsoil - FAIR TO POOR - water table - 1 to 3 feet; thick soil.	VERY POOR - layers of sand and gravel in places.	5 plus	Substratum - SEVERE - elastic; high shrink-swell potential; low bearing capacity.	SEVERE - high shrink-swell potential; fair shear strength; moderate compressibility.	Metal - HIGH Concrete - LOW
3 Same as No. 11, Alluvial land						
4 Marsh	VERY POOR - low mineral content; poorly drained.	VERY POOR - no sand and gravel present	5 plus	VERY SEVERE - poorly drained; low stability and bearing capacity.	VERY SEVERE - poorly drained; low stability and bearing capacity.	Metal - VERY HIGH Concrete - HIGH where acid, LOW where above pH 5.5
5 Same as No. 54, Lawson silt loam						
5W Sawmill silt loam	Surface soil - GOOD - dark; thick. Subsoil - GOOD TO FAIR - water table - 0 to 1 foot; thick soil.	VERY POOR - high water table; layers of sand and gravel in places.	5 plus	Subsoil and Substratum - SEVERE - relatively unstable; low bearing capacity.	MODERATE TO SEVERE - subject to frost heave and low bearing capacity on thawing.	Metal - HIGH Concrete - LOW
7 Dorchester silt loam	Surface soil - GOOD. Subsoil - FAIR - subject to stream overflow; thick soil.	VERY POOR - silty alluvium.	5 plus	Substratum - SEVERE - unstable at all moisture contents; low stability and bearing capacity.	MODERATE TO SEVERE - high frost hazard; loss of strength on thawing; fair shear strength; moderate compressibility.	Metal - MODERATE Concrete - LOW
7W Same as No. 54, Lawson silt loam						
10 Same as No. 11, Alluvial land						
10W Same as No. 11W, Alluvial land, wet						
11 Alluvial land	FAIR - Variable	VERY POOR - occasional flooding; variable.	5 plus	SEVERE - stability and bearing capacity; variable; occasional flooding.	MODERATE TO SEVERE - occasional flooding.	Metal - MODERATE Concrete - LOW
11W Alluvial land, wet	FAIR - Variable	VERY POOR - high water table; variable.	5 plus	SEVERE - unstable; high water table	SEVERE - unstable; high water table.	Metal - SEVERE Concrete - LOW
11WY Same as No. 11W, Alluvial land, wet						
12 Wea silt loam	Surface soil - GOOD - dark; thick. Subsoil - FAIR TO POOR - clayey; thick soil.	GOOD - Substratum is poorly graded stratified sand and gravel.	5 plus	Subsoil - SEVERE - moderate shrink-swell potential; low bearing capacity; highly elastic. Substratum - VERY SLIGHT - very stable under wheel loads.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength.	Metal - MODERATE Concrete - LOW
14 Same as No. 413, Crestview fine sandy loam						
15 Hillside seepage	POOR - erosive; oxidizes rapidly.	VERY POOR - low sand and gravel content.	5 plus	VERY SEVERE - organic soils cannot be used in subgrades.	VERY SEVERE - poor shear strength; high compressibility.	Metal - VERY HIGH Concrete - HIGH
16 Rome silt loam	Surface soil - GOOD - thick; dark. Subsoil - FAIR TO POOR - clayey and plastic in the lower part.	VERY POOR - thin layers of sand and gravel in places.	5 plus	Subsoil - SEVERE - low stability and bearing capacity. Substratum - SEVERE - unstable when wet.	SEVERE - moderate shrink-swell potential; poor shear strength; high compressibility.	Metal - MODERATE TO HIGH Concrete - LOW
18 Same as No. 266, Sisson silt loam						
18Y Same as No. 266, Sisson silt loam						
19 Same as No. 267, Sisson fine sandy loam						
21 Hebron loam	Surface soil - GOOD. Subsoil - FAIR TO POOR - lower subsoil unstable on slopes.	VERY POOR - thin layers of sand and gravel in places.	5 plus	Subsoil - MODERATE - low stability and bearing capacity. Substratum - SEVERE - unstable when wet.	VERY SEVERE - high shrink-swell potential; high compressibility; poor shear strength.	Metal - MODERATE Concrete - LOW
21Y Same as No. 21, Hebron loam						
22 Same as No. 21, Hebron loam						
23 Same as No. 54, Lawson silt loam						
24 Same as No. 21, Hebron loam						
26 Wauconda fine sandy loam	Surface soil - GOOD. Subsoil - FAIR TO POOR - unstable on slopes; water table - 1 to 3 feet.	POOR - poorly graded fine sand with silt layers in places; high water table.	5 plus	Subsoil - SEVERE - low bearing capacity. Substratum - MODERATE - relatively unstable.	SEVERE - fairly low compressibility; moderately high frost hazard; water table, seepage, or both.	Metal - HIGH Concrete - LOW
27 Same as No. 26, Wauconda fine sandy loam						
27Z Same as No. 51, Aztalan loam						
28 Same as No. 29, Colwood silt loam						
28Z Same as No. 330, Navan loam						
29 Colwood silt loam	Surface - GOOD. Subsoil - FAIR - unstable on slopes; stratified with sand; water table - 0 to 1 foot.	POOR - substratum may contain layers of poorly graded fine sand with lenses of silt and clay.	5 plus	Subsoil - VERY SEVERE - low bearing capacity; unstable on slopes. Substratum - MODERATE - when properly compacted.	SEVERE - when drained; fairly low compressibility; moderately high frost hazard; loss of bearing capacity on thawing; water table - 0 to 1 foot.	Metal - VERY HIGH Concrete - LOW

TABLE 6.
THE USE OF SOILS FOR SPECIFIC ENGINEERING PURPOSES (Continued)

Soil Number and Soil Name	Suitability as a Source of		Depth to Bedrock (in ft.)	Limitations For		Soil Corrosivity For Conduits	
	Topsoil	Sand & Gravel		Road Subgrades	Foundations for Low Buildings		
29V	Same as No. 29, Colwood silt loam						
29X	Same as No. 76, Sebewa silt loam						
29Z	Same as No. 340, Navan silt loam						
30	Same as No. 29, Colwood silt loam						
31	Same as No. 16, Rome silt loam						
32	Same as No. 16, Rome silt loam						
33	Same as No. 267, Sisson fine sandy loam						
33Z	Same as No. 21, Hebron loam						
34	Same as No. 266, Sisson silt loam						
35	Same as No. 45, Yahara very fine sandy loam						
35Z	Same as No. 370, Mosel sandy loam						
36	Same as No. 45, Yahara very fine sandy loam						
37	Same as No. 26, Wauconda fine sandy loam						
37Z	Same as No. 370, Mosel sandy loam						
38	Kibbie silt loam	Surface - GOOD. Subsoil - FAIR TO POOR - unstable on slopes; water table - 1 to 3 feet.	POOR - poorly graded fine sand with silt layers in places; high water table - 1 to 3 feet.	5 plus	Subsoil - SEVERE - low bearing capacity. Substratum - MODERATE - relatively unstable.	SEVERE - low shrink-swell potential; fairly low compressibility; moderately high frost hazard; high water table - seepage, or both.	Metal - HIGH Concrete - LOW
38R	Same as No. 306, Knowles silt loam, wet variant						
38Z	Same as No. 369, Mosel silt loam						
39	Saylesville loam	Surface soil - GOOD. Subsoil - FAIR TO POOR - unstable on slopes.	VERY POOR - no sand or gravel.	5 plus	Subsoil - VERY SEVERE - high shrink-swell potential; very plastic; elastic. Substratum - SEVERE - relatively unstable.	SEVERE - high shrink-swell potential; moderate compressibility; fair to poor shear strength.	Metal - HIGH Concrete - LOW
39X	Same as No. 72, Fox loam						
40	Same as No. 39, Saylesville loam						
40V	Same as No. 266, Sisson silt loam						
40Y	Same as No. 161, Dodge silt loam						
40X	Same as No. 72, Fox loam						
41	Same as No. 42, Tichigan silt loam						
42	Tichigan silt loam	Surface soil - GOOD. Subsoil - POOR - clayey; unstable on slopes; water table - 1 to 3 feet.	VERY POOR - no sand and gravel.	5 plus	Subsoil - VERY SEVERE - high plasticity and shrink-swell potential. Substratum - SEVERE - high shrink-swell potential and low bearing capacity.	SEVERE - high shrink-swell potential; moderate compressibility; fair to poor shear strength; high water table - seepage, or both.	Metal - HIGH Concrete - LOW
42R	Same as No. 306, Knowles silt loam, wet variant						
42V	Same as No. 38, Kibbie silt loam						
42X	Same as No. 87, Sleeth silt loam						
42Y	Same as No. 364, Lamartine silt loam						
44	Jericho silt loam	Surface soil - GOOD - dark. Subsoil - POOR - clayey; unstable on slopes.	VERY POOR - no sand and gravel.	5 plus	Subsoil - VERY SEVERE - high shrink-swell potential; very plastic; elastic. Substratum - SEVERE - relatively unstable.	SEVERE - high shrink-swell potential; fair shear strength; moderate compressibility.	Metal - HIGH Concrete - LOW
45	Yahara very fine sandy loam	Surface soil - GOOD. Subsoil - FAIR - unstable on slopes; water table - 1 to 3 feet.	POOR - substratum in places contains poorly graded fine sand with silt layers; high water table.	5 plus	Subsoil - MODERATE - moderate stability and low shrink-swell potential where sandy. Substratum - MODERATE - relatively unstable.	SEVERE - moderate shrink-swell potential; fairly low compressibility; moderately high frost hazard; low bearing capacity on thawing; high water table, seepage, or both.	Metal - MODERATE TO LOW Concrete - LOW
45Z	Same as No. 370, Mosel sandy loam						
46	Same as No. 45, Yahara very fine sandy loam						
47	Same as No. 45, Yahara very fine sandy loam						
47Z	Same as No. 371, Mosel loam						
48	Keowns silt loam	Surface soil - GOOD - dark; thick. Subsoil - FAIR - unstable on slopes; water table - 0 to 1 feet.	POOR - substratum in some places contains layers of fine, poorly graded sand with silt strata; high water table.	5 plus	Subsoil - MODERATE - relatively unstable at all moisture contents. Substratum - MODERATE - low shrink-swell potential.	SEVERE - low shrink-swell potential; fairly low compressibility; very high frost hazard; loss of bearing capacity on thawing; water table - 0 to 1 foot.	Metal - HIGH Concrete - LOW
48Z	Same as No. 340, Navan silt loam						
49	Same as No. 48, Keowns silt loam						

TABLE 6.
THE USE OF SOILS FOR SPECIFIC ENGINEERING PURPOSES (Continued)

Soil Number and Soil Name	Suitability as a Source of		Depth to Bedrock (in ft.)	Limitations For		Soil Corrosivity For Conduits	
	Topsoil	Sand & Gravel		Road Subgrades	Foundations for Low Buildings		
49Y	Same as No. 48, Keowns silt loam						
51	Aztalan loam	Surface soil - GOOD. Subsoil - FAIR TO POOR - lower subsoil unstable on slopes.	VERY POOR - low sand and gravel content.	5 plus	Subsoil - SEVERE - low stability and bear- ing capacity when wet. Substratum - SEVERE - unstable when wet.	VERY SEVERE - moder- ate shrink-swell potential; high compressibility; poor shear strength; high water table, seepage, or both.	Metal - HIGH Concrete - LOW
52	Aztalan sandy loam	Surface soil - GOOD. Subsoil - POOR - lower subsoil unstable on slopes.	VERY POOR - low sand and gravel content.	5 plus	Subsoil - SLIGHT - moderate stability and bearing capacity when wet. Substratum - SEVERE - unstable when wet.	VERY SEVERE - moder- ate shrink-swell potential; high compressibility; poor shear strength; high water table, seepage or both	Metal - HIGH Concrete - LOW
53	Same as No. 51, Aztalan loam						
54	Lawson silt loam	Surface soil - GOOD, thick; dark Subsoil - GOOD TO FAIR - thick; water table - 1 to 3 feet.	POOR - high water table; layers of sand and gravel in places.	5 plus	Subsoil and Substratum - SEVERE - relatively unstable; very low bearing capacity.	MODERATE TO SEVERE - very high frost hazard; loss of bearing capacity on thawing; fair shear strength; moderate compressibility.	Metal - LOW Concrete - LOW
59	Dousman sandy loam	Surface - GOOD - somewhat drouthy and erosive. Subsoil - POOR - thin over sand and gravel; water table - 1 to 3 feet.	FAIR TO GOOD - sub-stratum is poorly graded sand with some pockets of gravel; high water table.	5 plus	Subsoil - SLIGHT TO MODERATE - low shrink-swell potential. Substratum - SLIGHT - lacks stability under wheel loads unless moist.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength; good bearing capacity; high water table, seepage, or both.	Metal - MODERATE Concrete - LOW
59Z	Same as No. 52, Aztalan sandy loam						
60	Same as No. 59, Dousman sandy loam						
60Z	Same as No. 51, Aztalan loam						
63	Same as No. 231, Brookston silt loam						
64	Same as No. 231, Brookston silt loam						
66	Same as No. 386, Granby fine sandy loam						
67	Same as No. 386, Granby fine sandy loam						
69	Casco-Fox silt loams	Casco part -- same as No. 172, Casco loam Fox part -- same as No. 72, Fox loam					
70	Fox sandy loam	Surface soil - FAIR. Subsoil - POOR - lower subsoil gravelly in many places.	GOOD - substratum has poorly graded stratified sand and gravel.	5 plus	Subsoil - MODERATE - good bearing capacity when properly compacted. Substratum - VERY SLIGHT - very stable.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength.	Metal - LOW Concrete - LOW
70V	Same as No. 267, Sisson fine sandy loam						
70Y	Same as No. 367, Hochheim fine sandy loam						
70Z	Same as No. 21, Hebron loam						
71	Casco-Fox loams	Casco part -- same as No. 172, Casco loam Fox part -- same as No. 72, Fox loam					
72	Fox loam	Surface - GOOD. Subsoil - POOR - lower subsoil gravelly in many places.	GOOD - substratum is poorly graded stratified sand and gravel.	5 plus	Subsoil - MODERATE - good bearing capacity when properly compacted. Substratum - VERY SLIGHT - stable.	SLIGHT - very low compressibility; good shear strength; low shrink-swell potential.	Metal - LOW Concrete - LOW
72R	Same as No. 208, Knowles silt loam						
72V	Same as No. 266, Sisson silt loam						
72Y	Same as No. 358, Miami loam						
72Z	Same as No. 21, Hebron loam						
73	Same as No. 72, Fox loam						
73R	Same as No. 208, Knowles silt loam						
73V	Same as No. 266, Sisson silt loam						
73Y	Same as No. 358, Miami loam						
73Z	Same as No. 21, Hebron loam						
75	Rodman gravelly loam	Surface soil and Subsoil - VERY POOR - very thin; cobbly.	GOOD - substratum is poorly graded sand and gravel; stratified; cobbly in places.	5 plus	Subsoil and Substratum - VERY SLIGHT - good stability; low shrink-swell potential.	SLIGHT - good shear strength; negligible compressibility; low shrink-swell potential.	Metal - LOW Concrete - LOW
76	Sebewa silt loam	Surface soil - GOOD - dark; thick. Subsoil - FAIR TO POOR - thin; water table - 0 to 1 foot.	GOOD - substratum is poorly graded stratified sand and gravel; high water table hinders excavation.	5 plus	Subsoil - SEVERE - moderate shrink-swell potential; low stability and high plasticity index. Substratum - VERY SLIGHT - when drained; very stable under wheel loads.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength; water table - 0 to 1 foot most of the year.	Metal - HIGH Concrete - LOW
76R	Same as No. 212R, Ehler silt loam, rock substratum.						

TABLE 6.
THE USE OF SOILS FOR SPECIFIC ENGINEERING PURPOSES (Continued)

Soil Number and Soil Name	Suitability as a Source of		Depth to Bedrock (in ft.)	Limitations For		Soil Corrosivity For Conduits	
	Topsoil	Sand & Gravel		Road Subgrades	Foundations for Low Buildings		
76V	Same as No. 29, Colwood silt loam.						
76Y	Same as No. 231, Brookston silt loam						
76Z	Same as No. 340, Navan silt loam						
77	Same as No. 59, Dousman sandy loam						
77Z	Same as No. 52, Aztalan sandy loam						
78	Same as No. 59, Dousman sandy loam						
78V	Same as No. 26, Wauconda fine sandy loam						
78Y	Same as No. 178, Crosby silt loam						
79	Waukechon loam	Surface soil - GOOD. Subsoil - POOR - thin; drouthy; water table - 0 to 1 foot; springs in places.	FAIR TO GOOD - sub- stratum is poorly graded sand; high water table hinders excavation.	5 plus	Subsoil - MODERATE - when properly com- pacted and drained. Substratum - SLIGHT - low shrink-swell po- tential; suitable for all pavement types when confined.	SLIGHT - very low com- pressibility; good shear strength; low shrink-swell potential.	Metal - HIGH Concrete - LOW
80	Same as No. 76, Sebewa silt loam						
80V	Same as No. 29, Colwood silt loam						
80Y	Same as No. 231, Brookston silt loam						
80Z	Same as No. 330, Navan loam						
81	Same as No. 76, Sebewa silt loam						
82	Juneau silt loam	Surface soil - GOOD - thick. Subsoil - FAIR TO POOR - clayey in places.	POOR - substratum con- tains pockets of sand and gravel.	5 plus	Subsoil - VERY SE- VERE - moderate shrink-swell potential; loss of bearing capa- city when wet. Substratum - MODER- ATE - high shrink- swell potential; fair stability when wet.	SLIGHT TO MODERATE - low compressibility; easy to compact; fair shear strength.	Metal - HIGH Concrete - LOW
84	Ockley silt loam	Surface soil - GOOD. Subsoil - POOR - clayey.	GOOD - substratum is poorly graded stratified sand and gravel.	5 plus	Subsoil - SEVERE - moderate shrink-swell potential; low bearing capacity. Substratum - SLIGHT - very stable under wheel loads.	SLIGHT - very low com- pressibility; low shrink- swell potential; good shear strength.	Metal - MODERATE Concrete - LOW
84V	Same as No. 266, Sisson silt loam						
84Z	Same as No. 21, Hebron loam						
84R	Same as No. 208, Knowles silt loam						
86	Thackery silt loam	Surface soil - GOOD. Subsoil - POOR - clayey.	GOOD - substratum poorly graded stratified sand and gravel.	5 plus	Subsoil - SEVERE - moderate shrink-swell potential; low bearing capacity; highly elastic. Substratum - SLIGHT - very stable under wheel loads.	SLIGHT - sufficient bear- ing capacity for low build- ings; good shear strength; negligible compressibility.	Metal - LOW TO MODERATE. Concrete - LOW
86V	Same as No. 266, Sisson silt loam						
87	Sleeth silt loam	Surface soil - GOOD. Subsoil - FAIR TO POOR - clayey in places; water table - 1 to 3 feet.	GOOD - substratum poorly graded stratified sand and gravel; high water table.	5 plus	Subsoil - SEVERE - moderate shrink-swell potential; loss of bear- ing capacity when wet. Substratum - SLIGHT - very stable.	SLIGHT - very low com- pressibility; very low shrink-swell potential; good shear strength; high water table.	Metal - MODERATE Concrete - LOW
87Z	Same as No. 371, Mosel loam						
89	Briggsville silty clay loam	Surface soil - FAIR. Subsoil - FAIR TO POOR - unstable on slopes.	VERY POOR - no sand and gravel.	5 plus	Subsoil - VERY SE- VERE - high shrink- swell potential; very plastic; elastic. Substratum - VERY SEVERE - relatively unstable.	SEVERE - moderate shrink-swell potential; low compressibility; mod- erately high frost hazard; loss of bearing capacity on thawing.	Metal - HIGH Concrete - LOW
91	Parr silt loam	Surface soil - GOOD - dark; thick. Subsoil - FAIR TO POOR - rock fragments in the lower part in places.	POOR - contains pockets of well graded sand and gravel.	5 plus	Subsoil - SEVERE - moderate shrink-swell potential; low bear- ing capacity when wet. Substratum - MODER- ATE - good stability and low shrink-swell potential.	SLIGHT TO MODERATE - low compressibility and good to fair shear strength.	Metal - MODERATE Concrete - LOW
91D	Same as No. 91, Parr silt loam						
92	Same as No. 91, Parr silt loam						
92N	Same as No. 91, Parr silt loam						
97	Same as No. 288, Hackett loamy sand						
99	Same as No. 100, Kewaunee silt loam						

TABLE 6.
THE USE OF SOILS FOR SPECIFIC ENGINEERING PURPOSES (Continued)

Soil Number and Soil Name	Suitability as a Source of		Depth to Bedrock (in ft.)	Limitations For		Soil Corrosivity For Conduits
	Topsoil	Sand & Gravel		Road Subgrades	Foundations for Low Buildings	
100 Kewaunee silt loam	Surface soil - GOOD. Subsoil - VERY POOR - clayey; plastic.	VERY POOR - clayey.	5 plus	Subsoil - VERY SE- VERE. Substratum - SEVERE - moderate shrink-swell potential; fair shear strength; moderate com- pressibility.	MODERATE TO SEVERE - moderate shrink-swell potential; fair shear strength; moderate com- pressibility.	Metal - MODERATE Concrete - LOW
101 Kewaunee sandy loam	Surface soil - FAIR - thin. Subsoil - VERY POOR - clayey; plastic.	VERY POOR - clayey.	5 plus	Subsoil - VERY SE- VERE. Substratum - SEVERE - moderate shrink-swell potential; fair shear strength; moderate com- pressibility.	MODERATE TO SEVERE - moderate shrink-swell potential; fair shear strength; moderate com- pressibility.	Metal - MODERATE Concrete - LOW
102 Vilas loamy sand	Surface and Subsoil - VERY POOR - drouthy; erosion hazard.	GOOD - poorly to well graded sand with some gravel.	5 plus	Subsoil and Substra- tum - SLIGHT - low shrink-swell potential; suitable for all pave- ment types when con- fined.	SLIGHT - very low com- pressibility; low shrink- swell potential; good shear strength.	Metal - LOW Concrete - LOW
103 Same as No. 100, Kewaunee silt loam						
106 Same as No. 110, Lorenzo loam						
106Z Same as No. 16, Rome silt loam						
108 Lorenzo-Rodman loams	Lorenzo part -- same as No. 110, Lorenzo loam Rodman part -- same as No. 75, Rodman gravelly loam					
109 Same as No. 174, Fabius loam						
109V Same as No. 26, Wauconda fine sandy loam						
109Y Same as No. 371, Mosel loam						
109Z Same as No. 369, Mosel silt loam						
110 Lorenzo loam	Surface soil - GOOD - dark; thin. Subsoil - POOR TO VERY POOR - clayey; thin over gravel.	GOOD - substratum is poorly graded stratified sand and gravel.	5 plus	Subsoil - SLIGHT - moderate shrink-swell potential; Substratum - VERY SLIGHT - very stable.	SLIGHT - very low com- pressibility; low shrink- swell potential; good shear strength.	Metal - LOW Concrete - LOW
110R Same as No. 208, Knowles silt loam						
110Y Same as No. 191, Parr silt loam, shallow variant						
110Z Same as No. 16, Rome silt loam						
111 Same as No. 161, Dodge silt loam						
112 Same as No. 243, Calamus silt loam						
113 Same as No. 278, Clyman silt loam						
114 Same as No. 358, Miami loam						
116 Same as No. 178, Crosby silt loam						
118 Same as No. 178, Crosby silt loam						
119 Warsaw silt loam	Surface soil - GOOD - dark; thick. Subsoil - POOR - lower subsoil gravelly in places.	GOOD - substratum poorly graded stratified sand and gravel.	5 plus	Subsoil - MODERATE - high shrink-swell po- tential; loss of bearing capacity when wet. Substratum - VERY SLIGHT - very stable.	SLIGHT - very low com- pressibility; low shrink- swell potential; good shear strength.	Metal - MODERATE Concrete - LOW
119V Same as No. 266, Sisson silt loam						
119Y Same as No. 91, Parr silt loam						
119Z Same as No. 16, Rome silt loam						
120 Same as No. 119, Warsaw silt loam						
120Y Same as No. 91, Parr silt loam						
120Z Same as No. 16, Rome silt loam						
121 Same as No. 110, Lorenzo loam						
122 Same as No. 110, Lorenzo loam						
123 Tippecanoe silt loam	Surface soil - GOOD - dark; thick. Subsoil - FAIR TO POOR - thick; clayey.	GOOD - substratum is poorly graded stratified sand and gravel.	5 plus	Subsoil - VERY SE- VERE - high shrink- swell potential; low bearing capacity; highly elastic. Substratum - VERY SLIGHT - very stable under wheel loads.	SLIGHT - sufficient strength for buildings; good shear strength; negligible compressibility; low shrink-swell poten- tial.	Metal - MODERATE Concrete - LOW
123V Same as No. 266, Sisson silt loam						
123Z Same as No. 21, Hebron loam						
124 Crane silt loam	Surface soil - GOOD. Subsoil - POOR - clayey.	GOOD - substratum is poorly graded sand and gravel; stratified at more than 40 inches.	5 plus	Subsoil - VERY SE- VERE - high shrink- swell potential. Substratum - VERY SLIGHT - very stable under wheel loads regardless of moisture content.	SLIGHT - very low com- pressibility; good shear strength; high water table, seepage, or both.	Metal - MODERATE Concrete - LOW

TABLE 6. THE USE OF SOILS FOR SPECIFIC ENGINEERING PURPOSES (Continued)

Soil Number and Soil Name	Suitability as a Source of		Depth to Bedrock (in ft.)	Limitations For		Soil Corrosivity For Conduits	
	Topsoil	Sand & Gravel		Road Subgrades	Foundations for Low Buildings		
125	Same as No. 206, Knowles silt loam, shallow variant						
126	Westland silt loam	Surface soil - GOOD - dark; thick. Subsoil - FAIR TO POOR - water table - 1 to 3 feet.	GOOD - substratum is poorly graded stratified sand and gravel; high water table hinders excavation.	5 plus	Subsoil - VERY SEVERE - high shrink-swell potential; low stability. Substratum - VERY SLIGHT when drained; very stable under wheel loads.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength; water table - 0 to 1 foot most of the year.	Metal - HIGH Concrete - LOW
126Y	Same as No. 212, Ehler silt loam						
126Z	Same as No. 340, Navan silt loam						
126V	Same as No. 29, Colwood silt loam						
133	Spinks fine sand	Surface soil and Subsoil - VERY POOR - drouthy; high wind erosion hazard.	GOOD - poorly graded sand; bands of silt and clay in places.	5 plus	Subsoil - SLIGHT - low stability under wheel loads; suitable for all pavement types when confined.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength; good bearing capacity.	Metal - LOW Concrete - LOW
134	Same as No. 133, Spinks fine sand						
142	Manawa silt loam	Surface soil - GOOD - thin. Subsoil - VERY POOR - clayey; plastic; water table - 1 to 3 feet.	VERY POOR - clayey	5 plus	Subsoil - VERY SEVERE. Substratum - SEVERE - high shrink-swell potential; low bearing capacity when wet; elastic.	MODERATE TO SEVERE - moderate shrink-swell potential; fair shear strength; moderate compressibility.	Metal - HIGH Concrete - LOW
144	Same as No. 371, Mosel loam						
152	Same as No. 153, Lapeer loam						
153	Lapeer loam	Surface soil - GOOD - thin. Subsoil - POOR - lower subsoil drouthy in many areas.	FAIR TO POOR - substratum contains pockets of well graded sand and gravel.	5 plus	Subsoil - MODERATE - good stability; low shrink-swell potential. Substratum - SLIGHT - moderate stability and bearing capacity when compacted properly.	SLIGHT - low compressibility; good to fair shear strength.	Metal - LOW Concrete - LOW
154	Same as No. 155, McHenry silt loam						
155	McHenry silt loam	Surface soil - GOOD. Subsoil - POOR - sandy in the lower part in places.	POOR - substratum contains pockets of well graded sand and gravel.	5 plus	Subsoil - SEVERE - moderate shrink-swell potential; low bearing capacity. Substratum - SLIGHT - moderate stability and bearing capacity when compacted properly.	SLIGHT - low compressibility; good to fair shear strength.	Metal - MODERATE Concrete - LOW
155Z	Same as No. 21, Hebron loam						
156	Lapeer sandy loam	Surface soil - FAIR - thin.	FAIR TO POOR - substratum contains pockets of well graded sand and gravel.	5 plus	Subsoil - SLIGHT TO MODERATE. Substratum - SLIGHT - good stability and shrink-swell potential.	SLIGHT - low compressibility; good to fair shear strength.	Metal - MODERATE Concrete - LOW
157	Same as No. 156, Lapeer sandy loam						
160	Hochheim-Sisson-Casco loams	Hochheim part -- same as No. 357, Hochheim loam Sisson part -- same as No. 266, Sisson silt loam Casco part -- same as No. 172, Casco loam					
161	Dodge silt loam	Surface soil - GOOD. Subsoil - POOR TO VERY POOR - clayey.	POOR - pockets of well graded sand and gravel in the substratum.	5 plus	Subsoil - VERY SEVERE - high shrink-swell potential; loss of bearing capacity when wet. Substratum - MODERATE - good stability and low shrink-swell potential.	SLIGHT - low compressibility; fair shear strength; moderately good bearing capacity.	Metal - MODERATE Concrete - LOW
161R	Same as No. 208, Knowles silt loam						
165	Poygan silt loam	Surface soil - GOOD - thin; dark. Subsoil - VERY POOR - clayey; water table - 0 to 1 foot.	VERY POOR - clayey.	5 plus	Subsoil - VERY SEVERE. Substratum - SEVERE - very elastic; high shrink-swell potential.	MODERATE TO SEVERE - high shrink-swell potential; shear strength; high to very high compressibility.	Metal - VERY HIGH Concrete - LOW
170	Casco sandy loam	Surface soil - FAIR - thin. Subsoil - POOR TO VERY POOR - clayey; thin over gravel.	GOOD - substratum is poorly graded stratified sand and gravel.	5 plus	Subsoil - VERY SEVERE - moderate shrink-swell potential. Substratum - VERY SLIGHT - very stable.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength.	Metal - LOW Concrete - LOW
170V	Same as No. 267, Sisson fine sandy loam						
170Y	Same as No. 21, Hebron loam						
170Z	Same as No. 21, Hebron loam						
171	Poygan silty clay loam	Surface soil - FAIR - thin; dark. Subsoil - VERY POOR - clayey; water table - 0 to 1 foot.	VERY POOR - clayey	5 plus	Subsoil - VERY SEVERE. Substratum - SEVERE - very elastic; high shrink-swell potential.	VERY SEVERE - high shrink-swell potential; shear strength; high to very high compressibility.	Metal - VERY HIGH Concrete - LOW

TABLE 6. THE USE OF SOILS FOR SPECIFIC ENGINEERING PURPOSES (Continued)

Soil Number and Soil Name	Suitability as a Source of		Depth to Bedrock (in ft.)	Limitations For		Soil Corrosivity For Conduits
	Topsoil	Sand & Gravel		Road Subgrades	Foundations for Low Buildings	
172 Casco loam	Surface soil - GOOD - thin. Subsoil - POOR TO VERY POOR - clayey; thin over gravel.	GOOD - substratum is poorly graded stratified sand and gravel.	5 plus	Subsoil - SEVERE - moderate shrink-swell potential. Substratum - VERY SLIGHT - very stable.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength.	Metal - LOW Concrete - LOW
172R Same as No. 208, Knowles silt loam						
172V Same as No. 266, Sisson silt loam						
172Y Same as No. 357, Hochheim loam						
172Z Same as No. 21, Hebron loam						
173 Same as No. 172, Casco loam						
173V Same as No. 266, Sisson silt loam						
173Y Same as No. 357, Hochheim loam						
173Z Same as No. 21, Hebron loam						
174 Fabius loam	Surface soil - GOOD - thin. Subsoil - POOR TO VERY POOR - clayey; thin over gravel; water table - 1 to 3 feet.	GOOD - substratum is poorly graded stratified sand and gravel; water table - 1 to 3 feet.	5 plus	Subsoil - VERY SEVERE - moderate shrink-swell potential. Substratum - VERY SLIGHT - very stable.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength; high water table, seepage, or both.	Metal - HIGH Concrete - LOW
174R Same as No. 306, Knowles silt loam, wet variant						
174Z Same as No. 371, Mosel loam						
175 Fabius sandy loam	Surface soil - FAIR - thin. Subsoil - POOR TO VERY POOR - clayey; thin over gravel; water table - 1 to 3 feet.	GOOD - substratum is poorly graded stratified sand and gravel; water table - 1 to 3 feet.	5 plus	Subsoil - VERY SEVERE - high shrink-swell potential; elastic. Substratum - VERY SLIGHT - very stable.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength; high water table, seepage, or both.	Metal - HIGH Concrete - LOW
175Z Same as No. 370, Mosel sandy loam						
176 Mussey loam	Surface soil - GOOD - dark. Subsoil - POOR - water table - 0 to 1 foot.	GOOD - substratum is poorly graded sand and gravel; high water table hinders excavation.	5 plus	Subsoil - SEVERE - moderate shrink-swell potential; low stability. Substratum - VERY SLIGHT - when properly drained; very stable.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength; high water table - 0 to 1 foot most of the year.	Metal - VERY HIGH Concrete - LOW
176Z Same as No. 330, Navan loam						
176V Same as No. 176, Mussey loam						
178 Crosby silt loam	Surface soil - GOOD. Subsoil - FAIR TO POOR - gravelly in the lower part in places.	POOR - pockets of well graded sand and gravel in the substratum.	5 plus	Subsoil - VERY SEVERE - high shrink-swell potential; loss of bearing capacity when wet. Substratum - MODERATE - low shrink-swell potential; fair stability when wet.	SLIGHT - low compressibility; fair shear strength; moderate to good bearing capacity.	Metal - HIGH Concrete - LOW
179 Same as No. 231, Brookston silt loam						
180 Mussey sandy loam	Surface soil - FAIR TO GOOD - dark; somewhat gummy. Subsoil - POOR - water table - 0 to 1 foot.	GOOD - substratum is poorly graded sand and gravel; high water table hinders excavation.	5 plus	Subsoil - VERY SEVERE - high shrink-swell potential; low stability. Substratum - VERY SLIGHT - when properly drained; very stable.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength; high water table - 0 to 1 foot most of the year.	Metal - VERY HIGH Concrete - LOW
181 Mussey silt loam	Surface soil - GOOD - dark. Subsoil - POOR - water table - 0 to 1 foot.	GOOD - substratum is poorly graded sand and gravel; high water table hinders excavation.	5 plus	Subsoil - VERY SEVERE - high shrink-swell potential; low stability. Substratum - VERY SLIGHT - when properly drained; very stable.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength; high water table - 0 to 1 foot most of the year.	Metal - VERY HIGH Concrete - LOW
181V Same as No. 26, Wauconda fine sandy loam						
181Y Same as No. 231, Brookston silt loam						
181Z Same as No. 340, Navan silt loam						
182 Same as No. 174, Fabius loam						
182V Same as No. 26, Wauconda fine sandy loam						
182Y Same as No. 178, Crosby silt loam						
182Z Same as No. 369, Mosel silt loam						
188 Same as No. 178, Crosby silt loam						
189 Bristol silt loam	Surface soil - GOOD - thick; dark. Subsoil - FAIR TO POOR - thick.	VERY POOR - low sand and gravel content.	5 plus	Subsoil - VERY SEVERE - high shrink-swell potential; low bearing capacity when wet. Substratum - MODERATE - good stability; low shrink-swell potential.	SLIGHT - high bearing capacity; good shear strength; low compressibility.	Metal - HIGH Concrete - LOW

TABLE 6.
THE USE OF SOILS FOR SPECIFIC ENGINEERING PURPOSES (Continued)

Soil Number and Soil Name	Suitability as a Source of		Depth to Bedrock (in ft.)	Limitations For		Soil Corrosivity For Conduits
	Topsoil	Sand & Gravel		Road Subgrades	Foundations for Low Buildings	
191 Parr silt loam, shallow variant	Surface soil - FAIR. Subsoil - FAIR TO POOR - contains rock fragments in the lower part.	POOR - substratum con- tains pockets of well graded sand and gravel.		Subsoil - SEVERE - moderate shrink-swell potential; low bearing capacity when wet. Substratum - MODER- ATE - good stability and low shrink-swell potential.	SLIGHT TO MODERATE - low compressibility; good to fair shear strength.	Metal - MODERATE Concrete - LOW
195 Same as No. 288, Hackett loamy sand						
203 Matherton loam	Surface soil - GOOD. Subsoil - POOR - lower subsoil gravelly and drouthy; water table - 1 to 3 feet.	GOOD - substratum is poorly graded stratified sand and gravel; water table - 1 to 3 feet.	5 plus	Subsoil - SEVERE - good bearing capacity when properly com- pacted. Substratum - VERY SE- VERE - very stable.	SLIGHT - very low com- pressibility; low shrink- swell potential; good shear strength; high water table, seepage, or both.	Metal - MODERATE Concrete - LOW
203V Same as No. 26, Wauconda fine sandy loam						
203Y Same as No. 178, Crosby silt loam						
203Z Same as No. 371, Mosel loam						
204 Same as No. 208, Knowles silt loam						
206 Knowles silt loam, shallow variant.	Surface soil - GOOD. Subsoil - POOR - thin over bedrock.	VERY POOR - bedrock at less than 20 inches.	Less than 2.	Subsoil - VERY SE- VERE - moderate shrink-swell poten- tial; low bearing capa- city when wet. Sub- stratum - VERY SLIGHT - dolomite bedrock.	SLIGHT - where footing is on dolomite bedrock.	Metal - LOW TO MODERATE Concrete - LOW
208 Knowles silt loam	Surface soil - GOOD. Subsoil - POOR - thin over bedrock.	VERY POOR - bedrock at less than 42 inches.	2 to 5	Subsoil - VERY SE- VERE - moderate shrink-swell potential; low bearing capacity when wet. Substratum - VERY SLIGHT - dolomite bedrock.	SLIGHT - where footing is on dolomite bedrock.	Metal - LOW TO MODERATE Concrete - LOW
212 Ehler silt loam	Surface soil - GOOD - thick; dark. Subsoil - POOR - clayey; water table - 0 to 1 foot.	VERY POOR - low sand and gravel content.	5 plus	Subsoil and Substra- tum - VERY SEVERE - highly plastic and high shrink-swell potential.	MODERATE TO SEVERE - fair shear strength; mod- erate compressibility; high water table; may shrink when drained.	Metal - VERY HIGH Concrete - LOW
212Y Same as No. 212, Ehler silt loam						
212X Same as No. 126, Westland silt loam						
212R Ehler silt loam, rock substratum.	Surface soil - GOOD - thick; dark. Subsoil - POOR - clayey; water table - 0 to 1 foot.	VERY POOR - low sand and gravel content.	Less than 2.	Subsoil - VERY SE- VERE - highly plastic; high shrink-swell po- tential; elastic. Substratum - VERY SEVERE - high water table.	MODERATE - dolomite bedrock; high water table.	Metal - VERY HIGH Concrete - LOW
213 Same as No. 212, Ehler silt loam						
213V Same as No. 29, Colwood silt loam						
213R Same as No. 212R, Ehler silt loam, rock substratum						
214 Same as No. 212, Ehler silt loam						
215 Same as No. 212, Ehler silt loam						
216 Same as No. 212, Ehler silt loam						
217 Bono silty clay loam	Surface soil - GOOD - thick; dark. Subsoil - VERY POOR - clayey; water table - 0 to 1 foot.	VERY POOR - clayey.	5 plus	Subsoil and Substra- tum - SEVERE - high shrink-swell potential; low bearing capacity; not suitable for flexi- ble pavement.	VERY SEVERE - high shrink-swell potential; high to very high com- pressibility; low shear strength; water table - 0 to 1 foot most of the year.	Metal - VERY HIGH Concrete - LOW
218 Same as No. 217, Bono silty clay loam						
218V Same as No. 212, Ehler silt loam						
218Y Same as No. 212, Ehler silt loam						
226D Keyser silt loam	Surface soil - GOOD - dark; thick. Subsoil - POOR - clayey; thick.	POOR - substratum con- tains pockets of well graded sand and gravel.	5 plus	Subsoil - VERY SE- VERE - high shrink- swell potential; low bearing capacity. Substratum - MODER- ATE - low shrink- swell potential; fair stability when wet.	SLIGHT - low compress- ibility; fair shear strength; good bearing capacity.	Metal - MODERATE Concrete - LOW
226 Same as No. 226D, Keyser silt loam						
228 Same as No. 451, Houghton mucky peat						
231 Brookston silt loam	Surface soil - GOOD - dark; thick. Subsoil - FAIR TO POOR - often clayey; water table - 0 to 1 foot.	VERY POOR - low sand and gravel content.	5 plus	Subsoil - VERY SE- VERE - high shrink- swell potential; low bearing capacity when wet; elastic. Substratum - MODER- ATE - low shrink-swell potential; fair stability when wet.	SLIGHT - high bearing capacity; good shear strength; low compress- ibility; high water table.	Metal - VERY HIGH Concrete - LOW

TABLE 6. THE USE OF SOILS FOR SPECIFIC ENGINEERING PURPOSES (Continued)

Soil Number and Soil Name	Suitability as a Source of		Depth to Bedrock (in ft.)	Limitations For		Soil Corrosivity For Conduits	
	Topsoil	Sand & Gravel		Road Subgrades	Foundations for Low Buildings		
231Z	Same as No. 298, Ashkum silty clay loam						
233	Matherton silt loam	Surface soil - GOOD. Subsoil - POOR - lower subsoil gravelly; drouthy in many areas; water table - 1 to 3 feet.	GOOD - substratum is poorly graded stratified sand and gravel; high water table.	5 plus	Subsoil - VERY SE- VERE - good bearing capacity when properly compacted. Substratum - VERY SLIGHT - very stable.	SLIGHT - very low com- pressibility; low shrink- swell potential; good shear strength; high water table, seepage, or both.	Metal - MODERATE Concrete - LOW
233V	Same as No. 26, Wauconda fine sandy loam						
233Y	Same as No. 178, Crosby silt loam						
233Z	Same as No. 369, Mosel silt loam						
234	Matherton sandy loam	Surface soil - FAIR. Subsoil - POOR - lower subsoil gravelly and drouthy in places; water table - 1 to 3 feet.	GOOD - substratum is poorly graded stratified sand and gravel; water table - 1 to 3 feet.	5 plus	Subsoil - VERY SE- VERE - good bearing capacity when properly compacted. Substratum - VERY SLIGHT - very stable.	SLIGHT - very low com- pressibility; low shrink- swell potential; good shear strength.	Metal - MODERATE Concrete - LOW
234V	Same as No. 26, Wauconda fine sandy loam						
234Y	Same as No. 178, Crosby silt loam						
243	Calamus silt loam	Surface soil - GOOD - thin. Subsoil - POOR - clay- ey; moderately thick.	POOR - substratum may contain pockets of well graded sand and gravel.	5 plus	Subsoil - VERY SE- VERE - high shrink- swell potential; loss of bearing capacity when wet. Substratum - MODER- ATE - low shrink- swell potential; fair stability.	SLIGHT - low compress- ibility; fair shear strength; flows in excavating below water table.	Metal - MODERATE Concrete - LOW
250	Tedrow sandy loam	Surface soil and Sub- soil - VERY POOR - drouthy; wind erosive; water table - 1 to 3 feet.	GOOD - substratum is poorly graded fine sand; high water table.	5 plus	Substratum - SLIGHT - stable under wheel loads when damp; low shrink-swell potential; suitable for all pave- ment types when con- fined.	SLIGHT - good shear strength; very low com- pressibility; low shrink- swell potential.	Metal - LOW Concrete - MODER- ATE
250Y	Same as No. 250, Tedrow sandy loam						
250Z	Same as No. 370, Mosel sandy loam						
250V	Same as No. 250, Tedrow sandy loam						
251	Same as No. 250, Tedrow sandy loam						
251Y	Same as No. 250, Tedrow sandy loam						
251Z	Same as No. 233, Matherton silt loam						
254	Tustin sandy loam	Surface soil - FAIR. Subsoil - POOR - somewhat drouthy; wind erosive.	POOR - less than 40 inches of medium sand over un- suitable clay substratum.	5 plus	Subsoil - SLIGHT - low shrink-swell potential; suitable for all pave- ment types when con- fined. Substratum - VERY SE- VERE - elastic; high shrink-swell potential; low bearing capacity when wet.	MODERATE - high shrink-swell potential; fair shear strength; mod- erate compressibility.	Metal - HIGH Concrete - LOW
261	Hackett sandy loam, wet variant	Surface soil - FAIR - drouthy. Subsoil - FAIR - water table - 1 to 3 feet.	GOOD - substratum is poorly graded sand with some gravel layers.	5 plus	Subsoil - MODERATE - good stability and low shrink-swell potential. Substratum - SLIGHT - stable under wheel loads; low shrink-swell potential.	SLIGHT - very low com- pressibility; low shrink- swell potential; good shear strength.	Metal - MODERATE Concrete - LOW
262	Hackett loamy sand, wet variant	Surface soil - POOR. Subsoil - POOR - gen- erally drouthy; shallow to substratum; water table - 1 to 3 feet.	GOOD - substratum is poorly graded sand with some gravel layers.	5 plus	Subsoil - SLIGHT TO MODERATE - good stability and low shrink- swell potential. Substratum - SLIGHT - stable under wheel loads; low shrink-swell potential; may need to be confined under pave- ments.	SLIGHT - very low com- pressibility; low shrink- swell potential; good shear strength.	Metal - MODERATE Concrete - LOW
266	Sisson silt loam	Surface soil - GOOD. Subsoil - FAIR TO POOR - unstable on slopes.	POOR - substratum con- tains poorly graded fine sand and silt layers.	5 plus	Subsoil - SEVERE - high shrink-swell po- tential; low bearing capacity when wet. Substratum - MODER- ATE - relative un- stable.	SEVERE - low shrink- swell potential; fairly low compressibility; high frost hazard; low bearing capacity on thawing.	Metal - MODERATE Concrete - LOW
266X	Same as No. 266, Sisson silt loam						
266Z	Same as No. 21, Hebron loam						
266R	Same as No. 208, Knowles silt loam						
267	Sisson fine sandy loam	Surface soil - FAIR - drouthy. Subsoil - FAIR - unstable on slopes	POOR - substratum con- tains poorly graded fine sand and silt layers.	5 plus	Subsoil - SEVERE - moderate shrink-swell potential; low bearing capacity. Substratum - MODER- ATE - relatively un- stable.	SEVERE - low shrink- swell potential; fairly low compressibility; moderate frost hazard; loss of bear- ing capacity on thawing.	Metal - MODERATE Concrete - LOW

TABLE 6.
THE USE OF SOILS FOR SPECIFIC ENGINEERING PURPOSES (Continued)

Soil Number and Soil Name	Suitability as a Source of		Depth to Bedrock (in ft.)	Limitations For		Soil Corrosivity For Conduits	
	Topsoil	Sand & Gravel		Road Subgrades	Foundations for Low Buildings		
268	Same as No. 266, Sisson silt loam						
269	Same as No. 119, Warsaw silt loam						
270	Same as No. 289, Hackett sandy loam						
270V	Same as No. 267, Sisson fine sandy loam						
271	Same as No. 288, Hackett loamy sand						
272	Tustin loamy fine sand	Surface soil - POOR. Subsoil - VERY POOR - drouthy; high wind erosion hazard.	POOR - no sand or gravel.	5 plus	Subsoil - SLIGHT - low shrink-swell potential; suitable for all pavement types when confined. Substratum - VERY SEVERE - elastic; high shrink-swell potential; low bearing capacity.	MODERATE - high shrink-swell potential; fair shear strength; moderate compressibility.	Metal - HIGH Concrete - LOW
276	Boyer sandy loam	Surface soil - POOR. Subsoil - POOR - thin.	FAIR TO GOOD - poorly graded sand with some pockets of gravel.	5 plus	Subsoil - SLIGHT - when properly compacted; low shrink-swell potential. Substratum - SLIGHT - lacks stability under wheel load unless moist; low shrink-swell potential.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength; good bearing capacity.	Metal - LOW Concrete - LOW
276Y	Same as No. 156, Lapeer sandy loam						
276Z	Same as No. 254, Tustin sandy loam						
277	Same as No. 276, Boyer sandy loam						
277Y	Same as No. 156, Lapeer sandy loam						
277Z	Same as No. 254, Tustin sandy loam						
278	Clyman silt loam	Surface soil - GOOD. Subsoil - POOR - clayey; moderately thick; water table - 1 to 3 feet.	POOR - substratum contains pockets of well graded sand and gravel - high water table.	5 plus	Subsoil - VERY SEVERE - high shrink-swell potential. Substratum - MODERATE - low shrink-swell potential; fair stability when wet.	SLIGHT - low compressibility; good bearing capacity; good to fair shear strength.	Metal - HIGH Concrete - LOW
279	Same as No. 276, Boyer sandy loam						
280	Same as No. 316, Boyer loamy sand						
281	Hackett loam	Surface soil - GOOD - thin. Subsoil - POOR - drouthy; shallow to substratum.	GOOD - substratum is poorly graded sand with some gravel pockets.	5 plus	Subsoil - MODERATE - good stability and low shrink-swell potential. Substratum - SLIGHT - stable under wheel loads when damp; low shrink-swell potential.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength.	Metal - LOW Concrete - LOW
282	Casco-Rodman loams	Casco part -- same as No. 172, Casco loam Rodman part -- same as No. 75, Rodman gravelly loam					
283	Same as No. 370, Mosel sandy loam						
284	Same as No. 370, Mosel sandy loam						
285	Same as No. 176, Mussey loam						
286	Same as No. 181, Mussey silt loam						
287	Same as No. 176, Mussey loam						
288	Hackett loamy sand	Surface soil - VERY POOR. Subsoil - POOR - drouthy; shallow to substratum.	GOOD - substratum is poorly graded sand with some gravel layers.	5 plus	Subsoil - MODERATE TO SLIGHT - good stability and low shrink-swell potential. Substratum - SLIGHT - stable under wheel loads; low shrink-swell potential.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength.	Metal - LOW Concrete - LOW
288V	Same as No. 267, Sisson fine sandy loam						
289	Hackett sandy loam	Surface soil - FAIR - thin. Subsoil - FAIR - generally drouthy; shallow to substratum.	GOOD - substratum is poorly graded sand with some gravel layers.	5 plus	Subsoil - MODERATE - good stability and low shrink-swell potential. Substratum - SLIGHT - stable under wheel loads; low shrink-swell potential.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength.	Metal - LOW Concrete - LOW
289Y	Same as No. 156, Lapeer sandy loam						
289Z	Same as No. 254, Tustin sandy loam						
295	Morley-Beecher silt loams	Morley part -- same as No. 297, Morley silt loam Beecher part -- same as No. 3361, Beecher silt loam					
297	Morley silt loam	Surface soil - GOOD. Subsoil - POOR - clayey.	VERY POOR - clayey.	5 plus	Subsoil and Substratum - SEVERE - high shrink-swell potential; low bearing capacity when wet.	SEVERE - fair; shear strength; moderately compressible; subject to shrinking on drying; poor bearing capacity.	Metal - MODERATE Concrete - LOW

TABLE 6.
THE USE OF SOILS FOR SPECIFIC ENGINEERING PURPOSES (Continued)

Soil Number and Soil Name	Suitability as a Source of		Depth to Bedrock (in ft.)	Limitations For		Soil Corrosivity For Conduits	
	Topsoil	Sand & Gravel		Road Subgrades	Foundations for Low Buildings		
297S	Same as No. 297, Morley silt loam						
297V	Same as No. 266, Sisson silt loam						
297X	Same as No. 72, Fox loam						
297Y	Same as No. 297, Morley silt loam						
298	Ashkum silty clay loam	Surface soil - GOOD - dark; thick. Subsoil - POOR - clayey; water table - 0 to 1 foot.	VERY POOR - clayey.	5 plus	Subsoil - VERY SEVERE. Substratum - high shrink-swell potential; low bearing capacity; elastic	SEVERE TO VERY SEVERE - fair shear strength; highly compressible; moderate shrink-swell potential; low bearing capacity; water table - 0 to 1 foot most of the year.	Metal - HIGH Concrete - LOW
299	Blount silt loam	Surface soil - FAIR TO GOOD - thin. Subsoil - POOR - clayey.	VERY POOR - clayey.	5 plus	Subsoil - VERY SEVERE. Substratum - SEVERE - high shrink-swell potential; low bearing capacity; elastic.	SEVERE TO VERY SEVERE - fair shear strength; highly compressible; moderate shrink-swell potential; low bearing capacity; high water table, seepage, or both.	Metal - HIGH Concrete - LOW
300	Ashkum-Beecher loams	Ashkum part -- same as No. 298, Ashkum silty clay loam Beecher part -- same as No. 3361, Beecher silt loam					
302	Same as No. 451, Houghton mucky peat						
303	Alluvial land, rock substratum	Surface layer - FAIR. Subsoil - POOR - variable texture; gravelly; water table - 0 to 1 foot.	VERY POOR - low sand and gravel content.	Less than 2	Subsoil - SEVERE - unstable; extremely variable. Substratum - VERY SEVERE - dolomite bedrock; high water table.	MODERATE - dolomite bedrock; high water table.	Metal - HIGH Concrete - LOW
305	Same as No. 208, Knowles silt loam						
306	Knowles silt loam, wet variant	Surface soil - GOOD. Subsoil - POOR - thin over bedrock.	VERY POOR - bedrock at less than 42 inches.	2 to 5	Subsoil - VERY SEVERE - moderate shrink-swell potential; low bearing capacity. Substratum - VERY SLIGHT - in places; dolomite bedrock.	SLIGHT - where footing is on dolomite bedrock.	Metal - LOW Concrete - LOW
307	Same as No. 306, Knowles silt loam, wet variant						
308	Same as No. 206, Knowles silt loam, shallow variant						
311	Manawa loam	Surface soil - GOOD - thin. Subsoil - VERY POOR - clayey; plastic, water table - 1 to 3 feet.	VERY POOR - clayey.	5 plus	Subsoil - VERY SEVERE. Substratum - SEVERE - high shrink-swell potential; low bearing capacity; elastic.	MODERATE TO SEVERE - moderate shrink-swell potential; fair shear strength; moderate compressibility.	Metal - HIGH Concrete - LOW
314	Same as No. 380, Sumner loamy sand						
315	Oshtemo loamy sand	Surface soil - POOR - drouthy. Subsoil - POOR - thin; over sand and gravel.	FAIR TO GOOD - substratum is poorly graded medium sand and some gravel.	5 plus	Subsoil - MODERATE TO SLIGHT - when properly compacted; low shrink-swell potential. Substratum - SLIGHT - low stability under wheel loads; very low shrink-swell potential.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength; good bearing capacity.	Metal - LOW Concrete - LOW
316	Boyer loamy sand	Surface soil - VERY POOR. Subsoil - VERY POOR - erosive and thin; over sand and gravel.	FAIR TO GOOD - poorly graded sand with some pockets of gravel.	5 plus	Subsoil - MODERATE TO SLIGHT - when properly compacted; low shrink-swell potential. Substratum - SLIGHT - lacks stability under wheel load; low shrink-swell potential.	VERY SLIGHT - very low compressibility; low shrink-swell potential; good shear strength; good bearing capacity.	Metal - LOW Concrete - LOW
316Y	Same as No. 156, Lapeer sandy loam						
316Z	Same as No. 272, Tustin loamy fine sand						
317	Same as No. 315, Oshtemo loamy sand						
320	Same as No. 315, Oshtemo loamy sand						
323	Ionia sandy loam	Surface soil - FAIR. Subsoil - POOR - lower subsoil gravelly and drouthy.	GOOD - substratum is poorly graded stratified sand and gravel.	5 plus	Subsoil - VERY SEVERE - good bearing capacity when properly compacted. Substratum - VERY SLIGHT - very stable.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength.	Metal - LOW Concrete - LOW
323V	Same as No. 267, Sisson fine sandy loam						
324	Same as No. 323, Ionia sandy loam						
324Y	Same as No. 343, Celina silt loam, nearly level to gently sloping						
324Z	Same as No. 21, Hebron loam						
324V	Same as No. 266, Sisson silt loam						

TABLE 6.
THE USE OF SOILS FOR SPECIFIC ENGINEERING PURPOSES (Continued)

Soil Number and Soil Name	Suitability as a Source of		Depth to Bedrock (in ft.)	Limitations For		Soil Corrosivity For Conduits
	Topsoil	Sand & Gravel		Road Subgrades	Foundations for Low Buildings	
325 Varna silt loam	Surface soil - GOOD - dark. Subsoil - FAIR TO POOR - clayey.	VERY POOR - clayey.	5 plus	Subsoil - VERY SEVERE. Substratum - SEVERE - high shrink-swell potential; low bearing capacity.	MODERATE - fair shear strength; moderately compressible; moderate shrink-swell potential; low bearing capacity	Metal - MODERATE Concrete - LOW
326 Abington silt loam	Surface soil - GOOD - dark; thick. Subsoil - POOR - water table - 0 to 1 foot.	FAIR - substratum is poorly graded sand and gravel; high water table hinders excavation.	5 plus	Subsoil - VERY SEVERE - high shrink-swell potential and low stability. Substratum - VERY SLIGHT - when properly drained; very stable under wheel loads.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength; water table - 0 to 1 foot.	Metal - HIGH Concrete - LOW
326Z Same as No. 212, Ehler silt loam						
327 Walkill silt loam	Surface soil - GOOD - thick. Subsoil - (organic material) - POOR - erosive; oxidizes rapidly; water table - 0 to 1 foot.	VERY POOR - organic material.	5 plus	VERY SEVERE - organic soils cannot be used in subgrades.	VERY SEVERE - high water table; very low bearing capacity; special footings required.	Metal - VERY HIGH Concrete - VERY HIGH when acid; LOW when above pH 5.5
328 Pistakee silt loam	Surface soil - GOOD - thick. Subsoil - POOR - thick; water table - 1 to 3 feet.	POOR - high water table; substratum has pockets of sand and gravel.	5 plus	Subsoil - MODERATE - moderate shrink-swell potential. Substratum - VERY SEVERE - relatively unstable.	SEVERE - high shrink-swell potential; fair shear strength; very high frost hazard; high water table.	Metal - MODERATE Concrete - LOW
328Y Same as No. 328, Pistakee silt loam						
330 Navan loam	Surface soil - GOOD - thick; dark. Subsoil - FAIR TO POOR - water table - 0 to 1 foot.	VERY POOR - may have thin layers of sand and gravel in subsoil.	5 plus	Subsoil - SEVERE - low stability and bearing capacity. Substratum - SEVERE - unstable.	VERY SEVERE - moderate shrink-swell potential; high compressibility; poor shear strength; high water table - 0 to 1 foot.	Metal - VERY HIGH Concrete - LOW
331 Markham-Elliott silt loams	Markham part -- same as No. 336, Markham silt loam Elliott part -- same as No. 3251, Elliott silt loam					
332 Kane silt loam	Surface soil - GOOD - dark; thick. Subsoil - POOR - clayey in places; water table - 1 to 3 feet.	GOOD - substratum is poorly graded stratified sand and gravel at less than 40 inches; high water table.	5 plus	Subsoil - VERY SEVERE - high shrink-swell potential; loss of bearing capacity when wet. Substratum - VERY SLIGHT - highly stable.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength; high water table, seepage, or both.	Metal - MODERATE Concrete - LOW
332V Same as No. 26, Wauconda fine sandy loam						
332Y Same as No. 178, Crosby silt loam						
332Z Same as No. 51, Aztalan loam						
333 Eagle silt loam	Surface soil - GOOD - dark; thick. Subsoil - FAIR TO POOR - lower subsoil is gravelly.	GOOD - substratum is poorly graded stratified sand and gravel.	5 plus	Subsoil - VERY SEVERE - good bearing capacity when compacted. Substratum - VERY SLIGHT - very stable.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength.	Metal - LOW Concrete - LOW
333Y Same as No. 91, Parr silt loam						
333Z Same as No. 16, Rome silt loam						
334 Same as No. 119, Warsaw silt loam						
335 Ionia silt loam	Surface soil - GOOD. Subsoil - POOR - lower subsoil gravelly and drouthy.	GOOD - substratum is poorly graded stratified sand and gravel.	5 plus	Subsoil - VERY SEVERE - good bearing capacity when properly compacted. Substratum - VERY SLIGHT - very stable.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength.	Metal - LOW Concrete - LOW
335Y Same as No. 343, Celina silt loam, nearly level to gently sloping						
335Z Same as No. 21, Hebron loam						
336 Markham silt loam	Surface soil - GOOD - dark. Subsoil - FAIR TO POOR - clayey.	VERY POOR - clayey.	5 plus	Subsoil and Substratum - VERY SEVERE - high shrink-swell potential; low bearing capacity.	MODERATE - fair shear strength; moderately compressible; moderate shrink-swell potential; low bearing capacity.	Metal - MODERATE Concrete - LOW
338 Same as No. 298, Ashkum silty clay loam						
339 Same as No. 326, Abington silt loam						
340 Navan silt loam	Surface soil - GOOD - thick; dark. Subsoil - FAIR TO POOR - water table - 0 to 1 foot.	VERY POOR - may have thin layers of sand and gravel in subsoil.	5 plus	Subsoil - SEVERE - low stability and bearing capacity when wet. Substratum - SEVERE - unstable at high moisture content.	VERY SEVERE - moderate shrink-swell potential; high compressibility; poor shear strength; water table - 0 to 1 foot.	Metal - VERY HIGH Concrete - LOW
343 Celina silt loam, nearly level to gently sloping	Surface - GOOD. Subsoil - FAIR TO POOR - lower part gravelly in places.	POOR - substratum contains pockets of well graded sand and gravel.	5 plus	Subsoil - VERY SEVERE - high shrink-swell potential; low bearing capacity. Substratum - MODERATE low shrink-swell potential; fair stability.	SLIGHT - very low compressibility; good bearing capacity; good to fair shear strength.	Metal - MODERATE Concrete - LOW

TABLE 6. THE USE OF SOILS FOR SPECIFIC ENGINEERING PURPOSES (Continued)

Soil Number and Soil Name	Suitability as a Source of		Depth to Bedrock (in ft.)	Limitations For		Soil Corrosivity For Conduits	
	Topsoil	Sand & Gravel		Road Subgrades	Foundations for Low Buildings		
343	Celina silt loam, sloping to moder- ately steep	Same as No. 362, Theresa silt loam					
344	Ashford silt loam	Surface soil - GOOD - thin. Subsoil - FAIR TO POOR - clayey; thin; lower part gravelly in places.	POOR - substratum con- tains pockets of well graded sand and gravel.	5 plus	Subsoil - VERY SE- VERE - high shrink- swell potential; low bearing capacity. Substratum - MODER- ATE - low shrink- swell potential; fair stability when wet.	SLIGHT TO MODERATE - low compressibility; easy to compact; good bearing capacity; good to fair shear strength.	Metal - MODERATE Concrete - LOW
345	Nenno silt loam	Surface soil - GOOD. Subsoil - FAIR TO POOR - may be gravel- ly in the lower part; water table 1 to 3 feet.	POOR - may have pockets of well graded sand and gravel in the substratum; high water table.	5 plus	Subsoil - VERY SE- VERE - high shrink- swell potential; low bearing capacity. Substratum - MODER- ATE - low shrink- swell potential; fair stability.	SLIGHT - low compressi- bility; fair shear strength; moderate to good bearing capacity.	Metal - HIGH Concrete - LOW
346	Kane loam	Surface soil - GOOD - dark; thick. Subsoil - POOR - clay- ey; water table - 1 to 3 feet.	GOOD - substratum is poorly graded stratified sand and gravel at less than 40 inches; high water table.	5 plus	Subsoil - VERY SE- VERE - high shrink- swell potential; low bearing capacity. Substratum - VERY SLIGHT - very stable.	SLIGHT - very low com- pressibility; low shrink- swell potential; good shear strength; high water table, seepage, or both.	Metal - MODERATE Concrete - LOW
346 Y	Same as No. 178, Crosby silt loam						
346 Z	Same as No. 51, Aztalan loam						
352	Same as No. 153, Lapeer loam						
355	Same as No. 156, Lapeer sandy loam						
356	Same as No. 156, Lapeer sandy loam						
357	Hochheim loam	Surface soil - GOOD - thin. Subsoil - FAIR TO POOR - clayey in places.	POOR - substratum con- tains pockets of well graded sand and gravel.	5 plus	Subsoil - VERY SE- VERE - high shrink- swell potential; low bearing capacity. Substratum - SLIGHT - low shrink-swell po- tential; fair stability.	SLIGHT TO MODERATE - low compressibility; easy to compact; fair shear strength.	Metal - MODERATE Concrete - LOW
357 R	Same as No. 208, Knowles silt loam						
357 X	Same as No. 172, Casco loam						
358	Miami loam	Surface soil - GOOD. Subsoil - POOR - gravel- ly in the lower part.	POOR - substratum con- tains pockets of well graded sand and gravel.	5 plus	Subsoil - VERY SE- VERE - high shrink- swell potential; low bearing capacity. Substratum - MODER- ATE - low shrink- swell potential; fair stability.	SLIGHT TO MODERATE - low compressibility; fair shear strength; high bearing capacity.	Metal - MODERATE Concrete - LOW
359	Hennepin loam	Surface soil - FAIR - very thin. Subsoil - POOR - thin; gravelly in the lower subsoil.	POOR - substratum con- tains pockets of well graded sand and gravel.	5 plus	Subsoil - VERY SE- VERE - high shrink- swell potential. Substratum - SLIGHT - low shrink-swell po- tential; fair stability.	SLIGHT TO MODERATE - low compressibility; fair shear strength; high bearing capacity; steep slopes.	Metal - MODERATE Concrete - LOW
360	Same as No. 357, Hochheim loam						
360 R	Same as No. 208, Knowles silt loam						
360 V	Same as No. 266, Sisson silt loam						
360 X	Same as No. 172, Casco loam						
361	Same as No. 358, Miami loam						
362	Theresa silt loam	Surface soil - GOOD. Subsoil - POOR - clayey and stony.	POOR - contains pockets of well graded sand and gravel in the substratum.	5 plus	Subsoil - VERY SE- VERE - high shrink- swell potential; low bearing capacity. Substratum - SLIGHT - good stability; low shrink-swell potential.	SLIGHT - low compressi- bility; easy to compact; fair shear strength.	Metal - MODERATE Concrete - LOW
362 R	Same as No. 208, Knowles silt loam						
362 V	Same as No. 266, Sisson silt loam						
362 X	Same as No. 70, Fox sandy loam						
362 Z	Same as No. 21, Hebron loam						
363	Mayville silt loam	Surface soil - GOOD. Subsoil - POOR - clay- ey and stony in places.	POOR - contains pockets of well graded sand and gravel in the substratum.	5 plus	Subsoil - VERY SE- VERE - high shrink- swell potential; low bearing capacity. Substratum - MODER- ATE - good stability; low shrink-swell potential.	SLIGHT - low compressi- bility; fair shear strength; good bearing capacity.	Metal - MODERATE Concrete - LOW
363 Y	Same as No. 363, Mayville silt loam						
363 R	Same as No. 306, Knowles silt loam, wet variant						

TABLE 6. THE USE OF SOILS FOR SPECIFIC ENGINEERING PURPOSES (Continued)

Soil Number and Soil Name		Suitability as a Source of		Depth to Bedrock (in ft.)	Limitations For		Soil Corrosivity For Conduits
		Topsoil	Sand & Gravel		Road Subgrades	Foundations for Low Buildings	
363X	Same as No. 335, Ionia silt loam						
363Z	Same as No. 21, Hebron loam						
364	Lamartine silt loam	Surface soil - GOOD. Subsoil - POOR - clayey; stony in places; water table - 1 to 3 feet.	POOR - substratum contains pockets of well graded sand and gravel.	5 plus	Subsoil - VERY SEVERE - high shrink-swell potential; low bearing capacity. Substratum - MODERATE - low shrink-swell potential; fair stability.	SLIGHT - low compressibility; fair shear strength; moderate to good bearing value.	Metal - HIGH Concrete - LOW
364V	Same as No. 26, Wauconda fine sandy loam						
364X	Same as No. 233, Matherton silt loam						
364Z	Same as No. 369, Mosel silt loam						
365	Same as No. 357, Hochheim loam						
365X	Hochheim-Hennepin loams, gravelly substratums.	Hochheim part -- same as No. 172, Casco loam Hennepin part -- same as No. 359, Hennepin loam					
366	Hochheim-Theresa loams	Hochheim part -- same as No. 357, Hochheim loam Theresa part -- same as No. 362, Theresa silt loam					
367	Hochheim fine sandy loam	Surface soil - FAIR. Subsoil - POOR - erosive; may be clayey and stony.	POOR - contains pockets of well graded sand and gravel.	5 plus	Subsoil - VERY SEVERE - high shrink-swell potential; low bearing capacity. Substratum - MODERATE - good stability; low shrink-swell potential.	SLIGHT - low compressibility; fair shear strength; good bearing capacity.	Metal - MODERATE Concrete - LOW
369	Mosel silt loam	Surface soil - GOOD. Subsoil - FAIR TO POOR - lower subsoil is unstable on slopes; water table - 1 to 3 feet.	VERY POOR - may have thin layers of sand and gravel in subsoil.	5 plus	Subsoil - SEVERE - low stability and bearing capacity. Substratum - SEVERE - unstable.	MODERATE TO SEVERE - moderate shrink-swell potential; high compressibility; poor shear strength, high water table, seepage, or both.	Metal - HIGH Concrete - LOW
370	Mosel sandy loam	Surface soil - FAIR. Subsoil - FAIR TO POOR - lower subsoil is unstable on slopes; water table - 1 to 3 feet.	VERY POOR - may have thin layers of sand and gravel in subsoil.	5 plus	Subsoil - MODERATE - low shrink-swell potential; suitable for all pavement types. Substratum - SEVERE - unstable.	MODERATE TO SEVERE - moderate shrink-swell potential; high compressibility; poor shear strength; high water table, seepage, or both.	Metal - LOW Concrete - MODERATE
371	Mosel loam	Surface soil - GOOD. Subsoil - FAIR TO POOR - lower subsoil is unstable on slopes; water table - 1 to 3 feet.	VERY POOR - may have thin layers of sand and gravel in subsoil.	5 plus	Subsoil - MODERATE - low shrink-swell potential; suitable for all pavement types. Substratum - SEVERE - unstable.	MODERATE TO SEVERE - moderate shrink-swell potential; high compressibility; poor shear strength; high water table, seepage, or both.	Metal - LOW Concrete - MODERATE
380	Sumner loamy sand	Surface soil - POOR. Subsoil - POOR.	FAIR TO GOOD - substratum is poorly graded sand with some pockets of gravel.	5 plus	Subsoil - SLIGHT when properly compacted; low shrink-swell potential. Substratum - SLIGHT - lacks stability under wheel load unless moist.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength; high bearing capacity.	Metal - LOW Concrete - LOW
386	Granby fine sandy loam	Surface soil - FAIR - dark; thin. Subsoil - VERY POOR - drouthy; water table - 0 to 1 foot.	GOOD - substratum is poorly graded sand; water table hinders excavation.	5 plus	Subsoil - SLIGHT - good stability and low shrink-swell potential. Substratum - SLIGHT - stable under wheel loads; low shrink-swell potential; may need to be confined under pavements.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength.	Metal - MODERATE Concrete - LOW
386Z	Same as No. 330, Navan loam						
386Y	Same as No. 386, Granby fine sandy loam						
387	Granby loamy sand	Surface soil - POOR. Subsoil - VERY POOR - drouthy; water table - 0 to 1 foot.	GOOD - substratum is poorly graded sand; high water table hinders excavation.	5 plus	Subsoil - SLIGHT - good stability; low shrink-swell potential. Substratum - SLIGHT - stable under wheel loads; low shrink-swell potential; confined under pavements.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength.	Metal - MODERATE Concrete - LOW
387V	Same as No. 26, Wauconda fine sandy loam						
391	Wea sandy loam	Surface soil - GOOD - dark; thick. Subsoil - FAIR TO POOR - thick; clayey.	GOOD - substratum is poorly graded stratified sand and gravel at more than 40 inches.	5 plus	Subsoil - VERY SEVERE - high shrink-swell potential; low bearing capacity; highly elastic. Substratum - VERY SLIGHT - very stable under wheel loads.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength.	Metal - LOW TO MODERATE Concrete - LOW
392	Ockley loam	Surface soil - GOOD. Subsoil - POOR - clayey.	GOOD - substratum is poorly graded stratified sand and gravel at more than 40 inches.	5 plus	Subsoil - VERY SEVERE - high shrink-swell potential; low bearing capacity. Substratum - SLIGHT - very stable under wheel loads.	SLIGHT - very low compressibility; low shrink-swell potential; good shear strength.	Metal - LOW TO MODERATE Concrete - LOW

TABLE 6.
THE USE OF SOILS FOR SPECIFIC ENGINEERING PURPOSES (Continued)

Soil Number and Soil Name	Suitability as a Source of		Depth to Bedrock (in ft.)	Limitations For		Soil Corrosivity For Conduits
	Topsoil	Sand & Gravel		Road Subgrades	Foundations for Low Buildings	
393 Ockley sandy loam	Surface soil - FAIR - Subsoil - POOR - clayey.	GOOD - substratum is poorly graded stratified sand and gravel at more than 40 inches.	5 plus	Subsoil - VERY SE- VERE - high shrink- swell potential; low bearing capacity. Substratum - VERY SLIGHT - very stable under wheel loads.	SLIGHT - very low com- pressibility; low shrink- swell potential; good shear strength.	Metal - LOW TO MODERATE Concrete - LOW
394 Parr sandy loam	Surface soil - FAIR. Subsoil - FAIR TO POOR - contains rock fragments in the lower part.	POOR - substratum con- tains pockets of well graded sand and gravel.	5 plus	Subsoil - VERY SE- VERE - high shrink- swell potential; low bearing capacity. Substratum - SLIGHT - good stability; low shrink-swell potential.	SLIGHT TO MODERATE - low compressibility; and good to fair shear strength.	Metal - MODERATE Concrete - LOW
397 Ozaukee silt loam	Surface soil - GOOD. Subsoil - POOR - clayey.	VERY POOR - clayey.	5 plus	Subsoil - VERY SE- VERE. Substratum - SEVERE - high shrink-swell po- tential; low bearing capacity when wet.	SEVERE - fair shear strength; moderately com- pressible; high shrink- swell potential; low bear- ing capacity.	Metal - MODERATE Concrete - LOW
397V Same as No. 397, Ozaukee silt loam						
397Y Same as No. 397, Ozaukee silt loam						
397R Same as No. 208, Knowles silt loam						
397X Same as No. 72, Fox loam						
398 Same as No. 298, Ashkum silty clay loam						
399 Mequon silt loam	Surface soil - FAIR TO GOOD - thin. Subsoil - POOR - clayey.	VERY POOR - clayey.	5 plus	Subsoil - VERY SE- VERE. Substratum - SEVERE - moderate shrink-swell potential; low bearing capacity; elastic.	SEVERE - fair shear strength; moderately com- pressible; poor bearing capacity; high water table, seepage, or both.	Metal - HIGH Concrete - LOW
410 Same as No. 133, Spinks fine sand						
411 Spinks fine sand, silty substratum	Surface soil - POOR TO VERY POOR - drouthy; high wind erosion haz- ard. Subsoil - VERY POOR - drouthy; high wind erosion hazard.	GOOD - substratum con- tains poorly graded fine sand and silt layers.	5 plus	Subsoil - SLIGHT - good stability; low shrink-swell potential. Substratum - MODER- ATE - relatively un- stable.	SLIGHT - very low com- pressibility; low shrink- swell potential; good shear strength.	Metal - MODERATE TO LOW Concrete - LOW
413 Crestview fine sandy loam	Surface soil - POOR TO VERY POOR - drouthy; thick; dark. Subsoil - VERY POOR - drouthy; high wind erosion hazard.	GOOD - substratum is poorly graded and con- tains some fines.	5 plus	Subsoil - SLIGHT - good stability and low shrink-swell potential. Substratum - SLIGHT - stable under wheel loads; low shrink-swell potential; may need to be confined under pave- ment.	SLIGHT - very low com- pressibility; low shrink- swell potential; good shear strength.	Metal - LOW Concrete - LOW
414 Same as No. 413, Crestview fine sandy loam						
416 Terrace escarp- ment, till	VERY POOR - clayey.	VERY POOR - no sand or gravel present	5 plus	VERY SEVERE - high shrink-swell potential; poor stability.	VERY SEVERE - high shrink-swell potential; poor stability; steep slopes.	Metal - HIGH Concrete - LOW
417 Terrace escarp- ments, outwash	POOR - variable.	FAIR - variable.	5 plus	SLIGHT - low shrink- swell potential; fairly stable.	SEVERE - steep slopes.	Metal - HIGH Concrete - LOW
419 Beach sand	Surface layer - VERY POOR. Subsoil - VERY POOR.	FAIR - poorly graded sand with some gravel.	5 plus	Substratum - VERY SLIGHT - stable under wheel loads when damp; low shrink-swell po- tential; suitable for all pavement types when confined; ground water level is governed by lake level.	SLIGHT - low compress- ibility; low shrink-swell potential.	Metal - LOW Concrete - LOW
420 Same as No. 358, Miami loam						
421 Same as No. 16, Dodge silt loam						
431 Knowles silt loam, shallow variant	Surface soil - VERY POOR - thin; stony; un- derlain by bedrock.	VERY POOR - dolomite bedrock.	Less than 2.	Substratum - VERY SLIGHT - bedrock dolomite.	SLIGHT - where footing is on dolomite bedrock.	Metal - MODERATE Concrete - LOW
449 Same as No. 451, Houghton mucky peat						
450 Same as No. 451, Houghton mucky peat						
451 Houghton mucky peat	POOR - erosive; oxi- dizes rapidly.	VERY POOR - no sand and gravel present.	5 plus	VERY SEVERE - or- ganic soils cannot be used in subgrades.	VERY SEVERE - organic soils cannot be used for foundations.	Metal - VERY HIGH Concrete - HIGH when below pH 5.5; low when above pH 5.5.
452 Adrian muck	POOR - erosive; oxi- dizes rapidly.	FAIR - underlying sand quite variable; high water table hinders excavation.	5 plus	VERY SEVERE - or- ganic soils cannot be used in subgrades.	VERY SEVERE - organic soils cannot be used for foundations.	Metal - VERY HIGH in organics; MODERATE in sands; Concrete - HIGH; below pH 5.5; LOW above pH 5.5.

TABLE 6.
THE USE OF SOILS FOR SPECIFIC ENGINEERING PURPOSES (Continued)

Soil Number and Soil Name	Suitability as a Source of		Depth to Bedrock (in ft.)	Limitations For		Soil Corrosivity For Conduits
	Topsoil	Sand & Gravel		Road Subgrades	Foundations for Low Buildings	
452Z	Same as No. 451, Houghton mucky peat					
453	Same as No. 452, Adrian muck					
454	Same as No. 451, Houghton mucky peat					
455	Same as No. 451, Houghton mucky peat					
456	Same as No. 451, Houghton mucky peat					
457	Same as No. 451, Houghton mucky peat					
458	Same as No. 451, Houghton mucky peat					
459	Same as No. 451, Houghton mucky peat					
460	Same as No. 451, Houghton mucky peat					
461	Same as No. 451, Houghton mucky peat					
462	Same as No. 451, Houghton mucky peat					
502	Same as No. 504, Flagg silt loam					
504	Flagg silt loam	Surface soil - GOOD. Subsoil - FAIR TO POOR - lower part clayey in places.	POOR - substratum contains pockets of well graded sand and gravel.	5 plus	Subsoil - VERY SEVERE - somewhat elastic; high shrink-swell potential. Substratum - MODERATE - high shrink-swell potential; good stability on wetting.	SLIGHT - good to fair shear strength; low compressibility. Metal - LOW TO MODERATE Concrete - LOW
505	Flagg silt loam, wet variant	Surface soil - GOOD. Subsoil - FAIR TO POOR - lower part somewhat clayey.	POOR - substratum contains pockets of well graded sand and gravel.	5 plus	Subsoil - VERY SEVERE - somewhat elastic; high shrink-swell potential. Substratum - MODERATE - high shrink-swell potential; good stability on wetting.	SLIGHT - good to fair shear strength; low compressibility. Metal - HIGH Concrete - LOW
508	Same as No. 510, Pecatonica silt loam					
510	Pecatonica silt loam	Surface soil - GOOD - thick; dark. Subsoil - FAIR TO POOR - lower part clayey in places.	POOR - may contain pockets of well graded sand and gravel.	5 plus	Subsoil - SEVERE - high shrink-swell potential; low bearing capacity. Substratum - MODERATE - good stability; high shrink-swell potential.	SLIGHT TO MODERATE - fair shear strength; low compressibility; fair bearing capacity. Metal - MODERATE Concrete - LOW
511	Same as No. 505, Flagg silt loam, wet variant					
514	Same as No. 516, Westville silt loam					
516	Westville silt loam	Surface soil - GOOD. Subsoil - FAIR TO POOR.	POOR - contains pockets of well graded sand and gravel.	5 plus	Subsoil - SEVERE - high shrink-swell potential; low bearing capacity. Substratum - MODERATE - good stability; low shrink-swell potential.	GOOD TO FAIR - fair shear strength; low compressibility; fair bearing capacity. Metal - MODERATE Concrete - LOW
550	Same as No. 212R, Ehler silt loam, rock substratum					
557	Same as No. 358, Miami loam					
560	Same as No. 358, Miami loam					
3251	Elliott silt loam	Surface soil - GOOD. thick; dark. Subsoil - POOR - clayey.	VERY POOR - clayey.	5 plus	Subsoil - VERY SEVERE Substratum - SEVERE - high shrink-swell potential; low bearing capacity.	SEVERE - fair shear strength; moderately compressible; moderate shrink-swell potential; low bearing capacity; high water table, seepage, or both. Metal - HIGH Concrete - LOW
3251V	Same as No. 3251, Elliott silt loam					
3361	Beecher silt loam	Surface soil - GOOD - dark. Subsoil - VERY POOR - clayey.	VERY POOR - clayey.	5 plus	Subsoil and Substratum - SEVERE - high shrink-swell potential; low bearing capacity when wet.	SEVERE - fair shear strength; moderately compressible; high shrink-swell potential; low bearing capacity; high water table, seepage, or both. Metal - HIGH Concrete - LOW

THE USE OF SOILS FOR ROAD CONSTRUCTION

Table 7 contains ratings and limitations of soils for road construction purposes. Where soils are used for roads or trails without asphalt, gravel or concrete surfacing, the limitation ratings are based mainly on the surface soil and subsoil characteristics. Ratings are based upon the entire soil in place without vegetative cover.

Pedestrian traffic ratings are determined mainly by surface soil texture, drainage class, stoniness and flood hazard. Well drained loam to sandy loam soils have fewer limitations than other soils. Soils with silt loam textures or finer are generally slippery when wet. Soils with loamy sand or sand textures are generally erosive when dry and difficult to walk on. The poorly drained soils are generally wet during most of the potential use period.

Vehicular traffic ratings are based mainly on surface soil texture, bearing capacity of the soil, soil drainage class and flood hazard. Well drained loam to sandy loam soils have fewer limitations for this use than other soils. Coarse textured soils erode readily and fine textured soils are slippery when wet. Somewhat poorly to poorly drained or frequently flooded soils are generally too wet and unstable for vehicular traffic without gravel, concrete or asphalt surfacing.

Columns in the table labeled *Adequate compaction*, *Surface stabilization with additives*, *Road base material* and *Backfill material* contain ratings and limitations of the material in the soil substratum. Ratings are based on the behavior of the material after it has been moved to the point where it is to be used.

Adequate compaction ratings are based mainly on the compressibility and the stability of the material after compaction. Compaction is defined as the volume change produced artificially by momentary load applications such as rolling, tamping or vibration.

Surface stabilization with additive ratings reflect the behavior of soil substratum mate-

rials where they are mixed with cement or asphalt and used as a road surface. The ratings are affected mainly by the shear strength and compressibility of soil materials after mixing and spreading. Coarse materials ranging in size from .07 millimeters to 2 inches in diameter are suitable for this use. A small amount of material finer than .07 millimeters is acceptable. Specific gradation requirements for Wisconsin are set forth in the publication, "Standard Specifications for Road and Bridge Construction", State Highway Commission.

Roadbase material is generally comprised of well graded gravel. Compressibility and stability are the principal properties affecting limitations. The ratings are based on the expected behavior of the material after it is in place beneath a concrete, asphalt or gravel road surface.

Backfill material is rated according to its behavior as it is affected by compressibility, perviousness and shrink-swell potential. Coarse material with a high content of gravel is generally most desirable. Clay soils with high shrink-swell potential are least desirable.

Winter grading is most successful on soils that can be moved with ease during the winter months. Ratings are based mainly on soil drainage and the texture of the subsoil and soil substratum. Well drained sandy or gravelly soils generally have fewer limitations for winter grading than other soils.



The base for this failing roadway is organic materials such as those that comprise the Houghton mucky peat soil profile.

1 Earth Manual, U.S. Department of Interior, Bureau of Reclamation

TABLE 7
THE USE OF SOILS FOR ROAD CONSTRUCTION

Soil Number and Soil Name	LIMITATIONS OF SOILS FOR						
	Pedestrian Traffic	Vehicular Traffic	Adequate Compaction	Surface Stabilization With Additives	Road Base Material	Backfill Material	Winter Grading
1 Rough broken land	SEVERE - steep slopes; erosive; soft and slippery when wet.	SEVERE - steep; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil and substratum - SEVERE.
2 Stinson silt loam	MODERATE - wet for short periods; frequent overflow; soft and slippery when wet.	SEVERE - wet for short periods; frequent overflow; soft and slippery when wet.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Substratum - SEVERE.
3 Stony colluvium	MODERATE - subject to occasional overflow; stones are restrictive.	MODERATE - occasional overflow.	MODERATE - properties variable.	MODERATE - properties variable.	MODERATE - properties variable.	MODERATE - properties variable.	MODERATE - properties variable.
4 Marsh	SEVERE - flooded most of the year.	SEVERE - flooded most of the year.	SEVERE - flooded most of the year; poor stability.	SEVERE - flooded most of the year; poor stability.	SEVERE - flooded most of the year; poor stability.	SEVERE - flooded most of the year; poor stability.	SEVERE - flooded most of the year.
5 Same as No. 54, Lawson silt loam.							
5W Sawmill silt loam	SEVERE - wet for long periods; frequent overflow; soft and slippery when wet.	SEVERE - wet for long periods; frequent overflow; soft and slippery when wet.	SEVERE - frequent overflow.	SEVERE - frequent overflow.	SEVERE - frequent overflow.	SEVERE - frequent overflow.	SEVERE - frequent overflow.
7 Dorchester silt loam	MODERATE - frequent overflow; soft and slippery when wet.	MODERATE - frequent overflow; soft and slippery when wet; fair bearing capacity.	MODERATE - medium compressibility.	MODERATE - medium compressibility.	SEVERE - poor stability.	SEVERE - poor stability.	SEVERE - properties variable.
7W Same as No. 54, Lawson silt loam							
10 Same as No. 11, Alluvial land							
10W Same as No. 11W, Alluvial land, wet							
11 Alluvial land	SEVERE - frequent overflow.	SEVERE - frequent overflow.	SEVERE - frequent overflow.	SEVERE - frequent overflow.	SEVERE - frequent overflow.	SEVERE - frequent overflow.	SEVERE - frequent overflow.
11W Alluvial land, wet	SEVERE - wet for long periods; frequent overflow.	SEVERE - wet for long periods; frequent overflow.	SEVERE - wet for long periods; frequent overflow.	SEVERE - wet for long periods; frequent overflow.	SEVERE - wet for long periods; frequent overflow.	SEVERE - wet for long periods; frequent overflow.	SEVERE - wet for long periods; frequent overflow.
11WY Same as No. 11W, Alluvial land, wet							
12 Wea silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - fairly stable.	SLIGHT - very low compressibility; very pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SLIGHT to MODERATE.
14 Same as No. 414, Crestview loamy fine sand							
15 Hillside seepage	SEVERE - wet for long periods.	SEVERE - wet for long periods.	SLIGHT - fairly stable; low compressibility.	SLIGHT - good to fair shear strength; low compressibility.	MODERATE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious.	Substratum - SEVERE.
16 Rome silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
18 Same as No. 266, Sisson silt loam							
18Y Same as No. 266, Sisson silt loam							
19 Same as No. 267, Sisson fine sandy loam							
21 Hebron loam	SLIGHT - erosive on slopes.	SLIGHT - fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
21Y Same as No. 21, Hebron loam							
22 Hebron sandy loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - MODERATE to SEVERE; substratum - SEVERE.
23 Same as No. 54, Lawson silt loam							
24 Same as No. 16, Rome silt loam							
26 Wauconda fine sandy loam	MODERATE - wet for short periods; erosive on slopes.	SLIGHT - wet for short periods; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	MODERATE - fair shear strength; high compressibility.	VERY SEVERE - poor stability.	SEVERE - medium compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
27 Wauconda silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	MODERATE - fair shear strength; high compressibility.	VERY SEVERE - poor stability.	SEVERE - medium compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
27Z Same as No. 53, Astalan silt loam							
28 Colwood fine sandy loam	SEVERE - wet for long periods; erosive on slopes.	MODERATE - wet for long periods; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	MODERATE - fair shear strength; high compressibility.	VERY SEVERE - poor stability.	SEVERE - medium compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
28Z Same as No. 330, Navan loam							
29 Colwood silt loam	SEVERE - wet for long periods; erosive on slopes.	SEVERE - wet for long periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility; close control essential.	MODERATE - fair shear strength; high compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
29V Same as No. 29, Colwood silt loam							
29X Same as No. 76, Sebewa silt loam							
29Z Same as No. 340, Navan silt loam							
30 Same as No. 29, Colwood silt loam							
31 Rome loam	SLIGHT - erosive on slopes.	SLIGHT - fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
32 Same as No. 22, Hebron sandy loam							
33 Same as No. 267, Sisson fine sandy loam							
33Z Same as No. 22, Hebron sandy loam							
34 Same as No. 266, Sisson silt loam							

TABLE 7.
THE USE OF SOILS FOR ROAD CONSTRUCTION (Continued)

Soil Number and Soil Name	LIMITATIONS OF SOILS FOR						
	Pedestrian Traffic	Vehicular Traffic	Adequate Compaction	Surface Stabilization With Additives	Road Base Material	Backfill Material	Winter Grading
35 Same as No. 45, Yahara very fine sandy loam							
35Z Same as No. 370, Mosel sandy loam							
36 Same as No. 46, Yahara silt loam							
37 Same as No. 26, Wauconda fine sandy loam							
37Z Same as No. 370, Mosel sandy loam							
38 Kibble silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility; close control essential.	MODERATE - fair shear strength; medium high compressibility.	VERY SEVERE - low plasticity; poor stability.	SEVERE - medium compressibility; semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
38R Same as No. 306, Knowles silt loam, wet variant							
38Z Same as No. 369, Mosel silt loam							
39 Saylesville loam	SLIGHT - erosive on slopes.	SLIGHT - fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
39X Same as No. 72, Fox loam							
40 Saylesville silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
40V Same as No. 266, Sisson silt loam							
40Y Same as No. 161, Dodge silt loam							
40X Same as No. 73, Fox silt loam							
41 Same as No. 42, Tichigan silt loam							
42 Tichigan silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious; moderate to high shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
42R Same as No. 306, Knowles silt loam, wet variant							
42V Same as No. 38, Kibble silt loam							
42X Same as No. 87, Sleeth silt loam							
42Y Same as No. 364, Lamartine silt loam							
44 Same as No. 40, Saylesville silt loam							
45 Yahara very fine sandy loam	MODERATE - wet for short periods; erosive on slopes.	SLIGHT - wet for short periods; poor bearing capacity.	MODERATE - poor stability; medium compressibility; close control necessary.	MODERATE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	SEVERE - medium compressibility; semi-pervious to impervious; very low shrink-swell.	Subsoil - SEVERE; substratum - SEVERE.
45Z Same as No. 370, Mosel sandy loam							
46 Yahara silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; erosive on slopes.	MODERATE - poor stability; medium compressibility; close control necessary.	MODERATE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	SEVERE - medium compressibility; semi-pervious to impervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
47 Yahara loam	MODERATE - wet for short periods; erosive on slopes.	MODERATE - wet for short periods; fair bearing capacity.	MODERATE - poor stability; medium compressibility; close control necessary.	MODERATE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	SEVERE - medium compressibility; semi-pervious to impervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
47Z Same as No. 371, Mosel loam							
48 Keowns silt loam	SEVERE - wet for long periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for long periods; soft and slippery when wet; poor bearing capacity.	MODERATE - poor stability; medium compressibility; close control necessary.	MODERATE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	SEVERE - medium compressibility; semi-pervious to impervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
48Z Same as No. 340, Navan silt loam							
49 Keowns fine sandy loam	SEVERE - wet for long periods; erosive on slopes.	MODERATE - wet for long periods; poor bearing capacity.	MODERATE - poor stability; medium compressibility; close control necessary.	MODERATE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	SEVERE - medium compressibility; semi-pervious to impervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
49Y Same as No. 49, Keowns fine sandy loam							
51 Astalan loam	MODERATE - wet for short periods; erosive on slopes.	MODERATE - wet for short periods; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
52 Astalan sandy loam	MODERATE - wet for short periods; erosive on slopes.	SLIGHT - wet for short periods; good bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
53 Astalan silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
54 Lawson silt loam	MODERATE - wet for short periods; frequent overflow; soft and slippery when wet.	SEVERE - wet for short periods; frequent overflow; soft and slippery when wet.	SEVERE - frequent overflow.	SEVERE - frequent overflow.	SEVERE - frequent overflow.	SEVERE - frequent overflow.	SEVERE - frequent overflow.
59 Dousman sandy loam	MODERATE - wet for short periods; erosive on slopes.	SLIGHT - wet for short periods; good bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	MODERATE - fair stability.	MODERATE - very low compressibility; pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
59Z Same as No. 52, Astalan sandy loam							
60 Same as No. 78, Dousman loam							
60Z Same as No. 51, Astalan loam							
63 Same as No. 231, Brookston silt loam							
64 Same as No. 231, Brookston silt loam							
66 Same as No. 386, Granby fine sandy loam							
67 Same as No. 386, Granby fine sandy loam							
69 Casco-Fox silt loams	Casco part - same as No. 173, Casco silt loam Fox part - same as No. 73, Fox silt loam						

TABLE 7.
THE USE OF SOILS FOR ROAD CONSTRUCTION (Continued)

Soil Number and Soil Name	LIMITATIONS OF SOILS FOR						
	Pedestrian Traffic	Vehicular Traffic	Adequate Compaction	Surface Stabilization With Additives	Road Base Material	Backfill Material	Winter Grading
70 Fox sandy loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SLIGHT TO MODERATE.
70V Same as No. 267, Sisson fine sandy loam							
70Y Same as No. 367, Hochheim fine sandy loam							
70Z Same as No. 22, Hebron sandy loam							
71 Casco-Fox loams	Casco part - same as No. 172, Casco loam Fox part - same as No. 72, Fox loam						
72 Fox loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good to fair shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SLIGHT TO MODERATE.
72R Same as No. 204, Knowles loam							
72V Same as No. 268, Sisson loam							
72Y Same as No. 358, Miami loam							
72Z Same as No. 21, Hebron loam							
73 Fox silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SLIGHT TO MODERATE.
73R Same as No. 206, Knowles silt loam							
73V Same as No. 266, Sisson silt loam							
73Y Same as No. 361, Miami silt loam							
73Z Same as No. 16, Rome silt loam							
75 Rodman gravelly loam	MODERATE - coarse fragments are restrictive.	SLIGHT - good bearing capacity.	SLIGHT - fairly stable; slight to very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - fairly stable.	MODERATE - very low compressibility; pervious; very low shrink-swell potential.	Substratum - SLIGHT TO MODERATE.
76 Sebewa silt loam	SEVERE - wet for long periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for long periods; soft and slippery when wet; fair bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
76R Same as No. 212R, Ehler silt loam, rock substratum							
76V Same as No. 29, Colwood silt loam							
76Y Same as No. 231, Brookston silt loam							
76Z Same as No. 340, Navan silt loam							
77 Same as No. 59, Dousman sandy loam							
77Z Same as No. 52, Axtalan sandy loam							
78 Dousman loam	MODERATE - wet for short periods; erosive on slopes.	MODERATE - wet for short periods; good bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	MODERATE - reasonably stable.	MODERATE - very low compressibility; pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE TO SEVERE.
78V Same as No. 38, Kibbie silt loam							
78Y Same as No. 178, Crosby silt loam							
79 Waukechon loam	SEVERE - wet for long periods; erosive on slopes.	MODERATE - wet for long periods; good bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
80 Sebewa loam	SEVERE - wet for long periods; erosive on slopes.	MODERATE - wet for long periods; fair bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
80V Same as No. 29, Colwood silt loam							
80Y Same as No. 231, Brookston silt loam							
80Z Same as No. 330, Navan loam							
81 Sebewa sandy loam	MODERATE - wet for long periods.	MODERATE - wet for long periods; fair bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good to fair shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
82 Juneau silt loam	MODERATE - subject to occasional overflow; erosive on slopes.	MODERATE - occasional overflow; poor bearing capacity.	MODERATE - fair stability; high compressibility.	SEVERE - poor shear strength; high compressibility.	VERY SEVERE - high plasticity; fair stability.	VERY SEVERE - high compressibility; impervious; high shrink-swell potential.	Subsoil - SEVERE.
84 Ockley silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - very stable; low compressibility; requires slope protection.	SLIGHT - good shear strength; low compressibility.	SLIGHT - very stable.	SLIGHT - low compressibility; very pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SLIGHT TO MODERATE.
84R Same as No. 208, Knowles silt loam.							
84V Same as No. 266, Sisson silt loam.							
84Z Same as No. 16, Rome silt loam							
86 Thackery silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - very stable; low compressibility; requires slope protection.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - very stable.	SLIGHT - very low compressibility; very pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SLIGHT TO MODERATE.
86V Same as No. 266, Sisson silt loam							
87 Sleeth silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	SLIGHT - very stable; low compressibility; requires slope protection.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - very stable.	SLIGHT - very low compressibility; very pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE TO SEVERE.
87Z Same as No. 371, Mosel loam							
89 Briggsville silty clay loam	MODERATE - soft and slippery when wet.	MODERATE - soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious; moderate to high shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.

TABLE 7.
THE USE OF SOILS FOR ROAD CONSTRUCTION (Continued)

Soil Number and Soil Name	LIMITATIONS OF SOILS FOR						
	Pedestrian Traffic	Vehicular Traffic	Adequate Compaction	Surface Stabilization With Additives	Road Base Material	Backfill Material	Winter Grading
91 Parr silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; low compressibility.	MODERATE - good to fair shear strength; low compressibility.	MODERATE - fair stability.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE.
91D Same as No. 91, Parr silt loam							
92 Parr loam	SLIGHT - erosive on slopes.	SLIGHT - fair bearing capacity.	SLIGHT - fairly stable; low compressibility.	MODERATE - good to fair shear strength; low compressibility.	MODERATE - fair stability.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE.
92N Same as No. 92, Parr loam							
97 Same as No. 288, Hackett loamy sand							
99 Same as No. 100, Kewaunee silt loam							
100 Kewaunee silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
101 Kewaunee sandy loam	SLIGHT - erosive on slopes.	SLIGHT - fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
102 Vilas loamy sand	MODERATE - unstable on slopes; erosive.	MODERATE - good bearing capacity; unstable on slopes.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good to fair shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil, substratum - SLIGHT TO MODERATE.
103 Kewaunee loam	SLIGHT - erosive on slopes.	SLIGHT - fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
106 Lorenzo silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - gravely good shear strength; very low compressibility.	SLIGHT - fairly stable.	SLIGHT - very low compressibility; very pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SLIGHT TO MODERATE.
106Z Same as No. 31, Rome loam							
108 Lorenzo-Rodman loams	Lorenzo part - same as No. 110, Lorenzo loam Rodman part - same as No. 75, Rodman gravelly loam						
109 Same as No. 174, Fabius loam							
109V Same as No. 38, Kibbie silt loam							
109Y Same as No. 371, Mosel loam							
109Z Same as No. 369, Mosel silt loam							
110 Lorenzo loam	SLIGHT - erosive on slopes.	SLIGHT - fair bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - fairly stable.	SLIGHT - very low compressibility; very pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SLIGHT TO MODERATE.
110R Same as No. 208, Knowles silt loam							
110Y Same as No. 191, Parr silt loam							
110Z Same as No. 16, Rome silt loam							
111 Same as No. 161, Dodge silt loam							
112 Same as No. 243, Calamus silt loam							
113 Same as No. 278, Clyman silt loam							
114 Same as No. 361, Miami silt loam							
116 Same as No. 343, Celina silt loam, nearly level to gently sloping							
118 Same as No. 178, Crosby silt loam							
119 Warsaw silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - excellent shear strength; very low compressibility.	SLIGHT - fairly stable.	SLIGHT - very low compressibility; very pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SLIGHT TO MODERATE.
119V Same as No. 266, Sisson silt loam							
119Y Same as No. 91, Parr silt loam							
119Z Same as No. 16, Rome silt loam							
120 Warsaw loam	SLIGHT - erosive on slopes.	SLIGHT - fair bearing capacity.	SLIGHT - reasonably stable; very low compressibility.	SLIGHT - excellent shear strength; very low compressibility.	SLIGHT - moderate stability and bearing capacity.	SLIGHT - very low compressibility; very pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SLIGHT TO MODERATE.
120Y Same as No. 91, Parr silt loam							
120Z Same as No. 16, Rome silt loam							
121 Same as No. 110, Lorenzo loam							
122 Same as No. 110, Lorenzo loam							
123 Tippecanoe silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - fairly stable.	SLIGHT - very low compressibility; very pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SLIGHT TO MODERATE.
123V Same as No. 266, Sisson silt loam							
123Z Same as No. 16, Rome silt loam							
124 Crane silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - fairly stable.	SLIGHT - very low compressibility; very pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
125 Same as No. 206, Knowles silt loam, shallow variant							
126 Westland silt loam	SEVERE - wet for long periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for long periods; soft and slippery when wet; fair bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - excellent to fair shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
126V Same as No. 29, Colwood silt loam							
126Y Same as No. 212, Ehler silt loam							
126Z Same as No. 340, Navan silt loam							

TABLE 7.
THE USE OF SOILS FOR ROAD CONSTRUCTION (Continued)

Soil Number and Soil Name	LIMITATIONS OF SOILS FOR						
	Pedestrian Traffic	Vehicular Traffic	Adequate Compaction	Surface Stabilization With Additives	Road Base Material	Backfill Material	Winter Grading
133 Spinks fine sand	SEVERE - unstable on slopes; erosive.	SEVERE - unstable on slopes.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Substratum - SLIGHT TO MODERATE.
134 Spinks loamy fine sand	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	MODERATE - poor stability; low compressibility; close control essential.	MODERATE - fair shear strength; low compressibility.	MODERATE - poor stability.	SEVERE - low compressibility; pervious; very low shrink-swell potential.	Substratum - SLIGHT TO MODERATE.
142 Manawa silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
144 Same as No. 371, Mosel loam							
152 Lapeer loam, shallow variant	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - fairly stable; slight compressibility.	SLIGHT - sandy; good to fair shear strength; low compressibility.	MODERATE - fair stability.	SEVERE - low compressibility; semi-pervious to impervious; very low shrink-swell potential.	Subsoil - MODERATE; substratum - MODERATE.
153 Lapeer loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - fairly stable; low compressibility.	SLIGHT - good to fair shear strength; low compressibility.	MODERATE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; very low shrink-swell potential.	Subsoil - MODERATE; substratum - MODERATE.
154 Same as No. 155, McHenry silt loam							
155 McHenry silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; poor bearing capacity.	SLIGHT - fairly stable; low compressibility.	SLIGHT - good to fair shear strength; low compressibility.	MODERATE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; very low shrink-swell potential.	Subsoil - MODERATE TO SEVERE; substratum - MODERATE.
155Z Same as No. 21, Hebron loam							
156 Lapeer sandy loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - fairly stable; low compressibility.	SLIGHT - good to fair shear strength; low compressibility.	MODERATE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; very low shrink-swell potential.	Subsoil - MODERATE; substratum - MODERATE.
157 Same as No. 156, Lapeer sandy loam							
160 Hochheim-Casco-Sisson loams	Hochheim part - same as No. 357, Hochheim loam Casco part - same as No. 172, Casco loam Sisson part - same as No. 268, Sisson loam						
161 Dodge silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; low compressibility.	MODERATE - good shear strength; low compressibility.	MODERATE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE.
161R Same as No. 208, Knowles silt loam							
165 Poygan silt loam	SEVERE - wet for long periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for long periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
170 Casco sandy loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - very stable; slight to very slight compressibility.	SLIGHT - good to fair shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - MODERATE TO SEVERE; substratum - SLIGHT TO MODERATE.
170V Same as No. 267, Sisson fine sandy loam							
170Y Same as No. 22, Hebron sandy loam							
170Z Same as No. 22, Hebron sandy loam							
171 Same as No. 165, Poygan silt loam							
172 Casco loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - MODERATE TO SEVERE; substratum - SLIGHT TO MODERATE.
172R Same as No. 204, Knowles loam							
172V Same as No. 268, Sisson loam							
172Y Same as No. 357, Hochheim loam							
172Z Same as No. 21, Hebron loam							
173 Casco silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE.
173V Same as No. 266, Sisson silt loam							
173Y Same as No. 360, Hochheim silt loam							
173Z Same as No. 16, Rome silt loam							
174 Fabius loam	MODERATE - wet for short periods; erosive on slopes.	MODERATE - wet for short periods; good bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE TO SEVERE.
174R Same as No. 306, Knowles silt loam, wet variant							
174Z Same as No. 371, Mosel loam							
175 Fabius sandy loam	MODERATE - wet for short periods; erosive on slopes.	SLIGHT - wet for short periods; good bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE TO SEVERE.
175Z Same as No. 370, Mosel sandy loam							
176 Mussey loam	SEVERE - wet for long periods; erosive on slopes.	MODERATE - wet for long periods; good bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
176V Same as No. 176, Mussey loam							
176Z Same as No. 330, Navan loam							
178 Crosby silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; low compressibility.	MODERATE - good shear strength; low compressibility.	MODERATE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.

TABLE 7.
THE USE OF SOILS FOR ROAD CONSTRUCTION (Continued)

Soil Number and Soil Name	LIMITATIONS OF SOILS FOR						
	Pedestrian Traffic	Vehicular Traffic	Adequate Compaction	Surface Stabilization With Additives	Road Base Material	Backfill Material	Winter Grading
179 Same as No. 231, Brookston silt loam							
180 Mussey sandy loam	SEVERE - wet for long periods; erosive on slopes.	MODERATE - wet for long periods; good bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - fairly stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
181 Mussey silt loam	SEVERE - wet for long periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for long periods; soft and slippery when wet; fair bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - fairly stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
181V Same as No. 29, Colwood silt loam							
181Y Same as No. 231, Brookston silt loam							
181Z Same as No. 340, Navan silt loam							
182 Fabius silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good shear strength; low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; semi-pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE TO SEVERE.
182V Same as No. 38, Kibbie silt loam							
182Y Same as No. 178, Crosby silt loam							
182Z Same as No. 369, Mosel silt loam							
188 Same as No. 178, Crosby silt loam							
189 Bristol silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; low compressibility.	MODERATE - good shear strength; low compressibility.	MODERATE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
191 Parr silt loam, shallow variant	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; low compressibility.	MODERATE - good shear strength; low compressibility.	MODERATE - fairly stable; fair bearing capacity.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE.
195 Same as No. 288, Hackett loamy sand							
195V Same as No. 267, Sisson fine sandy loam							
195Y Same as No. 156, Lapeer sandy loam							
195Z Same as No. 22, Hebron sandy loam							
203 Matherton loam	MODERATE - wet for short periods; erosive on slopes.	MODERATE - wet for short periods; good bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good shear strength; low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE TO SEVERE.
203V Same as No. 38, Kibbie silt loam							
203Y Same as No. 178, Crosby silt loam							
203Z Same as No. 371, Mosel loam							
204 Knowles loam	SLIGHT - erosive on slopes.	SLIGHT - fair bearing capacity; dolomite outcrop in places.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	Subsoil - SEVERE; substratum - VERY SEVERE - bedrock.
206 Knowles silt loam, shallow variant.	SLIGHT - erosive on slopes; rock fragments may be restrictive.	MODERATE - soft and slippery when wet; dolomite outcrops in places.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	Subsoil - SEVERE; substratum - VERY SEVERE - bedrock.
208 Knowles silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity; dolomite outcrop in places.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	Subsoil - SEVERE; substratum - VERY SEVERE - bedrock.
212 Ehler silt loam	SEVERE - wet for long periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for long periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate to high shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
212X Same as No. 126, Westland silt loam							
212Y Same as No. 212, Ehler silt loam							
212R Ehler silt loam, rock substratum	SEVERE - wet for long periods; soft and slippery when wet; rock fragments restrictive in some places.	SEVERE - wet for long periods; soft and slippery when wet; dolomite outcrops in places.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	Subsoil - SEVERE; substratum - VERY SEVERE - bedrock.
213 Same as No. 212, Ehler silt loam							
213R Same as No. 212R, Ehler silt loam, rock substratum							
213V Same as No. 29, Colwood silt loam							
214 Same as No. 212, Ehler silt loam							
215 Same as No. 212, Ehler silt loam							
216 Same as No. 212, Ehler silt loam							
217 Bono silty clay loam	SEVERE - wet for long periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for long periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - high plasticity; poor stability.	VERY SEVERE - high compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
218 Same as No. 217, Bono silty clay loam							
218V Same as No. 212, Ehler silt loam							
218Y Same as No. 212, Ehler silt loam							
226 Same as No. 226D, Keyser silt loam							
226D Keyser silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; low compressibility.	MODERATE - good to fair shear strength; low compressibility.	MODERATE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE.
228 Same as No. 451, Houghton mucky peat							
231 Brookston silt loam	SEVERE - wet for long periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for long periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	MODERATE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
231Z Same as No. 298, Ashkum silty clay loam							

TABLE 7.
THE USE OF SOILS FOR ROAD CONSTRUCTION (Continued)

Soil Number and Soil Name	LIMITATIONS OF SOILS FOR						
	Pedestrian Traffic	Vehicular Traffic	Adequate Compaction	Surface Stabilization With Additives	Road Base Material	Backfill Material	Winter Grading
233 Matherton silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; good bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - excellent to fair shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE TO SEVERE.
233V Same as No. 38, Kibbie silt loam							
233Y Same as No. 178, Crosby silt loam							
233Z Same as No. 369, Mosel silt loam							
234 Matherton sandy loam	MODERATE - wet for short periods; erosive on slopes.	SLIGHT - wet for short periods; good bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good to fair shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE TO SEVERE.
234V Same as No. 26, Wauconda fine sandy loam							
234Y Same as No. 178, Crosby silt loam							
243 Calamus silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; low compressibility.	MODERATE - good to fair shear strength; low compressibility.	MODERATE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE.
250 Tedrow sandy loam	MODERATE - wet for short periods; erosive on slopes.	SLIGHT - wet for short periods; good bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good to fair shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low to low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Substratum - MODERATE TO SEVERE.
250V Same as No. 250, Tedrow sandy loam							
250Y Same as No. 250, Tedrow sandy loam							
250Z Same as No. 370, Mosel sandy loam							
251 Tedrow loamy sand	MODERATE - wet for short periods; unstable on slopes.	MODERATE - wet for short periods; good bearing capacity; unstable on slopes.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good to fair shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Substratum - MODERATE TO SEVERE.
251Y Same as No. 251, Tedrow loamy sand							
251Z Same as No. 52, Astalan sandy loam							
254 Tustin sandy loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate to high shrink-swell potential.	Subsoil - SLIGHT TO MODERATE; clayey substratum - SEVERE.
261 Hackett sandy loam, wet variant	MODERATE - wet for short periods; erosive on slopes.	SLIGHT - wet for short periods; good bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE TO SEVERE.
262 Hackett loamy sand, wet variant	MODERATE - wet for short periods; unstable on slopes; erosive.	MODERATE - wet for short periods; good bearing capacity; unstable on slopes.	SLIGHT - fairly stable; very slight compressibility.	SLIGHT - good shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE TO SEVERE.
266 Sisson silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility; close control essential.	MODERATE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	SEVERE - medium compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
266R Same as No. 208, Knowles silt loam							
266X Same as No. 266, Sisson silt loam							
266Z Same as No. 16, Rome silt loam							
267 Sisson fine sandy loam	SLIGHT - erosive on slopes.	SLIGHT - fair bearing capacity.	MODERATE - poor stability; medium compressibility.	MODERATE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	SEVERE - medium compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
268 Sisson loam	SLIGHT - erosive on slopes.	SLIGHT - fair bearing capacity.	MODERATE - poor stability; medium compressibility.	MODERATE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	SEVERE - medium compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
269 Warsaw sandy loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good to fair shear strength; very low compressibility.	SLIGHT - moderate stability.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - MODERATE TO SEVERE; substratum - SLIGHT TO MODERATE.
270 Same as No. 289, Hackett sandy loam							
270V Same as No. 267, Sisson fine sandy loam							
271 Same as No. 288, Hackett loamy sand							
272 Tustin loamy fine sand	MODERATE - unstable on slopes; erosive.	MODERATE - good bearing capacity; unstable on slopes.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate to high shrink-swell potential.	Subsoil - SLIGHT TO MODERATE; clayey substratum - SEVERE.
276 Boyer sandy loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious; very low shrink-swell potential.	Subsoil - MODERATE; substratum - SLIGHT TO MODERATE.
276Y Same as No. 156, Lapeer sandy loam							
276Z Same as No. 254, Tustin sandy loam							
277 Sumner sandy loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious; very low shrink-swell potential.	Subsoil - MODERATE; substratum - SLIGHT TO MODERATE.
277Y Same as No. 156, Lapeer sandy loam							
277Z Same as No. 254, Tustin sandy loam							
278 Clyman silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; slight compressibility.	SLIGHT - good to fair shear strength; low compressibility.	MODERATE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
279 Same as No. 276, Boyer sandy loam							
280 Same as No. 316, Boyer loamy sand							

TABLE 7.
THE USE OF SOILS FOR ROAD CONSTRUCTION (Continued)

Soil Number and Soil Name	LIMITATIONS OF SOILS FOR						
	Pedestrian Traffic	Vehicular Traffic	Adequate Compaction	Surface Stabilization With Additives	Road Base Material	Backfill Material	Winter Grading
281 Hackett loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - fairly stable; very slight compressibility.	SLIGHT - good shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious; very low shrink-swell potential.	Subsoil - MODERATE TO SEVERE; substratum - SLIGHT TO MODERATE.
282 Casco-Rodman loams	Casco part - same as No. 172, Casco loam Rodman part - same as No. 75, Rodman gravelly loam						
283 Same as No. 370, Mosel sandy loam							
284 Same as No. 370, Mosel sandy loam							
285 Same as No. 176, Mussey loam							
286 Same as No. 181, Mussey silt loam							
287 Same as No. 176, Mussey loam							
288 Hackett loamy sand	MODERATE - unstable; on slopes; erosive.	MODERATE - good bearing capacity; unstable on slopes.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious; very low shrink-swell potential.	Subsoil - MODERATE TO SEVERE; substratum - SLIGHT TO MODERATE.
288V Same as No. 267, Sisson fine sandy loam							
289 Hackett sandy loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity; unstable on slopes.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SLIGHT TO MODERATE.
289Y Same as No. 156, Lapeer sandy loam							
289Z Same as No. 254, Tustin sandy loam							
295 Morley-Beecher silt loams	Morley part - same as No. 297, Morley silt loam Beecher part - same as No. 3361, Beecher silt loam						
297 Morley silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
297S Same as No. 297, Morley silt loam							
297V Same as No. 266, Sisson silt loam							
297X Same as No. 73, Fox silt loam							
297Y Same as No. 297, Morley silt loam							
298 Ashkum silty clay loam	SEVERE - wet for long periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for long periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
299 Blount silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
300 Ashkum-Beecher silt loam	Ashkum part - same as No. 298, Ashkum silty clay loam Beecher part - same as No. 3361, Beecher silt loam						
302 Same as No. 451, Houghton mucky peat							
303 Alluvial land, rocky substratum	SEVERE - wet for long periods; subject to frequent overflow.	SEVERE - wet for long periods; frequent overflow.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	SEVERE - bedrock at 24 to 60 inches.
305 Same as No. 208, Knowles silt loam							
306 Knowles silt loam, wet variant	MODERATE - soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; dolomite outcrops in places.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	Subsoil - SEVERE; substratum - bedrock at 20 to 40 inches.
307 Same as No. 306, Knowles silt loam, wet variant							
308 Same as No. 206, Knowles silt loam, shallow variant							
311 Manawa loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
314 Same as No. 380, Sumner loamy sand							
315 Oshtemo loamy sand	MODERATE - unstable on slopes; erosive.	MODERATE - good bearing capacity; unstable on slopes.	SLIGHT - fairly stable; very slight compressibility.	SLIGHT - good shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious; very low shrink-swell potential.	Subsoil - MODERATE; substratum - SLIGHT TO MODERATE.
316 Same as No. 315, Oshtemo loamy sand							
316Y Same as No. 156, Lapeer sandy loam							
316Z Same as No. 272, Tustin loamy fine sand							
317 Same as No. 315, Oshtemo loamy sand							
320 Oshtemo sandy loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious; very low shrink-swell potential.	Subsoil - MODERATE; substratum - SLIGHT TO MODERATE.
323 Ionia sandy loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good to fair shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - MODERATE TO SEVERE; substratum - SLIGHT TO MODERATE.
323V Same as No. 267, Sisson fine sandy loam							
324 Ionia loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good to fair shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - MODERATE TO SEVERE; substratum - SLIGHT TO MODERATE.
324V Same as No. 268, Sisson loam							
324Y Same as No. 343, Celina silt loam, nearly level to gently sloping							
324Z Same as No. 21, Hebron loam							

TABLE 7.
THE USE OF SOILS FOR ROAD CONSTRUCTION (Continued)

Soil Number and Soil Name	LIMITATIONS OF SOILS FOR						
	Pedestrian Traffic	Vehicular Traffic	Adequate Compaction	Surface Stabilization With Additives	Road Base Material	Backfill Material	Winter Grading
325 Varna silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	MODERATE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
326 Abington silt loam	SEVERE - wet for long periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for long periods; soft and slippery when wet; fair bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good to fair shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
326Z Same as No. 212, Ehler silt loam							
327 Walkkill silt loam	SEVERE - wet for long periods; occasional overflow; soft and slippery when wet.	SEVERE - wet for long periods; occasional overflow; soft and slippery when wet.	VERY SEVERE - poor stability; high compressibility.	VERY SEVERE - poor shear strength; high compressibility.	VERY SEVERE - poor stability.	VERY SEVERE - high compressibility.	Subsoil - SEVERE; organic.
328 Pistakee silt loam	MODERATE - wet for short periods; occasional overflow; soft and slippery when wet.	SEVERE - wet for long periods; occasional overflow; soft and slippery when wet.	MODERATE - fair stability; high compressibility.	SEVERE - high plasticity; poor shear strength; high compressibility.	VERY SEVERE - high plasticity; fair stability.	VERY SEVERE - high compressibility; impervious; high shrink-swell potential.	Subsoil - SEVERE.
328Y Same as No. 328, Pistakee silt loam							
330 Navan loam	SEVERE - wet for long periods; erosive on slopes.	MODERATE - wet for long periods; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
331 Markham-Elliott silt loam	Markham part - same as No. 336, Markham silt loam Elliott part - same as No. 3251, Elliott silt loam						
332 Kane silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - little or no fines; good shear strength; very low compressibility.	SLIGHT - fairly stable.	SLIGHT - very low compressibility; very pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE TO SEVERE.
332V Same as No. 27, Wauconda silt loam							
332Y Same as No. 178, Crosby silt loam							
332Z Same as No. 53, Astalan silt loam							
333 Eagle silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; very slight compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - fairly stable.	SLIGHT - very low compressibility; very pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SLIGHT TO MODERATE.
333Y Same as No. 91, Parr silt loam							
333Z Same as No. 16, Rome silt loam							
334 Same as No. 119, Warsaw silt loam							
335 Ionia silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SLIGHT TO MODERATE.
335Y Same as No. 343, Celina silt loam, nearly level to gently sloping							
335Z Same as No. 16, Rome silt loam							
336 Markham silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; fairly stable.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
338 Same as No. 298, Ashkam silty clay loam							
339 Abington silty clay loam	SEVERE - wet for long periods; soft and slippery when wet.	SEVERE - wet for long periods; soft and slippery when wet; fair bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
340 Navan silt loam	SEVERE - wet for long periods; soft and slippery when wet; erosive on slopes.	MODERATE - wet for long periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
343 Celina silt loam, nearly level to gently sloping.	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; low compressibility.	MODERATE - fair shear strength; low compressibility.	MODERATE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE.
343 Celina silt loam, sloping to moderate steep - same as No. 362, Theresa silt loam							
344 Ashford silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; low compressibility.	MODERATE - fair shear strength; low compressibility.	MODERATE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE.
345 Nenno silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; low compressibility.	MODERATE - fair shear strength; low compressibility.	MODERATE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
346 Kane loam	MODERATE - wet for short periods; erosive on slopes.	MODERATE - wet for short periods; fair bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - fairly stable.	SLIGHT - very low compressibility; very pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE TO SEVERE.
346Y Same as No. 346, Kane loam							
346Z Same as No. 178, Crosby silt loam							
352 Same as No. 153, Lapeer loam							
355 Same as No. 156, Lapeer sandy loam							
356 Same as No. 156, Lapeer sandy loam							
357 Hochheim loam	SLIGHT - erosive on slopes.	SLIGHT - fair bearing capacity.	SLIGHT - fairly stable; low compressibility.	SLIGHT - good to fair shear strength; low compressibility.	MODERATE TO SEVERE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE.
357R Same as No. 204, Knowles loam							
357X Same as No. 172, Casco loam							
358 Miami loam	SLIGHT - erosive on slopes.	SLIGHT - fair bearing capacity.	MODERATE - poor stability; medium compressibility.	MODERATE - fair shear strength; medium compressibility.	SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.

TABLE 7.
THE USE OF SOILS FOR ROAD CONSTRUCTION (Continued)

Soil Number and Soil Name	LIMITATIONS OF SOILS FOR						
	Pedestrian Traffic	Vehicular Traffic	Adequate Compaction	Surface Stabilization With Additives	Road Base Material	Backfill Material	Winter Grading
359 Hennepin loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	MODERATE - very stable; medium compressibility.	MODERATE - fair shear strength; medium compressibility.	MODERATE - very stable.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE.
360 Hochheim silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; low compressibility.	SLIGHT - good to fair shear strength; low compressibility.	MODERATE TO SEVERE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE.
360R Same as No. 208, Knowles silt loam							
360V Same as No. 266, Sisson silt loam							
360X Same as No. 173, Casco silt loam							
361 Miami silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	MODERATE - fair shear strength; medium compressibility.	SEVERE - low plasticity; poor stability; medium compressibility.	VERY SEVERE - medium compressibility; impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
362 Theresa silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; low compressibility.	SLIGHT - good to fair shear strength; low compressibility.	MODERATE TO SEVERE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE.
362R Same as No. 208, Knowles silt loam							
362V Same as No. 266, Sisson silt loam							
362X Same as No. 73, Fox silt loam							
362Z Same as No. 16, Rome silt loam							
363 Mayville silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - poor stability; low compressibility.	MODERATE - fair shear strength; low compressibility.	SEVERE - poor stability.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE.
363R Same as No. 306, Knowles silt loam, wet variant							
363X Same as No. 335, Ionia silt loam							
363Y Same as No. 363, Mayville silt loam							
363Z Same as No. 16, Rome silt loam							
364 Lamartine silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; low compressibility.	MODERATE - fair shear strength; low compressibility.	SEVERE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - MODERATE.
364V Same as No. 38, Kibbie silt loam							
364X Same as No. 233, Matherton silt loam							
364Z Same as No. 369, Mosel silt loam							
365 Hochheim-Hennepin loams	Hochheim part - same as No. 357, Hochheim loam Hennepin part - same as No. 359, Hennepin loam						
365X Hochheim-Hennepin loams, gravelly substratum	Hochheim part - same as No. 357, Hochheim loam Hennepin part - same as No. 172, Casco loam, gravelly substratum						
366 Hochheim-Theresa loams	Hochheim part - same as No. 357, Hochheim loam Theresa part - same as No. 362, Theresa silt loam						
367 Hochheim fine sandy loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - fairly stable; low compressibility.	MODERATE - good to fair shear strength; low compressibility.	MODERATE TO SEVERE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - MODERATE TO SEVERE; substratum - MODERATE.
369 Mosel silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
370 Mosel sandy loam	MODERATE - wet for short periods; erosive on slopes.	SLIGHT - wet for short periods; good bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
371 Mosel loam	MODERATE - wet for short periods; erosive on slopes.	MODERATE - wet for short periods; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
380 Sumner loamy sand	MODERATE - unstable on slopes; erosive.	MODERATE - good bearing capacity; unstable on slopes.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious; very low shrink-swell potential.	Subsoil - MODERATE; substratum - SLIGHT TO MODERATE.
386 Granby fine sandy loam	MODERATE - wet for long periods; erosive on slopes.	MODERATE - wet for long periods; poor bearing capacity.	SLIGHT - fairly stable; low compressibility.	SLIGHT - good to fair shear strength; low compressibility.	MODERATE - fairly stable.	MODERATE - low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
386Y Same as No. 386, Granby fine sandy loam							
386Z Same as No. 330, Navan loam							
387 Granby loamy sand	Same as No. 386, Granby fine sandy loam						
387V Same as No. 26, Wauconda fine sandy loam							
391 Wea sandy loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - fairly stable.	MODERATE - very low compressibility; semi-pervious to semi-pervious; very low shrink-swell potential.	Subsoil - MODERATE TO SEVERE; substratum - SLIGHT TO MODERATE.
392 Ockley loam	SLIGHT - erosive on slopes.	SLIGHT - fair bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good to fair shear strength; very low compressibility.	SLIGHT - fairly stable.	SLIGHT - very low compressibility; very pervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SLIGHT TO MODERATE.
393 Same as No. 392, Ockley loam							
394 Parr sandy loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - fairly stable; low compressibility.	SLIGHT - good to fair shear strength; low compressibility.	MODERATE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; very low shrink-swell potential.	Subsoil - MODERATE TO SEVERE; substratum - MODERATE.
397 Ozaukee silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.

TABLE 7.
THE USE OF SOILS FOR ROAD CONSTRUCTION (Continued)

Soil Number and Soil Name	LIMITATIONS OF SOILS FOR						
	Pedestrian Traffic	Vehicular Traffic	Adequate Compaction	Surface Stabilization With Additives	Road Base Material	Backfill Material	Winter Grading
397R Same as No. 208, Knowles silt loam							
397V Same as No. 397, Ozaukee silt loam							
397X Same as No. 73, Fox silt loam							
397Y Same as No. 397, Ozaukee silt loam							
398 Same as No. 298, Ashkum silty clay loam							
399 Mequon silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
410 Same as No. 134, Spinks loamy fine sand.							
411 Spinks fine sand, silty substratum	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	MODERATE - poor stability; medium compressibility.	MODERATE - fair shear strength; high compressibility.	VERY SEVERE - low plasticity; poor stability.	SEVERE - medium compressibility; semi-pervious to impervious; low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
413 Crestview fine sandy loam	SLIGHT - erosive on slopes.	SLIGHT - good bearing capacity.	SLIGHT - fairly stable; low compressibility.	SLIGHT - good to fair strength; low compressibility.	MODERATE - fairly stable.	MODERATE - low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Substratum - SLIGHT TO MODERATE.
413Z Same as No. 254, Tustin sandy loam							
414 Crestview loamy fine sand	MODERATE - unstable on slopes; erosive.	MODERATE - good bearing capacity; unstable on slopes.	SLIGHT - fairly stable; low compressibility.	SLIGHT - good to fair shear strength; low compressibility.	MODERATE - fairly stable.	MODERATE - low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Substratum - SLIGHT TO MODERATE.
416 Terrace escarpment, till	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Substratum - SEVERE.
417 Terrace escarpments, outwash	MODERATE - erosive on slopes; stones are restrictive.	SLIGHT - good bearing capacity.	SLIGHT - very stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	SLIGHT - very stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Substratum - SLIGHT TO MODERATE.
419 Beach sand	MODERATE TO SEVERE - frequent flooding; unstable.	MODERATE TO SEVERE - frequent flooding; unstable.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - fair shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious to semi-pervious; very low shrink-swell potential.	Substratum - SLIGHT TO MODERATE.
420 Same as No. 361, Miami silt loam							
421 Same as No. 161, Dodge silt loam							
431 Knowles stony silt loam, shallow variant	MODERATE - soft and slippery when wet; erosive on slopes; rock fragments are restrictive.	MODERATE - soft and slippery when wet; dolomite outcrops in places.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	VERY SEVERE - bedrock.	VERY SEVERE substratum - bedrock.
449 Same as No. 451, Houghton mucky peat							
450 Houghton muck	Same as No. 451, Houghton mucky peat						
451 Houghton mucky peat	SEVERE - wet for long periods; poor bearing capacity.	SEVERE - wet for long periods; poor bearing capacity.	VERY SEVERE - all engineering properties very unfavorable.	VERY SEVERE - all engineering properties very unfavorable.	VERY SEVERE - all engineering properties very unfavorable.	VERY SEVERE - all engineering properties very unfavorable.	VERY SEVERE - all engineering properties very unfavorable.
452 Adrian muck	SEVERE - wet for long periods; poor bearing capacity.	SEVERE - wet for long periods; poor bearing capacity.	SLIGHT - fairly stable; very low compressibility.	SLIGHT - good shear strength; very low compressibility.	MODERATE - fairly stable.	MODERATE - very low compressibility; pervious; very low shrink-swell potential.	Substratum - SEVERE.
452Z Same as No. 454, Palms muck							
453 Adrian mucky peat	Same as No. 452, Adrian muck						
454 Palms muck	SEVERE - wet for long periods; poor bearing capacity.	SEVERE - wet for long periods; poor bearing capacity.	SLIGHT - fairly stable; low compressibility.	SLIGHT - fair shear strength; low compressibility.	MODERATE - fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; very low shrink-swell potential.	Substratum - SEVERE.
455 Palms mucky peat	Same as No. 454, Palms muck						
456 Ogden muck	Severe - wet for long periods; poor bearing capacity.	SEVERE - wet for long periods; poor bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Substratum - SEVERE.
457 Ogden mucky peat	Same as No. 456, Ogden muck						
458 Rollin muck, shallow	Same as No. 451, Houghton mucky peat						
459 Rollin muck	Same as No. 451, Houghton mucky peat						
460 Rollin mucky peat	Same as No. 451, Houghton mucky peat						
461 Muskego muck	Same as No. 451, Houghton mucky peat						
462 Houghton peat, acid variant	Same as No. 451, Houghton mucky peat						
502 Same as No. 504, Flagg silt loam							
504 Flagg silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	MODERATE - fairly stable; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	SEVERE - low plasticity; fairly stable.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
505 Flagg silt loam, wet variant	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	MODERATE - fairly stable; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	SEVERE - low plasticity; fairly stable.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
508 Same as No. 510, Pecatonica silt loam							
510 Pecatonica silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	MODERATE - fairly stable; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	SEVERE - fairly stable.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
511 Same as No. 505, Flagg silt loam, wet variant							
514 Same as No. 516, Westville silt loam							

TABLE 7.
THE USE OF SOILS FOR ROAD CONSTRUCTION (Continued)

Soil Number and Soil Name	LIMITATIONS OF SOILS FOR						
	Pedestrian Traffic	Vehicular Traffic	Adequate Compaction	Surface Stabilization With Additives	Road Base Material	Backfill Material	Winter Grading
516 Westville silt loam	MODERATE - soft and slippery when wet; erosive on slopes.	MODERATE - soft and slippery when wet; fair bearing capacity.	SLIGHT - fairly stable; low compressibility.	MODERATE - good to fair shear strength; low compressibility.	MODERATE, fairly stable.	SEVERE - low compressibility; semi-pervious to impervious; very low shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
550 Same as No. 212R, Ehler silt loam, rock substratum							
557 Same as No. 358, Miami loam							
560 Same as No. 361, Miami silt loam							
3251 Elliott silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	MODERATE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.
3251V Same as No. 3251, Elliott silt loam							
3361 Beecher silt loam	MODERATE - wet for short periods; soft and slippery when wet; erosive on slopes.	SEVERE - wet for short periods; soft and slippery when wet; fair bearing capacity.	MODERATE - poor stability; medium compressibility.	SEVERE - fair shear strength; medium compressibility.	VERY SEVERE - low plasticity; poor stability.	VERY SEVERE - medium compressibility; impervious; moderate shrink-swell potential.	Subsoil - SEVERE; substratum - SEVERE.

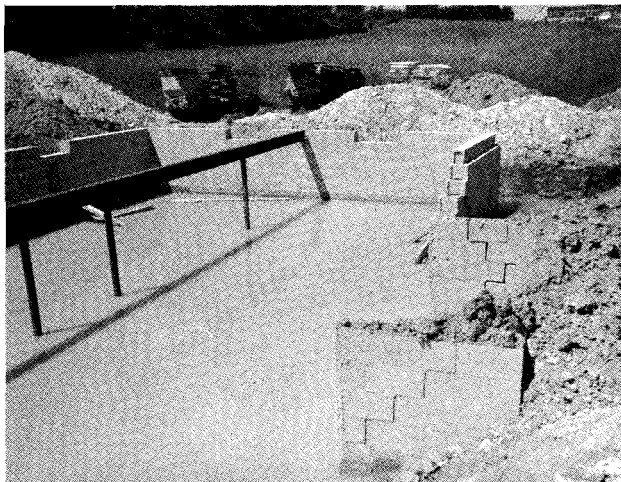
Chapter VI

SELECTED RURAL AND URBAN USES OF SOILS

Under the effects of urban diffusion, entire regions, such as southeastern Wisconsin, are becoming mixed rural-urban areas, and this has intensified the pressing need for detailed soil surveys and the interpretation of these surveys for both rural and urban planning and engineering purposes. Table 8 contains selected soil interpretations pertinent to both rural and urban development planning. Limitations ratings for soils are defined in the introduction to Chapter V.

Cultivated crops, pasture and trees can each be grown on soils with slight limitations without damage to the soil. Limitations ratings for these uses are based on the erodibility of soils, the texture, depth, permeability and water holding capacity of soils, the drainage class and the flood hazard. Some soils that have severe limitations for crops can be successfully used for pasture or trees.

Residential development with public sewer service can be accomplished successfully where soils have favorable bearing capacity, shrink-swell potential and depth to the water table. Other factors considered are flood hazards, the danger of frost heave and



Wet basements are the limiting factor when Ehler soils are used for residential development.

soil erodibility. Where poor drainage or frequent flooding is a problem, other soil properties have little bearing on the ratings.

On-site soil absorption systems for sewage disposal can generally be used in well drained soils that are not subject to flooding. Soil permeability, soil slope and depth to bed-rock are other factors that affect the use of soils for on-site sewage disposal. Soils with high water tables for long periods of time or frequently flooded soils are unsuitable for these systems. Effluent from septic tank systems should move through the soil at a moderate rate. Excessive rates of movement may permit contamination of ground water. Slow or very slow rates of effluent movement through the soil may cause a saturated condition resulting in surface overflow and conditions dangerous to the public health. As indicated by differing soil ratings for lots of less than 1 acre and more than 1 acre in size, where soil permeability is the only soil limitation, an increase in the size of the filter field may compensate to some extent for slow permeability. Soils with slope gradients of more than 12 percent are rated as having severe limitations even though other characteristics are favorable.

Light industry and commercial buildings generally require well drained soils that are not subject to flooding. The soils must also have good bearing capacity, low shrink-swell potential, high shear strength, low frost hazard and low compressibility. Structures for these enterprises are generally 3 stories or less in height and have at least 2500 square feet of floor space on any given level. They can be built on slopes of 12 percent or less that do not exceed 200 to 300 feet in length. Soil ratings for this use are based on characteristics and properties of the substratum because foundations for structures rest on this part of the soil.

The soils are not rated for heavy industry which require larger structures that need base materials with much greater bearing capacity and are severely limited by slopes exceeding 6 percent. On-site foundation investigations are generally required for the

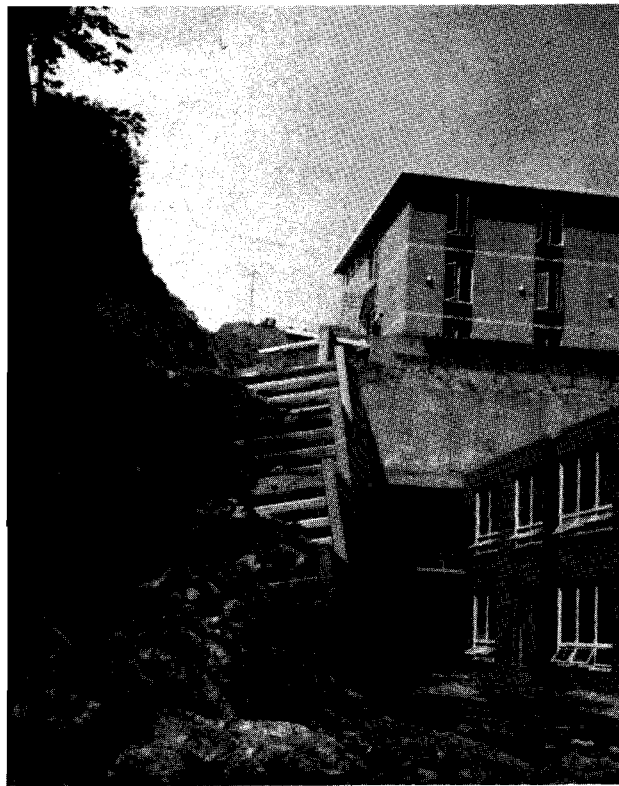
design of these types of buildings.

Transportation systems include roads, railroads and airports. Within the content of Table 8 airports refer to landing fields to accommodate general purpose aviation activities consisting primarily of light aircraft. These airports can be constructed on relatively small tracts that may include areas of sloping soils. Bearing capacity, shrink-swell potential, frost hazard, flood hazard and depth to the water table are the principal soil properties considered in rating soils for transportation systems. The subsoil and



The placement of on-site sewage disposal systems in soils having slow permeability may result in surface seepage of effluent and cause severe hazards to public health as well as depreciation of property values.

substratum only are rated and the surface soil is generally removed during construction.



The walls of this building have begun to crack and give way under pressure of steep unstable soils. Reinforcement was necessary after completion of construction and the retaining wall was built to prevent further damage to the building.

TABLE 8.
SELECTED RURAL AND URBAN USES OF SOILS

LIMITATIONS OF SOIL FOR						
Soil Number and Soil Name	Cultivated Crops, Pasture and Trees	Residential Development With Public Sewer Service	On-site Soil Absorption Sewage Disposal Systems for Lots		Light Industry and Commercial Buildings	Highway, Railroad and Airport Development
			Less than 1 acre	1 acre or more		
1 Rough broken land	VERY SEVERE for crops or pasture; SEVERE for trees; severe erosion hazard.	SEVERE - steep slopes are unstable.	VERY SEVERE - seepage beds impractical on steep slopes.	VERY SEVERE - seepage beds impractical on steep slopes.	SEVERE - moderate bearing capacity; high shrink-swell potential; unstable on steep slopes.	SEVERE - subject to land slides and severe erosion.
2 Stinson silt loam	SLIGHT for crops when protected from overflow; SLIGHT for pasture and trees; frequent overflow.	VERY SEVERE - low bearing capacity; high shrink-swell potential; high water table; frequent overflow.	VERY SEVERE - frequent overflow; systems will not operate when flooded.	VERY SEVERE - frequent overflow; systems will not operate when flooded.	VERY SEVERE - frequent overflow; high water table; high shrink-swell potential.	VERY SEVERE - frequent overflow; high water table; moderate shrink-swell potential; low bearing capacity.
3 Stony colluvium	VERY SEVERE for crops; SEVERE for pasture and trees.	SEVERE - subject to overflow.	VERY SEVERE - flooding hazard; systems will not operate when flooded.	VERY SEVERE - flooding hazard; systems will not operate when flooded.	SEVERE - flooding hazard and variable substratum.	MODERATE - variable sub-soil and substratum; low bearing capacity; frost heave; areas generally need fill.
4 Marsh	VERY SEVERE for crops, pasture, and trees.	VERY SEVERE - high water table.	VERY SEVERE - high water table; systems will not operate when flooded.	VERY SEVERE - high water table; systems will not operate when flooded.	VERY SEVERE - high water table.	VERY SEVERE - high water table.
5 Same as No. 54, Lawson silt loam						
5W Otter silt loam	SLIGHT for crops when drained and protected from flooding; SLIGHT for pasture and SEVERE for trees.	VERY SEVERE - low bearing capacity; frequent overflow; high water table.	VERY SEVERE - frequent overflow; systems will not operate when flooded.	VERY SEVERE - frequent overflow; systems will not operate when flooded.	VERY SEVERE - frequent overflow; high water table; low bearing capacity; piping; frost heave.	VERY SEVERE - frequent overflow; high water table; low bearing capacity; piping; frost heave.
7 Dorchester silt loam	SLIGHT for crops when drained and protected from flooding; SLIGHT for pasture and trees.	VERY SEVERE - low bearing capacity; frost heave.	VERY SEVERE - frequent overflow; systems will not operate when flooded.	VERY SEVERE - frequent overflow; systems will not operate when flooded.	VERY SEVERE - frequent overflow; low bearing capacity; piping; frost heave.	VERY SEVERE - frequent overflow; low bearing capacity; piping; frost heave.
7W Same as No. 54, Lawson silt loam						
10 Same as No. 11, Alluvial land						
10W Same as No. 11W, Alluvial land, wet						
11 Alluvial land	MODERATE for crops with flood protection; MODERATE for pasture and trees.	VERY SEVERE - flood hazard.	VERY SEVERE - flood hazard; systems will not operate when flooded.	VERY SEVERE - flood hazard; systems will not operate when flooded.	SEVERE - low bearing capacity; flood hazard; frost heave.	SEVERE - poor stability; low bearing capacity; frost heave.
11W Alluvial land, wet	VERY SEVERE for crops; MODERATE for pasture and trees; severe overflow hazard.	VERY SEVERE - high water table; frequent overflow.	VERY SEVERE - high water table; frequent overflow.	VERY SEVERE - high water table; frequent overflow.	VERY SEVERE - high water table; frequent overflow.	VERY SEVERE - high water table; frequent overflow.
11WY Same as No. 11W, Alluvial land, wet						
12 Wea silt loam	VERY SLIGHT on 0-2% and SLIGHT on 2-6%, and MODERATE on 6-12% slopes for crops; VERY SLIGHT for pasture and SEVERE for trees; erosive on slopes.	VERY SLIGHT on 0-6% and SLIGHT on 6-12% slopes; erosive on slopes; frost heave.	SLIGHT on 0-6% and MODERATE on 6-12% slopes; erosive on slopes; frost heave.	SLIGHT on 0-6% and MODERATE on 6-12% slopes; erosive on slopes; frost heave.	SLIGHT on 0-6% and MODERATE on 6-12% slopes; erosive on slopes; frost heave.	SLIGHT - subsoil has low bearing capacity; frost heave.
14 Same as No. 413, Crestview fine sandy loam						
15 Hillside seepage	MODERATE for crops and pasture when drained; MODERATE for trees.	SEVERE - erosive; subject to shrinkage; high water table.	VERY SEVERE - high water table.	VERY SEVERE - high water table.	VERY SEVERE - erosive; high water table; peat has high compressibility and instability.	VERY SEVERE - high water table; peat has high compressibility and instability; very low bearing capacity.
16 Rome silt loam	SLIGHT on 0-6% and MODERATE on 6-12% slopes for crops; VERY SLIGHT for pasture; and MODERATE for trees; erosive on slopes.	MODERATE - erosive on slopes; high shrink-swell potential; low bearing capacity; subject to slippage.	SEVERE - slow permeability restricts use of systems.	MODERATE - slow permeability restricts use of systems.	MODERATE on 0-6% and SEVERE on steeper slopes; high shrink-swell potential; low shear strength; high compressibility; subject to slippage; erosive on slopes.	MODERATE - moderate shrink-swell potential; low bearing capacity; high compressibility; frost heave; slippage and seepage.
18 Same as No. 266, Sisson silt loam						
18Y Same as No. 266, Sisson silt loam						
19 Same as No. 266, Sisson silt loam						
21 Hebron loam	SLIGHT on 0-6% and MODERATE on 6-12%, SEVERE on steeper slopes for crops; SLIGHT for pasture and trees; erosive on slopes.	MODERATE on 0-12% slopes; SEVERE on steeper slopes; erosive on slopes; low bearing capacity; high shrink-swell potential.	SEVERE - slow permeability restricts use of systems.	MODERATE - slow permeability restricts use of systems.	MODERATE - high shrink-swell potential; high compressibility; low shear strength.	MODERATE - substratum has low bearing capacity; high shrink-swell potential.
21Y Same as No. 21, Hebron loam						
22 Hebron sandy loam	MODERATE for crops and pasture; SLIGHT for trees; erosive on slopes.	MODERATE on 0-12% slopes; erosive on slopes; low bearing capacity; high shrink-swell potential.	SEVERE - slow permeability restricts use of systems.	MODERATE - slow permeability restricts use of systems.	MODERATE - high shrink-swell potential; high compressibility; low shear strength.	MODERATE - substratum has low bearing capacity; high shrink-swell potential.
23 Same as No. 54, Lawson silt loam						
24 Same as No. 21, Hebron loam						
26 Wauconda fine sandy loam	SLIGHT for crops when drained; SLIGHT for pasture and trees; needs drainage; erosive on slopes.	MODERATE - erosive on slopes; low bearing capacity; frost heave; high water table.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - low bearing capacity; piping; high water table; frost heave.	SEVERE - low bearing capacity; piping; frost heave; seepage; high water table.
27 Same as No. 26, Wauconda fine sandy loam						
27Z Same as No. 51, Astalan loam						
28 Colwood fine sandy loam	SLIGHT for crops when drained; SLIGHT for pasture and MODERATE for trees.	SEVERE - high water table; difficult to install utilities; flotation of pipes; wet basements.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	SEVERE - high water table; frost heave.	SEVERE - high water table; subsoil has moderate shrink-swell potential; substratum subject to piping; frost heave.
28Z Same as No. 330, Navan loam						
29 Same as No. 28, Colwood fine sandy loam						
29V Same as No. 28, Colwood fine sandy loam						
29X Same as No. 76, Sebewa silt loam						
29Z Same as No. 330, Navan loam						
30 Same as No. 28, Colwood fine sandy loam						
31 Same as No. 16, Rome silt loam						

TABLE 8.
SELECTED RURAL AND URBAN USES OF SOILS (Continued)

LIMITATIONS OF SOIL FOR							
Soil Number and Soil Name	Cultivated Crops, Pasture and Trees	Residential Development With Public Sewer Service	On-site Soil Absorption Sewage Disposal Systems for Lots		Light Industry and Commercial Buildings	Highway, Railroad and Airport Development	
			Less than 1 acre	1 acre or more			
32	Same as No. 16, Rome silt loam						
33	Same as No. 266, Sisson silt loam						
33Z	Same as No. 21, Hebron loam						
34	Same as No. 266, Sisson silt loam						
35	Same as No. 45, Yahara very fine sandy loam						
35Z	Same as No. 369, Mosel silt loam						
36	Same as No. 45, Yahara very fine sandy loam						
37	Kibbie fine sandy loam	SLIGHT for crops when drained; SLIGHT for pasture and trees; erosive on slopes.	MODERATE - erosive on slopes; low bearing capacity; frost heave; high water table.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - low bearing capacity; piping; high water table; frost heave.	SEVERE - low bearing capacity; piping; frost heave; seepage; high water table.
37Z	Same as No. 369, Mosel silt loam						
38	Same as No. 37, Kibbie fine sandy loam						
38R	Same as No. 306, Knowles silt loam, wet variant						
38Z	Same as No. 369, Mosel silt loam						
39	Saylesville loam	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes for crops; SLIGHT for pasture and trees; erosive on slopes.	MODERATE on 0-12% and SEVERE on steeper slopes; erosive on slopes; high shrink-swell potential; frost heave.	SEVERE - slow permeability restricts use of systems.	MODERATE on 0-12% and SEVERE on steeper slopes; slow permeability restricts use of systems.	MODERATE on 0-6% and SEVERE on steeper slopes; high shrink-swell potential; frost heave; erosive on slopes.	MODERATE on 0-12% and SEVERE on steeper slopes; high shrink-swell potential; low bearing capacity; erosive on slopes; frost heave; slippage and seepage.
39X	Same as No. 70, Fox sandy loam						
40	Same as No. 39, Saylesville loam						
40V	Same as No. 266, Sisson silt loam						
40X	Same as No. 70, Fox sandy loam						
40Y	Same as No. 161, Dodge silt loam						
41	Same as No. 42, Tichigan silt loam						
42	Tichigan silt loam	SLIGHT on 0-6% slopes for crops and pastures; SLIGHT for trees; erosive on slopes.	MODERATE - erosive on slopes; low bearing capacity; high shrink-swell potential; high water table.	VERY SEVERE - high water table; slow permeability; systems will not operate.	VERY SEVERE - high water table; slow permeability; systems will not operate.	SEVERE - high water table; high shrink-swell potential; low bearing capacity; erosive on slopes.	SEVERE - high water table; high shrink-swell potential; low bearing capacity; erosive on slopes.
42R	Same as No. 306, Knowles silt loam, wet variant						
42V	Same as No. 37, Kibbie fine sandy loam						
42X	Same as No. 87, Sleeth silt loam						
42Y	Same as No. 364, Lamartine silt loam						
44	Jericho silt loam	SLIGHT on 0-6% slopes for crops; SLIGHT for pasture and trees; erosive on slopes.	MODERATE - erosive on slopes; low bearing capacity; high shrink-swell potential; frost heave.	SEVERE - slow permeability restricts use of systems.	MODERATE - slow permeability restricts use of systems.	MODERATE on 0-6% slopes; low bearing capacity; high shrink-swell potential; erosive on slopes.	MODERATE - low bearing capacity; high shrink-swell potential; erosive on slopes; frost heave; slippage and seepage.
45	Yahara very fine sandy loam	SLIGHT for crops when drained; SLIGHT for pasture and trees; erosive on slopes.	MODERATE - low bearing capacity; frost heave; high water table.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - piping; high water table; frost heave.	SEVERE - high water table; piping; seepage; frost heave; low bearing capacity.
45Z	Same as No. 369, Mosel silt loam						
46	Same as No. 45, Yahara very fine sandy loam						
47	Same as No. 45, Yahara very fine sandy loam						
47Z	Same as No. 369, Mosel silt loam						
48	Keowns silt loam	MODERATE for crops when drained; SLIGHT for pasture and MODERATE for trees; high water table.	SEVERE - low bearing capacity; frost heave; high water table; wet basements; flotation of pipes.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; piping.	SEVERE - high water table; low bearing capacity; piping; frost heave; slippage.
48Z	Same as No. 300, Navan loam						
49	Same as No. 48, Keowns silt loam						
49Y	Same as No. 48, Keowns silt loam						
51	Aztalan loam	SLIGHT for crops when drained; SLIGHT for pasture and MODERATE for trees; erosive on slopes.	MODERATE - high shrink-swell potential; high water table.	VERY SEVERE - high water table; slow permeability; systems will not operate.	SEVERE - high water table; slow permeability; systems will not operate.	SEVERE - high shrink-swell potential; high compressibility; low shear strength; high water table.	SEVERE - subsoil has low stability and bearing capacity; substratum has high shrink-swell potential; slippage; frost heave; high water table.
52	Same as No. 51, Aztalan loam						
53	Same as No. 51, Aztalan loam						
54	Lawson silt loam	SLIGHT for crops when protected from overflow; SLIGHT for pasture and SEVERE for trees.	VERY SEVERE - low bearing capacity; frost heave; frequent overflow; high water table.	VERY SEVERE - systems will not operate when flooded.	VERY SEVERE - systems will not operate when flooded.	VERY SEVERE - frequent overflow; high water table; piping; low bearing capacity.	VERY SEVERE - frequent overflow; high water table; piping; frost heave; low bearing capacity.
59	Dousman sandy loam	MODERATE for crops when drained; SLIGHT for pasture and trees; high water table.	MODERATE - high water table.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - high water table.	MODERATE - high water table.
59Z	Same as No. 51, Aztalan loam						
60	Same as No. 78, Dousman loam						
60Z	Same as No. 51, Aztalan loam						
63	Same as No. 231, Brookston silt loam						
64	Same as No. 231, Brookston silt loam						
66	Same as No. 386, Granby fine sandy loam						
67	Same as No. 386, Granby fine sandy loam						
69	Casco-Fox silt loams	Casco part - Same as No. 172, Casco loam Fox part - Same as No. 70, Fox sandy loam					

TABLE 8.
SELECTED RURAL AND URBAN USES OF SOILS (Continued)

LIMITATIONS OF SOIL FOR							
Soil Number and Soil Name	Cultivated Crops, Pasture and Trees	Residential Development With Public Sewer Service	On-site Soil Absorption Sewage Disposal Systems for Lots		Light Industry and Commercial Buildings	Highway, Railroad and Airport Development	
			Less than 1 acre	1 acre or more			
70	Fox sandy loam	MODERATE on 0-12%, SEVERE on steeper slopes for crops; MODERATE for pasture and trees; drouthy; erosive on slopes.	SLIGHT on 0-12%, MOD- ERATE on 12-20%, and SEVERE on steeper slopes; slight drouthy; erosive on slopes.	VERY SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	VERY SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODER- ATE on 6-12%, and SEVERE on steeper slopes; erosive on slopes.	SLIGHT on 0-12%, MODER- ATE on 12-30, and SEVERE on steeper slopes; erosive on slopes; subsoil has high shrink-swell potential.
70V	Same as No. 266, Sisson silt loam						
70Y	Same as No. 367, Hochheim fine sandy loam						
70Z	Same as No. 21, Hebron loam						
71	Casco-Fox loams	Casco part - Same as No. 172, Casco loam Fox part - Same as No. 70, Fox sandy loam					
72	Same as No. 70, Fox sandy loam						
72R	Same as No. 208, Knowles silt loam						
72V	Same as No. 266, Sisson silt loam						
72Y	Same as No. 358, Miami loam						
72Z	Same as No. 21, Hebron loam						
73	Same as No. 70, Fox sandy loam						
73R	Same as No. 208, Knowles silt loam						
73V	Same as No. 266, Sisson silt loam						
73Y	Same as No. 358, Miami loam						
73Z	Same as No. 21, Hebron loam						
75	Rodman gravelly loam	VERY SEVERE for crops, MODERATE for pasture, and SEVERE for trees; very drouthy; gravelly and cobbly in places.	MODERATE on 0-12% and SEVERE on steeper slopes; erosive on slopes; drouthy; difficult to in- stall utilities; stony in places.	MODERATE on 0-12% and SEVERE on steeper slopes; contamination of ground water.	MODERATE on 0-12% and SEVERE on steeper slopes; contamination of ground water.	SLIGHT on 0-6%, MODER- ATE on 6-12%, and SEVERE on steeper slopes; erosive on slopes; stony in places.	SLIGHT on 0-12% and MOD- ERATE on steeper slopes; drouthy; stony in places.
76	Sebewa silt loam	SLIGHT for crops when drained; SLIGHT for pas- ture, and SEVERE for trees; high water table.	SEVERE - high water table; wet basements; flotation of pipes.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table.	SEVERE - high water table; subsoil has low bearing capacity; frost heave.
76R	Same as No. 212R, Ehler silt loam, rock substratum						
76V	Same as No. 28, Colwood fine sandy loam						
76Y	Same as No. 231, Brookston silt loam						
76Z	Same as No. 330, Navan loam						
77	Same as No. 78, Dousman loam						
77Z	Same as No. 51, Astalan loam						
78	Dousman loam	SLIGHT for crops when drained and SLIGHT for pasture and trees; high water table.	MODERATE - high water table.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - high water table.	MODERATE - high water table.
78V	Same as No. 37, Kibbie fine sandy loam						
78Y	Same as No. 178, Crosby silt loam						
79	Waukechon loam	MODERATE for crops when drained, SLIGHT for pasture, and SEVERE for trees; high water table.	SEVERE - high water table; wet basements; flotation of pipes.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; frost heave.	SEVERE - high water table.
80	Sebewa loam	SLIGHT for crops when drained, SLIGHT for pasture, and SEVERE for trees; high water table.	SEVERE - high water table; wet basements; flotation of pipes.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table.	SEVERE - high water table; subsoil has low bear- ing capacity; frost heave.
80V	Same as No. 28, Colwood fine sandy loam						
80Y	Same as No. 231, Brookston silt loam						
80Z	Same as No. 330, Navan loam						
81	Same as No. 80, Sebewa loam						
82	Juneau silt loam	VERY SLIGHT on 0-2%, SLIGHT on 2-6%, and MODERATE on 6-12% slopes for crops; VERY SLIGHT for pasture or trees; erosive on slopes; occasional overflow.	MODERATE - erosive on slopes; low bearing capac- ity; frost heave; occasion- al overflow.	SEVERE - systems will not operate when flooded.	SEVERE - systems will not operate when flooded.	SEVERE - occasional over- flow; low bearing capacity; piping; frost heave.	SEVERE - occasional over- flow; low bearing capacity; frost heave; piping.
84	Ockley silt loam	VERY SLIGHT on 0-2%, SLIGHT on 2-6%, and MODERATE on 6-12% slopes for crops; VERY SLIGHT for pasture; SLIGHT for trees; erosive on slopes.	VERY SLIGHT on 0-6% and SLIGHT on 6-12% slopes; erosive on slopes; frost heave.	SLIGHT on 0-6% and MODERATE on 6-12% slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes.	SLIGHT on 0-6% and MOD- ERATE on 6-12% slopes; erosive on slopes; frost heave.	SLIGHT - subsoil has low bearing capacity; erosive on slopes; frost heave.
84R	Same as No. 208, Knowles silt loam						
84V	Same as No. 266, Sisson silt loam						
84Z	Same as No. 21, Hebron loam						
86	Thackery silt loam	VERY SLIGHT on 0-2%, SLIGHT on 2-6%, and MODERATE on 6-12% slopes for crops; VERY SLIGHT for pasture and trees; erosive on slopes.	SLIGHT - erosive on slopes; high water table; frost heave.	MODERATE - high water table;	SLIGHT on 0-6% and MODERATE on 6-12% slopes; high water table;	SLIGHT on 0-6% and MOD- ERATE on 6-12% slopes; erosive on slopes; frost heave.	SLIGHT - erosive on slopes
86V	Same as No. 266, Sisson silt loam						
87	Sleeth silt loam	SLIGHT for crops when drained, VERY SLIGHT for pasture, and SLIGHT for trees; high water table.	MODERATE - high water table.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - high water table; frost heave.	MODERATE - high water table; subsoil has low bear- ing capacity.
87Z	Same as No. 369, Mosel silt loam						

TABLE 8.
SELECTED RURAL AND URBAN USES OF SOILS (Continued)

LIMITATIONS OF SOIL FOR						
Soil Number and Soil Name	Cultivated Crops, Pasture and Trees	Residential Development With Public Sewer Service	On-site Soil Absorption Sewage Disposal Systems for Lots		Light Industry and Commercial Buildings	Highway, Railroad and Airport Development
			Less than 1 acre	1 acre or more		
89 Briggsville silty clay loam	SLIGHT on 0-6% and MODERATE on 6-12% slopes for crops; SLIGHT for pasture and trees; erosive on slopes.	SLIGHT - erosive; low bearing capacity; high shrink-swell potential.	MODERATE - slow permeability restricts use of systems.	MODERATE - slow permeability restricts use of systems.	MODERATE on 0-6% and SEVERE on steeper slopes; erosive on slopes; low bearing capacity; high shrink-swell potential; frost heave.	MODERATE - low bearing capacity; high shrink-swell potential; frost heave.
91 Parr silt loam	VERY SLIGHT on 0-2%, SLIGHT on 2-6%, and MODERATE on 6-12% slopes for crops; SLIGHT for pasture; SEVERE for trees; erosive on slopes.	VERY SLIGHT on 0-6% and SLIGHT on 6-12% slopes; erosive on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes; erosive on slopes.	SLIGHT on 0-12% slopes; subsoil has moderate shrink-swell potential; low bearing capacity; erosive on slopes.
91D Same as No. 91, Parr silt loam						
92 Same as No. 91, Parr silt loam						
92N Same as No. 91, Parr silt loam						
97 Same as No. 281, Hackett loam						
99 Same as No. 100, Kewaunee silt loam						
100 Kewaunee silt loam	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes for crops; SLIGHT for pasture and trees; erosive on slopes.	MODERATE on 0-12% and SEVERE on steeper slopes; erosive on slopes; high shrink-swell potential; low bearing capacity.	SEVERE - slow permeability restricts use of systems.	MODERATE - slow permeability restricts use of systems.	MODERATE on 0-12% and SEVERE on steeper slopes; high shrink-swell potential; low bearing capacity; erosive on slopes.	MODERATE on 0-12% and SEVERE on steeper slopes; moderate to high shrink-swell potential; low bearing capacity; erosive on slopes.
101 Same as No. 100, Kewaunee silt loam						
102 Vilas loamy sand	MODERATE on 0-6% and SEVERE on steeper slopes for crops; MODERATE for pasture and trees; very drouthy and erosive.	MODERATE on 0-12% and SEVERE on steeper slopes; drouthy; erosive; difficult to vegetate.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 0-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; erosive; drouthy; difficult to vegetate cuts and fills.	SLIGHT on 0-12% and MODERATE on steeper slopes; erosive; drouthy, difficult to stabilize cuts and fills.
103 Same as No. 100, Kewaunee silt loam						
106 Lorenzo silt loam	MODERATE on 0-12% and SEVERE on steeper slopes for crops; MODERATE for pasture and trees; erosive on slopes; slightly drouthy.	SLIGHT on 0-12%, MODERATE on 12-20%, and SEVERE on steeper slopes; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; probable contamination of ground water.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; probable contamination of ground water.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; erosive on slopes; cuts and fills difficult to vegetate.	SLIGHT on 0-12% and MODERATE on steeper slopes; cuts and fills difficult to vegetate; erosive on slopes.
106Z Same as No. 16, Rome silt loam						
108 Lorenzo-Rodman loams	Lorenzo part - Same as No. 106, Lorenzo silt loam Rodman part - Same as No. 75, Rodman gravelly loam					
109 Same as No. 174, Fabius loam						
109V Same as No. 37, Kibbie fine sandy loam						
109Y Same as No. 369, Mosel silt loam						
109Z Same as No. 369, Mosel silt loam						
110 Same as No. 106, Lorenzo silt loam						
110R Same as No. 208, Knowles silt loam						
110Y Same as No. 191, Parr silt loam, shallow variant						
110Z Same as No. 16, Rome silt loam						
111 Same as No. 161, Dodge silt loam						
112 Same as No. 243, Calamus silt loam						
113 Same as No. 278, Clyman silt loam						
114 Same as No. 358, Miami loam						
116 Same as No. 343, Celina silt loam, nearly level to gently sloping						
118 Same as No. 178, Crosby silt loam						
119 Warsaw silt loam	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes for crops; SLIGHT for pasture and SEVERE for trees; erosive on slopes.	VERY SLIGHT on 0-6%, SLIGHT on 6-12%, and SEVERE on steeper slopes; erosive on slopes; frost heave.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; erosive on slopes; frost heave.	SLIGHT - erosive on slopes.
119V Same as No. 266, Sisson silt loam						
119Y Same as No. 91, Parr silt loam						
119Z Same as No. 16, Rome silt loam						
120 Same as No. 119, Warsaw silt loam						
120Y Same as No. 91, Parr silt loam						
120Z Same as No. 16, Rome silt loam						
121 Same as No. 106, Lorenzo silt loam						
122 Same as No. 106, Lorenzo silt loam						
123 Tippecanoe silt loam	VERY SLIGHT on 0-2%, SLIGHT on 2-6%, and SEVERE on steeper slopes for crops; VERY SLIGHT for pasture and SEVERE for trees; erosive on slopes.	SLIGHT - frost heave; high water table.	MODERATE - high water table; systems will not operate.	MODERATE - high water table; systems will not operate.	MODERATE - high water table; frost heave.	MODERATE - high water table; frost heave; subsoil has low bearing capacity.
123V Same as No. 266, Sisson silt loam						
123Z Same as No. 21, Hebron loam						
124 Crane silt loam	SLIGHT for crops when drained; SLIGHT for pasture and MODERATE for trees.	MODERATE - frost heave; high water table.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - high water table; frost heave.	MODERATE - high water table; frost heave; subsoil has low bearing capacity.
125 Same as No. 206, Knowles silt loam, shallow variant						
126 Westland silt loam	SLIGHT for crops when drained; SLIGHT for pasture and MODERATE for trees; high water table.	SEVERE - high water table; wet basements; flotation of pipes.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; frost heave.	SEVERE - high water table; subsoil has high shrink-swell potential; low bearing capacity; frost heave.

TABLE 8.
SELECTED RURAL AND URBAN USES OF SOILS (Continued)

LIMITATIONS OF SOIL FOR						
Soil Number and Soil Name	Cultivated Crops, Pasture and Trees	Residential Development With Public Sewer Service	On-site Soil Absorption Sewage Disposal Systems for Lots		Light Industry and Commercial Buildings	Highway, Railroad and Airport Development
			Less than 1 acre	1 acre or more		
126Y	Same as No. 212, Ehler silt loam					
126Z	Same as No. 330, Navan loam					
133	Spinks fine sand MODERATE on 0-12% and SEVERE on steeper slopes for crops; MODERATE for pasture and trees; very drouthy and erosive.	MODERATE on 0-12% and SEVERE on steeper slopes; drouthy; erosive; difficult to vegetate.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; probable contamination of ground water.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; probable contamination of ground water.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; erosive; drouthy; difficult to vegetate cuts and fills.	SLIGHT on 0-12% and MODERATE on steeper slopes; drouthy; erosive; difficult to stabilize cuts and fills.
134	Same as No. 133, Spinks fine sand					
142	Manawa silt loam SLIGHT for crops when drained; SLIGHT for pasture and trees.	MODERATE - high water table; clayey till has high shrink-swell potential; low bearing capacity.	VERY SEVERE - high water table; slow permeability; systems will not operate.	VERY SEVERE - high water table; slow permeability; systems will not operate.	SEVERE - high water table; high shrink-swell potential; low bearing capacity.	SEVERE - high water table; low bearing capacity; high shrink-swell potential; frost heave.
144	Same as No. 369, Mosel silt loam					
152	Lapeer loam, shallow variant MODERATE on 0-12% and severe on steeper slopes for crops; MODERATE for pasture and SLIGHT for trees; slightly drouthy; erosive on slopes.	SLIGHT on 0-12%, MODERATE on 12-20%, and SEVERE on steeper slopes; stony in places.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; erosive on slopes.	SLIGHT on 0-12% and MODERATE on steeper slopes; erosive on slopes.
153	Lapeer loam SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes for crops; SLIGHT for pasture and trees; erosive on slopes.	VERY SLIGHT on 0-6%, SLIGHT on 6-12%, MODERATE on 12-20% slopes, and SEVERE on steeper slopes; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; erosive on slopes.	SLIGHT on 0-12% and MODERATE on steeper slopes; erosive on slopes.
154	Same as No. 155, McHenry silt loam					
155	McHenry silt loam VERY SLIGHT on 0-2%, SLIGHT on 2-6%, MODERATE on 6-12%, and SEVERE on over 12% slopes for crops; VERY SLIGHT for pasture and trees; erosive on slopes.	VERY SLIGHT on 0-6%, SLIGHT on 6-12%, MODERATE on 12-20%, and SEVERE on steeper slopes; erosive on slopes; frost heave.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; subject to frost heave.	SLIGHT on 0-12% and MODERATE on 12-30% slopes; erosive on slopes; subsoil has low bearing capacity.
155Z	Same as No. 21, Hebron loam					
156	Lapeer sandy loam MODERATE on 0-12% slopes for crops; MODERATE for pasture and SLIGHT for trees; slightly drouthy; erosive on slopes.	SLIGHT on 0-12% slopes; erosive on slopes; stony in places.	SLIGHT on 0-6% and MODERATE on 6-12% slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes; erosive on slopes.	SLIGHT on 0-12% slopes; erosive on slopes.
157	Same as No. 156, Lapeer sandy loam					
160	Hochheim-Casco-Sisson loams Hochheim part - Same as No. 357, Hochheim loam Casco part - Same as No. 172, Casco loam Sisson part - Same as No. 266, Sisson silt loam					
161	Dodge silt loam VERY SLIGHT on 0-2%, SLIGHT on 2-6%, and MODERATE on 6-12% slopes for crops; SLIGHT for pasture and trees; erosive on slopes.	VERY SLIGHT on 0-6% and SLIGHT on 6-12% slopes; erosive on slopes; frost heave.	SLIGHT on 0-6% and MODERATE on 6-12% slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes; erosive on slopes; frost heave.	SLIGHT on 0-12% slopes; erosive on slopes; frost heave; subsoil has high shrink-swell potential and low bearing capacity.
161R	Same as No. 208, Knowles silt loam					
165	Poygan silt loam SLIGHT for crops when drained; SLIGHT for pasture and MODERATE for trees; needs drainage; slowly permeable.	SEVERE - high shrink-swell potential; high water table; wet basements; frost heave.	VERY SEVERE - high water table; slow permeability; systems will not operate.	VERY SEVERE - high water table; slow permeability; systems will not operate.	SEVERE - high water table; high shrink-swell potential; low shear strength; high compressibility; frost heave.	SEVERE - high water table; high shrink-swell potential; low bearing capacity; high compressibility; frost heave.
170	Same as No. 172, Casco loam					
170V	Same as No. 266, Sisson silt loam					
170Y	Same as No. 21, Hebron loam					
170Z	Same as No. 21, Hebron loam					
171	Same as No. 165, Poygan silt loam					
172	Casco loam MODERATE on 0-12% and SEVERE on steeper slopes for crops; MODERATE for pasture and SLIGHT for trees; drouthy and erosive on slopes.	SLIGHT on 0-12%, MODERATE on 12-20%, and SEVERE on steeper slopes; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; erosive on slopes; cuts difficult to vegetate.	SLIGHT on 0-12%, MODERATE on 12-30, and SEVERE on steeper slopes; cuts and fills difficult to stabilize; subsoil has high shrink-swell potential.
172R	Same as No. 208, Knowles silt loam					
172V	Same as No. 266, Sisson silt loam					
172Y	Same as No. 357, Hochheim loam					
172Z	Same as No. 21, Hebron loam					
173	Same as No. 172, Casco loam					
173V	Same as No. 266, Sisson silt loam					
173Y	Same as No. 357, Hochheim loam					
173Z	Same as No. 21, Hebron loam					
174	Fabius loam MODERATE for crops when drained; SLIGHT for pasture and trees; high water table.	MODERATE - high water table; occasional overflow.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - high water table.	MODERATE - high water table.
174R	Same as No. 306, Knowles silt loam, wet variant					
174Z	Same as No. 369, Mosel silt loam					
175	Same as No. 174, Fabius loam					
175Z	Same as No. 369, Mosel silt loam					
176	Mussey loam MODERATE for crops when drained; SLIGHT for pasture and MODERATE for trees; high water table.	SEVERE - high water table; wet basements; flotation of pipes; occasional overflow.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table.	SEVERE - high water table; frost heave.
176V	Same as No. 176, Mussey loam					
176Z	Same as No. 330, Navan loam					

TABLE 8.
SELECTED RURAL AND URBAN USES OF SOILS (Continued)

Soil Number and Soil Name	Cultivated Crops, Pasture and Trees	Residential Development With Public Sewer Service	LIMITATIONS OF SOIL FOR On-site Soil Absorption Sewage Disposal Systems for Lots		Light Industry and Commercial Buildings	Highway, Railroad and Airport Development
			Less than 1 acre	1 acre or more		
178 Crosby silt loam	SLIGHT for crops when drained; SLIGHT for pastures and trees.	MODERATE - high water table.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - high water table; frost heave.	MODERATE - high water table; frost heave; subsoil has high shrink-swell potential; and low bearing capacity.
179 Same as No. 231, Brookston silt loam						
180 Same as No. 176, Mussey loam						
181 Same as No. 176, Mussey loam						
181V Same as No. 28, Colwood fine sandy loam						
181Y Same as No. 231, Brookston silt loam						
181Z Same as No. 330, Navan loam						
182 Same as No. 174, Fabius loam						
182V Same as No. 37, Kibbie fine sandy loam						
182Y Same as No. 178, Crosby silt loam						
182Z Same as No. 369, Mosel silt loam						
188 Same as No. 178, Crosby silt loam						
189 Bristol silt loam	SLIGHT for crops when drained; SLIGHT for pasture and MODERATE for trees.	MODERATE - erosive on slopes; high water table.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - high water table; frost heave.	MODERATE - subsoil has low bearing capacity; high shrink-swell potential; frost heave; high water table.
191 Parr silt loam, shallow variant	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes for crops; SLIGHT for pasture; SEVERE for trees; erosive on slopes.	VERY SLIGHT on 0-6%, SLIGHT on 6-12%, MODERATE on 12-20%, and SEVERE on steeper slopes erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; erosive on slopes.	SLIGHT on 0-12% and MODERATE on steeper slopes; subsoil has moderate shrink-swell potential and low bearing capacity; erosive on slopes.
195 Same as No. 281, Hackett loam						
195V Same as No. 266, Sisson silt loam						
195Y Same as No. 156, Lapeer sandy loam						
195Z Same as No. 21, Hebron loam						
203 Matherton loam	SLIGHT for crops when drained; SLIGHT for pasture and trees; high water table.	MODERATE - high water table.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - high water table.	MODERATE - high water table.
203V Same as No. 37, Kibbie fine sandy loam						
203Y Same as No. 178, Crosby silt loam						
203Z Same as No. 369, Mosel silt loam						
204 Same as No. 208, Knowles silt loam						
206 Knowles silt loam, shallow variant	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes for crops; SLIGHT for pasture; MODERATE for trees; shallow rooting zone; drouthy; erosive on slopes.	MODERATE on 0-12% and SEVERE on steeper slopes; erosive on slopes; bedrock hinders excavation; difficult to install utilities.	VERY SEVERE - bedrock restricts use of systems; probably ground water contamination.	VERY SEVERE - bedrock restricts use of systems; probably ground water contamination.	MODERATE on 0-12% and SEVERE on steeper slopes; erosive on slopes; bedrock hinders excavation.	SLIGHT on 0-12% and MODERATE on steeper slopes; erosive on slopes; frost heave; bedrock hinders excavation.
208 Knowles silt loam	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes for crops; SLIGHT for pasture and trees; slightly drouthy; erosive on slopes.	MODERATE on 0-12% and SEVERE on steeper slopes; erosive on slopes; bedrock hinders excavation; difficult to install utilities.	SEVERE - bedrock restricts use of systems; probable ground water contamination.	SEVERE - bedrock restricts use of systems; probable ground water contamination.	MODERATE on 0-12% and SEVERE on steeper slopes; erosive on slopes; bedrock hinders excavation.	SLIGHT on 0-12% and MODERATE on steeper slopes; erosive on slopes; frost heave; bedrock hinders excavation.
212 Ehler silt loam	SLIGHT for crops when drained; SLIGHT for pasture and MODERATE for trees.	SEVERE - liquefies easily; low bearing capacity; frost heave; high water table; wet basements; flotation of pipes.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; high shrink-swell potential; piping.	SEVERE - high water table; high shrink-swell potential; low bearing capacity; piping; frost heave.
212R Ehler silt loam, rock substratum	SLIGHT on 0-2% slopes for crops; SLIGHT for pasture and trees.	SEVERE - bedrock hinders excavation; difficult to install utilities.	SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - on 0-2% slopes; erosive on slopes; bedrock hinders excavation.	SLIGHT on 0-2% slopes; erosive on slopes; bedrock hinders excavation.
212X Same as No. 126, Westland silt loam						
212Y Same as No. 212, Ehler silt loam						
213 Same as No. 212, Ehler silt loam						
213R Same as No. 212R, Ehler silt loam, rock substratum						
213V Same as No. 28, Colwood fine sandy loam						
214 Same as No. 212, Ehler silt loam						
217 Bono silty clay loam	MODERATE for crops when drained; SLIGHT for pasture and MODERATE for trees; slowly permeable.	SEVERE - low bearing capacity; high shrink-swell potential; high water table; wet basements.	VERY SEVERE - high water table; slow permeability; systems will not operate.	VERY SEVERE - high water table; slow permeability; systems will not operate.	SEVERE - high water table; high shrink-swell potential; low bearing capacity; low shear strength.	VERY SEVERE - high water table; high shrink-swell potential; low bearing capacity; low shear strength.
218 Same as No. 217, Bono silty clay loam						
218V Same as No. 212, Ehler silt loam						
218Y Same as No. 212, Ehler silt loam						
226 Same as No. 226D, Keyser silt loam						
226D Keyser silt loam	VERY SLIGHT on 0-2% and SLIGHT on 2-6% slopes for crops; VERY SLIGHT for pasture and SEVERE for trees; erosive on slopes.	SLIGHT - erosive on slopes; frost heave.	MODERATE - high water table; systems will not operate.	MODERATE - high water table; systems will not operate.	SLIGHT on 0-6% slopes; erosive on slopes; frost heave.	SLIGHT - subsoil has low bearing capacity; erosive on slopes; frost heave.
228 Same as No. 458, Rollin muck, shallow phase						
231 Brookston silt loam	SLIGHT for crops and pasture when drained; MODERATE for trees.	SEVERE - high water table; needs water management; wet basements; flotation of pipes; occasional overflow.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; occasional overflow; frost heave.	SEVERE - subsoil has low bearing capacity and high shrink-swell potential; frost heave; high water table.

TABLE 8.
SELECTED RURAL AND URBAN USES OF SOILS (Continued)

LIMITATIONS OF SOIL FOR							
Soil Number and Soil Name		Cultivated Crops, Pasture and Trees	Residential Development With Public Sewer Service	On-site Soil Absorption Sewage Disposal Systems for Lots		Light Industry and Commercial Buildings	Highway, Railroad and Airport Development
				Less than 1 acre	1 acre or more		
231Z	Same as No. 298, Ashkum silty clay loam						
233	Matherton silt loam	SLIGHT for crops when drained; SLIGHT for pasture and trees; high water table.	MODERATE - high water table.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - high water table; frost heave.	MODERATE - high water table; frost heave.
233V	Same as No. 37, Kibbie fine sandy loam						
233Y	Same as No. 178, Crosby silt loam						
233Z	Same as No. 369, Mosel silt loam						
234	Same as No. 233, Matherton silt loam						
234V	Same as No. 37, Kibbie fine sandy loam						
234Y	Same as No. 178, Crosby silt loam						
243	Calamus silt loam	VERY SLIGHT on 0-2%, SLIGHT on 2-6%, and MODERATE on 6-12% slopes for crops; VERY SLIGHT for pasture; and SLIGHT for trees; erosive on slopes.	SLIGHT - erosive on slopes; frost heave.	MODERATE - high water table for short periods restricts use of systems.	MODERATE - high water table for short periods restricts use of systems.	SLIGHT on 0-6% and MODERATE on 6-12% slopes; erosive on slopes; high water table for short periods; frost heave.	MODERATE - subsoil has low bearing capacity; high shrink-swell potential; frost heave.
250	Tedrow sandy loam	MODERATE for crops, pasture and trees; low in natural fertility.	MODERATE - high water table hinders installation of sanitary systems.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - high water table; piping; erosive.	SLIGHT - high water table; piping.
250V	Same as No. 250, Tedrow sandy loam						
250Y	Same as No. 250, Tedrow sandy loam						
250Z	Same as No. 369, Mosel silt loam						
251	Same as No. 250, Tedrow sandy loam						
251Y	Same as No. 250, Tedrow sandy loam						
251Z	Same as No. 51, Aztalan loam						
254	Tustin sandy loam	SLIGHT on 0-6% and MODERATE on 6-12% slopes for crops; SLIGHT for pasture and trees; slightly drouthy; erosive on slopes.	SLIGHT on 0-12% slopes; erosive on slopes; clay has high shrink-swell potential.	MODERATE - slowly permeable substratum restricts use of systems.	SLIGHT on 0-6% and MODERATE on 6-12% slopes; slowly permeable substratum restricts use of systems.	MODERATE on 0-12% slopes; erosive; drouthy; low bearing capacity.	SLIGHT on 0-12% slopes; clay substratum has high shrink-swell potential and low bearing capacity.
261	Hackett sandy loam, wet variant	SLIGHT for crops when drained; SLIGHT for pasture; SEVERE for trees.	MODERATE - high water table hinders installation of utilities.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	SLIGHT - good shear strength; low volume change; low compressibility.	SLIGHT - low shrink-swell potential; good stability.
262	Same as No. 261, Hackett sandy loam, wet variant						
266	Sisson silt loam	VERY SLIGHT on 0-2%, SLIGHT on 2-6%, MODERATE on 6-12%, and SEVERE on steeper slopes for crops; SLIGHT for pasture and trees; erosive on slopes.	SLIGHT on 0-12%, MODERATE on 12-20% slopes, and SEVERE on steeper slopes; frost heave; low bearing capacity.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 0-12% slopes, and SEVERE on steeper slopes.	MODERATE on 0-12% and SEVERE on steeper slopes; low bearing capacity; frost heave; erosive on slopes; piping.	MODERATE on 0-12% and SEVERE on steeper slopes; low bearing capacity; frost heave; piping; slippage.
266R	Same as No. 208, Knowles silt loam						
266X	Same as No. 266, Sisson silt loam						
266Z	Same as No. 21, Hebron loam						
267	Same as No. 266, Sisson silt loam						
268	Same as No. 266, Sisson silt loam						
269	Warsaw sandy loam	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes for crops; SLIGHT for pasture and SEVERE for trees; erosive on slopes.	SLIGHT - slightly drouthy; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; erosive on slopes.	SLIGHT - erosive on slopes.
270	Same as No. 281, Hackett loam						
270V	Same as No. 266, Sisson silt loam						
271	Same as No. 281, Hackett loam						
272	Tustin loamy fine sand	MODERATE on 0-12% slopes for crops; MODERATE for pasture and trees; drouthy and erosive.	MODERATE on 0-12% slopes; drouthy; erosive; clay has high shrink-swell potential.	MODERATE - slowly permeable substratum restricts use of systems.	SLIGHT on 0-6% slopes; slowly permeable substratum restricts use of systems.	MODERATE on 0-12% slopes; erosive; drouthy; low bearing capacity.	SLIGHT on 0-12% slopes; clay substratum has high shrink-swell potential and low bearing capacity; erosive.
276	Boyer sandy loam	MODERATE on 0-12% and SEVERE on steeper slopes for crops; MODERATE for pasture and trees; drouthy and erosive.	SLIGHT on 0-12% and MODERATE on 12-20% slopes; erosive on slopes; slightly drouthy.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; contamination of ground water.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; contamination of ground water.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; erosive; drouthy; cuts and fills difficult to vegetate.	SLIGHT on 0-12% and MODERATE on steeper slopes; erosive; difficult to stabilize cuts and fills.
276Y	Same as No. 156, Lapeer sandy loam						
276Z	Same as No. 254, Tustin sandy loam						
277	Same as No. 276, Boyer sandy loam						
277Y	Same as No. 156, Lapeer sandy loam						
277Z	Same as No. 254, Tustin sandy loam						
278	Clyman silt loam	SLIGHT for crops when drained; SLIGHT for pasture and trees.	MODERATE - frost heave; high water table.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - high water table; frost heave.	MODERATE - high water table; subject to frost heave; subsoil has high shrink-swell potential and low bearing capacity.
279	Same as No. 276, Boyer sandy loam						
280	Same as No. 316, Boyer loamy sand						
281	Hackett loam	MODERATE on 0-12% and SEVERE on steeper slopes for crops; MODERATE for pasture and trees; drouthy and erosive.	MODERATE on 0-12% and SEVERE on steeper slopes; erosive; drouthy; difficult to vegetate.	MODERATE on 0-12% and SEVERE on steeper slopes; contamination of ground water.	MODERATE on 0-12% and SEVERE on steeper slopes; contamination of ground water.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; drouthy; erosive.	SLIGHT on 0-12% and MODERATE on steeper slopes; drouthy; erosive; cuts and fills difficult to vegetate.
282	Casco-Rodman loams	Casco part - Same as No. 172, Casco loam Rodman part - Same as No. 75, Rodman gravelly loam					

TABLE 8.
SELECTED RURAL AND URBAN USES OF SOILS (Continued)

LIMITATIONS OF SOIL FOR							
Soil Number and Soil Name	Cultivated Crops, Pasture and Trees	Residential Development With Public Sewer Service	On-site Soil Absorption Sewage Disposal Systems for Lots		Light Industry and Commercial Buildings	Highway, Railroad and Airport Development	
			Less than 1 acre	1 acre or more			
283	Same as No. 369, Mosel silt loam						
284	Same as No. 369, Mosel silt loam						
285	Same as No. 176, Mussey loam						
286	Same as No. 176, Mussey loam						
287	Same as No. 176, Mussey loam						
288	Same as No. 281, Hackett loam						
288V	Same as No. 266, Sisson silt loam						
289	Same as No. 281, Hackett loam						
289Y	Same as No. 156, Lapeer sandy loam						
289Z	Same as No. 254, Tustin sandy loam						
295	Morley-Beecher silt loams	Morley part - Same as No. 297, Morley silt loam Beecher part - Same as No. 3361, Beecher silt loam					
297	Morley silt loam	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes for crops; SLIGHT for pasture and trees; erosive on slopes.	MODERATE on 0-12% and SEVERE on steeper slopes; erosive on slopes; low bearing capacity; high shrink-swell potential.	SEVERE - high water table; slow permeability; systems will not operate.	MODERATE - high water table; slow permeability; systems will not operate.	MODERATE on 0-6% and SEVERE on steeper slopes; low bearing capacity; high shrink-swell potential; erosive on slopes.	MODERATE on 0-12% and SEVERE on steeper slopes; low bearing capacity; high shrink-swell potential; erosive on slopes; frost heave.
297S	Same as No. 297, Morley silt loam						
297V	Same as No. 266, Sisson silt loam						
297X	Same as No. 70, Fox sandy loam						
297Y	Same as No. 297, Morley silt loam						
298	Ashkum silty clay loam	SLIGHT for crops when drained; SLIGHT for pasture and MODERATE for trees.	SEVERE - low bearing capacity; high shrink-swell potential; high water table.	VERY SEVERE - high water table; slow permeability; systems will not operate.	VERY SEVERE - high water table; slow permeability; systems will not operate.	SEVERE - low bearing capacity; high shrink-swell potential; high water table.	SEVERE - high shrink-swell potential; low bearing capacity; high water table.
299	Blount silt loam	SLIGHT for crops when drained; SLIGHT for pasture and trees.	MODERATE - low bearing capacity; high shrink-swell potential; high water table.	VERY SEVERE - high water table; slow permeability; systems will not operate.	VERY SEVERE - high water table; slow permeability; systems will not operate.	SEVERE - high water table; high shrink-swell potential; low bearing capacity; erosive on slopes; frost heave.	SEVERE - high water table; high shrink-swell potential; low bearing capacity; erosive on slopes; frost heave.
300	Ashkum-Beecher silt loams	Ashkum part - Same as No. 298, Ashkum silty clay loam Beecher part - Same as No. 3361, Beecher silt loam					
302	Same as No. 458, Rollin muck, shallow						
303	Alluvial land, rock substratum	SEVERE - for crops and trees; MODERATE for pasture, shallow rooting zone; high water table.	SEVERE - bedrock interferes with installation of utilities, basements.	VERY SEVERE - bedrock restricts use of systems; probable ground water contamination.	VERY SEVERE - bedrock restricts use of systems; probable ground water contamination.	SEVERE - high water table.	SEVERE - subsoil has low bearing capacity; substratum is excellent but costly when cuts must be made.
305	Same as No. 208, Knowles silt loam						
306	Knowles silt loam, wet variant	MODERATE for crops and trees; SLIGHT for pasture.	SEVERE - bedrock interferes with installation of utilities; basements.	VERY SEVERE - bedrock restricts use of systems; probable ground water contamination.	SEVERE - bedrock restricts use of systems; probable ground water contamination.	MODERATE - where excavation into bedrock is not required.	MODERATE - subsoil has low bearing capacity; substratum is excellent but costly to excavate.
307	Same as No. 306, Knowles silt loam, wet variant						
308	Same as No. 206, Knowles silt loam, shallow variant						
311	Manawa loam	SLIGHT for crops when drained; SLIGHT for pasture and trees.	MODERATE - high water table; clayey till has high shrink-swell potential; low bearing capacity.	VERY SEVERE - high water table; slow permeability; systems will not operate.	VERY SEVERE - high water table; slow permeability; systems will not operate.	SEVERE - high water table; high shrink-swell potential; low bearing capacity.	SEVERE - high water table; low bearing capacity; high shrink-swell potential; frost heave.
314	Same as No. 380, Sumner loamy sand						
315	Oshemo loamy sand	MODERATE on 0-12% slopes for crops; MODERATE for pasture and trees; drouthy and erosive.	MODERATE on 0-12% slopes; erosive; drouthy.	SLIGHT	SLIGHT	SLIGHT on 0-6% slopes; erosive; drouthy.	SLIGHT on 0-12% slopes; erosive; drouthy; difficult to vegetate cuts and fills.
316	Boyer loamy sand	MODERATE for crops on 0-12% slopes; VERY SEVERE for crops on slopes over 12%; MODERATE for pasture and trees; drouthy and erosive.	MODERATE on 0-12% and SEVERE on steeper slopes; drouthy; erosive; difficult to vegetate.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; ground water contamination.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; ground water contamination.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; erosive; drouthy; cuts and fills difficult to vegetate.	SLIGHT on 0-12% and MODERATE on steeper slopes; erosive; difficult to stabilize cuts and fills.
316Y	Same as No. 156, Lapeer sandy loam						
316Z	Same as No. 272, Tustin loamy fine sand						
317	Same as No. 315, Oshemo loamy sand						
320	Oshemo sandy loam	MODERATE on 0-12% slopes for crops; MODERATE for pasture and SLIGHT for trees; drouthy; erosive on slopes.	SLIGHT on 0-12% slopes; slightly drouthy; erosive on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes; SEVERE on steeper slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes; SEVERE on steeper slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes; erosive; drouthy.	SLIGHT on 0-12% slopes; erosive; drouthy; difficult to vegetate cuts and fills.
323	Ionia sandy loam	SLIGHT for crops, pasture and trees; erosive on slopes.	SLIGHT - slightly drouthy; erosive on slopes.	MODERATE - high water table for short periods restricts use of systems.	MODERATE - high water table for short periods restricts use of systems.	SLIGHT - high water table; for short periods; erosive on slopes.	SLIGHT - high water table for short periods; erosive on slopes.
323V	Same as No. 266, Sisson silt loam						
324	Ionia loam	SLIGHT for crops, pasture and trees; erosive on slopes.	VERY SLIGHT - erosive on slopes.	MODERATE - high water table for short periods restricts use of systems.	MODERATE - high water table for short periods restricts use of systems.	SLIGHT - high water table; erosive on slopes.	SLIGHT - high water table; erosive on slopes.
324V	Same as No. 266, Sisson silt loam						
324Y	Same as No. 343, Celina silt loam, nearly level to gently sloping						
324Z	Same as No. 21, Hebron loam						
325	Varna silt loam	VERY SLIGHT on 0-2%, SLIGHT on 2-6%, and MODERATE on 6-12% slopes for crops; VERY SLIGHT for pasture and SEVERE for trees; erosive on slopes.	MODERATE - erosive on slopes; high shrink-swell potential; low bearing capacity; frost heave.	SEVERE - slow permeability restricts use of systems.	MODERATE - slow permeability restricts use of systems.	MODERATE on 0-6% and SEVERE on steeper slopes; high shrink-swell potential; low bearing capacity; frost heave.	MODERATE - high shrink-swell potential; low bearing capacity; frost heave.
326	Abington silt loam	SLIGHT for crops and pasture when drained; MODERATE for trees.	SEVERE - high water table; occasional overflow; wet basements.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; systems will not operate	MODERATE - high water table; occasional overflow.	SEVERE - high water table; subsoil has moderate shrink-swell potential; low bearing capacity; frost heave.

TABLE 8.
SELECTED RURAL AND URBAN USES OF SOILS (Continued)

LIMITATIONS OF SOIL FOR							
Soil Number and Soil Name	Cultivated Crops, Pasture and Trees	Residential Development With Public Sewer Service	On-site Soil Absorption Sewage Disposal Systems for Lots		Light Industry and Commercial Buildings	Highway, Railroad and Airport Development	
			Less than 1 acre	1 acre or more			
326Z	Same as No. 212, Ehler silt loam						
327	Walkill silt loam	SLIGHT for crops when drained and protected from overflow; SLIGHT for pasture and MODERATE for trees; frequent overflow.	VERY SEVERE - low bearing capacity; subject to shrinkage on drying; high water table; frequent overflow.	VERY SEVERE - systems will not operate when flooded.	VERY SEVERE - systems will not operate when flooded.	VERY SEVERE - high water table; high compressibility and instability; frequent overflow.	VERY SEVERE - high compressibility and instability; frequent overflow; low bearing capacity; high water table.
328	Pistakee silt loam	SLIGHT for crops when drained and protected from overflow; SLIGHT for pasture and trees; occasional overflow.	SEVERE - low bearing capacity; frost heave; high water table; occasional overflow.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; low bearing capacity; piping; occasional overflow.	SEVERE - high water table; low bearing capacity; piping; frost heave; occasional overflow.
330	Navan loam	SLIGHT for crops when drained; SLIGHT for pasture and MODERATE for trees.	SEVERE - substratum has low bearing capacity; high shrink-swell potential; high water table; wet basements.	VERY SEVERE - high water table; slow permeability; systems will not operate.	VERY SEVERE - high water table; slow permeability; systems will not operate.	SEVERE - high water table; high compressibility; low shear strength; high shrink-swell potential; low bearing capacity.	SEVERE - high water table; substratum has moderate compressibility and shrink-swell potential and low bearing capacity.
331	Markham-Elliott silt loams	Markham part - Same as No. 336, Markham silt loam Elliott part - Same as No. 3251, Elliott silt loam					
332	Kane silt loam	SLIGHT for crops when drained; SLIGHT for pasture and trees; high water table.	MODERATE - high water table.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - high water table; frost heave.	MODERATE - high water table; frost heave.
332V	Same as No. 26, Wauconda fine sandy loam						
332Y	Same as No. 178, Crosby silt loam						
332Z	Same as No. 51, Aztalan loam						
333	Eagle silt loam	SLIGHT for crops and pastures; MODERATE for trees; droughty.	SLIGHT - erosive on slopes.	MODERATE - high water table for short periods restricts use of systems.	MODERATE - high water table for short periods restricts use of systems.	SLIGHT on 0-6% and MODERATE on 6-12% slopes; high water table for short periods; erosive on slopes.	SLIGHT - high water table for short periods; erosive on slopes.
333Y	Same as No. 91, Parr silt loam						
333Z	Same as No. 16, Rome silt loam						
334	Same as No. 119, Warsaw silt loam						
335	Ionia silt loam	SLIGHT for crops, pasture and trees; erosive on slopes.	SLIGHT - erosive on slopes.	MODERATE - high water table for short periods restricts use of systems.	MODERATE - high water table for short periods restricts use of systems.	SLIGHT on 0-6% and MODERATE on 6-12% slopes; high water table for short periods; erosive on slopes.	SLIGHT - high water table for short periods; erosive on slopes.
335Y	Same as No. 343, Celina silt loam, nearly level to gently sloping						
335Z	Same as No. 21, Hebron loam						
336	Markham silt loam	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes for crops; SLIGHT for pasture and MODERATE for trees; erosive on slopes.	MODERATE - erosive on slopes; low bearing capacity; high shrink-swell potential; erosive on slopes.	SEVERE - slowly permeable substratum restricts use of systems.	MODERATE - slowly permeable substratum restricts use of systems.	MODERATE on 0-12% and SEVERE on steeper slopes; low bearing capacity; high shrink-swell potential; erosive on slopes.	SLIGHT on 0-12% and MODERATE on steeper slopes; low bearing capacity; high shrink-swell potential; erosive on slopes.
338	Same as No. 298, Ashkum silty clay loam						
339	Abington silty clay loam	SLIGHT for crops and pasture when drained; MODERATE for trees.	SEVERE - high water table; occasional overflow; wet basements.	VERY SEVERE - systems will not operate when flooded.	VERY SEVERE - systems will not operate when flooded.	MODERATE - high water table; occasional overflow.	SEVERE - high water table; subsoil has moderate shrink-swell potential; low bearing capacity; frost heave.
340	Same as No. 330, Navan loam						
343	Celina silt loam, nearly level to gently sloping.	VERY SLIGHT on 0-2%, and SLIGHT on 2-6% slopes for crops; SLIGHT for pasture and trees; erosive on slopes.	SLIGHT - erosive on slopes; frost heave.	MODERATE - high water table for short periods restricts use of systems.	MODERATE - high water table for short periods restricts use of systems.	SLIGHT - erosive on slopes; high water table for short periods; frost heave.	MODERATE - subsoil has high shrink-swell potential; low bearing capacity; frost heave.
343	Moderately steep to steep - Same as No. 362, Theresa silt loam						
344	Ashford silt loam	SLIGHT on 0-6% and MODERATE on 6-12% slopes for crops; SLIGHT for pasture and trees; erosive on slopes.	VERY SLIGHT on 0-6% and SLIGHT on 6-12% slopes; erosive on slopes.	MODERATE - high water table for short periods restricts use of systems.	MODERATE - high water table for short periods restricts use of systems.	SLIGHT on 0-6% and MODERATE on 6-12% slopes; high water table for short periods; erosive on slopes.	SLIGHT - erosive on slopes; high water table for short periods.
345	Nenno silt loam	SLIGHT for crops when drained; SLIGHT for pasture and trees.	MODERATE - erosive on slopes; high water table.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - high water table.	MODERATE - high water table; frost heave.
346	Kane loam	SLIGHT for crops when drained; SLIGHT for pasture and trees; high water table.	MODERATE - high water table.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - high water table.	MODERATE - high water table.
346Y	Same as No. 178, Crosby silt loam						
346Z	Same as No. 51, Aztalan loam						
352	Same as No. 156, Lapeer sandy loam						
355	Same as No. 156, Lapeer sandy loam						
356	Same as No. 156, Lapeer sandy loam						
357	Hochheim loam	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes for crops; SLIGHT for pasture and trees; erosive on slopes.	VERY SLIGHT on 0-6%, SLIGHT on 6-12%, MODERATE on 12-20%, and SEVERE on steeper slopes; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; erosive on slopes.	SLIGHT on 0-12% and MODERATE on steeper slopes; subsoil has moderate shrink-swell potential; erosive on slopes.
357R	Same as No. 208, Knowles silt loam						
357X	Same as No. 172, Casco loam						
358	Miami loam	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes for crops; SLIGHT for pasture and trees; erosive on slopes.	VERY SLIGHT on 0-6%, SLIGHT on 6-12%, MODERATE on 12-20%, and SEVERE on steeper slopes; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-12% and MODERATE on steeper slopes; subsoil has high shrink-swell potential and low bearing capacity; erosive on slopes.
359	Hennepin loam	MODERATE on 0-6% and SEVERE on steeper slopes for crops; MODERATE for pasture and trees; slightly droughty; erosive on slopes.	SLIGHT on 0-12%, MODERATE on 12-20%, and SEVERE on steeper slopes; erosive on slopes; stony in places.	MODERATE on 0-12% and SEVERE on steeper slopes.	MODERATE on 0-12% and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; erosive on slopes; stony in places.	SLIGHT on 0-12%, MODERATE on 12-30%, and SEVERE on steeper slopes; stony in places.

TABLE 8.
SELECTED RURAL AND URBAN USES OF SOILS (Continued)

LIMITATIONS OF SOIL FOR						
Soil Number and Soil Name	Cultivated Crops, Pasture and Trees	Residential Development With Public Sewer Service	On-site Soil Absorption Sewage Disposal Systems for Lots		Light Industry and Commercial Buildings	Highway, Railroad and Airport Development
			Less than 1 acre	1 acre or more		
360	Same as No. 357, Hochheim loam					
360R	Same as No. 208, Knowles silt loam					
360Y	Same as No. 266, Sisson silt loam					
360X	Same as No. 172, Casco loam					
361	Same as No. 358, Miami loam					
362	Theresa silt loam	VERY SLIGHT on 0-2%, SLIGHT on 2-6%, MODER- ATE on 6-12%, and SE- VERE on steeper slopes for crops; VERY SLIGHT for pasture or trees; ero- sive on slopes.	VERY SLIGHT on 0-6%, SLIGHT on 6-12%, MOD- ERATE on 12-20%, and SEVERE on steeper slopes; erosive on slopes; frost heave.	SLIGHT on 0-6%, MOD- ERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODER- ATE on 6-12%, and SEVERE on steeper slopes; erosive on slopes; frost heave.	SLIGHT on 0-12% and MOD- ERATE on steeper slopes; subsoil has high shrink- swell potential and low bear- ing capacity; frost heave.
362R	Same as No. 208, Knowles silt loam					
362V	Same as No. 266, Sisson silt loam					
362X	Same as No. 70, Fox sandy loam					
362Z	Same as No. 21, Hebron loam					
363	Mayville silt loam	VERY SLIGHT on 0-2%, SLIGHT on 2-6%, and MODERATE on 6-12% slopes for crops; VERY SLIGHT for pasture and trees; erosive on slopes.	SLIGHT - erosive on slopes; frost heave.	MODERATE - high water table for short periods restricts use of systems.	MODERATE - high water table for short periods restricts use of systems.	SLIGHT on 0-6% and MODER- ATE on 6-12% slopes; erosive on slopes; frost heave.
363R	Same as No. 306, Knowles silt loam, wet variant					
363X	Same as No. 335, Ionia silt loam					
363Y	Same as No. 363, Mayville silt loam					
363Z	Same as No. 21, Hebron loam					
364	Lamartine silt loam	SLIGHT for crops when drained; SLIGHT for pas- ture and trees.	MODERATE - frost heave; high water table.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - high water table; erosive on slopes; frost heave.
364V	Same as No. 37, Kibbie fine sandy loam					
364X	Same as No. 233, Matherton silt loam					
364Z	Same as No. 369, Mosel silt loam					
365	Hochheim-Hennepin loams	Hochheim part - Same as No. 357, Hochheim loam Hennepin part - Same as No. 357, Hochheim loam				
365X	Hochheim-Hennepin loams, gravelly substratum	Hochheim part - Same as No. 172, Casco loam Hennepin part - Same as No. 359, Hennepin loam				
366	Hochheim-Theresa loams	Hochheim part - Same as No. 357, Hochheim loam Theresa part - Same as No. 362, Theresa silt loam				
367	Hochheim fine sandy loam	SLIGHT on 0-6% slopes for crops; SLIGHT for pasture and trees; erosive on slopes.	SLIGHT - erosive on slopes.	VERY SLIGHT	VERY SLIGHT	SLIGHT - erosive on slopes.
369	Mosel silt loam	SLIGHT for crops when drained; SLIGHT for pas- ture and trees.	MODERATE - low bearing capacity; high shrink- swell potential; high water table.	VERY SEVERE - high water table; slow perme- ability; systems will not operate.	VERY SEVERE - high water table; slow perme- ability; systems will not operate.	SEVERE - high water table; high shrink-swell potential; low bearing capacity; low shear strength; high com- pressibility.
370	Same as No. 369, Mosel silt loam					
371	Same as No. 369, Mosel silt loam					
380	Sumner loamy sand	MODERATE on 0-12% slopes for crops; MODER- ATE for pasture and trees; droughty and erosive.	MODERATE on 0-12% slopes for crops; droughty; erosive; difficult to vege- tate.	SLIGHT - contamination of ground water.	SLIGHT - contamination of ground water.	SLIGHT on 0-6% slopes; erosive; droughty; cuts and fills difficult to vegetate.
386	Granby fine sandy loam	MODERATE for crops when drained; SLIGHT for pasture and MODERATE for trees; needs drainage; high water table.	SEVERE - erosive; high water table; wet base- ments; flotation of pipes.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; erosive; piping.
386Y	Same as No. 386, Granby fine sandy loam					
386Z	Same as No. 330, Navan loam					
387	Same as No. 386, Granby fine sandy loam					
387V	Same as No. 26, Wauconda fine sandy loam					
391	Wea sandy loam	VERY SLIGHT on 0-2%, SLIGHT on 2-6%, MODER- ATE on 6-12%, and SEVERE on steeper slopes for crops; VERY SLIGHT for pasture and trees; erosive on slopes.	VERY SLIGHT on 0-6%, SLIGHT on 6-12%, and MODERATE on steeper slopes; frost heave.	SLIGHT on 0-6%, MODER- ATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODER- ATE on 6-12%, and SEVERE on steeper slopes; erosive on slopes; frost heave.	SLIGHT - subsoil has low bearing capacity; frost heave.
392	Ockley loam	VERY SLIGHT on 0-2% and SLIGHT on 2-6% slopes for crops; VERY SLIGHT for pasture and SLIGHT for trees; erosive on slopes.	VERY SLIGHT on 0-6% slopes; erosive on slopes; frost heave.	SLIGHT	SLIGHT	SLIGHT - subsoil has low bearing capacity; erosive on slopes; frost heave.
393	Same as No. 392, Ockley loam					
394	Parr sandy loam	SLIGHT for crops and pasture on 0-6%, MODER- ATE for crops and pasture on 6-12% slopes; SEVERE on steeper slopes; MODER- ATE for trees.	VERY SLIGHT on 0-6%, SLIGHT on 6-12%, and MODERATE on steeper slopes; erosion hazard on sloping areas.	SLIGHT on 0-6%, MODER- ATE on 6-12%, and SEVERE on steeper slopes; moderately permeable.	SLIGHT on 0-6%, MODER- ATE on 6-12%, and SEVERE on steeper slopes; moderately permeable.	SLIGHT on 0-6%, MODER- ATE on 6-12%, and SEVERE on steeper slopes; low com- pressibility; good shear strength.
397	Ozaukee silt loam	SLIGHT on 0-6%, MODER- ATE on 6-12%, and SE- VERE on steeper slopes for crops; SLIGHT for pasture and trees; ero- sive on slopes.	MODERATE on 0-12% and SEVERE on steeper slopes; erosive on slopes; low bearing capacity; high shrink-swell potential.	SEVERE - slowly per- meable substratum re- stricts use of systems.	MODERATE - slowly permeable substratum restricts use of systems.	MODERATE on 0-6% and SEVERE on steeper slopes; low bearing capacity; high shrink-swell potential; erosive on slopes.

TABLE 8.
SELECTED RURAL AND URBAN USES OF SOILS (Continued)

LIMITATIONS OF SOIL FOR						
Soil Number and Soil Name	Cultivated Crops, Pasture and Trees	Residential Development With Public Sewer Service	On-site Soil Absorption Sewage Disposal Systems for Lots		Light Industry and Commercial Buildings	Highway, Railroad and Airport Development
			Less than 1 acre	1 acre or more		
397R	Same as No. 208, Knowles silt loam					
397V	Same as No. 397, Ozaukee silt loam					
397X	Same as No. 70, Fox fine sandy loam					
397Y	Same as No. 397, Ozaukee silt loam					
398	Same as No. 298, Ashkum silty clay loam					
399	Mequon silt loam	SLIGHT for crops when drained; SLIGHT for pasture and trees; erosive on slopes.	MODERATE - low bearing capacity; high shrink-swell potential; high water table.	VERY SEVERE - high water table; slow permeability; systems will not operate.	VERY SEVERE - high water table; slow permeability; systems will not operate.	SEVERE - high water table; high shrink-swell potential; low bearing capacity; erosive on slopes; frost heave.
410	Same as No. 133, Spinks fine sand					
411	Spinks fine sand, silty substratum	MODERATE for crops, pasture, and trees; drouthy; erosive.	SLIGHT on 0-12%, MODERATE on 12-20%, and SEVERE on steeper slopes; erosive on slopes; frost heave; low bearing capacity.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	MODERATE on 0-12% and SEVERE on steeper slopes; low bearing capacity; frost heave; erosive on slopes; piping.
413	Crestview fine sandy loam	MODERATE for crops, pasture, and trees; drouthy and erosive.	MODERATE - drouthy; erosive; difficult to vegetate.	SLIGHT	SLIGHT	SLIGHT on 0-6% slopes; erosive; drouthy; difficult to vegetate cuts and fills.
413Z	Same as No. 254, Tustin sandy loam					
414	Same as No. 413, Crestview fine sandy loam					
416	Terrace escarpments, till	VERY SEVERE - for crops and pastures; SEVERE for trees; severe erosion hazard.	SEVERE - steep slopes are unstable.	VERY SEVERE - seepage beds impractical on steep slopes.	VERY SEVERE - seepage beds impractical on steep slopes.	SEVERE - has moderate bearing capacity; high shrink-swell potential; unstable on steeper slopes.
417	Terrace escarpment, outwash	VERY SEVERE for crops; SEVERE for pasture and trees; severe drouth hazard.	VERY SEVERE - slopes generally too steep to install and maintain utilities.	VERY SEVERE - slopes too steep.	VERY SEVERE - slopes too steep.	VERY SEVERE - slopes too steep; subject to erosion.
419	Beach Sand	VERY SEVERE for crops and pasture; SEVERE for trees.	SEVERE - difficult to install and maintain utilities; high water table.	VERY SEVERE - high water table.	VERY SEVERE - high water table.	MODERATE - low compressibility; good shear strength; liquefies and flows when saturated; high water table.
420	Same as No. 358, Miami loam					
421	Same as No. 161, Dodge silt loam					
431	Knowles stony loam, shallow variant	VERY SEVERE for crops and trees; MODERATE for pasture.	SEVERE - bedrock interferes with installation of utilities; basements.	VERY SEVERE - bedrock restricts use of systems; probable ground water contamination.	VERY SEVERE - bedrock restricts use of systems; probable ground water contamination.	SLIGHT - where bedrock is not excavated; good foundation base.
449	Same as No. 451, Houghton mucky peat					
450	Same as No. 451, Houghton mucky peat					
451	Houghton mucky peat	MODERATE for crops and pasture when drained; MODERATE for trees; needs drainage; erosive.	VERY SEVERE - erosive; subject to shrinkage; low bearing capacity; high water table.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - erosive; high compressibility and instability; high water table.
452	Adrian muck	SEVERE for crops when drained; MODERATE for pasture when drained; MODERATE for trees; erosive; needs drainage.	SEVERE - erosive; subject to shrinkage; high water table.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - erosive; peat has high compressibility and instability; high water table.
452Z	Same as No. 451, Houghton mucky peat					
453	Adrian mucky peat	SEVERE for crops when drained; MODERATE for pasture when drained; MODERATE for trees; erosive; needs drainage.	SEVERE - erosive; subject to shrinkage; high water table.	VERY SEVERE - erosive; subject to shrinkage; high water table.	VERY SEVERE - erosive; subject to shrinkage; high water table.	VERY SEVERE - erosive; peat has high compressibility and instability; high water table.
454	Same as No. 451, Houghton mucky peat					
455	Same as No. 451, Houghton mucky peat					
456	Ogden muck	MODERATE for crops and pasture when drained; MODERATE for trees; needs drainage; erosive.	SEVERE - erosive; subject to shrinkage; high water table; clay has high shrink-swell potential.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; erosive; clays have high shrink-swell potential.
457	Same as No. 456, Ogden muck					
458	Rollin muck, shallow	SEVERE for crops and MODERATE for pasture when drained; MODERATE for trees; erosive.	VERY SEVERE - erosive; subject to shrinkage; high water table; has low bearing capacity.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; high compressibility and instability.
459	Same as No. 458, Rollin muck, shallow					
460	Same as No. 458, Rollin muck, shallow					
461	Muskego muck	SEVERE for crops; difficult to drain adequately; SEVERE for pasture and trees.	VERY SEVERE - high water table; shrinks and settles on draining; compressible.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; high compressibility and instability.
462	Houghton peat, acid variant	VERY SEVERE for crops and pasture; SEVERE for trees.	VERY SEVERE - erosive; subject to shrinkage; low bearing capacity; high water table.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - high water table; systems will not operate.	VERY SEVERE - erosive; high compressibility and instability; high water table.
502	Same as No. 504, Flagg silt loam					
504	Flagg silt loam	SLIGHT on 0-6% slopes for crops; SLIGHT for pasture and trees; erosive on slopes.	VERY SLIGHT on 0-6% slopes; erosive on slopes; frost heave.	MODERATE - high water table for short periods restricts use of systems.	MODERATE - high water table for short periods restricts use of systems.	SLIGHT on 0-6% slopes; erosive on slopes; frost heave.
505	Flagg silt loam, wet variant	SLIGHT for crops when drained; SLIGHT for pasture and SEVERE for trees.	MODERATE - frost heave; high water table.	VERY SEVERE - high water table; systems will not operate.	SEVERE - high water table; systems will not operate.	MODERATE - high water table; frost heave.
508	Same as No. 510, Pecatonica silt loam					

TABLE 8.
SELECTED RURAL AND URBAN USES OF SOILS (Continued)

LIMITATIONS OF SOIL FOR						
Soil Number and Soil Name	Cultivated Crops, Pasture and Trees	Residential Development With Public Sewer Service	On-site Soil Absorption Sewage Disposal Systems for Lots		Light Industry and Commercial Buildings	Highway, Railroad and Airport Development
			Less than 1 acre	1 acre or more		
510	Pecatonica silt loam	VERY SLIGHT on 0-2%, SLIGHT on 2-6%, and MODERATE on 6-12% slopes for crops; VERY SLIGHT for pasture and trees; erosive on slopes.	VERY SLIGHT on 0-6% and SLIGHT on 6-12% slopes; erosive on slopes; frost heave.	SLIGHT on 0-6% and MODERATE on 6-12% slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes; erosive on slopes; frost heave.
511	Same as No. 505, Flagg silt loam, wet variant					
514	Same as No. 516, Westville silt loam					
516	Westville silt loam	VERY SLIGHT on 0-2%, SLIGHT on 2-6%, MODERATE on 6-12%, and SEVERE on steeper slopes for crops; VERY SLIGHT for pasture and trees; erosive on slopes.	VERY SLIGHT on 0-6%, SLIGHT on 6-12%, MODERATE on 12-20%, and SEVERE on steeper slopes; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-12% and MODERATE on steeper slopes; subsoil has moderate shrink-swell potential and low bearing capacity; erosive on slopes; frost heave.
550	Same as No. 212R, Ehler silt loam, rock substratum					
557	Same as No. 358, Miami loam					
3251	Elliott silt loam	SLIGHT for crops when drained; SLIGHT for pasture and SEVERE for trees.	MODERATE - erosive on slopes; low bearing capacity; high shrink-swell potential; high water table.	VERY SEVERE - high water table; slow permeability; systems will not operate.	VERY SEVERE - high water table; slow permeability; systems will not operate.	SEVERE - high water table; low bearing capacity; high shrink-swell potential; frost heave; erosive on slopes.
3251V	Same as No. 3251, Elliott silt loam					
3361	Beecher silt loam	SLIGHT for crops when drained; SLIGHT for pasture and MODERATE for trees.	MODERATE - high shrink-swell potential; high water table; low bearing capacity.	VERY SEVERE - high water table; slow permeability; systems will not operate.	VERY SEVERE - high water table; slow permeability; systems will not operate.	SEVERE - high water table; high shrink-swell potential; low bearing capacity; frost heave.

Chapter VII

AGRICULTURAL USE OF SOILS

In southeastern Wisconsin the agricultural use of soils can be classified into the use of soils for cultivated crops, pastures, and woodlands. The limitations, hazards and management problems related to these uses of the soils within the Region are discussed in this chapter.

The soil interpretations for cropland use include: grouping of soils into capability units; yield estimates for selected suitable crops; a guide for the installation and use of sprinkler irrigation systems where applicable; and a guide for the installation of drainage systems where needed and feasible. Capability units comprise the most basic category in a soil capability classification scheme designed to group soils with similar use and management properties for cultivated crops.

The soil interpretations for woodland use include: grouping of soils into woodland suitability groups and yield estimates for both natural and plantation stands of timber. Each woodland suitability group includes soils with similar limitations and hazards for tree growth and similar management problems.

CAPABILITY GROUPS OF SOILS

The soils of southeastern Wisconsin have been classified into capability groupings that indicate their general suitability for most kinds of farming. These are practical groupings based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment.

In this system all soils are grouped at three levels, the capability class, subclass, and capability unit. The eight capability classes in the broadest grouping are designated by Roman numerals I through VIII. In class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In class VIII are soils and land forms so rough, shallow, or otherwise limited that they do not produce eco-

nomically worthwhile yields of crops, forage, or wood products.

The subclasses indicate major kinds of limitations within the classes. Within most classes there are up to four subclasses. The subclass is indicated by the addition of a lower case letter, e, w, s, or c, to the class numeral, as for example IIe. The letter e indicates that the main limitation on the use of the soil for cultivated crops is risk of erosion unless close-growing plant cover is maintained; w indicates that water in or on the soil will interfere with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); s indicates that use of the soil for cultivated crops is limited mainly because it is shallow, drouthy, or stony; and c indicates that the use of the soil for cultivated crops is mainly limited because of climate that is too cold or too dry. In southeastern Wisconsin climate is not a limiting factor for soil use.

There are no subclasses in Class I because the soils in this class have few or no limitations. Class V can contain only subclasses w and s because the soils in this class have little or no erosion hazard but have other limitations that restrict their use mainly to pasture, woodland, or wildlife.

Each subclass is further divided into capability units. These consist of groups of soils that are very similar and, therefore, suited to the same kinds of crop and pasture plants, require similar management, and have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping of soils for management purposes. Capability units are identified by the addition of an Arabic numeral code to the class and subclass code, as for example IIe-1 or IIIs-2.

Soils are classified in capability classes, subclasses, and units in accordance with the degree and kind of their permanent limitations; but without consideration of major and generally expensive land-forming that would

change the slope, depth, or other characteristics of the soil; and without consideration of possible but unlikely major reclamation projects.

The following capability classes, subclasses and units encompass all of the soils of the Southeastern Wisconsin Region:

CLASS I - These are deep, well drained and moderately well drained, nearly level soils with no serious limitations that restrict their use for cultivated crops.

Capability Unit I-1. This unit consists of deep, well drained, nearly level, moderately permeable soils that have a high available moisture capacity.

Soil deterioration and erosion are relatively easy to control and a favorable soil structure is easy to maintain. Continuous cultivated crops can be grown where soils are properly fertilized and all residues are added to the soil.

CLASS II - These are soils that have some limitations that reduce the choice of plants that can be economically produced or require some conservation practices.

Subclass IIe - These are gently sloping soils with a slight erosion hazard that can be easily controlled.

Capability Unit IIe-1. This unit consists of deep, well and moderately well drained soils. These soils are moderately permeable and have a high available moisture capacity.



Contour stripcropping will help control erosion where gently sloping soils are used for cultivated crops.

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Capability Unit IIe-2. This unit consists of moderately deep, well and moderately well drained loam and silt loam soils underlain by loose sand and gravel or limestone bedrock. These moderately permeable soils have a good available moisture capacity.

Capability Unit IIe-5. This unit consists of deep, well to moderately well drained alluvial soils over poorly drained soils. These soils occur in depressional areas and waterways that are subject to occasional overflow.

Capability Unit IIe-6. This unit consists of deep, well and moderately well drained loam, silt loam and silty clay loam soils with clayey subsoils, substrata, or both. These soils are moderately slow to slowly permeable and have a high available moisture capacity.

Capability Unit IIe-7. This unit consists of deep, well and moderately well drained sandy loam soils overlying loam to clay at a depth of less than 3-1/2 feet. These soils have moderate to moderately slow permeability and a good available moisture capacity. These soils are slightly drouthy.

Subclass IIs. These are nearly level soils that are slightly drouthy and need some moisture-conserving practices.

Capability Unit IIs-1. This unit consists of moderately deep, well and moderately drained loam and silt loam soils underlain by loose sand and gravel or dolomite bedrock. These soils are moderately permeable, have a fair available moisture capacity, and are slightly drouthy.

Capability Unit IIs-7. This unit consists of deep, well and moderately well drained sandy loam, loam and silt loam soils with clayey subsoils, substrata, or both. They have moderately slow to slow permeability and high available moisture capacity. Clayey subsoils or substrata restrict deep root growth.

Subclass IIw. These are soils that have a slight limitation because of excess water.

Capability Unit IIw-1. This unit consists of deep, poorly and very poorly drained, nearly level to sloping loam to silty clay loam soils. These soils are moderately to slowly permeable and have a high available moisture capacity. These soils can be used for cultivated crops when adequately drained and are suitable for surface drainage, tile drainage, or both.

Capability Unit IIw-2. This unit consists of deep, somewhat poorly drained, nearly level and gently sloping loam and silt loam soils. These soils are moderate to slowly permeable and have a high available moisture capacity. These soils can be used for cultivated crops when adequately drained and are suitable for surface drainage, tile drainage, or both.

Capability Unit IIw-3. This unit consists of moderately deep, somewhat poorly drained, nearly level and gently sloping silt loam soils underlain by dolomite bedrock at 24 to 40 inches. These soils are moderately permeable and have a good available moisture capacity and can be used for cultivated crops when adequately drained. Where soils are less than 3 feet to bedrock they are not suitable for tile drainage.

Capability Unit IIw-5. This unit consists of moderately deep, somewhat poorly to poorly drained, nearly level and sloping sandy loam, loam and silt loam soils underlain by loose sands and gravel or silt and fine sand. These soils are moderately permeable and have a high available moisture capacity. These soils can be used for cultivated crops when adequately drained. They are not suitable for tile drainage, but open-ditch and surface drainage can be used.

Capability Unit IIw-8. This unit consists of moderately deep, poorly drained, nearly level and gently sloping, well disintegrated peat and muck overlying loam. These soils can be used for cultivated crops when adequately drained and are suitable for open-ditch or tile drainage.

Capability Unit IIw-11. This unit consists of deep, well to moderately well drained and gently sloping silt loam alluvial soils on stream flood plains. These soils are subject to occasional overflow and are moderately permeable and have a high available moisture capacity. These soils can be used for cultivated crops when protected from flooding.

Capability Unit IIw-13. This unit consists of deep, somewhat poorly drained, nearly level to sloping silt loam alluvial soils on stream flood plains. These soils are subject to overflow, seepage, and high water table, are moderately permeable and have a high available moisture capacity. These soils can be used for cultivated crops when adequately drained and protected from flooding. They are not suitable for tile drainage, but

open-ditch and surface drainage can be used.

CLASS III-These are soils that have moderate limitations that restrict the choice of plants or require special conservation practices or both.

Subclass IIIe. These are soils that have a moderate erosion hazard.

Capability Unit IIIe-1. This unit consists of deep, well and moderately well drained, sloping soils that are moderately permeable and have a good available moisture capacity. Erosion control practices are needed where cultivated crops are grown.

Capability Unit IIIe-2. This unit consists of moderately deep, well and moderately well drained, sloping loam and silt loam soils overlying loose sand and gravel or dolomite bedrock. These soils are moderately permeable and have a good available moisture capacity. Erosion control practices are needed where cultivated crops are grown.

Capability Unit IIIe-4. This unit consists of shallow to moderately deep, excessively drained, gently sloping sandy loam and loam soils underlain by loose sand and gravel or sandy glacial drift. These soils have moderate to moderately rapid permeability and a low available moisture capacity. Erosion control practices are needed where cultivated crops are grown.



This soil has a moderate erosion hazard but gully erosion has destroyed its usefulness for cultivated crops.

Capability Unit IIIe-5. This unit consists of deep, well to moderately well drained, sloping alluvium over poorly drained soils. These soils occur in depressional areas and waterways that are subject to occasional overflow.

Capability Unit IIIe-6. This unit consists of deep, well drained, sloping loam and silt loam soils with clayey subsoils and substrata. These soils have moderately slow to slow permeability and a high available moisture capacity. Erosion control practices are needed where cultivated crops are grown.

Capability Unit IIIe-7. This unit consists of moderately deep, well drained and somewhat excessively drained, sloping, sandy loam soils underlain by loose sand and gravel, loam or clay. These soils are moderately permeable and have a fair to low available moisture capacity. Erosion control practices are needed where cultivated crops are grown.

Capability Unit IIIe-8. This unit consists of deep, somewhat poorly drained, sloping soils that are moderately to slowly permeable and have a high available moisture capacity. These soils occur as seepage areas and are not easily drained. Erosion control practices are needed where cultivated crops are grown and drainage is beneficial.

Subclass IIIs. These are soils that have a moderate drouth hazard or a shallow rooting zone that limits choice of plants.

Capability Unit IIIs-2. This unit consists of shallow to moderately deep, well to somewhat excessively drained, nearly level loam and sandy loam soils overlying sandy drift or loose sand and gravel. These soils have moderately rapid permeability and a low available moisture capacity as well as a slight wind erosion hazard and moderate drouth hazard. Moisture-conserving practices are needed where cultivated crops are grown.

Capability Unit IIIs-4. This unit consists of moderately deep, somewhat excessively drained, nearly level to gently sloping sandy loam soils underlain mainly by loose sand and gravel. Tustin loamy fine sand underlain by stratified silt, silty clay, and fine sand is included in this group. These soils have a moderately rapid permeability, a low available moisture capacity, and are subject to a slight wind erosion hazard as well as a moderate drouth hazard. Moisture-conserving practices are needed where cultivated crops are grown.

Capability Unit IIIs-8. This unit consists of shallow, well and moderately well drained, nearly level silt loam soils overlying dolomite bedrock.

These soils have a low available moisture capacity and a moderate drouth hazard. Moisture-conserving practices are needed where cultivated crops are grown. These soils also have moderate limitations for deep rooted crops.

Subclass IIIw. These are soils that have moderate limitations because of excess water.

Capability Unit IIIw-1. This unit consists of deep, poorly drained, nearly level to gently sloping silty clay loam soils. These soils are slowly permeable and have a high available moisture capacity. These soils have a high water table most of the year and are subject to surface-water accumulation. However, they can be used for cultivated crops when adequately drained.

Capability Unit IIIw-3. This unit consists of moderately deep to deep, somewhat poorly to poorly drained, nearly level to gently sloping soils that are moderately permeable and have a good available moisture capacity. These soils can be used for cultivated crops when adequately drained. Although they are not suited for tile drainage or open-ditch drainage, surface drainage can be used.

Capability Unit IIIw-5. This unit consists of somewhat poorly and poorly drained, nearly level to sloping, moderately deep loamy and deep sandy soils underlain by loose sand and gravel. These soils have a moderate available moisture capacity. These soils have a high water table and are subject to frequent overflow. They can be used for cultivated crops when adequately drained.

Capability Unit IIIw-6. This unit consists of deep, somewhat poorly drained, nearly level to sloping sandy loam and loamy sand soils underlain by clayey materials. These soils are rapidly permeable in the upper part and slowly permeable in lower part. These soils have a fair available moisture capacity, a seasonal high water table, and are subject to occasional overflow. These soils have a moderate wetness hazard. They can be used for cultivated crops when adequately drained.

Capability Unit IIIw-8. This unit consists of moderately deep, poorly drained, nearly level and gently sloping muck and peat soils overlying clayey material. These soils have a good available moisture capacity, a high water table, and are subject to accumulation of surface water. Cultivated crops can be grown where the soils are adequately drained.

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Capability Unit IIIw-9. This unit consists of deep, poorly drained, nearly level to moderately steep peat and muck soils. These soils have a high available moisture capacity, a high water table, and are subject to surface accumulation of water. Cultivated crops can be grown where the soils are adequately drained.

CLASS IV- These are soils that have severe limitations that restrict the choice of crops and require very careful management.

Subclass IVe. These are soils that have a severe erosion hazard.

Capability Unit IVe-1. This unit consists of deep, well drained, moderately steep soils that are moderately permeable and have a good available moisture capacity. Cultivated crops can be grown occasionally where both agronomic and erosion control practices are used.

Capability Unit IVe-2. This unit consists of moderately deep, well drained, moderately steep loam and silt loam soils underlain by loose sand and gravel or bedrock. These soils are moderately permeable and have a fair available moisture capacity. Cultivated crops can be grown occasionally where erosion control practices are used.

Capability Unit IVe-3. This unit consists of shallow, well drained, sloping silt loam soils underlain by dolomite bedrock at 12 to 24 inches. These soils have a low available moisture capacity and are drouthy. Cultivated crops can be grown occasionally where erosion control and moisture-conserving practices are used. The bedrock outcrops hinder tillage operations in some places.

Capability Unit IVe-4. This unit consists of shallow to moderately deep, excessively drained, sloping sandy loam, loam, and silt loam soils underlain by loose sand and gravel or sandy drift. These soils have moderate to moderately rapid permeability, a low available moisture capacity, and are very drouthy. Cultivated crops can be grown occasionally where moisture-conserving and erosion control practices are installed.

Capability Unit IVe-6. Soils consist of deep, well drained, moderately steep loam and silt loam soils with clayey subsoils and substrata. These soils have moderately slow to slow permeability and a high available moisture capacity. Cultivated crops can be

grown occasionally where erosion control practices are used.

Capability Unit IVe-7. This unit consists of moderately deep, excessively drained, moderately steep sandy loam soils underlain by loose sand and gravel. These soils are moderately permeable and have a low available moisture capacity. These soils have very severe limitations for cultivated crops.

Capability Unit IVe-8. This unit consists of deep, somewhat poorly drained, moderately steep soils that are moderately to slowly permeable and have a high available moisture capacity. These soils occur as seepage areas and are not easily drained. These soils have a severe water erosion hazard. Generally areas consisting of these soils are not cultivated, but are more productive for wildlife or pasture.

Capability Unit IVe-9. This unit consists of moderately deep to deep, excessively drained, sloping sandy soils with sandy subsoil and substratum. These soils have rapid permeability, a low available moisture capacity, are drouthy and subject to severe wind and water erosion hazard. Cultivated crops can be grown occasionally where erosion control and moisture-conserving practices are used.

Subclass IVs. These are soils that have a severe limitation because of low available moisture capacity.

Capability Unit IVs-3. This unit consists of moderately deep to deep, excessively to moderately well drained, nearly level and gently sloping sandy loam and loamy sand soils with sandy subsoils and substrata. These soils are rapidly permeable, have a low available moisture capacity, and are subject to wind erosion and a severe drouth hazard. Cultivated crops can be grown occasionally where moisture-conserving and erosion control practices are installed.

Subclass IVw. This unit consists of soils that have a severe limitation because of excess water.

Capability Unit IVw-5. This unit consists of deep, poorly and somewhat poorly drained, nearly level to gently sloping sandy loam and loamy sand soils with sandy subsoils and substrata. These soils have a high water table and are subject to surface water accumulation. These soils are rapidly permeable, have a low available moisture capacity,

and are subject to wind erosion where drained. Cultivated crops can be grown where soils are adequately drained and protected from wind erosion.

Capability Unit IVw-7. This unit consists of moderately deep, poorly drained, nearly level to sloping peat and muck soils overlying marl or loose sand. These soils have a high water table, are frequently flooded and are subject to wind erosion where drained. These soils can be used occasionally for cultivated crops when adequately drained and protected from wind erosion.

CLASS V—These are soils that have little or no erosion hazard but have other limitations impractical to remove without major reclamation. Their use is limited to wildlife, pasture, or woodland.

Subclass Vw. These are poorly drained soils that are very difficult to drain or in which drainage is not feasible.

Capability Unit Vw-7. This unit consists of shallow, poorly drained, nearly level to sloping peat and muck soils underlain by marl. These soils have a high water table almost continuously and are frequently flooded. These soils are used mainly for wildlife areas and woodland.

Capability Unit Vw-14. This unit consists of deep, poorly drained, nearly level to gently sloping alluvial soils on flood plains. These soils have a high water table almost continuously and are frequently flooded. Drainage is not feasible for these soils and flood protection is very difficult. These soils are used mainly for pasture, woodland, or wildlife areas.

CLASS VI—These are soils with very severe limitations for cultivation that limit their use mainly to pasture, woodland, or wildlife areas.

Subclass VIe. These are soils that are limited in use by severe or very severe erosion hazards.

Capability Unit VIe-1. This unit consists of deep, well drained, moderately steep and steep loam and silt loam soils. These soils are moderately permeable, have a good available moisture capacity. These soils are too steep to use for cultivated crops and have a very severe water erosion hazard. Most of these soils are used as pasture or woodland.

Capability Unit VIe-2. This unit consists of moderately deep, well drained, moderately steep and steep silt loam soils underlain by loose sand and gravel. These soils are moderately permeable, have a fair available moisture capacity, and have a very severe water erosion hazard. These soils are not suited to cultivated crops and most of them are used for pasture or woodland.

Capability Unit VIe-3. This unit consists of shallow, well drained, moderately steep silt loam soils underlain by dolomite bedrock at 12 to 24 inches. These soils have a low available moisture capacity, are drouthy, contain many bedrock outcrops, and have a severe water erosion hazard. These soils are not suitable for cultivated crops and are used mainly for pasture, woodland, or wildlife areas.

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Capability Unit VIe-4. This unit consists of shallow to moderately deep, excessively drained, sloping and moderately steep sandy loam to silt loam soils underlain by loose sand and gravel or sandy drift. These soils have a low available moisture capacity, are drouthy, and are subject to a very severe water erosion hazard. These soils are not suited for cultivated crops and are used mainly for pasture, woodland, or wildlife areas.

Capability Unit VIe-6. This unit consists of deep, well drained, steep silt loam soils with clayey subsoils and substrata. These soils have a high available moisture capacity. These soils are not suited for cultivated crops and are used mainly for pasture, woodland, or wildlife areas.

Capability Unit VIe-7. This unit consists of moderately deep, well and somewhat excessively drained, steep sandy loam soils underlain by loose sand and gravel, loams, or clay. These soils are moderately permeable, have a fair to low available moisture capacity and have a very severe water erosion hazard. These soils are not suited for cultivated crops and are used mainly for pasture, woodland, or wildlife areas.

Capability Unit VIe-9. This unit consists of moderately deep to deep, excessively drained, moderately steep sandy soils with sandy subsoils and substrata. These soils have rapid permeability, a low available moisture capacity, are drouthy, and have a severe wind and water erosion hazard. These soils are not suited for cultivated

crops and are used for pasture, woodland, and wildlife areas.

Subclass VIIs. These are soils with severe limitations for cultivation. These soils have low available moisture capacity, excess stones, or both.

Capability Unit VIIs-5. This unit consists of shallow, excessively drained, nearly level to moderately steep loam and silt loam soils. These soils are very drouthy and have a severe water erosion hazard. These soils are not suited for cultivated crops, but are used as woodland, pasture or wildlife areas.

Capability Unit VIIs-6. This unit consists of excessively drained, gently sloping to sloping stony land forms. These soils have a low available moisture capacity and have a very severe drouth and stoniness hazard. These soils are not suited for cultivated crops, but are used mainly for pasture, woodland, or wildlife areas.

CLASS VII- These are soils with very severe limitations for cultivation. They are used for pasture, woodland, or wildlife areas.

Subclass VIIe. These are soils with very severe erosion hazards.

Capability Unit VIIe-1. This unit consists of deep, well drained, steep and very steep loam and silt loam soils. These soils are moderately permeable and have a good available moisture capacity but are too steep for cultivated crops. These soils have a very severe water erosion hazard and most of the soils are used as pasture or woodland.

Capability Unit VIIe-4. This unit consists of shallow, excessively drained, steep and very steep loam and silt loam soils underlain by loose sand and gravel or sandy glacial drift. These soils are very drouthy and have a very severe water erosion hazard. These soils are not suitable for cultivated crops but are used mainly for pasture, woodland, or wildlife areas.

Capability Unit VIIe-6. This unit consists of deep, well drained, steep silt loam and silty clay loam soils with clayey subsoils and substrata. These soils have a high available moisture capacity and have very severe water erosion hazard. These soils are not suited for cultivated crops and are used mainly for pasture, woodland, or wildlife areas.

Capability Unit VIIe-7. This unit consists of moderately deep, well and somewhat excessively drained, very steep sandy loam soils underlain by loose sand and gravel or silt and fine sand. These soils have a moderate to moderately rapid permeability, a low available moisture capacity, and a very severe water erosion hazard. These soils are not suited for cultivated crops and are used mainly for pasture, woodland, or wildlife areas.

Capability Unit VIIe-9. This unit consists of moderately deep to deep, excessively drained, steep sandy soils with sandy subsoils and underlying material. These soils have rapid permeability, a low available moisture capacity, are drouthy, and have a very severe wind and water erosion hazard. These soils are not suited for cultivated crops and are used for pasture, woodland, and wildlife areas.

Subclass VIIIs. These soils are very severely limited in use by low moisture capacity and excessive stones.

Capability Unit VIIIs-5. This unit consists of shallow, stony, excessively drained, steep and very steep loam soils. These soils are very drouthy, have a very severe water erosion hazard and there are many stones on the surface and in the soil profile. These soils are not suited for cultivated crops and are used as woodland, pasture, or wildlife areas.

CLASS VIII- These are land types with very severe limitations for commercial production of plants. The land is used mainly for recreation or wildlife.

Subclass VIIIs. This is land with very low available moisture capacity and a very severe water erosion hazard.

Capability Unit VIIIs-10. This unit consists of infertile clay and sand deposits that are very drouthy and subject to a very severe water erosion hazard. The land seldom produces any harvestable vegetation and is used mainly for recreation or wildlife.

Subclass VIIIs. This is extremely wet, marshy land that cannot be feasibly reclaimed by drainage.

Capability Unit VIIIs-10. This unit consists of deep, poorly drained, nearly level peat areas that have a sphagnum moss surface. These areas are extremely acid and

not suited to cropland but can be used for wildlife areas.

Capability Unit VIIIw-15. This unit consists of marshland that is flooded almost continuously and is generally not suited to drainage because of location. Use is restricted to wildlife habitat.

CROP YIELDS ESTIMATES

The potential yield estimates set forth in Table 9 for the various soils are based on experimental plots, farm production records and observations over long periods of time. The use of long-term yield averages for this purpose compensates for the effects of annual variation in temperature and rainfall. In general, crop yields for soils within each soil series varies inversely with the slope gradient and the degree of erosion, provided management is similar.

Yield estimates listed in Table 9 apply to the most common slope, erosion and depth phase of each soil. For example, crop yields given for soil number 360 are the estimated yields for Hochheim silt loam, 2 to 6 percent slopes, moderately eroded and are considered representative of Hochheim silt loam. Slightly higher yields can be expected from Hochheim silt loam, 0 to 2 percent slopes. Yields on steeper and more eroded phases of this soil are about 10 to 20 percent lower.

Yields are given for average and high levels of management. High level management is defined as the best management possible with existing agricultural knowledge, technology, equipment and plant varieties. Yields with supplemental irrigation are not included in the data. High level management includes:

(1) The use of lime and fertilizer accord-

ing to soil test, soil type, cropping history, and crop to be grown.

(2) Adequate surface drainage, internal drainage, or both, and flood protection where needed and practical.

(3) Use of timely and adequate seedbed preparation and correct planting methods.

(4) Use of timely and careful harvesting methods.

(5) Installation and maintenance of needed erosion control practices.

(6) Adequate weed and insect control.

General conditions under average management are:

(1) Soils are limed and fertilized but amounts are inadequate.

(2) Drainage systems are installed but are not adequate for soil and crop needs.

(3) Weed and insect control permits competition and damage to cultivated crops.

(4) Seedbed preparation is sometimes inadequate or is carried out when soil is too wet or too dry.

(5) Erosion control measures are installed but are not properly maintained or are not adequate.

Returns from renovated pastures are approximately the same as for alfalfa-brome hay for each soil listed. The greatest yields will be obtained from green feeding.

Crop yields are given only for soils in Capability Classes I, II, III, and IV.

TABLE 9.
ESTIMATED CROP YIELDS

Soil Number and Soil Name ^{1/}	Corn				Oats		Alfalfa-Brome	
	Grain-Bushels Per Acre		Silage Tons Per Acre		Grain-Bushels Per Acre		Hay-Tons Per Acre ^{3/}	
	High	Average	High	Average	High ^{2/}	Average	High	Average
2 Stinson silt loam	95	60	16	12	65	45	4.0	2.0
5 Same as No. 54, Lawson silt loam								
5W Sawmill silt loam ^{4/}	110	5/	18	5/	5/	5/	5/	5/
7 Dorchester silt loam ^{4/}	110	80	18	13	70	50	4.5	3.5
7W Same as No. 54, Lawson silt loam								
12 Wea silt loam	125	85	19	14	75	60	4.5	3.0
16 Rome silt loam	105	80	17	13	70	55	4.5	3.0
18 Same as No. 266, Sisson silt loam								
18Y Sisson silt loam, loam substratum	95	70	16	12	70	50	4.5	3.0
19 Same as No. 267, Sisson fine sandy loam								
21 Hebron loam	110	80	17	12	70	55	4.5	3.0
21Y Hebron loam, loam substratum	110	80	17	12	70	55	4.5	3.0
22 Hebron sandy loam	100	75	17	12	60	45	4.0	3.0
23 Same as No. 54, Lawson silt loam								
24 Hebron silt loam	110	80	17	12	70	55	4.5	3.0
26 Wauconda fine sandy loam	95	70	16	12	65	45	4.0	3.0
27 Wauconda silt loam	100	70	17	12	65	45	4.5	3.0
27Z Wauconda silt loam, clay substratum	100	70	17	12	65	45	4.5	3.0
28 Colwood fine sandy loam	90	65	16	12	60	45	4.0	5/
28Z Colwood fine sandy loam, clay substratum	90	65	16	12	60	45	4.0	5/
29 Colwood silt loam	95	65	16	12	60	45	4.0	5/
29V Same as No. 29, Colwood silt loam								
29X Colwood silt loam, gravelly substratum	95	65	16	12	60	45	4.0	5/
29Z Same as No. 340, Navan silt loam								
31 Rome loam	105	80	17	13	70	55	4.5	3.0
32 Rome sandy loam	100	75	17	12	65	50	4.5	3.0

^{1/} Soils with very severe limitations and hazards for growing corn, oats, or alfalfa-brome hay or soils on which yields are highly variable are not listed in this table.

^{2/} Yields are for oats overseeded with a legume-grass mixture.

^{3/} Average annual yields (dry weight) of first and second year hay after adequate stands have been established.

^{4/} The soil has been protected from stream overflow.

^{5/} These crops are seldom grown or are not suitable for growth on this soil.

TABLE 9.
ESTIMATED CROP YIELDS (Continued)

Soil Number and Soil Name ^{1/}	Corn				Oats		Alfalfa-Brome	
	Grain-Bushels Per Acre		Silage Tons Per Acre		Grain-Bushels Per Acre		Hay- Tons Per Acre ^{3/}	
	High	Average	High	Average	High ^{2/}	Average	High	Average
33 Same as No. 267, Sisson fine sandy loam								
33Z Sisson fine sandy loam, clay substratum	85	65	14	11	65	50	4.0	3.0
34 Same as No. 266, Sisson silt loam								
35 Same as No. 45, Yahara very fine sandy loam								
35Z Same as No. 45Z, Yahara very fine sandy loam, clay substratum								
36 Same as No. 46, Yahara silt loam								
37 Kibbie fine sandy loam	95	70	16	12	65	45	4.0	3.0
37Z Kibbie fine sandy loam, clay substratum	95	70	16	12	65	45	4.0	3.0
38 Kibbie silt loam	100	75	17	12	65	45	4.0	3.0
38R Kibbie silt loam, rock substratum	100	75	17	12	65	45	4.0	3.0
38Z Kibbie silt loam, clay substratum	100	75	17	12	65	45	4.0	3.0
39 Saylesville loam	85	65	14	12	70	50	4.5	3.0
39Z Same as No. 72, Fox silt loam								
40 Saylesville silt loam	85	65	14	12	70	50	4.5	3.0
40V Saylesville silt loam, silt and fine sand substratum	85	65	14	12	70	50	4.5	3.0
40X Saylesville silt loam, gravelly substratum	85	65	14	12	70	50	4.5	3.0
40Y Saylesville silt loam, loam substratum	85	65	14	12	70	50	4.5	3.0
41 Same as No. 42, Tichigan silt loam								
42 Tichigan silt loam	100	65	17	11	65	50	4.0	2.5
42R Tichigan silt loam, rock substratum	100	65	17	11	65	50	4.0	2.5
42V Tichigan silt loam, silt and fine sand substratum	100	65	17	11	65	50	4.0	2.5
42X Tichigan silt loam, gravelly substratum	100	65	17	11	65	50	4.0	2.5
42Y Tichigan silt loam, loam substratum	100	65	17	11	65	50	4.0	2.5
44 Jericho silt loam	105	80	17	13	70	55	4.5	3.0
45 Yahara very fine sandy loam	95	65	16	11	65	45	4.0	2.5
45Z Yahara very fine sandy loam, clay substratum	95	65	16	11	65	45	4.0	2.5
46 Yahara silt loam	95	65	16	11	65	45	4.0	2.5
47 Yahara loam	95	65	16	11	65	45	4.0	2.5

TABLE 9.
ESTIMATED CROP YIELDS (Continued)

Soil Number and Soil Name ^{1/}	Corn				Oats		Alfalfa-Brome	
	Grain-Bushels Per Acre		Silage Tons Per Acre		Grain-Bushels Per Acre		Hay-Tons Per Acre ^{3/}	
	High	Average	High	Average	High ^{2/}	Average	High	Average
47Z Yahara loam, clay substratum	95	65	16	11	65	45	4.0	2.5
48 Keowns silt loam	95	65	16	12	60	45	3.5	5/
48Z Keowns silt loam, clay substratum	95	65	16	12	60	45	3.5	5/
49 Keowns fine sandy loam	90	60	15	10	60	45	3.5	5/
49Y Keowns fine sandy loam, loam substratum	90	60	15	10	60	45	3.5	5/
51 Aztalan loam	105	65	17	11	60	50	4.5	2.5
52 Aztalan sandy loam	105	65	17	11	60	50	4.5	2.5
53 Aztalan silt loam	110	65	18	11	60	50	4.5	2.5
54 Lawson silt loam	110	70	18	12	65	45	4.0	2.0
59 Dousman sandy loam	85	60	14	11	50	40	3.0	2.0
59Z Dousman sandy loam, clay substratum	85	60	14	11	50	40	3.0	2.0
60 Dousman loam	90	60	15	11	50	40	3.0	2.0
60Z Dousman loam, clay substratum	90	60	15	11	50	40	3.0	2.0
63 Same as No. 231, Brookston silt loam								
64 Same as No. 231, Brookston silt loam								
66 Same as No. 386, Granby fine sandy loam								
67 Same as No. 386, Granby fine sandy loam								
69 Casco-Fox silt loams - Casco part - Same as No. 173, Casco silt loam - Fox part - Same as No. 73, Fox silt loam								
70 Fox sandy loam	70	50	12	8	55	40	2.5	2.0
70V Fox sandy loam, silt and fine sand substratum	70	50	12	8	55	40	2.5	2.0
70Y Fox sandy loam, loam substratum	70	50	12	8	55	40	2.5	2.0
70Z Fox sandy loam, clay substratum	70	50	12	8	55	40	2.5	2.0
71 Casco-Fox loams - Casco part - Same as No. 172, Casco loam - Fox part - Same as No. 72, Fox loam								
72 Fox loam	80	50	13	9	60	45	3.0	2.5
72R Fox loam, rock substratum	80	50	13	9	60	45	3.0	2.5
72V Fox loam, silt and fine sand substratum	80	50	13	9	60	45	3.0	2.5
72Y Fox loam, loam substratum	80	50	13	9	60	45	3.0	2.5
72Z Fox loam, clay substratum	80	50	13	9	60	45	3.0	2.5
73 Fox silt loam	85	60	14	10	65	50	3.5	2.5

TABLE 9.
ESTIMATED CROP YIELDS (Continued)

Soil Number and Soil Name ^{1/}	Corn				Oats		Alfalfa-Brome	
	Grain-Bushels Per Acre		Silage Tons Per Acre		Grain-Bushels Per Acre		Hay- Tons Per Acre ^{3/}	
	High	Average	High	Average	High ^{2/}	Average	High	Average
73R Fox silt loam, rock substratum	85	60	14	10	65	50	3.5	2.5
73Y Fox silt loam, loam substratum	85	60	14	10	65	50	3.5	2.5
73Z Fox silt loam, clay substratum	85	60	14	10	65	50	3.5	2.5
76 Sebewa silt loam	90	65	15	11	65	45	4.0	<u>5/</u>
76R Sebewa silt loam, rock substratum	90	65	15	11	65	45	4.0	<u>5/</u>
76V Sebewa silt loam, silt and fine sand substratum	90	65	15	11	65	45	4.0	<u>5/</u>
76Y Sebewa silt loam, loam substratum	90	65	15	11	65	45	4.0	<u>5/</u>
76Z Sebewa silt loam, clay substratum	90	65	15	11	65	45	4.0	<u>5/</u>
77 Dousman sandy loam	80	60	13	10	60	40	3.0	2.0
77Z Dousman sandy loam, clay sub- stratum	80	60	13	10	60	40	3.0	2.0
78 Same as No. 59, Dousman sandy loam								
78V Dousman loam, silt and fine sand	80	60	13	10	60	40	3.0	2.0
79 Waukechon loam	90	65	15	11	65	40	3.0	<u>5/</u>
80 Sebewa loam	90	65	15	11	65	45	4.0	<u>5/</u>
80V Sebewa loam, silt and fine sand substratum	90	65	15	11	65	45	4.0	<u>5/</u>
80Y Sebewa loam, loam substratum	90	65	15	11	65	45	4.0	<u>5/</u>
80Z Sebewa loam, clay substratum	90	65	15	11	65	45	4.0	<u>5/</u>
81 Sebewa sandy loam	80	60	13	11	60	40	3.0	<u>5/</u>
82 Juneau silt loam ^{4/}	105	75	17	12	70	55	4.5	3.5
84 Ockley silt loam	115	80	18	12	75	60	4.5	3.0
84R Same as No. 208, Knowles silt loam								
84V Same as No. 266, Sisson silt loam								
84Z Ockley silt loam, clay substratum	115	80	18	12	75	60	4.5	3.0
86 Thackery silt loam	115	80	18	12	75	60	4.5	3.0
86V Same as No. 266, Sisson silt loam								
87 Sleeth silt loam	115	80	18	12	70	55	4.5	3.0
87Z Same as No. 371, Mosel loam								
89 Briggsville silty clay loam	100	60	16	10	85	55	4.0	2.5
91 Parr silt loam	100	80	17	13	70	55	4.5	3.0
91D Same as No. 91, Parr silt loam								
92 Parr loam	100	80	17	13	70	55	4.5	3.0

TABLE 9.
ESTIMATED CROP YIELDS (Continued)

Soil Number and Soil Name ^{1/}	Corn				Oats		Alfalfa-Brome	
	Grain-Bushels Per Acre		Silage Tons Per Acre		Grain-Bushels Per Acre		Hay-Tons Per Acre ^{3/}	
	High	Average	High	Average	High ^{2/}	Average	High	Average
92N Same as No. 92, Parr loam								
97 Same as No. 288, Hackett loamy sand								
99 Kewaunee soils	75	50	12	8	65	40	3.0	2.0
100 Kewaunee silt loam	100	60	16	10	85	55	4.0	2.5
101 Kewaunee sandy loam	95	55	15	9	75	45	4.0	2.5
102 Vilas loamy sand	5/	5/	5/	5/	35	25	2.0	1.0
103 Kewaunee loam	95	55	15	9	75	45	4.0	2.5
106 Lorenzo silt loam	75	50	12	8	55	40	2.5	1.5
106Z Lorenzo silt loam, clay substratum	75	50	12	8	55	40	2.5	1.5
108 Lorenzo-Rodman loams - Lorenzo part - Same as No. 110, Lorenzo loam - Rodman part - No yield given								
109 Same as No. 174, Fabius loam								
109V Fabius silt loam, silt and fine sand substratum	80	55	14	9	55	40	3.0	2.0
109Y Same as No. 203Z, Matherton loam, clay substratum								
109Z Same as No. 174Z, Fabius loam, clay substratum								
110 Lorenzo loam	75	50	12	8	55	40	2.5	1.5
110R Same as No. 208, Knowles silt loam								
110Y Lorenzo loam, loam substratum	75	50	12	8	55	40	2.5	1.5
110Z Lorenzo loam, clay substratum	75	50	12	8	55	40	2.5	1.5
111 Same as No. 161, Dodge silt loam								
112 Same as No. 243, Calamus silt loam								
113 Same as No. 278, Clyman silt loam								
114 Same as No. 361, Miami silt loam								
116 Same as No. 343, Celina silt loam								
118 Same as No. 178, Crosby silt loam								
119 Warsaw silt loam	90	65	15	11	65	50	3.5	2.5
119V Warsaw silt loam, silt and fine sand substratum	90	65	15	11	65	50	3.5	2.5
119Y Warsaw silt loam, loam substratum	90	65	15	11	65	50	3.5	2.5
119Z Warsaw silt loam, clay substratum	90	65	15	11	65	50	3.5	2.5
120 Warsaw loam	90	65	15	11	65	50	3.5	2.5
120Y Warsaw loam, loam substratum	90	65	15	11	65	50	3.5	2.5
120Z Warsaw loam, clay substratum	90	65	15	11	65	50	3.5	2.5

TABLE 9.
ESTIMATED CROP YIELDS (Continued)

Soil Number and Soil Name ^{1/}	Corn				Oats		Alfalfa-Brome	
	Grain-Bushels Per Acre		Silage Tons Per Acre		Grain-Bushels Per Acre		Hay-Tons Per Acre ^{3/}	
	High	Average	High	Average	High ^{2/}	Average	High	Average
121 Same as No. 110, Lorenzo loam								
122 Same as No. 110, Lorenzo loam								
123 Tippecanoe silt loam	125	85	19	14	75	60	4.5	3.0
123V Same as No. 266, Sisson silt loam								
123Z Same as No. 24, Hebron silt loam								
124 Crane silt loam	125	85	19	14	70	55	4.0	3.0
125 Knowles silt loam, shallow variant	5/	5/	5/	5/	45	35	2.0	1.5
126 Westland silt loam	110	70	18	12	65	45	4.0	5/
126V Same as No. 29, Colwood silt loam								
126Y Westland silt loam, loam substra- tum	110	70	18	12	65	45	4.0	5/
126Z Westland silt loam, clay substra- tum	110	70	18	12	65	45	4.0	5/
133 Spinks fine sand	50	40	8	7	40	30	2.0	1.0
134 Spinks loamy fine sand	55	40	9	7	40	30	2.0	1.0
142 Manawa silt loam	90	60	15	10	75	50	4.0	2.5
144 Same as No. 203Z, Matherton loam, clay substratum								
152 Lapeer loam, shallow variant	70	55	12	9	50	40	2.5	2.0
153 Lapeer loam	80	60	13	10	60	45	3.0	2.0
154 Same as No. 155, McHenry silt loam								
155 McHenry silt loam	90	65	15	11	65	50	3.5	2.5
155Z McHenry silt loam, clay substratum	90	65	15	11	65	50	3.5	2.5
156 Lapeer sandy loam	75	55	12	9	50	40	2.5	2.0
157 Same as No. 156, Lapeer sandy loam								
160 Hochheim-Sisson-Casco loams	Hochheim part - Same as No. 357, Hochheim loam Casco part - Same as No. 172, Casco loam Sisson part - Same as No. 268, Sisson loam							
161 Dodge silt loam	110	80	17	13	75	60	4.5	3.0
161R Same as No. 208, Knowles silt loam								
165 Poygan silt loam	105	65	16	11	70	50	4.0	5/
170 Casco sandy loam	65	50	11	8	45	30	2.5	1.5
170V Casco sandy loam, silt and fine sand substratum	65	50	11	8	45	30	2.5	1.5
170Y Casco sandy loam, loam substra- tum	65	50	11	8	45	30	2.5	1.5

TABLE 9.
ESTIMATED CROP YIELDS (Continued)

Soil Number and Soil Name ^{1/}	Corn				Oats		Alfalfa-Brome	
	Grain-Bushels Per Acre		Silage Tons Per Acre		Grain-Bushels Per Acre		Hay-Tons Per Acre ^{3/}	
	High	Average	High	Average	High ^{2/}	Average	High	Average
170Z Casco sandy loam, clay substratum	65	50	11	8	45	30	2.5	1.5
171 Poygan silty clay loam	90	65	15	11	65	50	4.0	5/
172 Casco loam	70	50	12	8	55	40	2.5	1.5
172R Casco loam, rock substratum	70	50	12	8	55	40	2.5	1.5
172V Casco loam, silt and fine sand substratum	70	50	12	8	55	40	2.5	1.5
172Y Casco loam, loam substratum	70	50	12	8	55	40	2.5	1.5
172Z Casco loam, clay substratum	70	50	12	8	55	40	2.5	1.5
173 Casco silt loam	75	50	12	7	55	40	2.5	1.5
173V Casco silt loam, silt and fine sand substratum	75	50	12	7	55	40	2.5	1.5
173Y Casco silt loam, loam substratum	75	50	12	7	55	40	2.5	1.5
173Z Casco silt loam, clay substratum	75	50	12	7	55	40	2.5	1.5
174 Fabius loam	80	55	13	9	55	40	3.0	2.0
174R Fabius loam, rock substratum	80	55	13	9	55	40	3.0	2.0
174Z Fabius loam, clay substratum	80	55	13	9	55	40	3.0	2.0
175 Fabius sandy loam	70	50	12	8	55	40	2.5	1.5
175Z Fabius sandy loam, clay substra- tum	70	50	12	8	55	40	2.5	1.5
176 Mussey loam	80	55	13	9	55	40	2.5	5/
176V Same as No. 176, Mussey loam								
176Z Mussey loam, clay substratum	80	55	13	9	55	40	2.5	5/
178 Crosby silt loam	110	75	17	12	65	55	4.0	2.5
180 Mussey sandy loam	75	50	12	7	55	40	2.5	5/
181 Mussey silt loam	80	55	13	9	55	40	2.5	5/
181V Mussey silt loam, silt and find sand substratum	80	55	13	9	55	40	2.5	5/
181Y Mussey silt loam, loam substratum	80	55	13	9	55	40	2.5	5/
181Z Mussey silt loam, clay substratum	80	55	13	9	55	40	2.5	5/
182 Fabius silt loam	80	55	13	9	55	40	3.0	2.0
182V Fabius silt loam, silt and fine sand substratum	80	55	13	9	55	40	3.0	2.0
182Y Fabius silt loam, loam substratum	80	55	13	9	55	40	3.0	2.0
182Z Fabius silt loam, clay substratum	80	55	13	9	55	40	3.0	2.0
188 Same as No. 178, Crosby silt loam								
189 Bristol silt loam	120	85	19	14	65	55	4.5	2.5

TABLE 9.
ESTIMATED CROP YIELDS (Continued)

Soil Number and Soil Name ^{1/}		Corn				Oats		Alfalfa-Brome Hay-Tons	
		Grain-Bushels Per Acre		Silage Tons Per Acre		Grain-Bushels Per Acre		Per Acre ^{3/}	
		High	Average	High	Average	High ^{2/}	Average	High	Average
191	Parr silt loam, shallow variant	90	70	15	12	60	50	3.5	2.5
195	Same as No. 288, Hackett loamy sand								
203	Matherton loam	90	65	15	11	60	45	3.5	2.5
203V	Matherton loam, silt and fine sand substratum	90	65	15	11	60	45	3.5	2.5
203Y	Matherton loam, loam substratum	90	65	15	11	60	45	3.5	2.5
203Z	Matherton loam, clay substratum	90	65	15	11	60	45	3.5	2.5
204	Knowles loam	85	60	14	10	70	50	3.5	2.5
206	Knowles silt loam, shallow variant	70	50	12	8	55	40	2.5	1.5
208	Knowles silt loam	85	60	14	10	70	50	3.5	2.5
212	Ehler silt loam	115	75	18	12	65	55	4.0	<u>5/</u>
212R	Ehler silt loam, rock substratum	105	65	17	11	65	55	4.0	<u>5/</u>
212X	Same as No. 126, Westland silt loam								
212Y	Same as No. 212, Ehler silt loam								
213	Same as No. 212, Ehler silt loam								
213R	Same as No. 212R, Ehler silt loam, rock substratum								
213V	Same as No. 29, Colwood silt loam								
214	Same as No. 212, Ehler silt loam								
215	Same as No. 212, Ehler silt loam								
216	Same as No. 212, Ehler silt loam								
217	Bono silty clay loam	100	65	17	11	60	40	4.0	<u>5/</u>
218	Bono silty clay loam, thin surface variant	100	65	17	11	<u>60</u>	40	4.0	<u>5/</u>
218V	Same as No. 217, Bono silty clay loam								
218Y	Same as No. 217, Bono silty clay loam								
226	Keyser silt loam	120	85	18	14	75	60	4.5	3.0
226D	Same as No. 226, Keyser silt loam								
231	Brookston silt loam	115	75	18	13	65	50	4.0	<u>5/</u>
231Z	Brookston stilt loam, clay sub- stratum	115	75	18	13	65	50	4.0	<u>5/</u>
233	Matherton silt loam	90	65	15	11	60	45	3.5	2.5
233V	Matherton silt loam, silt and fine sand substratum	90	65	15	11	60	45	3.5	2.5
233Y	Matherton silt loam, loam sub- stratum	90	65	15	11	60	45	3.5	2.5

TABLE 9.
ESTIMATED CROP YIELDS (Continued)

Soil Number and Soil Name ^{1/}		Corn				Oats		Alfalfa-Brome	
		Grain-Bushels Per Acre		Silage Tons Per Acre		Grain-Bushels Per Acre		Hay-Tons Per Acre ^{3/}	
		High	Average	High	Average	High ^{2/}	Average	High	Average
233Z	Matherton silt loam, clay sub- stratum	90	65	15	11	60	45	3.5	2.5
234	Matherton sandy loam	85	60	14	10	55	40	3.0	2.0
234V	Matherton sandy loam, silt and fine sand substratum	85	60	14	10	55	40	3.0	2.0
234Y	Matherton sandy loam, loam sub- stratum	85	60	14	10	55	40	3.0	2.0
243	Calamus silt loam	115	80	18	14	75	65	4.5	3.0
250	Tedrow sandy loam	55	40	9	7	55	35	2.5	1.5
250V	Same as No. 250, Tedrow sandy loam								
250Y	Tedrow sandy loam, loam sub- stratum	55	40	9	7	55	35	2.5	1.5
250Z	Tedrow sandy loam, clay sub- stratum	55	40	9	7	55	35	2.5	1.5
251	Tedrow loamy sand	55	40	9	7	55	35	2.5	1.5
251Y	Tedrow loamy sand, loam sub- stratum	55	40	9	7	55	35	2.5	1.5
251Z	Tedrow loamy sand, clay sub- stratum	55	40	9	7	55	35	2.5	1.5
254	Tustin sandy loam	60	45	10	7	50	35	2.5	1.5
261	Hackett sandy loam, wet variant	60	45	10	7	50	35	2.5	1.5
262	Hackett loamy sand, wet variant	60	45	10	7	50	35	2.5	1.5
266	Sisson silt loam	95	70	16	12	70	50	4.5	3.0
266R	Sisson silt loam, rock substratum	95	70	16	12	70	50	4.5	3.0
266X	Same as No. 266, Sisson silt loam								
266Z	Same as No. 24, Hebron silt loam								
267	Sisson fine sandy loam	95	70	16	12	70	50	4.5	3.0
268	Same as No. 266, Sisson silt loam								
269	Warsaw sandy loam	80	55	13	9	55	40	3.0	2.0
270	Hackett sandy loam	55	40	9	7	45	30	2.5	1.0
270V	Same as No. 270, Hackett sandy loam								
271	Same as No. 288, Hackett loamy sand								
272	Tustin loamy fine sand	55	40	9	7	50	35	2.5	1.5
276	Boyer sandy loam	70	55	12	9	55	40	2.5	1.5
276Y	Boyer sandy loam, loam substra- tum	70	55	12	9	55	40	2.5	1.5
276Z	Boyer sandy loam, clay substra- tum	70	55	12	9	55	40	2.5	1.5

TABLE 9.
ESTIMATED CROP YIELDS (Continued)

Soil Number and Soil Name ^{1/}		Corn				Oats		Alfalfa-Brome	
		Grain-Bushels		Silage		Grain-Bushels Per Acre	Hay-Tons Per Acre ^{3/}		
		Per Acre	Tons Per Acre	High	Average				
		High	Average	High	Average	High ^{2/}	Average	High	Average
277	Sumner sandy loam	70	55	12	9	55	40	2.5	1.5
277Y	Sumner sandy loam, loam sub- stratum	70	55	12	9	55	40	2.5	1.5
277Z	Sumner sandy loam, clay substra- tum	70	55	12	9	55	40	2.5	1.5
278	Clyman silt loam	115	80	18	13	65	55	4.5	2.5
279	Same as No. 276, Boyer sandy loam								
280	Same as No. 316, Boyer loamy sand								
281	Hackett loam	60	45	10	8	45	30	2.5	1.0
282	Casco-Rodman loams - Casco part - Same as No. 172, Casco loam Rodman part - No yield given								
283	Same as No. 370, Mosel sandy loam								
284	Same as No. 370, Mosel sandy loam								
285	Same as No. 176, Mussey loam								
286	Mussey silt loam	80	60	13	11	65	45	3.0	<u>5/</u>
287	Same as No. 176, Mussey loam								
288	Hackett loamy sand	55	40	9	7	45	30	2.5	1.0
288V	Hackett loamy sand, silt and fine sand	55	40	9	7	45	30	2.5	1.0
289	Hackett sandy loam	55	40	9	7	45	30	2.5	1.0
289Y	Hackett sandy loam, loam sub- stratum	55	40	9	7	45	30	2.5	1.0
289Z	Hackett sandy loam, clay substra- tum	55	40	9	7	45	30	2.5	1.0
295	Morley-Beecher silt loam - Morley part - Same as No. 297, Morley silt loam Beecher part - Same as No. 3361, Beecher silt loam								
297	Morley silt loam	100	65	17	12	70	50	4.5	3.0
297S	Morley sandy loam	90	60	15	10	65	55	4.0	3.0
297V	Morley silt loam, silt and fine sand	100	65	17	12	70	50	4.5	3.0
297X	Morley silt loam, gravelly substra- tum	100	65	17	12	70	50	4.5	3.0
297Y	Same as No. 297, Morley silt loam								
298	Ashkum silty clay loam	100	70	17	12	65	50	4.0	<u>5/</u>
299	Blount silt loam	100	65	17	12	65	50	4.0	2.5
300	Ashkum-Beecher silt loam - Ashkum part - Same as No. 298, Ashkum silty clay loam Beecher part - Same as No. 3361, Beecher silt loam								
305	Same as No. 208, Knowles silt loam								

TABLE 9.
ESTIMATED CROP YIELDS (Continued)

Soil Number and Soil Name ^{1/}	Corn				Oats		Alfalfa-Brome	
	Grain-Bushels Per Acre		Silage Tons Per Acre		Grain-Bushels Per Acre		Hay-Tons Per Acre ^{3/}	
	High	Average	High	Average	High ^{2/}	Average	High	Average
306 Knowles silt loam, wet variant	80	50	13	8	70	45	3.5	2.0
307 Same as No. 306, Knowles silt loam, wet variant								
308 Knowles silt loam, shallow variant	70	50	12	9	55	45	2.5	2.0
311 Manawa loam	90	60	15	10	75	50	4.0	2.5
314 Same as No. 380, Sumner loamy sand								
315 Oshtemo loamy sand	65	45	11	8	50	35	2.5	1.5
316 Boyer loamy sand	65	45	11	8	50	35	2.5	1.5
316Y Boyer loamy sand, loam substratum	65	45	11	8	50	35	2.5	1.5
316Z Boyer loamy sand, clay substratum	65	45	11	8	50	35	2.5	1.5
317 Oshtemo loamy fine sand	65	45	11	8	50	35	2.5	1.5
320 Oshtemo sandy loam	65	45	11	8	50	35	2.5	1.5
323 Ionia sandy loam	70	50	12	8	55	40	2.5	2.0
323V Same as No. 267, Sisson fine sandy loam								
324 Ionia loam	80	50	13	9	60	45	3.0	2.5
324V Same as No. 266, Sisson silt loam								
324Y Ionia loam, loam substratum	80	50	13	9	60	45	3.0	2.5
324Z Ionia loam, clay substratum	80	50	13	9	60	45	3.0	2.5
325 Varna silt loam	100	70	17	12	70	50	4.5	3.0
326 Abington silt loam	110	70	18	12	65	50	4.0	5/
326Z Abington silt loam, clay substratum	110	70	18	12	65	50	4.0	5/
327 Wallkill silt loam	105	80	17	13	60	40	5/	5/
328 Pistakee silt loam	105	70	16	12	75	50	4.0	3.0
328Y Same as No. 328, Pistakee silt loam								
330 Navan loam	115	65	18	12	65	45	4.0	5/
331 Markham-Elliott silt loam - Markham part - Same as No. 336, Markham silt loam Elliott part - Same as No. 3251, Elliott silt loam								
332 Kane silt loam	100	80	17	13	65	45	3.5	2.5
332V Kane silt loam, silt and fine sand substratum	100	80	17	13	65	45	3.5	2.5
332Y Kane silt loam, loam substratum	100	80	17	13	65	45	3.5	2.5
332Z Kane silt loam, clay substratum	100	80	17	13	65	45	3.5	2.5
333 Eagle silt loam	90	65	15	11	65	50	3.5	2.5

TABLE 9.
ESTIMATED CROP YIELDS (Continued)

Soil Number and Soil Name ^{1/}	Corn				Oats		Alfalfa-Brome	
	Grain-Bushels Per Acre		Silage Tons Per Acre		Grain-Bushels Per Acre		Hay-Tons Per Acre ^{3/}	
	High	Average	High	Average	High ^{2/}	Average	High	Average
333Y Warsaw silt loam, loam substratum	90	65	15	11	65	50	3.5	2.5
333Z Warsaw silt loam, clay substratum	90	65	15	11	65	50	3.5	2.5
334 Warsaw loam	90	65	12	11	65	50	3.5	2.5
335 Ionia silt loam	80	50	13	9	60	45	3.0	2.5
335Y Ionia silt loam, loam substratum	80	50	13	9	60	45	3.0	2.5
335Z Ionia silt loam, clay substratum	80	50	13	9	60	45	3.0	2.5
336 Markham silt loam	100	65	17	12	70	50	4.5	3.0
338 Same as No. 298, Ashkum silty clay loam								
339 Abington silty clay loam	110	70	18	12	65	50	4.0	<u>5/</u>
340 Navan silt loam	115	65	18	12	65	45	4.0	<u>5/</u>
343 Celina silt loam	115	75	18	12	70	55	4.5	3.0
344 Ashford silt loam	100	65	15	11	70	50	4.5	3.5
345 Nenno silt loam	100	65	16	11	70	50	4.5	3.5
346 Kane loam	100	80	17	13	65	45	3.5	2.5
346Y Kane loam, loam substratum	100	80	17	13	65	45	3.5	2.5
346Z Same as No. 51, Aztalan loam								
352 Lapeer loam	75	55	12	9	50	40	2.5	2.0
355 Same as No. 156, Lapeer sandy loam								
356 Same as No. 156, Lapeer sandy loam								
357 Hochheim loam	90	65	15	11	65	50	4.0	2.5
357R Hochheim loam, rock substratum	90	65	15	11	65	50	4.0	2.5
357X Hochheim loam, gravelly substratum	90	65	15	11	65	50	4.0	2.5
358 Miami loam	100	70	16	12	70	55	4.5	3.0
360 Hochheim silt loam	90	65	15	11	65	50	4.5	2.5
360R Hochheim silt loam, rock substratum	90	65	15	11	65	50	4.5	2.5
360V Hochheim silt loam, silt and fine sand substratum	90	65	15	11	65	50	4.5	2.5
360X Hochheim silt loam, gravelly substratum	90	65	15	11	65	50	4.5	2.5
361 Miami silt loam	100	70	16	12	70	55	4.5	3.0
362 Theresa silt loam	100	70	16	12	65	50	4.5	2.5
362R Theresa silt loam, rock substratum	100	70	16	12	65	50	4.5	2.5

TABLE 9.
ESTIMATED CROP YIELDS (Continued)

Soil Number and Soil Name ^{1/}		Corn				Oats		Alfalfa-Brome	
		Grain-Bushels		Silage		Grain-Bushels Per Acre	Hay-Tons Per Acre ^{3/}	High	Average
		Per Acre		Tons	Per Acre				
		High	Average	High	Average	High ^{2/}	Average	High	Average
362V	Theresa silt loam, silt and fine sand substratum	100	70	16	12	65	50	4.5	2.5
362X	Theresa silt loam, gravelly substratum	100	70	16	12	65	50	4.5	2.5
362Z	Theresa silt loam, clay substratum	100	70	16	12	65	50	4.5	2.5
363	Mayville silt loam	105	80	17	13	75	60	4.5	3.0
363R	Mayville silt loam, rock substratum	105	80	17	13	75	60	4.5	3.0
363X	Mayville silt loam, gravelly substratum	105	80	17	13	75	60	4.5	3.0
363Y	Same as No. 363, Mayville silt loam								
363Z	Mayville silt loam, clay substratum	105	80	17	13	75	60	4.5	3.0
364	Lamartine silt loam	115	75	18	12	65	55	4.0	2.5
364V	Lamartine silt loam, silt and fine sand substratum	115	75	18	12	65	55	4.0	2.5
364X	Lamartine silt loam, gravelly substratum	115	75	18	12	65	55	4.0	2.5
364Z	Lamartine silt loam, clay substratum	115	75	18	12	65	55	4.0	2.5
365	Hochheim-Hennepin loams - Hochheim part - Same as No. 357, Hochheim loam Hennepin part - Same as No. 357, Hochheim loam								
365X	Hochheim - Hennepin loams, gravelly substratum - Hochheim part - Same as No. 172, Casco loam Hennepin part - No yields given								
366	Hochheim - Theresa loams - Hochheim part - Same as No. 357, Hochheim loam Theresa part - Same as No. 362, Theresa silt loam								
367	Hochheim fine sandy loam	85	60	14	9	60	45	4.0	2.5
369	Mosel silt loam	105	65	17	11	60	50	4.5	2.5
370	Mosel sandy loam	100	60	17	10	55	45	4.0	2.5
371	Mosel loam	105	65	17	11	60	50	4.5	2.5
380	Sumner loamy sand	65	45	11	8	50	35	2.5	1.5
380Z	Sumner loamy sand, clay substratum	65	45	11	8	50	35	2.5	1.5
386	Granby fine sandy loam	65	45	11	8	50	40	3.0	<u>5/</u>
386Y	Granby fine sandy loam, loam substratum	65	45	11	8	50	40	3.0	<u>5/</u>
386Z	Granby fine sandy loam, clay substratum	65	45	11	8	50	40	3.0	<u>5/</u>
387	Granby loamy sand	60	40	10	7	50	40	3.0	<u>5/</u>
387V	Granby loamy sand, silt and fine sand substratum	60	40	10	7	50	40	3.0	<u>5/</u>

TABLE 9.
ESTIMATED CROP YIELDS (Continued)

Soil Number and Soil Name ^{1/}		Corn				Oats		Alfalfa-Brome	
		Grain-Bushels Per Acre		Silage Tons Per Acre		Grain-Bushels Per Acre		Hay- Tons Per Acre ^{3/}	
		High	Average	High	Average	High ^{2/}	Average	High	Average
391	Wea sandy loam	120	80	19	13	70	55	4.0	2.5
392	Ockley loam	115	80	18	12	75	60	4.5	3.5
393	Ockley sandy loam	110	75	17	11	70	55	4.0	3.0
394	Parr sandy loam	90	70	15	12	60	50	3.5	2.5
397	Ozaukee silt loam	100	65	17	12	70	50	4.5	3.0
397R	Ozaukee silt loam, rock substratum	100	65	17	12	70	50	4.5	3.0
397V	Ozaukee silt loam, silt and fine sand substratum	100	65	17	12	70	50	4.5	3.0
397X	Ozaukee silt loam, gravelly sub-stratum	100	65	17	12	70	50	4.5	3.0
397Y	Same as No. 397, Ozaukee silt loam								
398	Ashkum silty clay loam	100	70	17	12	65	50	4.0	5/
399	Mequon silt loam	100	65	17	12	65	50	4.0	2.5
410	Same as No. 134, Spinks loamy fine sand								
411	Spinks fine sand, silty substratum	60	40	10	7	50	35	2.5	1.0
413	Crestview fine sandy loam	50	40	8	7	40	30	2.0	1.0
413Z	Crestview fine sandy loam, clay substratum	60	45	10	8	45	35	2.5	1.0
414	Crestview loamy fine sand	50	40	8	7	40	30	2.0	1.0
420	Same as No. 361, Miami silt loam								
421	Same as No. 161, Dodge silt loam								
449	Same as No. 451, Houghton mucky peat								
450	Houghton muck	5/	5/	19	15	5/	5/	5/	5/
451	Houghton mucky peat	5/	5/	19	15	5/	5/	5/	5/
452	Adrian muck	5/	5/	17	12	5/	5/	5/	5/
452Z	Adrian muck, clay substratum	5/	5/	17	12	5/	5/	5/	5/
453	Adrian mucky peat	5/	5/	17	12	5/	5/	5/	5/
454	Palms muck	5/	5/	19	15	5/	5/	5/	5/
455	Palms mucky peat	5/	5/	19	15	5/	5/	5/	5/
456	Ogden muck	5/	5/	19	15	5/	5/	5/	5/
457	Ogden mucky peat	5/	5/	19	15	5/	5/	5/	5/
459	Rollin muck	5/	5/	17	12	5/	5/	5/	5/
460	Rollin mucky peat	5/	5/	17	12	5/	5/	5/	5/
502	Flagg silt loam	120	80	18	13	80	60	4.5	3.5

TABLE 9.
ESTIMATED CROP YIELDS (Continued)

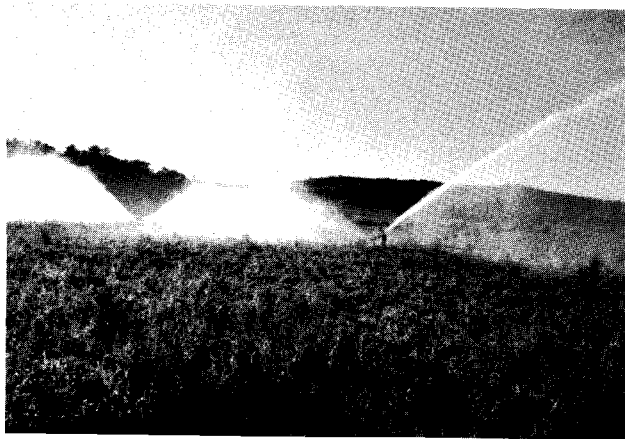
Soil Number and Soil Name _{1/}	Corn				Oats		Alfalfa-Brome	
	Grain-Bushels Per Acre		Silage Tons Per Acre		Grain-Bushels Per Acre		Hay- Tons Per Acre _{3/}	
	High	Average	High	Average	High _{2/}	Average	High	Average
504 Same as No. 502, Flagg silt loam								
505 Flagg silt loam, wet variant	120	80	18	13	75	60	4.0	3.0
508 Same as No. 510, Pecatonica silt loam								
510 Pecatonica silt loam	105	75	17	12	75	60	4.5	3.0
511 Same as No. 505, Flagg silt loam, wet variant								
514 Same as No. 516, Westville silt loam								
516 Westville silt loam	115	80	18	13	80	60	3.5	2.5
550 Same as No. 212R, Ehler silt loam, rock substratum								
557 Same as No. 358, Miami loam								
560 Same as No. 361, Miami silt loam								
3251 Elliott silt loam	100	65	17	12	65	50	4.0	2.5
3251V Elliott silt loam, silt and fine sand	100	65	17	12	65	50	4.0	2.5
3361 Beecher silt loam	100	65	17	12	70	50	4.5	3.0

SPRINKLER IRRIGATION GUIDE FOR SOILS ¹

The guide for sprinkler irrigation application is based on certain soil characteristics that affect the design and operation of sprinkler irrigation systems. A system that successfully supplies water to crops as they need it, and at the same time conserves soil and water, must be designed to fit the crops and the soils that are being irrigated. Only those soils suitable for sprinkler irrigation systems are given consideration in Table 10. Soils that have similar physical characteristics have been grouped by capability units in the first column of the table. The capability unit for each soil in southeastern Wisconsin is listed at the end of the description of that soil in Chapter IV of this report.

The description of the soils in the capability units summarizes the physical soil characteristics that are important to irrigation. Soil depth refers to the mean depth of each major soil horizon in successive order of occurrence below the surface. These are average depths of all the soils in the capability unit. The available moisture capacity given for each horizon is the average mois-

¹ From the Sprinkler Irrigation Guide for Wisconsin, Soil Conservation Service, USDA, March, 1955.



Sprinkler irrigation may be used to provide needed crop moisture during drouth periods.

ture content of all the soils in the capability unit. The maximum water application rate is based on the average rate of water intake into the soil for both bare and covered conditions. Bare soil condition refers to land planted in row crops where the land is exposed to compaction and the sealing effect of rainfall impact. On soils with cover, the vegetation or mulch absorbs the raindrop energy and there is little or no surface sealing. The application rates given are for nearly level to gently sloping soils and do not apply to soils with slopes of 5 percent or more.

The crop groups represent a grouping of crops with similar root depths and similar peak moisture use rates. The depth of soil to be irrigated is given for each crop group. This depth is related to rooting characteristics of crops in each group and the purpose for which the crop is grown. The peak water-use rate for each crop group provides a basis for estimating the amount of water that must be supplied to the plant. The total available moisture in the soil depth to be irrigated indicates the amount of water that must be replaced in each irrigation. It may be calculated by multiplying the available moisture capacity for the various soil horizons by the appropriate depths to be irrigated.

The recommended amount of water, in inches, to be applied at each irrigation is based on a 75 percent irrigation efficiency. Irrigation efficiency is affected by evaporation losses, uneven distribution, and interception by foliage. It is also based on the assumption that irrigation is begun when 45 percent of the available moisture has been depleted from the soil depth to be irrigated. The application time, in hours, required to supply the necessary water by sprinkler irrigation for bare soil groups and for soils with cover is based on the total water to be applied versus the rate of application. The maximum irrigation frequency, in days, or the maximum length of time between irrigations, in days, is based on the peak use rate.

Flood irrigation is not considered in this report because it is rarely used and sprinkler systems have proved more versatile and practical in southeastern Wisconsin.

TABLE 10.
SPRINKLER IRRIGATION GUIDE FOR SOILS

SOILS				CROPS				IRRIGATION SPECIFICATIONS					
Soil Capability Units	Description of Capability Units	Soil Depth (inches)	Available moisture capacity (inches per inch of soil depth)	Maximum water application rate (inches per hour)		Crop ^{1/} Groups	Depth of soil to be irrigated (inches)	Peak moisture use rates (inches per day)	Total available moisture capacity of soil depth to be irrigated (inches)	Water to be applied at each irrigation (inches)	Water application time based on maximum water application rate (hours)		Maximum time to cover irrigated area based on peak-use rate (days)
				Bare Soil	With vegetative cover						Bare	Cover	
I-1 Ile-2	Deep, moderately permeable loam and silt loam soils with permeable substrata.	0-7	0.22	0.5	0.8	1	6	0.10	1.32	0.79	1.6	1.0	6
		7-12	0.22	0.18	2	12	0.20	2.64	1.58	3.2	2.0	6	
					3	18	0.20	3.72	2.23	4.5	2.8	8	
					4	24	0.20	4.80	2.88	5.8	3.6	11	
					5	18	0.25	3.72	2.23	4.5	2.8	7	
					6	24	0.20	4.80	2.88	5.8	3.6	11	
					7	24	0.30	4.80	2.88	5.8	3.6	7	
		8	36	0.30	6.90	4.14	8.3	5.2	10				
Tobacco	12	0.25	2.64	1.58	3.2	2.0	5						
Ile-2	Moderately deep, moderately permeable, loam and silt loam soils with sand and gravel on dolomite bedrock substrata.	0-7	0.18	0.5	0.8	1	6	0.10	1.08	0.65	1.3	0.8	5
		7-12	0.18	2	12	0.20	2.16	1.30	2.6	1.6	5		
				3	18	0.20	3.00	1.80	3.6	2.3	7		
				4	24	0.20	3.84	2.30	4.6	2.9	9		
				5	18	0.25	3.00	1.80	3.6	2.3	5		
				6	24	0.20	3.84	2.30	4.6	2.9	9		
				7	24	0.30	3.84	2.30	4.6	2.9	6		
		8	30	0.30	4.68	2.81	5.6	3.5	7				
Ile-5 IIw-11	Deep, moderately permeable loam and silt loam soils on alluvial flood plains subject to occasional overflow.	0-7	0.20	0.5	0.8	1	6	0.10	1.20	0.72	1.4	0.9	5
		7-15	0.17	2	12	0.20	2.25	1.35	2.7	1.7	5		
				3	18	0.20	3.27	1.96	3.9	2.5	7		
				4	24	0.20	4.29	2.58	5.2	3.2	10		
				5	18	0.25	3.27	1.96	3.9	2.5	6		
				6	24	0.20	4.29	2.58	5.2	3.2	10		
				7	24	0.30	4.29	2.58	5.2	3.2	6		
		8	36	0.30	6.33	3.80	7.6	4.8	10				
Tobacco	12	0.25	2.25	1.35	2.7		4						
Ile-6	Deep, moderately slow to slowly permeable, loam to silty clay loam soils with clayey substrata.	0-5	0.24	0.5	0.8	1	6	0.10	1.40	0.84	1.7	1.0	6
		5-9	0.20	2	12	0.20	2.66	1.60	3.2	2.0	6		
				3	18	0.20	3.98	2.39	4.8	3.0	9		
				4	24	0.20	5.30	3.18	6.4	4.0	12		
				5	18	0.25	3.98	2.39	4.8	3.0	7		
				6	24	0.20	5.30	3.18	6.4	4.0	12		
				7	24	0.30	5.30	3.18	6.4	4.0	8		
		8	36	0.30	7.94	4.76	9.5	6.0	12				
Ile-7 IIs-7	Deep, moderate to moderately slowly permeable sandy loam soils with clayey substrata.	0-7	0.12	0.5	1.0	1	6	0.10	0.72	0.43	0.9	0.4	3
		7-12	0.12	2	12	0.20	1.44	0.86	1.7	0.9	3		
				3	18	0.20	2.28	1.37	2.7	1.4	5		
				4	24	0.20	3.12	1.87	3.7	1.9	7		
				5	18	0.25	2.28	1.37	2.7	1.4	4		
				6	24	0.20	3.12	1.87	3.7	1.9	7		
				7	24	0.30	3.12	1.87	3.7	1.9	5		
		8	36	0.30	4.56	2.74	5.5	2.7	7				
IIs-1	Moderately deep, moderately permeable loam and silt loam soils with sand and gravel or dolomite bedrock substrata.	0-7	0.22	0.5	1.0	1	6	0.10	1.32	0.79	1.6	0.8	6
		7-27	0.18	2	12	0.20	2.44	1.46	2.9	1.5	6		
				3	18	0.20	3.52	2.11	4.2	2.1	8		
				4	24	0.20	4.60	2.76	5.5	2.8	10		
				5	18	0.25	3.52	2.11	4.2	2.1	6		
				6	24	0.20	4.60	2.76	5.5	2.8	10		
				7	24	0.30	4.60	2.76	5.5	2.8	7		
		8	36	0.30	5.86	3.51	7.0	3.5	9				
IIIe-4 IIIs-2	Shallow to moderately deep, moderate to moderately rapidly permeable, sandy loam and loam soils with sand and gravel on sandy substrata.	0-7	0.12	0.8	1.0	1	6	0.10	0.72	0.43	0.5	0.4	3
		7-20	0.15	2	12	0.20	1.59	0.93	1.2	0.9	4		
				3	18	0.20	2.49	1.49	1.9	1.5	6		
				4	24	0.20	3.11	1.87	2.3	1.9	7		
				5	18	0.25	2.49	1.49	1.9	1.5	4		
				6	24	0.20	3.11	1.87	2.3	1.9	7		
				7	24	0.30	3.11	1.87	2.3	1.9	5		
		8	36	0.30	4.07	2.44	3.1	2.4	6				
IIIs-8	Shallow, moderately permeable loam and silt loam soils with dolomite bedrock substrata.	0-7	0.18	0.5	1.0	1	6	0.10	1.08	0.65	1.3	0.6	5
		7-24	0.18	2	12	0.20	2.16	1.30	2.6	1.3	5		
				3	18	0.20	3.24	1.94	3.9	1.9	7		
				4	24	0.20	4.32	2.59	5.2	2.6	10		
				5	18	0.25	3.24	1.94	3.9	1.9	6		
				6	24	0.20	4.32	2.59	5.2	2.6	10		
				7	24	0.30	4.32	2.59	5.2	2.6	7		
		8	24	0.30	4.32	2.59	5.2	2.6	7				
IIIs-9	Deep, moderately permeable disintegrated organic soils.	0-12	0.35	1.0	1.0	1	6	0.10	2.10	1.26	1.3	1.3	9
		12 plus	0.25	2	12	0.20	4.20	2.52	2.5	2.5	9		
				3	18	0.20	5.70	3.42	3.4	3.4	13		
				4	24	0.20	7.20	4.32	4.3	4.3	16		
				5	18	0.25	5.70	3.42	3.4	3.4	10		
				6	24	0.20	7.20	4.32	4.3	4.3	16		
				7	24	0.30	7.20	4.32	4.3	4.3	11		
		8	36	0.30	10.20	6.12	6.1	6.1	15				
IVs-3	Moderately deep to deep, excessive to moderate permeability, sandy loam to loamy sand soils with sandy substrata.	0-7	0.12	0.8	1.0 plus	1	6	0.10	0.72	0.43	0.5	0.4	3
		7-18	0.14	2	12	0.20	1.54	0.92	1.1	0.9	3		
				3	18	0.20	2.38	1.43	1.8	1.4	5		
				4	24	0.20	2.68	1.61	2.0	1.6	6		
				5	18	0.25	2.38	1.43	1.8	1.4	4		
				6	24	0.20	2.68	1.61	2.0	1.6	6		
				7	24	0.30	2.68	1.61	2.0	1.6	4		
		8	36	0.30	3.28	1.97	2.5	2.0	5				

^{1/} Crop Group 1: Seedlings and transplants.

Crop Group 2: Shallow rooted truck crops such as strawberries, onions, lettuce, radishes, spinach, celery.

Crop Group 3: Medium rooted truck crops such as green beans, tomatoes, carrots, potatoes, cabbage, cucumbers, garden beets.

Crop Group 4: Deep rooted truck crops such as asparagus, melons, small fruit, horse-radish.

Crop Group 5: Small grains, soybeans, sugar beets, timothy, ladino.

Crop Group 6: Red clover (red clover-timothy) brome-grass.

Crop Group 7: Corn

Crop Group 8: Alfalfa (alfalfa-brome) tree fruits and nuts.

DRAINAGE GUIDE FOR SOILS ¹

The need for adequate drainage systems to improve soils for farming has been recognized for many years. The design of such systems requires some knowledge of the soils and how they will respond to drainage improvements. Table 11 provides guidelines for the design and installation of farm drainage systems for those soil capability units that normally require drainage. The soil capability unit designation of each soil mapped in the Region may be found at the end of each soil description in Chapter IV of this report. Capability units comprised of soils that do not need drainage or are not suitable for drainage are not listed in this table. The information provided in this table is not intended for use in designing urban drainage systems that are installed to lower water tables or to provide storm water drainage.



Surface drainage, properly designed, will lower water tables and permit the use of wet soils for cultivated crops.

THE USE OF SOILS FOR WOODLAND

The original vegetation in the northern part of the Region, namely, Ozaukee, Washington, Milwaukee, and extreme eastern Waukesha Counties was southern mesic forest. The principal species were sugar maple, beech, basswood, red oak, ash, elm, and ironwood. Most of the remainder of the Region was

either prairie, oak-hickory forest or oak openings (oak savannah). Today about 7-1/2 percent of the total land area of the Region, or 129,000 acres, is in woodlands. Of this, over one-quarter (27 percent) is oak, nearly one-fifth (18 percent) is northern hardwoods, about one-third is lowland hardwoods, lowland brush, conifers, and aspen, and about one-fifth is upland brush. Principal species are much as they were when the white man arrived; oak, elm, ash, and maple.

Nearly one-half of the woodlands are heavily grazed. Two-thirds of the woodland have insufficient numbers of high quality trees. Brushiness, rockiness, wetness, and steep slopes make most of this poorly stocked woodland unfavorable for planting. Because of poor stocking the growth rate is only 0.15 cord per acre per year. The rate of growth could be tripled by stocking with high quality trees and by applying good management practices.

The 1959 drain on the forest resource of the area was somewhat less than the allowable cuts. Only in Waukesha County did the drain exceed the allowable cut. Forest products cut for sale in the Region are declining annually. There are very few farmsteads using wood for fuel. It is estimated that less than 10 percent of the area farms are cutting fuelwood and the volume cut in 1959 was less than half of that cut in 1954. The use of woodlands as a source of fenceposts has also sharply declined. Less than one percent of the farms in the Region cut fenceposts in 1959, and the total number of fenceposts cut in 1959 was 22 percent of that cut in 1954. Christmas trees are the only forest product that presently seems to be in demand. Consequently the production of quality Christmas trees is an economically feasible land use. Such production will probably increase substantially in the future because of the advantageous proximity of the urban markets within the Region.

Pressures on woodlands for uses other than cellulose production emphasizes the need for careful management decisions in the cultural treatment of the land. Careful planning is needed to prevent destruction of existing woodlands. Although comprising a minor part of the total land area, these woodlands can provide much needed parks, parkways, green strips, and a valuable setting for residential development.

¹ Extracted from the Drainage Guide for Wisconsin, Soil Conservation Service, USDA, April, 1962.

TABLE 11
DRAINAGE GUIDE FOR SOILS

Soil Capability Units ^{4/}	Description of Capability Units	Subsurface Drains ^{1/}		Surface Field Ditches Spacing ^{3/} (feet)	Remarks
		Depth (feet)	Spacing ^{2/} (feet)		
IIw-1	Deep, poorly drained, nearly level to sloping, moderate to slowly permeable loamy soils.	Tile Drain 3.0-4.0	Tile Drain 60-80	200-400	Divert upland runoff where possible. Surface drains needed to supplement tile. Land smoothing is usually beneficial.
IIw-2	Deep, somewhat poorly drained, nearly level to sloping, moderate to slowly permeable loamy to clayey soils.	Tile Drain 3.0-4.0	Tile Drain 60-80	200-400	Use random tile lines in complex topography. Divert upland runoff where possible. Surface drains needed to supplement tile. Land smoothing is usually beneficial. (See "IIIe-8" for "C" slopes.)
IIw-3	Moderately deep, somewhat poorly to poorly drained, nearly level to sloping moderately permeable loamy soils overlying dolomite bedrock.	Tile Drain 2.5-3.0	Tile Drain 60-90	200-400	May be tiled if sufficient depth over bedrock exists. Surface drainage is recommended. Land smoothing is beneficial.
IIw-5	Moderately deep, somewhat poorly to poorly drained, nearly level to sloping, moderately permeable, loamy soils overlying sand and gravel.	Open Ditch 2.5-3.0	Open Ditch 330-440	200-450	Tiling is questionable. If tiled, take precautions to prevent sand from entering tile system. Land smoothing is beneficial. Surface drainage is satisfactory for meadow and pasture crops. Use open ditch for subsurface drainage.
IIw-8	Moderately deep, poorly drained, nearly level, permeable organic soils overlying loamy mineral soil.	Tile Drain 3.5-4.0 Open Ditch 3.0-3.5	Tile Drain 100-120 Open Ditch 200-440	--- ---	Divert or intercept runoff from adjacent uplands. Subject to wind erosion when drained unless control practices are applied.
IIw-11	Deep, moderate to well drained, nearly level, moderately permeable loamy alluvial soils subject to occasional stream overflow.	---	---	Random	Use diversions or dikes to protect from overflow. Provide surface drainage by random ditches or waterways. Land smoothing is desirable to eliminate small depressed areas.
IIw-13	Deep, somewhat poorly drained, nearly level, moderately permeable loamy alluvial soils subject to stream overflow and high water table.	(See Remarks)	(See Remarks)	200-300	Use diversions or dikes to protect from overflow. Surface drainage is usually adequate for field crops. Land smoothing is desirable. Tile may be used to drain seepage areas associated with these soils.
IIIe-6 IVe-6	Deep, well drained, sloping, moderately slow to slowly permeable soils with clayey subsoils, substratum, or both.	Tile drain 3.0-3.5	Tile Drain Random	Use minimum terrace spacing.	Tile lines are effective in waterways and in seep areas.
IIIe-8 IVe-8	Deep, somewhat poorly drained, sloping, moderately slow to slowly permeable loamy soils.	Tile Drain 2.5-3.0	Tile Drain Random	Random	Tile lines effective in waterways and seep areas.
IIIw-1	Deep, poorly drained, nearly level, moderately slow to slowly permeable clayey soils.	Tile Drain 3.0-4.0	Tile Drain 60-80	200-400	Divert upland runoff whenever possible. Surface drains needed to supplement tile. Land smoothing is beneficial.
IIIw-3	Deep to moderately deep, somewhat poorly to poorly drained, nearly level to sloping, moderately permeable loamy soils.	Open Ditch 2.5-3.0	Open Ditch 300-440	150-400	Tiling is not feasible. Land smoothing is beneficial.
IIIw-5 IVw-5	Deep to moderately deep, somewhat poorly to poorly drained, nearly level, permeable sandy soils.	Open Ditch 3.0-3.5	Open Ditch 440-660	200-400	Tiling is questionable. If tiled, take precautions to prevent sand from entering the tile. Surface drainage is satisfactory for meadow and pasture crops.
IIIw-6	Moderately deep, somewhat poorly drained, nearly level to sloping, sandy soils underlain by slowly permeable clayey soil.	Tile Drain 3.0-4.0 Open Ditch 3.0-3.5	Tile Drain 120-160 Open Ditch 440-660	--- ---	Tiling is questionable. If tiled, take precautions to prevent sand from entering the tile.

^{1/} Subsurface drainage is accomplished by tile or deep open ditch.

^{2/} Tile spacing shown is for field crops. Spacing for high value truck crops should be limited to 60 feet or one-half of maximum value shown, whichever is less. Use maximum spacing for field crops when surface drainage is provided.

^{3/} Intensity of surface drainage pattern is dependent on slope and degree of wetness. Use close spacing when not tiled or smoothed.

Use wide spacing when supplemented by subsurface drainage and land smoothing.

^{4/} Capability Units not listed have very severe limitations for drainage.

--- Not suitable, or seldom done.

TABLE 11
DRAINAGE GUIDE FOR SOILS (Continued)

Soil ^{4/} Capability Units	Description of Capability Units	Subsurface Drains ^{1/}		Surface Field Ditches Spacing ^{3/} (feet)	Remarks
		Depth (feet)	Spacing ^{2/} (feet)		
IIIw-8	Moderately deep, poorly drained nearly level organic soils un- derlain by slowly permeable clayey soil.	Tile Drain 3.5-4.0	Tile Drain 80-100	---	Divert or intercept runoff from ad- jacent uplands. Subject to wind ero- sion when drained unless controlled drainage is practiced or shelter- belts are installed.
		Open Drain 3.0-3.5	Open Ditch 200-440	---	
IIIw-9	Deep, poorly drained, nearly level to sloping, moderately permeable organic soils.	Tile Drain 4.0-5.0	Tile Drain 120-200	---	May be improved for pasture with ditches 1.5 to 2.0 feet deep, spaced 200 to 300 feet apart. Subject to wind erosion when drained and left without a vegetative cover unless controlled drainage is practiced or shelterbelts are installed.
		Open Ditch 3.0-4.5	Open Ditch 200-660	---	
IVw-7	Moderately deep, poorly drained nearly level to sloping, organic soils underlain by sands, marl or bedrock at a depth of 24 to 40 inches.	Open Ditch 2.5-3.5	Open Ditch 330-660	---	Tiling is not feasible. Subject to wind erosion when drained unless controlled drainage practices or shelterbelts are used.

Rating Soils for Woodland Use

Management of woodlands is influenced by the quantity, quality, and type of forest products that can be grown. Different soils produce at different rates. Their potential may range from nearly zero to several hundred board feet per acre per year. Some areas producing hardwoods are not suitable for pine. Some areas currently producing low-value species are capable of growing more valuable species.

More than 100,000 areas of the Region have potential for commercial woodland use. The soil surveys can be used to determine the suitability of the soils for use as woodlands, for selecting suitable species, predicting productivity, and for recognition of special hazards related to the soils.

Woodland interpretations in this report consist of (1) a discussion of woodland suitability groupings and their management limitations; (2) Table 12 setting forth the hazards and limitations and species suitability of the soils in the woodland suitability groups; and (3) Table 13 setting forth woodland yields.

In the discussion of woodland suitability groups and in Table 12 ratings of *slight*, *moderate*, or *severe* are given for selected limitations and hazards. Factors such as soil drouth, plant competition, soil wetness, erosion hazard, equipment limitations and windthrow hazards are rated. A *slight* rating for a given factor indicates that there are no limitations or that limitations can be easily overcome. A *moderate* rating indicates that the limitation or hazard can be overcome by the right kind of management. A *severe* rating indicates that the limitation or hazard is very difficult to overcome or that expensive techniques are needed in managing the site.

Woodland Suitability Groupings

In this section, soils which respond similarly to use and management and are suitable for the same species have been grouped together. Discussion of these groups includes limitations for woodland use such as tree mortality, plant competition, equipment limitations, soil-associated diseases, insects and animals, windthrow hazard, erosion, species suitability and productivity. Woodland suitability groupings have been numbered according to a statewide classification system. Woodland suitability groups 11 and 12 have been omitted because natural

stands of merchantable timber do not grow on the soils within the Region or the soils are not suitable for tree planting.

The *site index* of many of these soils was determined from measurements made by foresters and soil scientists working together. The site index is defined as the average total height of the dominant trees in a stand at age 50 years. Site index is one of the best indicators of potential soil productivity. Where woodland sites suitable for measurement were not available, data from a similar soil were used. The site index and the best available yield tables supplied by research foresters are the basis for yield predictions in Table 13.



This natural stand of hardwood is being managed for the sale of merchantable timber. Home fuel is a by-product.

72 **Woodland Suitability Group 1** The soils in this group have the highest potential for timber production in Southeastern Wisconsin but they are seldom used for woodland because they are also well suited for cultivated crops and pasture. Areas of these soils used for woodland are generally small and isolated. The principal native trees on the soils in this group were sugar maple, beech, oak, basswood, elm and ash.

Individual plot measurements of red oak in representative soils of this group indicate a site index of 63 ± 6 with yields of 140 to 230 board feet per acre per year (BF/acre/yr). Yields of northern hardwoods are somewhat higher, up to 250 BF/acre/yr. Yields are lower for woodlands on ridgetops and on hot, dry southwest slopes.

These soils generally produce tall, well formed hardwood stems, and produce high

quality sawlogs and veneer. Eroded sites on upper slopes are utilized mostly for production of posts and low grade sawlogs. Regeneration of oak stands presents some problems. Although seed production is generally adequate, both seeds and seedlings suffer heavy losses from rodents and insects. The most important destructive agent is the acorn weevil which, in places, infests as much as 90 percent of the acorn crop. A system of cutting that will open up the forest stand sufficiently to allow oak seedlings to grow in sunlight is needed for successful oak regeneration. Other hardwoods such as maple, hickory, ash, elm, and basswood need less light and are usually easily established if an adequate seed supply is available.

Plantings of white and Norway pine do well, but natural stands of white pine are not common in this area. Competition from brush, grass and weeds is severe unless adequate control measures are used. Pre-planting treatment such as scalping, furrowing or clean tillage will reduce competition. Herbicides can be used effectively on most sites. Control of grasses in young pine plantations reduces competition and the hazard of damage by field mice and other rodents.

Use of equipment in this group of soils is restricted temporarily by wet soil conditions during heavy rains or spring thaws. Logging may cause some damage from compaction by heavy equipment. Logging during the winter will result in less damage to the soil and timber. Steep topography limits machine planting and fire control activities. On soil slopes of 12 percent or more, logging roads or fire accessways should be located on ridges or on contour lines. Uphill skidding will lessen the problem of erosion.

Hardwood stands can be managed for the production of high quality saw timber or veneer. Maple, basswood, ash, red oak, and white pine are valuable species on the more favorable sites, such as north and east exposures and in coves. Red oak grows on the less favorable south and west facing slopes. Hardwood plantings have generally been unsuccessful, but plantings of white pine, Norway pine, and white spruce are suitable. The best species for farm windbreaks are white pine, white spruce, and white cedar.

There is a slight hazard in the establishment of trees from frost, frost heaving, and drowning. The hazard to seedlings from

heat and drouth is slight on the north and eastern exposures and moderate on the southern and western exposures. Insects cause moderate damage except in grassy areas where white grubs may severely damage tree roots. "Damping off" fungi may affect conifer seedlings in local areas, and white pine blister rust may be a problem where Ribes plants (currants and gooseberries) are prevalent. Deer and rabbits can cause severe damage to new seedlings in local areas.

Suitable native shade trees for urban and recreational areas include sugar maple, American beech, Northern red oak, and white oak. Hickory, basswood, ironwood, and white ash are suitable for street trees. Both red cedar and white cedar are suitable for hedges, screens and windbreaks.

Woodland Suitability Group 2 This group includes moderately deep to deep, moderately well to well drained fine-textured soils. Native vegetation on the soils in this group was generally northern hardwoods. The principal woodland products are sawlogs and veneer. Site quality for these soils is rated high for hardwoods and medium for conifers, based on limited plot measurements. Site index for sugar maple is about 70, and the site index for red oak ranges between 62 and 72.

Competition from grass, brush, and weeds causes a severe hazard to the establishment of tree seedlings. Soil cracking and the drying of tree roots during periods of drouth cause some losses. Frost heaving is common on these soils. White grubs are a problem in sod areas because of the damage they do to tree roots.

Wheeled vehicles will have poor traction and will cause soil compaction during wet seasons on this soil. Little soil damage results from use of the vehicles when soils are dry or frozen.

In natural stands the preferred species are sugar maple, basswood, white ash, and red and white oak. White pine and white spruce are suitable for planting. Care should be taken to avoid planting white pine in areas of high concentration of currants and gooseberries which host white pine blister rust.

Tree planting is frequently delayed by wet soil conditions. Shade trees suitable for these soils are sugar maple, American beech, and white oak. Good street trees are hickory, green ash, and ironwood. White spruce,

white cedar, and red cedar are acceptable for hedges, screens, and windbreaks.

Woodland Suitability Group 3 This group includes moderately deep and deep, moderately coarse textured soils and deep coarse textured soils with loam, clay or silt and fine sand substrata. These soils are somewhat excessively drained, well drained, and moderately well drained. Natural stands on the soils in this group consist of aspen, black oak, bur oak and hickory. Principal forest products are fuel wood and saw timber.

Site quality on these soils is poor for oak and other hardwoods and good for pine. Where erosion is severe, the site quality is poor for all species. There is little danger to seedlings from frost on these soils. Damage by heat or drouth can be severe on eroded soils and south slopes but moderate on other sites. Plant competition, except for occasional brush on north slopes, is generally not a problem. There are no special limitations for the use of equipment for planting, timber harvesting, or fire control except for stoniness in places and the limitations of steep slopes in some soils.

Normally, pines will produce more timber than hardwoods on these soils. White grubs and pine sawflies are the principal insect hazards. Oak wilt damages trees in some areas. Rodents are occasionally a moderate problem. Rabbits and deer damage trees in some areas, especially new plantations.

There are a few native trees on these soils that are especially suited for recreational or urban uses. Bur oak and black oak are suitable for shade trees and ironwood can be used for a street tree. Red cedar, black locust, and cottonwood can be used for screen hedges, or windbreaks.

Woodland Suitability Group 4 The soils in the group are excessively drained and are subject to drouth. Native forest vegetation on these soils is mainly northern pine, oak, black oak, bur oak, and some white pine. Brush, grass, and weeds are common on the steeper and eroded sites.

Plot measurements of representative stands on these soils indicate an average site index of 40 or less for oak. The preferred species for planting is red cedar on the steeper slopes and eroded areas but productivity is very low. White pine can be underplanted in poor oak stands. Norway pine is not recommended on calcareous soils.

Seedlings mortality from heat and drouth is rated as severe on these areas. There is little danger of frost heaving in plantations. Plant competition is generally not a serious problem, and there is little problem of tree diseases.

Limitations on the use of equipment are those imposed by slopes and stoniness. Location of roads on the contour or ridgetops of the steeper slopes and protection from concentrations of water will help control erosion.

Black oak and northern pin oak are the only native trees with much value for shade, though hackberry will do well as a street tree. Trees suitable for hedges, windbreaks and screens are red cedar and jack pine.

123 *Woodland Suitability Group 5* The soils in this group are somewhat excessively drained and medium to moderately coarse textured. Their limited depth restricts tree root development and provides less water-supplying capacity than deeper soils. In Southeastern Wisconsin, these soils are underlain by calcareous material which limits use of these soils for woodland purposes. Native vegetation on these soils is principally mixed oak with some maple, basswood, and aspen. On drier and eroded sites, bur oak, black oak, and red cedar are common.

Native trees suitable for shade include red and white oak, sugar maple, and American beech. Street trees include hickory, green ash, and ironwood. Trees suitable for hedges, screens, and windbreaks are red and white cedar, white pine, and white spruce.

The average site index of red oak on Casco loam is 48. The site index for sugar maple ranges from 47 to 59. Species suitable for planting are white pine on the north and east slopes and in underplantings, while on the south and west slopes and severely eroded areas red cedar is the only known suitable species. Oak can reproduce itself on these soils, but on the poorest sites heat and drouth are limiting factors. Rabbits and meadow mice sometimes present a local problem, and white grubs are a hazard in sod areas. Brush control is needed to prevent overtopping of young trees.

Machine tree planting is hindered by gullies, stoniness and steep slopes. Fire control activities or timber harvesting operations are difficult because access to these areas is difficult. The harvesting of timber during dry or frozen periods will prevent soil

compaction and erosion. Road layout and construction is generally difficult on steeper slopes. Roads should be built along ridge lines where possible.

Woodland Suitability Group 6 The soils in this group are less than 12 inches deep over bedrock or gravel. Because of the drouthy nature of these soils, caused by low available moisture capacity, tree growth is very slow. Native vegetation consists mainly of grass, bur oak, and red cedar. The trees are scrubby, short-boled, and limby. Fenceposts and fuel wood are the principal forest products grown on these soils.

There is a severe loss of seedlings from heat, drouth, and erosion. In spite of the shallow depth of these soils, windfall is not considered a severe hazard.

Steep topography limits the use of equipment. Planting machines can be used on gentler slopes. Red cedar is the only species suitable for planting, but because of slow growth there is little likelihood of producing merchantable timber in a lifetime. Because of drouthy conditions and severe exposures, regeneration of woody species is slow. The maintenance of present woodland stands on these soils is a principal management objective. Because these soils are poor for all species, all existing trees should be saved where ever possible for recreational purposes or as a setting for residential development.

Woodland Suitability Group 7 These soils are somewhat poorly to very poorly drained, medium to fine textured upland soils. Native vegetation on the somewhat poorly drained soils of this group was mainly mixed hardwoods, oak, and aspen. On the poorly drained soils, soft maple, ash, and elm were the more common species. Some white cedar also grows on these soils. The principal woodland products are sawtimber, posts and fuel wood.

Site quality is medium to good for mixed hardwoods, white pine, white cedar and white spruce on the somewhat poorly drained sites and only fair on the poorly drained soils. Measurements of young white pine plantations indicate good growth on the somewhat poorly drained soils. The danger of seedling drowning is moderate on the somewhat poorly drained sites to severe on the poorly drained sites. Competition from grasses, sedges, and brush is severe. Blister rust may be a serious problem for white pine

when gooseberries and currants are nearby. Root rot is a major disease on these soils and dutch elm disease is a severe threat to elm trees. Rabbits and deer can cause serious damage to trees in local areas, especially to new plantations.



A pine plantation on Casco-Rodman loams in the Kettle Moraine.

The windthrow hazard is severe, and any logging system should allow removal of only mature and defective trees leaving wind barriers around the borders of the stand. There is little danger of heat or drouth damage, but frost is a hazard in depressions. Machine tree planting, timber harvesting and fire control are difficult. Logging is recommended in winter or dry seasons only. Logging when soils are wet will result in low traction for equipment and cause serious soil compaction. Erosion is seldom a problem on these soils.

In managing the natural stands, white pine, maple and oak are the species to favor. In planting, white spruce, white pine, and white cedar are the preferred species. Trees can be planted on mounds or ridges, but low areas are not suitable. Timber is difficult to re-establish on these soils.

Good shade trees on these soils are swamp white oak, red maple, and ash. For street trees, green ash, red maple, and basswood are suitable. White spruce and white cedar are good for hedges, screens, and windbreaks.

Woodland Suitability Group 8 This group of soils consists of the somewhat poorly drained to very poorly drained, moderately coarse

to coarse textured mineral soils. Native vegetation on these soils was oak, elm, ash, hickory, soft maple, grasses, sedges, and, in some places, willows. The principal woodland products are box lumber.

Hazards to seedlings are moderate to severe due to drowning and plant competition. Wood-rotting fungi are often troublesome. Dutch elm disease and oak wilt are major disease problems. There is a serious problem of using equipment on these soils, especially during wet periods in the spring. Although many of the trees are shallow-rooted, the hazard of windthrow is moderate because wet sand generally provides good anchorage.

Silver maple can be used as a shade tree and black ash as a street tree while white cedar is useful for hedges, screens, and windbreaks.

Woodland Suitability Group 9 These soils are somewhat poorly to very poorly drained alluvial soils. Site quality for hardwoods ranges from poor to good. Cottonwood grows well on the somewhat poorly drained sites.

There is little hazard from heat, drouth, or frost on these soils, but the hazard from drowning is rated as severe due to frequent flooding. Plant competition from tall weeds and brush is severe. Normally there is little hazard due to insects, but there is a hazard of root and stem rot which ranges from moderate to severe. Dutch elm disease is a major threat to elm trees. Windthrow hazard is generally moderate but is severe where there is a prolonged high water table.

Erosion is a problem only along streambanks where it can be severe. Machine tree planting can be hazardous on the somewhat poorly drained soils and impracticable on the poorly drained soils. Cottonwood is the only suitable species except that willows may be useful for streambank protection. Timber harvesting is limited to frozen conditions or when dry conditions prevail. In any logging operations, the original hardwood cover should be maintained. Access for fire control purposes is generally difficult, but the occurrence of fires on these soils is rather infrequent.

Suitable native shade trees on these soils include swamp white oak and red maple. Ash make a good street tree and white cedar is good for screens, hedges, and windbreaks.

Woodland Suitability Group 10 This group consists of the organic soils such as peat and muck. Natural vegetation consists principally of red and silver maple, elm, ash, white cedar, willow, and sedges. Trees harvested on these soils are used for sawlogs and cedar posts. Site quality ranges from poor to good depending on the variability in drainage caused by microrelief and underground movement of water.

Late frosts are common and cause serious mortality of seedlings. Fluctuating water tables drown many tree seedlings. Windthrow hazard is severe. Maintaining relatively thick stands will reduce wind damage. Deer browse may be a problem on white cedar. Planting is not feasible because tree planting machines are impractical and hand planting is difficult. White cedar grows well, when established. Willows are suitable for windbreaks to control wind erosion in cultivated areas.

Suitable shade trees for these soils include silver maple, red maple, and white ash. White cedar and willows are suitable for windbreaks, hedges, and screens.

Woodland Suitability Group 13 This group is comprised of rough, broken, and stony land that varies widely in texture and depth. These areas are productive, but woodland management on them is difficult and variable because of steep slopes and rockiness. Native vegetation ranges from northern hardwoods, such as maple, basswood, ash and oak, on the cool moist north and east slopes to oak and hickory on the hot dry south and west slopes. Aspen, cottonwood, and cherry grow as pioneer species in some areas. Principal woodland products are sawlogs and fuel wood.

Where the soil is deep and medium textured, high production can be expected, while on the thinner and coarse textured soils, hardwood production is very low. On the south and west slopes, the hazard to seedlings survival from heat and drouth is rated as moderate to severe. On the north and east slopes, the hazard to seedlings survival is rated as slight.

Access for fire control purposes is difficult and it is generally impractical to construct firebreaks on these land types. Logging operations are difficult and generally require specialised equipment. Tree planting is limited to hand methods. Species preferred for planting are white pine on the deeper

TABLE 12.
THE USE OF SOILS FOR WOODLAND

Woodland Suitability Group	Description	Hazards Affecting Seedling Survival			Erosion Hazard	Wind-throw Hazard	Equipment Limitation for		Species Suitability	
		Drouth	Plant Competition	Wetness			Tree Planting	Timber Harvest	Natural Stands	Plantations
1	Moderately deep and deep, well to moderately well drained, medium textured soils, with less than 12 percent slopes.	Slight	Severe	Slight	Slight	Slight	Slight	Slight	Maple, basswood, red oak, white pine	White pine, Norway pine, white spruce
	Soils in Group 1 but with slopes of 12 percent or more.	Slight on northeast; moderate on southwest	Severe	None	Moderate	Slight	Moderate to Severe	Moderate to Severe	Same as above	Same as above
2	Moderately deep and deep, moderately well to well drained fine textured soils with less than 12 percent slopes.	Slight	Severe	Slight	Slight	Slight	Moderate	Moderate	Maple, basswood, white oak, red oak, white ash	White pine, white spruce
	Soils in Group 2 with slopes of 12 percent or more.	Moderate	Severe	Slight	Moderate	Slight	Severe	Severe	Same as above	Same as above
3	Moderately deep and deep, moderately coarse textured, somewhat excessively drained soils with less than 12 percent slopes.	Moderate	Moderate	None	Moderate	Slight	Slight	Slight	White pine, Norway pine, red oak	White pine, Norway pine
	Group 3 soils with slopes of 12 percent or more.	Moderate on north slopes; Severe on south slopes	Moderate (brush on north slopes)	None	Severe	Slight	Moderate to Severe	Moderate to Severe	Same as above	Same as above
4	Excessively drained coarse textured soils with less than 12 percent slopes.	Severe	Slight	None	Moderate (Wind Erosion)	Slight	Slight	Slight	Red oak	White pine for underplanting
	Group 4 soils with slopes of 12 percent or more	Severe	Slight	None	Severe (Wind erosion)	Slight	Moderate to Severe	Moderate to Severe		White pine on north slopes
5	Thin, somewhat excessively drained, medium to moderately coarse textured soils with less than 12 percent slopes.	Moderate	Moderate	Slight	Slight	Slight	Slight	Moderate	Pines, red oak, sugar maple, basswood	White pine, white spruce for underplanting
	Group 5 soils with slopes of 12 percent or more.	Moderate to Severe	Moderate to Severe	Slight	Moderate to Severe	Slight	Moderate to Severe	Moderate to Severe	Red oak, pines	White pine on north and east; red cedar on south and west slopes.
6	Excessively drained, very thin, medium to coarse textured soils on slopes of 12 percent or less.	Severe	Slight	None	Moderate (wind erosion)	Moderate	Slight	Slight	All species	White pine (underplanting), red cedar
	Same as above but with slopes of 12 percent or more.	Severe	Slight	None	Severe	Moderate	Moderate to Severe	Moderate to Severe	Same as above	Same as above
7	Somewhat poorly to very poorly drained, medium to fine textured soils.	Slight	Severe	Moderate on somewhat poorly to severe on very poorly drained soils.	Slight	Moderate on somewhat poorly to severe on poorly drained soils	Moderate to Severe	Moderate to Severe	White pine, maple, oak	White spruce, white pine, white cedar
8	Somewhat poorly to very poorly drained, moderately coarse to coarse textured soils.	Slight	Severe	Severe	Slight	Moderate	Severe	Severe	All species	Not recommended
9	Somewhat poorly to very poorly drained alluvial soils.	Slight	Severe	Moderate to Severe	Moderate (stream-bank)	Moderate	Moderate to Severe	Moderate on somewhat poorly to severe on very poorly drained soils.	All species	Cottonwood
10	Organic soils - peat and muck	Slight	Severe	Moderate to Severe	Severe (when cleared)	Severe	Moderate to Severe	Moderate to Severe	Silver maple	Willow (windbreaks) and white cedar
13	Steep and rocky lands	Slight on north and east slopes to severe on south and west slopes.	Moderate	Slight	Moderate	Slight	Severe (hand methods only)	Severe	Oak, maple, basswood	White pine on north and east types, Norway pine on south and west slopes.

soils of the north and east slopes, while Norway pine is preferred on the shallower soils and south and west slopes. Soils with less than 18 inches of silt over dolomite are generally questionable for woodland.

Woodland Yields The estimated yields of selected species of trees on various soils of the Region are given in Table 13. These data represent the average annual production in gross board feet of lumber per acre as measured by Scribner's rule. The yields are for fully stocked, unmanaged areas with enough trees to fully utilize the site. No

deduction is made for culls or defective trees. Yields for white pine and red pine are for areas that are being managed intensively and where trees are harvested at optimum age. Material cut in thinning is included in white and red pine yields.

Some soils have been omitted from the Woodland Yield Table because natural stands of merchantable timber do not grow on them or they are not suitable for tree planting. Yield data for certain species on some listed soils have been omitted because the species is not suitable for planting or does not grow naturally on a particular soil.

TABLE 13
WOODLAND YIELDS

Soil Name ¹	Woodland Suitability Group	Lumber Yield in Board Feet per Acre			
		Mixed Hardwood	Oak	Red Pine	White Pine
Adrian muck	10	100-200	-	-	-
Adrian muck, clay substratum	10	100-200	-	-	-
Adrian mucky peat	10	100-200	-	-	-
Alluvial land	1	200-275	-	-	-
Alluvial land, rock substratum	9	50-100	-	-	-
Alluvial land, wet	9	100-200	-	-	-
Argyle silt loam	1	-	160-190	-	-
Ashford silt loam	5	200-250	160-190	-	-
Ashkum silty clay loam	7	-	80-120	-	-
Beecher silt loam	7	-	160-190	-	-
Blount silt loam	7	-	160-190	-	-
Bono silty clay loam	7	-	160-190	-	-
Boyer loamy sand	4	-	60-90	200-300	250-350
Boyer loamy sand, clay substratum	3	-	60-90	250-350	300-450
Boyer loamy sand, loam substratum	3	-	60-90	250-350	300-450
Boyer sandy loam	3	-	80-120	300-350	400-450
Boyer sandy loam, clay substratum	3	-	80-120	300-400	400-500
Boyer sandy loam, loam substratum	3	-	80-120	300-400	400-500
Briggsville silty clay loam	2	180-220	160-200	-	-
Brookston silt loam	7	80-120	-	-	-
Brookston silt loam, clay substratum	7	80-120	-	-	-
Calamus silt loam	1	180-220	180-220	-	-
Casco loam	5	-	100-150	-	300-375
Casco loam, clay substratum	5	-	100-150	-	300-400
Casco loam, loam substratum	1	-	100-150	-	300-400
Casco loam, rock substratum	1	-	100-150	-	300-375
Casco loam, silt and fine sand substratum	1	-	100-150	-	300-400
Casco sandy loam	5	-	80-120	-	250-300

¹ Soils that are not suitable for woodlands have been omitted from this table.
- Species not suitable for this soil.

TABLE 13
WOODLAND YIELDS (Continued)

Soil Name	Woodland Suitability Group	Lumber Yield in Board Feet per Acre			
		Mixed Hardwood	Oak	Red Pine	White Pine
Casco sandy loam, clay substratum	5	-	100-150	-	250-350
Casco sandy loam, loam substratum	1	-	100-150	-	250-350
Casco sandy loam, silt and fine sand substratum	1	-	100-150	-	250-350
Casco silt loam	5	-	135-165	-	350-450
Casco silt loam, clay substratum	1	-	135-165	-	350-450
Casco silt loam, loam substratum	1	-	135-165	-	350-450
Celina silt loam	1	160-190	135-165	-	400-450
Clyman silt loam	7	135-165	135-165	-	400-450
Colwood fine sandy loam	7	100-150	-	-	300-375
Colwood fine sandy loam, clay substratum	7	100-150	-	-	300-375
Colwood silt loam	7	100-150	-	-	300-375
Colwood silt loam, clay substratum	7	100-150	-	-	300-375
Colwood silt loam, gravelly substratum	7	100-150	-	-	300-375
Crestview fine sandy loam	3	-	-	-	450-500
Crestview fine sandy loam, clay substratum	3	-	-	-	450-500
Crestview loamy fine sand	4	-	-	-	450-500
Crosby silt loam	7	160-190	160-190	-	
Dodge silt loam	1	200-250	160-190	400-450	475-550
Dodge silt loam, rock substratum	1	200-250	160-190	-	400-450
Dorchester silt loam	1	225-275	200-250	-	-
Dousman loam	7	80-120	80-120	-	350-450
Dousman loam, clay substratum	7	80-120	80-120	-	350-450
Dousman loam, loam substratum	7	80-120	80-120	-	350-450
Dousman loam, silt and fine sand substratum	7	80-120	80-120	-	350-450
Dousman sandy loam	8	80-120	80-120	-	350-400
Dousman sandy loam, clay substratum	8	80-120	80-120	-	350-450
Ehler silt loam	7	80-120	-	-	-
Ehler silt loam, rock substratum	7	80-120	-	-	-

TABLE 13
WOODLAND YIELDS (Continued)

Soil Name	Woodland Suitability Group	Lumber Yield in Board Feet per Acre			
		Mixed Hardwood	Oak	Red Pine	White Pine
Ehler silt loam, gravelly substratum	7	80-120	-	-	-
Fabius loam	7	80-120	100-150	-	350-450
Fabius loam, clay substratum	7	80-120	100-150	-	350-450
Fabius loam, rock substratum	7	80-120	100-150	-	350-450
Fabius sandy loam	7	80-120	100-150	-	350-450
Fabius sandy loam, clay substratum	7	80-120	100-150	-	350-450
Fabius silt loam	7	80-120	100-150	-	350-450
Fabius silt loam, clay substratum	7	80-120	100-150	-	350-450
Fabius silt loam, loam substratum	7	80-120	100-150	-	350-450
Fabius silt loam, silt and fine sand substratum	7	80-120	100-150	-	350-450
Flagg silt loam	1	-	225-275	450-570	500-575
Fox loam	1	160-190	135-165	325-400	400-450
Fox loam, clay substratum	1	160-190	135-165	325-400	400-450
Fox loam, loam substratum	1	160-190	135-165	325-400	400-450
Fox loam, rock substratum	1	160-190	135-165	325-400	400-450
Fox loam, silt and fine sandy substratum	1	160-190	135-165	325-400	400-450
Fox sandy loam	3	135-165	135-165	325-400	400-450
Fox sandy loam, clay substratum	3	135-165	135-165	325-400	400-450
Fox sandy loam, loam substratum	3	135-165	135-165	325-400	400-450
Fox sandy loam, silt and fine sand substratum	3	135-165	135-165	325-400	400-450
Fox silt loam	1	180-220	135-165	325-400	400-450
Fox silt loam, clay substratum	1	180-220	135-165	325-400	400-450
Fox silt loam, loam substratum	1	180-220	135-165	325-400	400-450
Fox silt loam, rock substratum	1	180-220	135-165	325-400	400-450
Fox silt loam, silt and fine sand substratum	1	180-220	135-165	325-400	400-450
Granby fine sandy loam	8	80-120	-	-	-
Granby fine sandy loam, clay substratum	8	80-120	-	-	-

TABLE 13
WOODLAND YIELDS (Continued)

Soil Name	Woodland Suitability Group	Lumber Yield in Board Feet per Acre			
		Mixed Hardwood	Oak	Red Pine	White Pine
Granby fine sandy loam, loam substratum	8	80-120	-	-	-
Granby loamy sand	8	80-120	-	-	-
Granby loamy sand, silt and fine sand substratum	8	80-120	-	-	-
Hackett loam	3	-	60-90	250-350	300-400
Hackett loamy sand	4	-	40-60	200-300	250-350
Hackett loamy sand, silt and fine sand substratum	4	-	40-60	-	-
Hackett loamy sand, wet variant	8	-	80-120	-	350-450
Hackett sandy loam	3	-	60-90	250-350	300-400
Hackett sandy loam, clay substratum	3	-	60-90	300-400	350-450
Hackett sandy loam, loam substratum	3	-	60-90	300-400	350-450
Hackett sandy loam, wet variant	8	-	80-120	-	350-450
Hebron loam	1	-	135-165	-	400-450
Hebron loam, loam substratum	1	-	135-165	-	400-450
Hebron sandy loam	3	-	80-120	-	250-300
Hebron silt loam	1	-	135-165	-	400-450
Hennepin loam	5	80-120	80-120	-	-
Hillside seepage	7	40-60	-	-	-
Hochheim fine sandy loam	5	180-220	135-165	-	-
Hochheim loam	5	180-220	135-165	-	400-450
Hochheim loam, gravelly substratum	5	180-220	135-165	-	400-450
Hochheim loam, rock substratum	5	180-220	135-165	-	400-450
Hochheim silt loam	5	200-250	135-165	-	400-450
Hochheim silt loam, gravelly substratum	5	200-250	135-165	-	400-450
Hochheim silt loam, rock substratum	5	200-250	135-165	-	400-500
Hochheim silt loam, silt and fine sand substratum	5	200-250	135-165	-	-
Houghton muck	10	100-200	-	-	-
Houghton mucky peat	10	100-200	-	-	-

TABLE 13
WOODLAND YIELDS (Continued)

Soil Name	Woodland Suit-ability Group	Lumber Yield in Board Feet per Acre			
		Mixed Hardwood	Oak	Red Pine	White Pine
Houghton peat, acid variant	10	50-100	-	-	-
Ionia loam	1	160-190	135-165	-	-
Ionia loam, clay substratum	1	160-190	135-165	-	-
Ionia loam, loam substratum	1	160-190	135-165	-	-
Ionia loam, silt and fine sand substratum	1	160-190	135-165	-	-
Ionia sandy loam	3	135-165	100-150	300-400	400-450
Ionia sandy loam, silt and fine sand substratum	3	135-165	100-150	300-400	400-450
Ionia silt loam	1	180-220	135-165	-	-
Ionia silt loam, clay substratum	1	180-220	135-165	-	-
Ionia silt loam, loam substratum	1	180-220	135-165	-	-
Jericho silt loam	2	-	160-190	-	-
Juneau silt loam	1	180-220	180-220	-	-
Keowns fine sandy loam	7	80-120	-	-	300-375
Keowns fine sandy loam, loam substratum	7	80-120	-	-	300-375
Keowns silt loam	7	80-120	-	-	300-375
Keowns silt loam, clay substratum	7	80-120	-	-	300-375
Kewaunee loam	2	200-250	200-250	300-400	400-450
Kewaunee sandy loam	2	180-220	180-220	300-400	400-450
Kewaunee silt loam	2	225-275	225-275	300-400	450-500
Kibbie fine sandy loam	7	180-220	180-220	-	350-400
Kibbie fine sandy loam, clay substratum	7	180-220	180-220	-	350-400
Kibbie silt loam	7	225-275	225-275	-	350-400
Kibbie silt loam, clay substratum	7	225-275	225-275	-	350-400
Kibbie silt loam, rock substratum	7	225-275	225-275	-	350-400
Knowles loam	1	135-165	160-190	275-350	350-400
Knowles silt loam	1	135-165	160-190	275-350	350-400
Knowles silt loam, shallow variant	5	100-150	135-165	-	-
Knowles silt loam, wet variant	1	135-165	160-190	275-350	350-400

TABLE 13
WOODLAND YIELDS (Continued)

Soil Name	Woodland Suit-ability Group	Lumber Yield in Board Feet per Acre			
		Mixed Hardwood	Oak	Red Pine	White Pine
Lamartine silt loam	7	135-165	-	-	-
Lamartine silt loam, clay substratum	7	135-165	-	-	-
Lamartine silt loam, gravelly substratum	7	135-165	-	-	-
Lamartine silt loam, silt and fine sand substratum	7	135-165	-	-	-
Lapeer loam	1	180-220	180-220	450-500	450-500
Lapeer loam, shallow variant	5	100-150	100-150	-	350-450
Lapeer sandy loam	3	-	100-150	350-450	400-450
Manawa loam	7	160-190	160-190	-	300-400
Manawa silt loam	7	160-190	160-190	-	300-400
Markham silt loam	1	160-190	160-190	-	-
Matherton loam	7	135-165	135-165	-	-
Matherton loam, clay substratum	7	135-165	135-165	-	-
Matherton loam, loam substratum	7	135-165	135-165	-	-
Matherton loam, silt and fine sand substratum	7	135-165	135-165	-	-
Matherton sandy loam	7	135-165	135-165	-	350-450
Matherton sandy loam, loam substratum	7	135-165	135-165	-	350-450
Matherton sandy loam, silt and fine sand substratum	7	135-165	135-165	-	350-450
Matherton silt loam	7	135-165	135-165	-	-
Matherton silt loam, clay substratum	7	135-165	135-165	-	-
Matherton silt loam, loam substratum	7	135-165	135-165	-	-
Matherton silt loam, silt and fine sand substratum	7	135-165	135-165	-	-
Mayville silt loam	1	180-220	160-190	-	300-375
Mayville silt loam, clay substratum	1	180-220	160-190	-	300-375
Mayville silt loam, gravelly substratum	1	180-220	160-190	-	300-375
Mayville silt loam, rock substratum	1	180-220	160-190	-	300-375
McHenry silt loam	1	180-220	180-220	300-375	350-400
McHenry silt loam, clay substratum	1	180-220	180-220	-	400-450

TABLE 13
WOODLAND YIELDS (Continued)

Soil Name	Woodland Suit-ability Group	Lumber Yield in Board Feet per Acre			
		Mixed Hardwood	Oak	Red Pine	White Pine
Mequon silt loam	7	-	160-190	-	-
Miami loam	1	180-220	180-220	300-375	350-400
Miami silt loam	1	180-220	180-220	300-375	350-400
Morley sandy loam	2	135-165	135-165	-	-
Morley silt loam	2	160-190	100-150	-	-
Morley silt loam, gravelly substratum	2	135-165	135-165	-	-
Morley silt loam, silt and fine sand substratum	2	135-165	135-165	-	-
Mosel loam	7	135-165	135-165	-	-
Mosel sandy loam	8	135-165	135-165	-	-
Mosel silt loam	7	135-165	135-165	-	-
Muskego muck	10	100-200	-	-	-
Mussey loam	7	80-120	-	-	-
Mussey loam, clay substratum	7	80-120	-	-	-
Mussey sandy loam	8	80-120	-	-	-
Mussey silt loam	7	80-120	-	-	-
Mussey silt loam, clay substratum	7	80-120	-	-	-
Mussey silt loam, loam substratum	7	80-120	-	-	-
Mussey silt loam, silt and fine sand substratum	7	80-120	-	-	-
Navan loam	7	60-90	-	-	-
Navan silt loam	7	60-90	-	-	-
Nenno silt loam	7	100-150	100-150	-	-
Ockley loam	1	200-250	225-275	450-500	450-550
Ockley sandy loam	1	200-250	225-275	450-500	450-550
Ockley silt loam	1	200-250	225-275	450-500	450-550
Ockley silt loam, clay substratum	1	200-250	225-275	450-500	450-550
Ockley silt loam, rock substratum	1	200-250	225-275	450-500	450-550
Ockley silt loam, silt and fine sand substratum	1	200-250	225-275	450-500	450-550

TABLE 13
WOODLAND YIELDS (Continued)

Soil Name	Woodland Suit-ability Group	Lumber Yield in Board Feet per Acre			
		Mixed Hardwood	Oak	Red Pine	White Pine
Ogden muck	10	100-200	-	-	-
Ogden mucky peat	10	100-200	-	-	-
Oshtemo loamy fine sand	4	-	100-150	350-450	400-500
Oshtemo loamy sand	4	-	100-150	350-450	400-500
Oshtemo sandy loam	3	-	135-165	400-550	500-600
Ozaukee silt loam	2	160-190	160-190	-	-
Ozaukee silt loam, gravelly substratum	2	160-190	160-190	-	-
Ozaukee silt loam, loam substratum	2	160-190	160-190	-	-
Ozaukee silt loam, rock substratum	2	160-190	160-190	-	-
Ozaukee silt loam, silt and fine sand substratum	2	160-190	160-190	-	-
Palms muck	10	100-200	-	-	-
Palms mucky peat	10	100-200	-	-	-
Parr sandy loam	3	-	-	400-450	450-500
Pecatonica silt loam	1	160-190	160-190	400-450	450-500
Pistakee silt loam	7	180-220	180-220	-	-
Poygan silt loam	7	80-120	-	-	-
Poygan silty clay loam	7	80-120	-	-	-
Rodman gravelly loam	6	-	40-60	-	-
Rollin muck	10	100-200	-	-	-
Rollin muck, shallow	10	100-200	-	-	-
Rollin mucky peat	10	100-200	-	-	-
Rome sandy loam	3	-	-	400-450	400-500
Rough broken land	13	135-250	135-200	-	300-450
Sawmill silt loam	9	100-150	-	-	-
Saylesville loam	2	225-275	225-275	-	-
Saylesville loam, gravelly substratum	2	175-225	160-200	-	-
Saylesville silt loam	2	225-275	225-275	-	-
Saylesville silt loam gravelly substratum	2	175-225	160-200	-	-

TABLE 13
WOODLAND YIELDS (Continued)

Soil Name	Woodland Suitability Group	Lumber Yield in Board Feet per Acre			
		Mixed Hardwood	Oak	Red Pine	White Pine
Saylesville silt loam, loam substratum	2	225-275	225-275	-	-
Saylesville silt loam, silt and fine sand substratum	2	225-275	225-275	-	-
Sebewa loam	7	80-120	-	-	-
Sebewa loam, clay substratum	7	80-120	-	-	-
Sebewa loam, loam substratum	7	80-120	-	-	-
Sebewa loam, silt and fine sand substratum	7	80-120	-	-	-
Sebewa sandy loam	8	80-120	-	-	-
Sebewa silt loam	7	80-120	-	-	-
Sebewa silt loam, clay substratum	7	80-120	-	-	-
Sebewa silt loam, loam substratum	7	80-120	-	-	-
Sebewa silt loam, rock substratum	7	80-120	-	-	-
Sebewa silt loam, silt and fine sand substratum	7	80-120	-	-	-
Sisson fine sandy loam	3	180-220	180-220	-	-
Sisson fine sandy loam, clay substratum	3	180-220	180-220	-	-
Sisson loam	1	200-250	-	-	-
Sisson silt loam	1	200-250	-	400-450	450-500
Sisson silt loam, clay substratum	1	200-250	-	400-450	450-500
Sisson silt loam, gravelly substratum	1	200-250	-	400-450	450-500
Sisson silt loam, loam substratum	1	200-250	-	400-450	450-500
Sisson silt loam, rock substratum	1	200-250	-	400-450	450-500
Sleeth silt loam	7	180-220	180-220	-	-
Sleeth silt loam, clay substratum	7	180-220	180-220	-	-
Spinks fine sand	4	-	80-120	200-300	-
Spinks fine sand, silty substratum	3	-	80-125	300-400	-
Spinks loamy fine sand	4	-	80-120	300-400	400-450
Stinson silt loam	7	160-190	-	-	450-500
Stony colluvium	13	80-220	80-220	-	-

TABLE 13
WOODLAND YIELDS (Continued)

Soil Name	Woodland Suit-ability Group	Lumber Yield in Board Feet per Acre			
		Mixed Hardwood	Oak	Red Pine	White Pine
Sumner loamy sand	4	-	-	200-300	250-350
Sumner loamy sand, clay substratum	3	-	-	250-350	300-450
Sumner sandy loam	3	-	-	300-400	400-450
Sumner sandy loam, clay substratum	3	-	-	350-450	400-500
Sumner sandy loam, loam substratum	3	-	-	350-450	400-500
Tedrow loamy sand	8	-	100-150	-	300-400
Tedrow loamy sand, clay substratum	8	-	100-150	-	100-400
Tedrow loamy sand, loam substratum	8	-	100-150	-	300-400
Tedrow sandy loam	8	-	100-150	-	350-450
Tedrow sandy loam, clay substratum	8	-	100-150	-	350-450
Tedrow sandy loam, loam substratum	8	-	100-150	-	350-450
Tedrow sandy loam, silt and fine sand substratum	8	-	100-150	-	-
Terrace escarpment, outwash	13	-	80-120	-	-
Terrace escarpment, till	13	-	80-120	-	-
Thackery silt loam	1	200-250	225-275	450-500	450-550
Thackery silt loam, silt and fine sand substratum	1	200-250	225-275	450-500	450-550
Theresa silt loam	1	200-250	180-220	300-350	350-400
Theresa silt loam, clay substratum	1	200-250	180-220	-	-
Theresa silt loam, gravelly substratum	1	200-250	180-220	-	-
Theresa silt loam, rock substratum	1	200-250	180-220	-	-
Theresa silt loam, silt and fine sand substratum	1	200-250	180-220	-	-
Tichigan silt loam	7	160-190	160-190	-	-
Tichigan silt loam, gravelly substratum	7	160-190	160-190	-	-
Tichigan silt loam, loam substratum	7	160-190	160-190	-	-
Tichigan silt loam, rock substratum	7	160-190	160-190	-	-
Tichigan silt loam, silt and fine sand substratum	7	160-190	160-190	-	-
Tustin loamy fine sand	4	-	100-150	325-375	500-550

TABLE 13
WOODLAND YIELDS (Continued)

Soil Name	Woodland Suit-ability Group	Lumber Yield in Board Feet per Acre			
		Mixed Hardwood	Oak	Red Pine	White Pine
Tustin sandy loam	3	-	135-165	325-375	500-550
Vilas loamy sand	4	-	60-90	500-575	500-575
Wallkill silt loam	9	135-165	-	-	-
Waukechon loam	9	80-120	-	-	-
Wea sandy loam	3	-	-	450-500	500-550
Westland silt loam	7	80-120	-	-	-
Westland silt loam, clay substratum	7	80-120	-	-	-
Westland silt loam, loam substratum	7	80-120	-	-	-
Westland silt loam, silt and fine sand substratum	7	80-120	-	-	-
Westville silt loam	1	225-275	225-275	-	500-600
Yahara loam	7	160-190	160-190	-	-
Yahara loam, clay substratum	7	160-190	160-190	-	-
Yahara silt loam	7	160-190	160-190	-	-
Yahara very fine sandy loam	7	160-190	160-190	-	450-500
Yahara very fine sandy loam, clay substratum	7	160-190	160-190	-	-

Chapter VIII

PLANT MATERIALS FOR BEAUTIFICATION AND SOIL STABILIZATION

Plant materials for non-agricultural purposes include legume-grass mixtures or grasses in pure stands for critical areas where removal of vegetation has caused a severe erosion hazard, golf courses, lawns, play areas and open areas in urban developments; shrubs and vines for landscaping uses; and trees for use as shade trees, on lawns, street trees, hedges and windbreaks. When properly placed and maintained these plants provide cover for critical areas and beauty to the landscape. In addition they help to control erosion and conserve moisture.

This chapter contains guides for herbaceous plantings, shrub and vine plantings, and tree

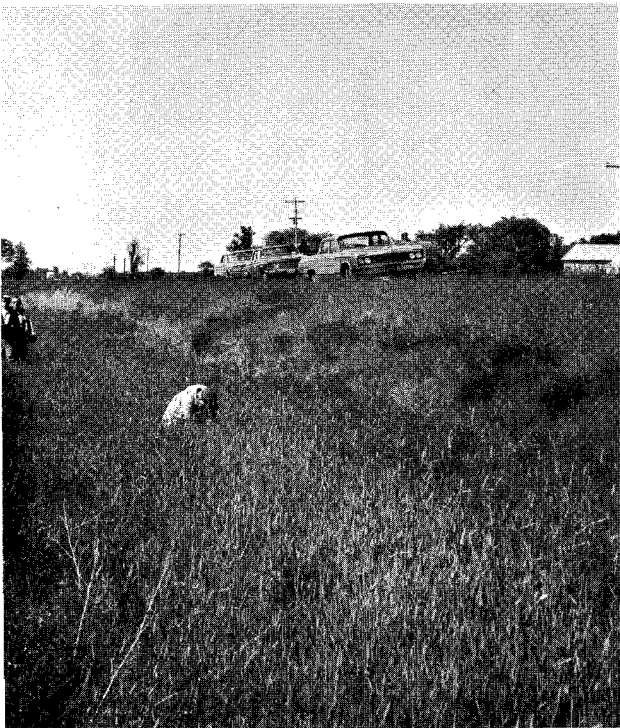
plantings in urban developments and farmsteads. The soils are grouped by land capability units or woodland suitability groups. Soils are placed in the groupings according to characteristics that affect the suitability of plants for a given site.

HERBACEOUS PLANTING GUIDE

The "Herbaceous Planting Guide" includes plants suitable for use in critical areas, open areas, golf course roughs, lawns, golf course fairways, and play areas. Soils of the Region are grouped by capability units into well drained soils, excessively drained and drouthy soils, somewhat poorly drained soils, and poorly drained soils. The guide includes information for both sunny exposures and partial shade. Critical areas and open area seedings for permanent vegetation include several grasses and legumes. Where "turf" is required in areas such as lawns, golf courses, and play areas, varieties of Kentucky bluegrass (*Poa pratensis*) such as common, delta, or park can be used. Where creeping red fescue (*Festuca rubra*) is suggested, varieties such as Pennlawn, Rainier, common, or chewings fescue can be used. On sunny, well drained sites or somewhat poorly drained soils, Kentucky bluegrass makes up two-thirds of the mixture and creeping red fescue the other third. On sandy or drouthy soils or on well drained soils in partial shade, the ratio is reversed with creeping red fescue making up two-thirds of the mixture.

Seeding rates per acre for the uses intended vary with the soil condition. It is assumed that fertility needs will be met. Roughly, only one-fourth of the seed sown can be expected to survive. Seeding rates are based on the assumption that about the same number of seed per square foot will be needed for each of the following conditions:

- (1) Intensive play areas on sandy soils in partial shade



This roadside planting illustrates how birds-foot trefoil, Garrison creeping foxtail and creeping red fescue can be used for beautification and roadside stabilization.

- (2) Extensive play areas or campgrounds on loamy soils in partial shade
- (3) Golf course fairways on sandy soils in sunny areas
- (4) Lawns on loamy soils in sunny areas.

Seeding Aids

For spring seedings, 5 to 10 percent of the mixture can be ryegrass (*Lolium multiflorum*). Ryegrass is unsuitable for summer seeding. Ideal late summer seeding dates are generally between August 15 and September 15.

Merion Kentucky bluegrass can be substituted for all bluegrass in mixtures for sunny lawns. It can be substituted for as much as 15 percent of the total seed mixture in sunny golf course fairways on well drained soils or on irrigated sandy soils. Where Merion Kentucky bluegrass is used, rust hazard can be reduced by doubling the amount of nitrogen applied.



Empire birdsfoot trefoil is well suited for use in legume-grass mixtures for critical areas.

Emerald crownvetch (*Coronilla varia*) can be substituted for birdsfoot trefoil in sunny areas and can also be used in partial shade. It provides a heavy protective cover for critical areas but spreads and grows slower than trefoil. Lime requirements are similar to alfalfa. In critical areas on well drained soils exposed to sunlight, a mixture of 5 pounds of crownvetch, 2 pounds of Kentucky bluegrass, and 1 pound of creeping red fescue is a suitable mixture. In critical areas on well drained soils in partial shade, a mixture of 5 pounds of crownvetch, 1 pound

of Kentucky bluegrass, and 2 pounds of creeping red fescue is suggested. A mixture of 5 pounds of crownvetch, 1 pound of Kentucky bluegrass, and 2 pounds of creeping red fescue is suitable for sandy soils in both sun and shade.

Successful stands can be expected under most conditions where seedbeds are properly prepared, adequate plant food is provided, and good seeding equipment is used. Seed germination and seedling survival are generally improved where the soil is kept damp until the grass has developed a good root system. Under many conditions, quack grass or bluegrass, when present, can be fertilized and will provide suitable sod.

Peat Moss

The use of peat moss (*Sphagnum* sedge reed moss) on lawns and intensive play areas such as athletic fields with clay or sandy soils will improve the soils and the turf. One-half cubic yard of peat moss per 1,000 square feet incorporated into the top 4 to 6 inches of soil is adequate.

Fertilizers

Seedings are generally more successful when properly fertilized. Normally, a soil test should be made to determine the fertilizer needs at planting time. For topdressing on pure grass stands, the ratio is generally about four parts of nitrogen (N), one part of phosphate (P_2O_5) and two parts of potash (K_2O). The needs can usually be met by applying part of the fertilizer in the spring and part in the fall. Where legumes are included in the stand, the need for nitrogen is almost eliminated.

Mulching

Mulching of seeded areas will improve germination and seedling survival and help control soil erosion. The mulch should consist of clean straw (free from grain and weed seeds) or hay (including slough grass hay). Approximately one 50-pound bale of straw or hay per 1,000 square feet or about one or two tons per acre is needed. Allow mulch to rot in place.

Intensive Play Areas (Athletic Fields)

On intensive play areas, where football, baseball, or lawn tennis fields are desired, pure stands of bluegrass can be used. Sufficient lime and fertilizer to satisfy the

high requirements of bluegrass are needed. Careful watering will speed establishment of the turf.

Mowing and Spraying

- A. Lawns, golf courses, play areas.
Weed growth can be controlled on newly established stands by mowing when grass is about 3 inches high. Established Kentucky bluegrass and creeping red fescue sods are generally mowed about once each week and cut to a height of about 1-1/2 to 2 inches.
- B. Permanent vegetated areas.
Weeds can be controlled by mowing after plants are well established. When established stands are mowed several

times each year a good-looking appearance can be maintained and weeds will be prevented from seeding. For best results, mow when the grass is about 4 inches high.

- C. Critical area seedings.
These areas are generally not mowed but sprays can be used to control weeds where legumes are not being used.
- D. Spraying for weed control.
Many areas are chemically sprayed for weed control. In pure stands of grass, sprays can be very beneficial in controlling troublesome weeds when the manufacturer's recommendations are followed. Where legumes are included in the mixtures, the seeded areas cannot be sprayed for weed control.

TABLE 14.
HERBACEOUS PLANTING GUIDE

		SUITABLE MIXTURES AND SUGGESTED SEEDING RATES FOR						
Soil Capability Units	Brief Descriptions of Soils in Units	Stabilization of ^{1/} Critical Areas	Open Areas; Permanent Vegetation	Golf Course Roughs	Lawns	Golf Course Fairways	Extensive Play ^{2/} Areas	Intensive Play ^{3/} Areas
I IIc-1 IIc-2 IIc-5 IIc-6 IIc-7 IIw-11 IIIc-1 IIIc-2 IIIc-5 IIIc-6 IIIc-7 IVc-1 IVc-2 IVc-6 IVc-7 Vlc-1 Vlc-2 Vlc-6 Vlc-7 VIIc-1 VIIc-2 VIIc-6 VIIc-7	Moderately deep to deep, moderate to well drained, medium textured soils with good moisture supplying capacity for plant growth. Remarks: Class VI and VII capability units in this grouping occur on steep slopes, have a severe erosion hazard and are difficult to seed and maintain	SUNNY EXPOSURES						
		NOT SPRAYED FOR WEED CONTROL 13 lbs. of seed per acre comprised of 10 lbs. Empire birds-foot trefoil 2 lbs. Kentucky bluegrass 1 lb. Creeping red fescue	WEED CONTROL 12-15 lbs. of seed per acre comprised of 8-10 lbs. Vernal alfalfa 4-5 lbs. Smooth brome	22-1/2 lbs. of seed per acre comprised of 15 lbs. Kentucky bluegrass 7-1/2 lbs. Creeping red fescue	27 lbs. of seed per acre comprised of 18 lbs. Kentucky bluegrass 9 lbs. Creeping red fescue	33 lbs. of seed per acre comprised of 22 lbs. Kentucky bluegrass 11 lbs. Creeping red fescue	39 lbs. of seed per acre comprised of 26 lbs. Kentucky bluegrass 13 lbs. Creeping red fescue	45 lbs. of seed per acre comprised of 30 lbs. Kentucky bluegrass 15 lbs. Creeping red fescue
		22 lbs. of seed per acre comprised of 7 lbs. Empire birds-foot trefoil 5 lbs. Smooth brome 10 lbs. Tall fescue	8-9 lbs. of seed per acre comprised of 6 lbs. Empire birds-foot trefoil 2-3 lbs. Timothy or Kentucky bluegrass		Home Owners: Without proper seeding equipment, 1-1/2 - 2 lbs. of mixture (2 parts Kentucky bluegrass, 1 part Creeping red fescue) per 1,000 square feet.			35 lbs. per acre of Kentucky bluegrass
		SPRAYED FOR WEED CONTROL 36 lbs. of seed per acre comprised of 24 lbs. Smooth brome 12 lbs. Tall fescue						
		30-35 lbs. per acre of Smooth brome						
		PARTIAL SHADE						
		24 lbs. of seed per acre comprised of 8 lbs. Smooth brome 16 lbs. Tall fescue	21 lbs. of seed per acre comprised of 7 lbs. Kentucky bluegrass 14 lbs. Creeping red fescue	24 lbs. of seed per acre comprised of 8 lbs. Kentucky bluegrass 16 lbs. Creeping red fescue	27 lbs. of seed per acre comprised of 9 lbs. Kentucky bluegrass 18 lbs. Creeping red fescue	Condition not probable	39 lbs. of seed per acre comprised of 13 lbs. Kentucky bluegrass 26 lbs. Creeping red fescue	48 lbs. of seed per acre comprised of 16 lbs. Kentucky bluegrass 32 lbs. Creeping red fescue
		27 lbs. of seed per acre comprised of 9 lbs. Kentucky bluegrass 18 lbs. Creeping red fescue			Home Owners: Without proper seeding equipment - 1-1/2 - 2 lbs. mixture (1 part Kentucky bluegrass, 2 parts Creeping red fescue) per 1,000 square feet.			
		SUNNY EXPOSURES						
		NOT SPRAYED FOR WEED CONTROL 12 lbs. of seed per acre comprised of 9 lbs. Empire birds-foot trefoil 1 lb. Kentucky bluegrass 2 lbs. Creeping red fescue	9-12 lbs. of seed per acre comprised of 6-8 lbs. Vernal alfalfa 3-4 lbs. Smooth brome	27 lbs. of seed per acre comprised of 9 lbs. Kentucky bluegrass 18 lbs. Creeping red fescue	33 lbs. of seed per acre comprised of 11 lbs. Kentucky bluegrass 22 lbs. Creeping red fescue	39 lbs. of seed per acre comprised of 13 lbs. Kentucky bluegrass 26 lbs. Creeping red fescue	48 lbs. of seed per acre comprised of 16 lbs. Kentucky bluegrass 32 lbs. Creeping red fescue	57 lbs. of seed per acre comprised of 19 lbs. Kentucky bluegrass 38 lbs. Creeping red fescue
		18 lbs. of seed per acre comprised of 6 lbs. Empire birds-foot trefoil 4 lbs. Smooth brome 8 lbs. Tall fescue			Home Owners: Without proper seeding equipment, 1-1/2 - 2 lbs. mixture (1 part Kentucky bluegrass, 2 parts Creeping red fescue) per 1,000 square feet.			
		SPRAYED FOR WEED CONTROL 30 lbs. of seed per acre comprised of 10 lbs. Smooth brome 20 lbs. Tall fescue						
		21 lbs. of seed per acre comprised of 7 lbs. Smooth brome 14 lbs. Tall fescue	18 lbs. of seed per acre comprised of 6 lbs. Kentucky bluegrass 12 lbs. Creeping red fescue	21 lbs. of seed per acre comprised of 7 lbs. Kentucky bluegrass 14 lbs. Creeping red fescue	24 lbs. of seed per acre comprised of 8 lbs. Kentucky bluegrass 16 lbs. Creeping red fescue	Condition not probable	33 lbs. of seed per acre comprised of 11 lbs. Kentucky bluegrass 22 lbs. Creeping red fescue	Try to avoid. 39 lbs. of seed per acre comprised of 13 lbs. Kentucky bluegrass 26 lbs. Creeping red fescue
		24 lbs. of seed per acre comprised of 8 lbs. Kentucky bluegrass 16 lbs. Creeping red fescue			Home Owners: Without proper seeding equipment, 1-1/4 - 1-3/4 lbs. mixture (1 part Kentucky bluegrass, 2 parts Creeping red fescue) per 1,000 square feet.			

- 1/ Cuts, fills, drainage ditches, gully banks, roadsides
2/ Camping areas, parks
3/ Playgrounds, ball fields

TABLE 14.
HERBACEOUS PLANTING GUIDE

SUITABLE MIXTURES AND SUGGESTED SEEDING RATES FOR									
Soil Capability Units	Brief Descriptions of Soils in Units	Stabilization of Critical Areas ^{1/}	Open Areas; Permanent Vegetation	Golf Course Roughs	Lawns	Golf Course Fairways	Extensive Play ^{2/} Areas	Intensive Play ^{3/} Areas	
SUNNY EXPOSURES									
IIw-1 IIw-2 IIw-3 IIw-5 IIw-8 IIw-13	Somewhat poorly to poorly drained soils with high moisture supplying capacity for plant growth and with adequate artificial drainage.	NOT SPRAYED FOR WEED CONTROL							
IIIc-8 IIIw-1 IIIw-3 IIIw-5 IIIw-6 IIIw-8 IIIw-9		10 lbs. of seed per acre comprised of 8 lbs. Empire birds-foot trefoil 2 lbs. Kentucky bluegrass	8 lbs. of seed per acre comprised of 6 lbs. Empire birds-foot trefoil 2 lbs. Timothy or bluegrass	18 lbs. of seed per acre comprised of 12 lbs. Kentucky bluegrass 6 lbs. Creeping red fescue	22-1/2 lbs. of seed per acre comprised of 15 lbs. Kentucky bluegrass 7-1/2 lbs. Creeping red fescue	27 lbs. of seed per acre comprised of 18 lbs. Kentucky bluegrass 9 lbs. Creeping red fescue	33 lbs. of seed per acre comprised of 22 lbs. Kentucky bluegrass 11 lbs. Creeping red fescue	39 lbs. of seed per acre comprised of 26 lbs. Kentucky bluegrass 13 lbs. Creeping red fescue	
IVc-8 IVw-3 IVw-5 IVw-7		18 lbs of seed per acre comprised of 6 lbs. Empire birds-foot trefoil 4 lbs. Smooth brome 8 lbs. Tall fescue	8-11 lbs. of seed per acre comprised of 4-5 lbs. Alsike clover 4-6 lbs. Smooth brome		Home Owners: Without proper seeding equipment, 1-1/4 to 1-3/4 lbs. of mixture (2 parts Kentucky bluegrass, 1 part Creeping red fescue) per 1,000 square feet.			29 lbs. per acre of Kentucky bluegrass	
Vw-7 Vw-14		SPRAYED FOR WEED CONTROL							
		33 lbs of seed per acre comprised of 22 lbs. Smooth brome 11 lbs. Tall fescue							
		25-30 lbs. per acre of smooth brome							
					PARTIAL SHADE				
			21 lbs. of seed per acre comprised of 7 lbs. Smooth brome 14 lbs. Tall fescue	18 lbs. of seed per acre comprised of 6 lbs. Kentucky bluegrass 12 lbs. Creeping red fescue	21 lbs. of seed per acre comprised of 7 lbs. Kentucky bluegrass 14 lbs. Creeping red fescue	24 lbs. of seed per acre comprised of 8 lbs. Kentucky bluegrass 16 lbs. Creeping red fescue	Condition not probable	33 lbs. of seed per acre comprised of 11 lbs. Kentucky bluegrass 22 lbs. Creeping red fescue	39 lbs. of seed per acre comprised of 13 lbs. Kentucky bluegrass 26 lbs. Creeping red fescue
			24 lbs. of seed per acre comprised of 8 lbs. Kentucky bluegrass 16 lbs. Creeping red fescue			Home Owners: 1-1/4 - 1-3/4 lbs. of mixture (1 part Kentucky bluegrass, 2 parts Creeping red fescue) per 1,000 square feet.			
IIw-1 IIw-5 IIIw-1 IIIw-3 IIIw-5 IIIw-8 IIIw-9 IVw-5 IVw-7 Vw-14		Poorly drained soils with high moisture supplying capacity for plant growth but without adequate drainage.	Near water's edge on lakeshores, streambanks and gully bottoms, 1' x 1' sprig spacing of reed canary-grass or ribbon grass	8 lbs. per acre of Reed canary-grass	10 lbs. per acre of Reed canary-grass	Wet Shade: 1 part Annual bluegrass (Poa trivialis), 1 part Kentucky bluegrass. Rate: 20 lbs. per acre	No species recommended.	No species recommended.	No species recommended.
		10 lbs. per acre of Reed canary-grass							

GENERAL SHRUB AND VINE PLANTING GUIDE

The general Shrub and Vine Planting Guide is for selection of suitable plants for purposes such as hedges, wildlife food and cover, roadside plantings, and ground cover. The most important item to be considered in the selection of suitable plants is "hardiness". All shrubs and vines listed in the tables are suited climatically to southeastern Wisconsin. Only the commonly used plants have been included in this table.

Plant selections are listed by groups of capability units. The capability unit for each soil mapped in this area is given at the end of each soil description in Chapter IV. Many of the shrubs and vines listed for the better drained soils are also suitable for the somewhat poorly and poorly drained soils that are adequately drained. Organic soils have severe limitations for many plants, even when drained.

Shade tolerance is an important factor in selection of shrubs and vines. Factors such as color and fragrance of flowers, fruiting characteristics of shrubs, and foliage characteristics are treated under "Remarks". The esthetic value of plants is increasing in importance. Autumn color and winter beauty should be given consideration in selecting

shrubs. Adding beauty to the landscape is important to maintaining sound urban development and desirable farm homesteads. In addition to serving as good screening or ornamental plants shrubs can be used to attract wildlife. Whenever possible shrubs should be selected for multi-purpose use. The better ornamental shrubs are multiple purpose and are of particular visual interest during at least two seasons of the year.

Planting

Most shrubs are planted in the spring before growth starts. For best results existing competition should be removed. The shrub should be planted in a hole large enough to easily accommodate the roots. Soil should be packed around the roots and the plants should be watered adequately. Peat moss and fertilizers are frequently used. For best results, follow instructions that are generally provided with the plants.

Spacing

It is desirable to allow at least 3 feet from foundations and ample room from property lines. Individual plants should be given ample room in which to grow. Plants for hedges can be spaced closer together. The following suggested spacings are provided as a general guide.

Ground cover (solid plantings) - - - - -	3 ft. x 3 ft.
Hedges (one row) - - - - -	2 ft. to 3 ft. apart in the row
Landscaping	
Large shrubs (8 ft. to 12 ft. high) - - - - -	7 ft. to 10 ft. apart
Medium shrubs (5 ft. to 8 ft. high) - - - - -	5 ft. to 7 ft. apart
Small shrubs (less than 5 ft. high) - - - - -	2 ft. to 5 ft. apart
Screens, shrub windbreaks, and borders - - - - -	4 ft. apart in 1 or more rows
	4 ft. apart
Roadsides (solid plantings) - - - - -	4 ft. x 4 ft.
Wildlife food and cover (clump plantings)	
Food - - - - -	10 ft. x 10 ft.
Cover - - - - -	5 ft. x 5 ft.
(Planting in clumps is encouraged, leaving half of the area in grass.)	

TABLE 15
GENERAL SHRUB AND VINE PLANTING GUIDE

Soil Capability Units	Brief Description of Units	Plant Species	Shade Tolerance	USES					GROWTH FORM				AESTHETIC VALUE			Remarks
				Land-scape	Hedges Screens Windbreaks	Wildlife Food & Cover	Road-sides	Ground cover	Height (feet)	Type	Thorny	Thicket former	Flower	Fruit or Berry	Fall Color	
I	Moderately deep to deep, moderate to well drained, medium textured soils with good moisture supplying capacity for plant growth.	Arboretum (shrub types) (Thuja species)	Some	x	x	x			3-7	Shrub					x	Conifer
IIe-1		Barberry, Japanese (Berberis thunbergii)	x	x	x	x			6	Shrub	x			x	x	Colorful
IIe-2		*Bittersweet (Celastrus scandens)	x	Some		x	x	x	Climbs	Vine				x	x	Male and female plants--can injure trees.
IIe-5		*Blackberry, dewberry blackcap, raspberry (Rubus species)				x	x	x	1-5	Bramble	x	x		x	x	Many species--edible.
IIe-6		*Chokeberry, black (Aronia melanocarpa)	x	x		x	x	x	1-3	Shrub		x		x	x	
IIe-7		Cotoneaster (Cotoneaster species)		x	x	x			4-8	Shrub				x	x	Usually glossy foliage--sun lovers
IIIe-1		Crabapple (Malus species)		x	x	x	x		Up to 25	Shrub				x	x	Much used large shrub.
IIIe-2		Current, Alpine (Ribes alpinum)	x	x	x				6-7	Foliage shrub				x		Leaves out early--especially
IIIe-5		*Dogwood, gray (Cornus racemosa)	x			x	x		6-10	Shrub				x	x	x
IIIe-6		*Dogwood, Pagoda (Cornus alternifolia)	x			x	x		10-15	Shrub				x	x	x
IIIe-7		*Dogwood, redosier (Cornus stolonifera)	x	Some					3-9	Shrub		x		x	x	Attractive red twigs.
IVe-1		*Dogwood, roundleaf (Cornus rugosa)	x			x	x	x	3-9	Shrub				x	x	x
IVe-2		*Dogwood, silky (Cornus anonomum)	x		x	x	x		6-10	Shrub				x	x	x
IVe-6		*Elder, American (Sambucus canadensis)				x	x		3-10	Shrub		x		x	x	
IVe-7		*Filbert (hazelnut) (Corylus americana)	x			x	x		5-8	Shrub		x		x	x	Bears edible nuts.
Vie-1		Forsythia (Forsythia species)	x	x					4-8	Shrub				x		Early yellow blooms.
Vie-2		*Grape, wild (Vitis species)	x			x	x	x	Climbs	Vine				x	x	
Vie-6		*Hawthorn or thornapple (Crataegus species)	x	x		x	x		5-15	Shrub	x			x	x	Many types.
Vie-7		Honeyauckle (shrub types) (Lonicera species)	x	x	x	x			6-12	Shrub				x	x	Many shrub types--spreads by seed.
VIIe-1		*Juniper, creeping		x		x	x	x	1-2	Shrub	To touch			x	x	Conifer
VIIe-2		*Juniper, Pfitzer (J. chinensis pfitzeriana)		x		x			8-10	Shrub					x	Ornamental-type conifer.
VIIe-6		Lilac (Syringa species)		x	x		x		8-10	Shrub		Some are		x		Many varieties.
VIIe-7		Maple, Amur (Acer ginnala)		x	x				15+	Tall shrub					x	Low growing tree--can be pruned to hedge.
		Mockorange (Philadelphus species)		x	x				6-9	Shrub				x		Sweet scented flowers--several varieties.
		Myrtle or periwinkle (Vinca minor)	x	x			x	x	1	Short vine		Forms mat		x		Excellent ground cover--sun or shade.
		Ninebark, common (Physocarpus opulifolius)	x	x	x		x		6-9	Shrub				x	x	
		Olive, Autumn (Elaeagnus umbellata)	x	x	x	x			10-15	Shrub				x	x	Attractive to birds.
		Peashrub, Siberian (Caragana arborecens)			x	x	x		10-15	Shrub				x	x	
		Pine, mugho (Pinus mugo mughus)		x		x			6-9	Shrub					x	Conifer
		*Plum, American (Prunus americana & species)	x			x	x		10-15	Shrub	Some	x		x	x	Hardy--spreads.
		Privet, amur (Ligustrum amurense)	x	Some	x	x			10	Shrub				x	x	Good hedge.
		Privet, Regels border (Lobeliafolium regelianum)	x	Some	x	x			6-9	Shrub				x	x	
		*Redcedar, eastern (Juniperus virginiana)			x	x	x		10-20	Shrub	To touch			x	x	Conifer--shrub to tree
		Rose, rugosa & hort var. (Rosa species)		x		x	x		2-6	Shrub				x	x	Many types--use adapted species.
		Russianolive (Elaeagnus angustifolia)		x	x	x			15+	Shrub	x			x	x	Outstanding gray foliage.
		*Snowberry (Symphoricarpos species)	x	x		x	x	x	3-4	Shrub		x		x	x	
		Spirea, anthony waterer (Spirea bumalda)		x					2-3	Shrub				x		Good border plant.
		Spirea, van houttei (Spirea vanhouttei)	x	x	x				5-6	Shrub				x		
		*Suman, fragrant (Rhus aromatica)	x	x		x	x	x	3	Shrub		x		x	x	Brilliant foliage.
		*Sumac, smooth (Rhus glabra)				x	x		6-10	Shrub				x	x	
		*Sumac, staghorn (Rhus typhina)	x	Some		x	x		10-15	Shrub		x		x	x	
		*Viburnum, American cranberrybush (Viburnum trilobum)	x	x	x	x	x		7-9	Shrub				x	x	Versatile but slow growing.
		Viburnum, arrowwood (Viburnum dentatum)	x	x	x	x			10-12	Shrub				x	x	Slow growing--rich red in fall.
		*Viburnum, blackhaw (Viburnum prunifolium)	x		x	x	x		8-10	Shrub				x	x	
		*Viburnum, mapleleaf (Viburnum acerifolium)	x			x	x		3-5	Shrub				x	x	
		*Viburnum, nannyberry (Viburnum lentago)	x		x	x	x		9-12	Shrub				x	x	Slow growing.
		*Viburnum, rafinesque (Viburnum rafinesquianum)	x			x	x		2-4	Shrub				x	x	

*Natives--Have good display of fall color.
x - Use, growth, form, or esthetic value that applies to a specific plant.

TABLE 15
GENERAL SHRUB AND VINE PLANTING GUIDE (Continued)

Soil Capability Units	Brief Description of Units	Plant Species	Shade Tolerance	USES					GROWTH FORM				AESTHETIC VALUE			Remarks
				Land-scape	Hedges Screens Windbreaks	Wildlife Food & Cover	Road-sides	Ground cover	Height (feet)	Type	Thorny	Thicket former	Flower	Fruit or Berry	Fall Color	
		*Viburnum, wayfaringtree (Viburnum lantana)	x	x		x	x		4-9	Shrub			x	x	x	Winter food for birds.
		*Virginia creeper (Parthenocissus quinquefolia)	x	Some		x	x	x	Climbs	Vine				x	x	Also creeps.
		*Wahoo, eastern (Euonymus atropurpureus)	x	x		x	x		4-9	Shrub				x	x	Brilliant red in fall.
		Weigela (Weigela species)		x	x				4-8	Shrub			x			Showy blossoms.
		*Willows, shrubby types incl. pussywillow (Salix species)		x	x	x			2-8	Shrub						Pussy willow especially attractive in early spring.
		*Winterberry, common (Ilex verticillata)	x			x	x		6-9	Shrub				x	x	Colorful fruit.
		Yew (shrub types) (Taxus species)	x	x		x			3-10	Shrub				x	x	Best conifer for shade.
IIIc-3 IIIc-4 IIIc-2 IIIc-4 IIIc-8 IVc-3 IVc-4 IVc-9 IVc-3 Vle-3 Vle-4 Vle-9 Vle-3 Vle-5 VIIc-4 VIIc-9 VIIc-3 VIIc-5 VIIc-9	Shallow or sandy somewhat excessive to excessively drained soils with low moisture supplying capacity for plant growth.	Arbutus (shrub types) (Thuja species)	Some	x	x	x			3-7	Shrub					x	Conifer
		Berberis, Japanese (Berberis thunbergii)	x	x	x	x			6	Shrub	x			x	x	Colorful
		Bayberry or Waxmyrtle (Myrica pensylvanica)	x	x		x		x	5-9	Shrub				x	x	Aromatic-semi-evergreen leaves-noted for waxy berries.
		*Bittersweet (Celastrus scandens)	x	Some		x	x	x	Climbs	Vine				x	x	Male and female--can injure trees.
		*Blackberry and dewberry blackcap, raspberry (Rubus species)				x	x	x	1-5	Bramble	x	x	x	x	x	Many species--edible.
		Cotoneaster (Cotoneaster species)		x	x	x			4-8	Shrub				x	x	Usually glossy foliage--sun lovers.
		Crabapple (Malus species)		x	x	x	x		Up to 25	Shrub				x	x	x
		Current, Alpine (Ribes alpinum)	x	x	x				6-7	Foliage shrub			x			Leafy out--especially good hedge plant.
		*Dogwood, gray (Cornus racemosa)	x			x	x		6-10	Shrub				x	x	Best dogwood for dry sites.
		*Filbert (hazel nut) (Corylus americana)	x			x	x		5-8	Shrub		x		x	x	Bears edible nuts.
		Forsythia (Forsythia species)	x	x					4-8	Shrubs				x		Early yellow blooms.
		*Grape (Vitis species)	x			x	x	x	Climbs	Vine				x	x	
		Hawthorn (Crataegus species)	x	x		x	x		5-15	Shrubs	x			x	x	Many types.
		Honeysuckle (shrub types) (Lonicera species)	x	x	x	x			6-12	Shrubs				x	x	Many shrub types--spreads by seed.
		*Juniper, creeping (Juniperus species)		x		x	x	x	1-2	Shrubs	To touch			x	x	Conifer.
		Juniper, Pfitzer (Juniperus chinensis pfitzeriana)		x		x			8-10	Shrub		Some			x	Conifer--ornamental.
		Lilac (Syringa species)		x	x		x		8-10	Shrub		Some	x			Many varieties--not all good for dry sites.
		Maple, Amur (Acer ginnala)		x	x				15 plus	Tall shrub					x	Low growing tree--can be pruned into hedge.
		Mockorange variety (Philadelphus species)		x	x				6-9	Shrub			x			Sweet scented flowers--several varieties.
		Myrtle or periwinkle (Vinca minor)	x	x			x	x	1	Short vine		Forms mat	x			Excellent ground cover--sun or shade.
		Ninebark, common (Physocarpus opulifolius)	x	x	x		x		6-9	Shrub				x	x	
		Olive, Autumn (Elaeagnus umbellata)	x	x	x	x			10-15	Shrub				x	x	Attracts birds.
		Peashrub, Siberian (Caragana arborescens)			x	x	x		10-15	Shrub				x	x	
		Pine, mugho (Pinus mugo mughus)		x		x			6-9	Shrub					x	Conifer.
		Plum, American (Prunus americana)	x			x	x		10-15	Shrub	Some	x	x	x	x	Hardy and spread.
		Privet, Amur (Ligustrum amurense)	x	Some	x	x			10	Shrub				x	x	Good hedge.
		Privet, Regels Border (Ligustrum obtusifolium regelianum)	x	Some	x	x			6-9	Shrub				x	x	
		Redcedar, eastern (Juniperus virginiana)			x	x	x		10-20	Shrub	To touch			x	x	Shrub or small tree.
		Russianolive (Elaeagnus angustifolia)		x	x	x			15 plus	Shrub	x			x	x	Outstanding gray foliage.
		*Snowberry (Symphoricarpos species)	x	x		x	x	x	3-4	Shrub		x		x	x	
		Spirea, anthony waterer (Spirea bumalda)		x					2-3	Shrub				x		Good border plant.
		Spirea, van houttei (Spirea vanhouttei)	x	x	x				5-6	Shrub				x		
		*Sumac, fragrant (Rhus aromatica)	x	x		x	x	x	3	Shrub		x		x	x	Brilliant foliage.
		*Sumac, smooth (Rhus grabra)				x	x		6-10	Shrub				x	x	
		*Sumac, staghorn (Rhus typhina)	x	Some		x	x		10-15	Shrub				x	x	x
		*Viburnum, blackhaw (Viburnum prunifolium)	x		x	x	x		8-10	Shrub				x	x	x
		*Viburnum, nannyberry (Viburnum lentago)	x		x	x	x		9-12	Shrub				x	x	Slow growing.
		*Viburnum, rafinesque (Viburnum rafinesquianum)	x			x	x		2-4	Shrub				x		x
		*Viburnum, wayfaringtree (Viburnum lantana)	x	x		x	x		4-9	Shrub				x	x	One of best viburnums for dry soil.

TABLE 15
GENERAL SHRUB AND VINE PLANTING GUIDE (Continued)

Soil Capability Units	Brief Description of Units	Plant Species	Shade Tolerance	USES					GROWTH FORM				AESTHETIC VALUE			Remarks
				Land-scape	Hedges Screens Windbreaks	Wildlife Food & Cover	Road-sides	Ground cover	Height (feet)	Type	Thorny	Thicket former	Flower	Fruit or Berry	Fall Color	
		*Virginia creeper (Parthenocissus quinquefolia)	x	Some		x	x	x	Climbs	Vine				x	x	Also creeps.
		*Willows, (shrubby types) (Salix species)				x	x		2-4	Shrub						Native dry land willows.
IIw-1 IIw-2 IIw-3 IIw-5 IIw-8 IIw-13	Somewhat poorly and poorly drained soils with high moisture supplying capacity for plant growth but without adequate supplemental drainage.	Arboreal (shrub types) (Thuja species)	Some	x	x	x			3-7	Shrub					x	On poorly drained sands--noted for waxy gray berries.
		*Bayberry or Waxmyrtle (Myrica pensylvanica)	x	x		x		x	5-9	Shrub				x	x	On poorly drained sands only--noted for waxy gray berries.
IIIc-8 IIIw-1 IIIw-3 IIIw-5 IIIw-6 IIIw-8 IIIw-9		*Chokeberry, black (Aronia melanocarpa)	x			x	x	x	1-3	Shrub				x	x	
		*Dogwood, gray (Cornus racemosa)	x			x	x		6-10	Shrub			x	x	x	
		*Dogwood, Pagoda (Cornus alternifolia)	x			x	x		10-15	Shrub			x	x	x	
IVe-8 IVw-3 IVw-5 IVw-7		*Dogwood, redosier (Cornus stolonifera)	x	Some		x	x		3-9	Shrub			x	x	x	Attractive red twigs.
		*Dogwood, roundleaf (Cornus rugosa)	x			x	x		3-9	Shrub			x	x	x	
		*Dogwood, silky (Cornus amomum)	x		x	x	x		6-10	Shrub				x	x	
Vw-7 Vw-14		*Elder, American (Sambucus canadensis)				x	x		3-10	Shrub			x	x		
		Hawthorn (Crataegus species)	x			x	x		5-15	Shrub				x	x	Many types.
		Honeysuckle (shrub types) (Lonicera species)	x	x	x	x			6-12	Shrub			x	x	x	Spreads by seed.
		Ninebark, common (Physocarpus opulifolius)	x	x	x		x		6-9	Shrub			x		x	
		Olive, Autumn (Elaeagnus umbellata)	x		x	x			10-15	Shrub				x	x	Attractive to birds.
		Plum, American (Prunus americana)	x			x	x		10-15	Shrub	x	x	x	x	x	Hardy--spreads.
		Russianolive (Elaeagnus angustifolia)		x	x	x			15 plus	Shrub	x			x	x	Outstanding gray foliage.
		*Spiraea, narrowleaf-meadowsweet (Spiraea alba)					x		3-4	Shrub			x		x	Native found on wet borders.
		Spiraea, van houttei (Spiraea vanhouttei)	x	x	x				5-6	Shrub			x		x	
		*Viburnum, American cranberrybush (Viburnum trilobum)	x	x	x	x	x		7-9	Shrub			x	x	x	Versatile--slow growing.
		*Viburnum, mapleleaf (Viburnum acerifolium)	x			x	x		3-5	Shrub			x	x	x	Native--good roadside plant.
		*Viburnum, nannyberry (Viburnum lentago)	x		x	x	x		9-12	Shrub			x	x	x	Slow.
		*Viburnum, wayfaringtree (Viburnum lantana)	x		x	x	x		8-10	Shrub			x	x	x	Good winter food for birds.
		*Willows (shrubby types including pussywillows) (Salix species)			x	x	x		2-8	Shrub						Pussywillow especially attractive in early spring.
		*Winterberry, common (Ilex verticillata)	x			x	x		6-9	Shrub				x	x	Colorful fruit.
VIIIc-10 VIIIw-10	Very sandy, stony or wet soils with very severe limitations for most plant production.	No species recommended other than the natural vegetation. Unit VIIIc-10 contains soils that generally do not support any vegetative cover. Unit VIIIw-10 contains soils that are very wet and acid and vegetative cover is limited to a few tolerant native plants.														

TREE PLANTING AND SELECTION GUIDE

In addition to wood crop production, trees can be used to provide wildlife habitat and for landscaping purposes such as to provide shade, for street trees, for ornamentals, and for windbreaks or screens. Table 16 suggests the kinds of trees that are suitable for woodland plantations and landscape plantings. Soils are grouped by the woodland suitability groups discussed in Chapter VII.

Table 16 is intended as a general landscape planting guide. In choosing the right tree for a particular use, additional factors such as foliage colors, flowering and fruiting characteristics, resistance to smoke injury, and susceptibility to disease should be considered. Only the commonly used species are listed. Many horticultural varieties do well in Wisconsin, but have been omitted for the sake of brevity. The species listed give an indication of the varieties which might be acceptable.

American elm, a large and beautiful shade tree which is suitable to a wide variety of soil conditions, is not listed because it is susceptible to Dutch elm disease.



Willow windbreaks protect irrigated crop lands from wind erosion.

TREE SHAPE

ROUND



*White
Oak*

OVAL



*White
Ash*

UMBRELLA



*American
Elm*

COLUMNAR



*Lombardy
Poplar*

PYRAMIDAL



*White
Pine*

PENDULUS



*Weeping
Willow*

TABLE 16.
TREE PLANTING AND SELECTION GUIDE

Brief Description of Soils in the Woodland Suitability Group	WOODLANDS		TREES FOR LANDSCAPE PLANTING			
	Sheltered Coves N & E Slopes	Exposed Ridges S & W Slopes	Shade Trees	Street Trees	Lawn Trees	Hedges, Screens & Windbreaks
1 Moderately deep to deep, moderately well to well drained medium textured upland soils	Sugar Maple Basswood White Ash Black Walnut White Pine White Spruce White Cedar Red Pine	Red Pine White Pine	SUNNY SITES			
			American Beech (LO) Sugar Maple (LO) Red Maple (MO) Red Oak (LR) White Oak (LR) Basswood (LO) Hackberry (MR) White Ash (LO) Sycamore (LO) Bur Oak (LR) Norway Maple (MR) Silver Maple (LO) Thornless Honey Locust (MO)	Norway Maple (MR) S. Pin Oak (MP) Thornless Honey Locust (MO) Basswood (LO) White Ash (LO) Sugar Maple (LO) Hackberry (MR) Red Maple (MO)	Flowering Crab (SR) Mt. Ash (SO) Blue Beech (SR) Paper Birch (MO) River Birch (MO) Russian Olive (SR) S. Pin Oak (MP) Serviceberry (SR) Horse Chestnut (LR) Norway Spruce (LP) Red Pine (LP) White Pine (LP) White Spruce (MP) Black Cherry (LO) Blue Spruce (LP) Norway Spruce (LP) Hawthorn (SR)	Red Cedar (SP) White Cedar (MC, P) White Pine (LP) White Spruce (MP) Lombardy Poplar (LC) Russian Olive (SR) Upright Yew (SP)
2 Moderately deep to deep, moderately well to well drained fine textured soils.	Sugar Maple Basswood White Ash White Pine White Spruce White Cedar Norway Spruce	White Pine White Spruce	SUNNY SITES			
			American Beech (LO) Sugar Maple (LO) Red Maple (MO) Red Oak (LR) Hackberry (MR) White Ash (LO) Basswood (LO)	Norway Maple (MP) White Ash (LO) Basswood (LO) Sugar Maple (LO)	Blue Beech (SP) Serviceberry (SR) White Pine (LP) White Spruce (MP) Blue Spruce (LP) Norway Spruce (LP)	White Cedar (MC) White Pine (LP) White Spruce (MP) Upright Yew (SP)
3 Moderately deep and deep, moderately coarse textured soils somewhat excessively drained	Red Pine 2/ White Pine White Spruce White Ash	Red Pine Jack Pine	SUNNY SITES			
			Scarlet Oak (MO) Bur Oak (LR) Hackberry (MR) Black Oak (LR) Silver Maple (LO) Green Ash (MO) Thornless Honey Locust (MO)	Green Ash (MO) White Ash (LO) Hackberry (MR) S. Pin Oak (MP) Thornless Honey Locust (MO)	Flowering Crab (SR) Paper Birch (MO) Blue Beech (SR) Mt. Ash (SO) Black Cherry (LO) White Pine (LP) White Cedar (MC) S. Pin Oak (MP) White Spruce (MP) Russian Olive (SR)	Red Cedar (SP) Russian Olive (SR) Red Pine (LP) White Pine (LP) Upright Yew (SP) White Spruce (MP)
4 Coarse textured, excessively drained, drouthy soils.	White Pine Red Pine	Red Cedar Jack Pine	SUNNY SITES			
			Black Oak (LR) Scarlet Oak (MO) Hackberry (MR) Green Ash (MO) Silver Maple (LO)	Hackberry (MR) Green Ash (MO)	Red Pine (LP) White Pine (LP) Russian Olive (SR)	Red Cedar (SP) Jack Pine (MP) White Pine (LP) Russian Olive (SR)
5 Thin (12-24") somewhat excessively drained medium to moderately coarse textured soils.	White Pine	Red Cedar	SUNNY SITES			
			N. Red Oak (MO) White Oak (LR) Bur Oak (LR) Sugar Maple (LO) Red Maple (MO) Silver Maple (LO)	Norway Maple (MR) Green Ash (MO) Red Maple (MO) Sugar Maple (LO) Thornless Honey Locust (MO)	White Pine (LP) Paper Birch (MO) Russian Olive (SR) Flowering Crab (SR)	Red Cedar (SP) White Pine (LP) White Cedar (MC) White Spruce (MP) Russian Olive (SR)
6 Very thin (0-12") drouthy soils.	None	None	SUNNY SITES			
			Red Oak (LR) Sugar Maple (LO) American Beech (LO) Red Maple (MO)	Norway Maple (MP) Sugar Maple (LO) Red Maple (MO)	White Pine (LP) Blue Beech (SR)	White Pine (LP) White Cedar (MC) White Spruce (MP)

1/ The letters in parenthesis following each tree species indicate the general tree height and shape at maturity.
The first letter indicates height: S-less than 30'; M-30 to 60'; L-more than 60'.
The second letter indicates shape: C-columnar; O-oval; P-pyramidal; Pe-pendulous; R-round.

2/ Red pine does not grow well on calcareous soils such as Hackett, Hebron, Rome or on Shallow, Lapeer and Parr soils.

TABLE 16.
TREE PLANTING AND SELECTION GUIDE (Continued).

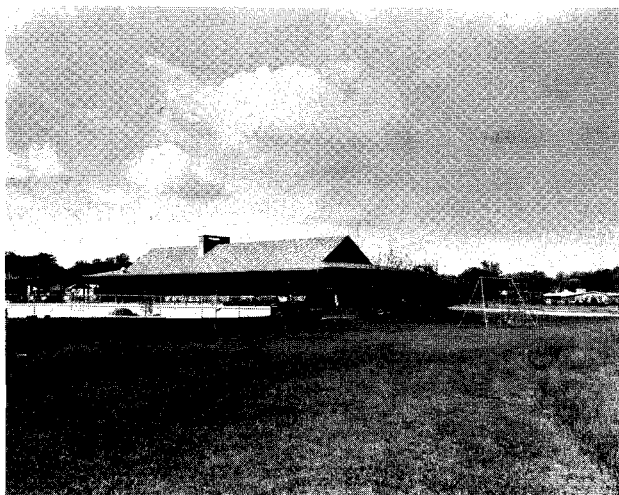
Brief Description of Soils in the Woodland Suitability Group	WOODLANDS		TREES FOR LANDSCAPE PLANTING			
	Sheltered Coves N & E Slopes	Exposed Ridges S & W Slopes	Shade Trees	Street Trees	Lawn Trees	Hedges, Screens & Windbreaks
7 Somewhat poorly to very poorly drained upland mineral soils, medium textured.	White Pine White Spruce White Ash Cottonwood (rooted cuttings) White Cedar	No exposed sites	SUNNY SITES			
			Swamp White Oak (LR) Hackberry (MR) Red Maple (MO) Basswood (LO) Green Ash (MO) White Ash (LO) Silver Maple (LO) Cottonwood (LO)	Green Ash (MO) Basswood (LO) Red Maple (MO) S. Pin Oak (MP)	White Spruce (MP) Paper Birch (MO) Mt. Ash (SO) Weeping Willow (MPe) White Cedar (MP) River Birch (MO)	White Cedar (MC) White Spruce (MP) Lombardy Poplar (LC) Laurel Willow (MO)
8 Somewhat poorly to very poorly drained moderately coarse textured soils.	Cottonwood (rooted cuttings) White Cedar	No exposed sites.	PARTIAL SHADE			
			Swamp White Oak (LR) Hackberry (MR) Red Maple (MO) Basswood (LO) Green Ash (MO) White Ash (LO)	Green Ash (MO) Basswood (LO) Red Maple (MO)	White Spruce (MP) Mt. Ash (SO)	White Cedar (MC) White Spruce (MP)
9 Somewhat poorly to very poorly drained alluvial or flood plain soils.	Cottonwood (rooted cuttings) Silver Maple	No exposed sites.	SUNNY SITE *			
			Black Ash (MC) Silver Maple (LO) Cottonwood (LO) Red Maple (MO)	Black Ash (MC) Red Maple (MO) Green Ash (MO)	Mt. Ash (SO) Weeping Willow (MPe) Paper Birch (MO)	White Cedar (MC) Laurel Willow (MO)
10 Organic soils, peats, and mucks.	Silver Maple White Cedar	No exposed sites.	PARTIAL SHADE			
			Red Maple (MO)	Red Maple (MO)	Mt. Ash (SO)	White Cedar (MC)
			SUNNY SITES			
			Swamp White Oak (LR) Red Maple (MO) Basswood (LO) Hackberry (MR) Green Ash (MO) Sycamore (LO) Cottonwood (LO)	S. Pin Oak (MP) Red Maple (MO) Green Ash (MO) Basswood (LO)	Paper Birch (MO) White Cedar (MC) White Spruce (MP) Mt. Ash (SO) Weeping Willow (MPe)	White Cedar (MC) Laurel Willow (MO) Lombardy Poplar (LC)
			PARTIAL SHADE			
			Swamp White Oak (LR) Hackberry (MR) Red Maple (MO) Basswood (LO) Green Ash (MO)	Red Maple (MO) Basswood (LO) Green Ash (MO)	White Cedar (MC) White Spruce (MP) Mt. Ash (SO)	White Cedar (MC) Lombardy Poplar (LC)
			SUNNY SITES			
			Silver Maple (LO) Red Maple (MO)	Red Maple (MO) Laurel Willow (MO)	White Cedar (MC) White Spruce (MP) Weeping Willow (MPe)	White Cedar (MC) Laurel Willow (MO)
			PARTIAL SHADE			
			Red Maple (MO)	None	White Cedar (MC) White Spruce (MP)	White Cedar (MC)

Chapter IX

THE USE OF SOILS FOR RECREATIONAL DEVELOPMENTS

Table 17 appraises the soils in southeastern Wisconsin for specific recreational purposes. These evaluations, expressed in terms of degree of limitations, are predictions of the behavior of specific kinds of soil for specific kinds of recreational uses. In making the ratings for the table, no consideration was given to esthetic values, to the size or shape of the soil bodies, nor to the pattern they form with other soils on the landscape. Planners will need to consider these factors in making a final use evaluation.

Soils relatively free of limitations or having limitations easy to overcome have been rated as having slight limitations for a specific recreational use. Soils that can be used with good management and careful design were rated as having moderate limitations for specific uses. Where the limitations are difficult to overcome or the suitability is questionable, a severe rating was given to the soil. Where usage is generally unsound a very severe rating has been used. In addition to the ratings given for each soil for specific recreational uses, a listing of hazards or limitations are given. Only the major hazards have been listed.



Soils with very severe limitations for residential development are being used for recreation.

Most poorly drained soils are not well suited to recreational uses. When artificially drained, however, these soils can be used for certain recreational developments. The degree of limitations noted for the poorly drained soils in the table are for soils in their natural conditions without artificial drainage. Soils subject to overflow will vary considerably in their degree of limitations for recreational use. Limitations depend not only on the length and duration of overflow, but also on the seasons in which it occurs. Overflow during non-use periods, is much less restricting than overflow during the use period. Hydrologic studies should be considered, wherever available, in preparing final recreational use plans for flood plain soils.

The use evaluations given in the table are intended to provide a general guide to the selection of suitable sites and to assist in the orderly development of recreational facilities. In addition to the specific recreational uses listed in the table, the soils information may be equally useful in determining suitability for many other related forms of recreational uses of land.

In the first column of Table 17, the soil number and soil name have been listed in numerical order from 1 through 3361 for easy reference.

Intensive Play Areas - In this column soils are evaluated for playgrounds, athletic fields and other intensive play areas. The assumption is made that the sites are two acres or larger in size and are to be used mainly for providing nearly level areas for organized games. Parts of these areas are frequently surfaced to facilitate their use. Though some play areas are more intensively used than others, all are subject to relatively heavy foot traffic. They require nearly level surfaces, good drainage, freedom from flooding during periods of use, and a soil texture and consistence that provide a firm surface. Areas should be free of coarse fragments and hard rock. They require good potential for production of vegetation on all areas not surfaced. Suitability for domestic

sewage disposal systems was not considered in the ratings listed in this column. Where such information is required, reference should be made to the column concerned with cottages, service and utility buildings.

Extensive Play Areas - The criteria used in evaluating soils for extensive play areas, such as picnic areas and parks, is very similar to that for intensive play areas. Sites should be three to five acres and larger in size. The most desirable soils have nearly level to gently sloping surfaces, good drainage, freedom from flooding during the use period, a texture and consistence that provide a firm surface, and the ability to support a good and varied vegetative cover. They also should be free of coarse fragments and rock outcrops. Where service and utility buildings are needed, reference should be made to the column concerned with Cottages, Service and Utility Buildings.



This picnic area and shelter house is an example of extensive use of soil for recreation.

Bridle Paths, Nature and Hiking Trails - The limitations of the soils for use as bridle paths, trails, cross-country hiking, and other intensive uses were made for areas to be used as they occur in nature and where little soil will be moved to provide for this recreational use. The most desirable soils from a physical standpoint for bridle paths, nature and hiking trails have good foot and hoof trafficability. They are well drained, loamy in texture, and have nearly level to sloping surfaces. They have good stability, are not subject to erosion or cutting out, and are free of coarse fragments and stones

or rock outcrops. Some areas possess outstanding esthetic values but costs of building and maintaining trails may be high. Consideration should be given to placement of paths and trails on sloping relief on the contour to help control erosion. Variability in slope gradient on paths and trails may serve to enhance interest but slopes should not exceed 12 percent for prolonged distances. Although vegetative potential was not considered in this evaluation, it is important in the areas bordering the trails and paths. The trail or path itself is generally compacted and devoid of vegetation.

Golf Course Fairways - In evaluating soils for use in golf courses, consideration was given only to those features of the soil that influence their use for fairways. Greens, traps, hazards, and tees are man-made, generally from disturbed, transported soil material. Therefore, they are not influenced by characteristics or qualities of the natural undisturbed soil. For best use, fairways should be well drained and firm, be free of flooding during use periods, have good trafficability, contain a minimum of coarse fragments or stones and have gently undulating slopes. They should be capable of supporting a good turf and be well suited for growing many kinds of trees and shrubs. Loamy soils are best, but coarser textured soils serve equally well if irrigated. Poorly drained mineral and organic soils have severe limitations but they may be used for pond sites to provide esthetic values or for storing water for turf maintenance. Sandy soils likewise may be designed for hazards or used as a source of sand for greens.



The soils in this golf course were formerly used for cultivated crops.

Cottages, Service and Utility Buildings -

The soil ratings in this column apply to seasonal and year-round cottages, washrooms and bathhouses and service buildings not served by public sewer and water facilities. The best soils for this use have good drainage, are suitable for absorbing waste from domestic sewage disposal systems, are not subject to flooding, and are nearly level to gently sloping. They have low shrink-swell potential, high bearing capacity and are not subject to liquefaction or frost heave. The best sites have little or no erosion hazard and are capable of supporting a good vegetative cover. In addition, hard bedrock does not occur within six feet of the surface and there is a minimum of coarse fragments or stones. In evaluating a particular site, attention should be given to the need for access roads, esthetic values and other features such as presence of trees or water areas which affect the desirability of a site.

Tent and Camp Trailer Sites - The appraisal of soils for areas suitable for pitching tents or parking camp trailers and accompanying activity for short-period outdoor living are for areas that require little site preparation and are suitable for unsurfaced parking of cars and camp trailers. They have well drained loamy soils with good trafficability

which are not subject to flooding during the use period. On the best sites an adequate vegetative cover is easy to maintain, erosion is not a hazard and the soils are level to gently sloping. They have surfaces free of coarse fragments and bedrock does not restrict their use. Limitations for domestic sanitary sewage disposal systems are in the column concerned with cottages, service, and utility buildings.



One of the camp sites of a thirty-unit camping area that is part of a farming operation.

TABLE 17.
THE USE OF SOILS FOR RECREATIONAL DEVELOPMENTS

Map Number and Soil Name	Playgrounds, Athletic Fields and Other Intensive Play Areas	Picnic Areas, Parks and Other Extensive Use Areas	Bridle Paths, Nature and Hiking Trails	Golf Course Fairways	Cottages, Service and Utility Buildings	Tent and Trailer Camp Sites
1 Rough broken land	VERY SEVERE - slopes are too steep; severe erosion hazard.	VERY SEVERE - slopes are too steep; severe erosion hazard.	VERY SEVERE - steep slopes; severe erosion hazard; trails and paths slippery when wet.	VERY SEVERE - steep slopes and severe erosion hazard.	VERY SEVERE - steep slopes and severe erosion hazard.	VERY SEVERE - steep slopes and severe erosion hazard.
2 Stinson silt loam	SEVERE - frequent overflow; seasonal high water table; needs water management.	MODERATE - frequent overflow; seasonal high water table.	MODERATE - frequent overflow; trails and paths slippery when wet.	MODERATE - frequent overflow; very low relief; low trafficability and turf easily damaged when wet.	VERY SEVERE - occurs on flood plain and subject to overflow.	VERY SEVERE - occurs on flood plain and subject to overflow.
3 Stony colluvium	SEVERE - subject to occasional flooding; stony; heavy foot traffic may damage sod.	MODERATE - subject to occasional flooding; stony.	MODERATE - subject to occasional overflow; trails and paths may be stony and slippery when wet.	MODERATE - will support a firm turf; stony; subject to occasional flooding.	SEVERE - subject to occasional overflow.	SEVERE - subject to occasional overflow.
4 Marsh	VERY SEVERE - flooded a good portion of the year.	VERY SEVERE - flooded a good portion of the year.	VERY SEVERE - flooded a good portion of the year.	VERY SEVERE - may be used for ponds and hazards or as source of water for irrigation.	VERY SEVERE - flooded a good portion of the year.	VERY SEVERE - flooded a good portion of the year.
5 Same as No. 54, Lawson silt loam						
5W Sawmill silt loam	SEVERE - frequent overflow; high water table; low trafficability when wet; sod easily damaged.	SEVERE - frequent overflow; high water table; low trafficability when wet; sod easily damaged.	SEVERE - frequent overflow; trails muddy and slippery when wet; may need surfacing.	SEVERE - subject to frequent overflow; very low relief; turf easily damaged when wet.	VERY SEVERE - occurs on flood plain and is subject to frequent overflow.	VERY SEVERE - occurs on flood plain and is subject to frequent overflow.
7 Dorchester silt loam	SEVERE - subject to occasional flooding; low trafficability when wet and compacts easily.	MODERATE - subject to occasional flooding.	MODERATE - subject to occasional flooding; trails may be slippery and muddy when wet; may need surfacing.	MODERATE - subject to occasional flooding; very low relief.	VERY SEVERE - occurs on flood plain and is subject to occasional flooding.	VERY SEVERE - occurs on flood plain and is subject to occasional flooding. MODERATE if protected from flooding by embankments.
7W Same as No. 54, Lawson silt loam						
10 Same as No. 11, Alluvial land						
10W Same as No. 11W, Alluvial land, wet						
11 Alluvial land	SEVERE - subject to frequent flooding; compacts easily when wet.	MODERATE - subject to frequent flooding; will support a good sod and a limited variety of shrubs and trees.	SEVERE - subject to frequent flooding; trails are muddy and slippery when wet and dry out slowly.	MODERATE - will support a firm turf; subject to frequent flooding; very low relief.	VERY SEVERE - occurs on flood plain and is subject to frequent flooding.	VERY SEVERE - occurs on flood plain and is subject to frequent flooding.
11W Alluvial land, wet	VERY SEVERE - subject to frequent flooding; high water table; low trafficability and sod easily damaged when wet.	SEVERE - subject to frequent flooding; high water table; sod easily damaged when wet.	SEVERE - subject to frequent flooding; trails and paths muddy and slippery when wet; may need surfacing.	SEVERE - turf may be severely damaged during periods of high water; subject to frequent flooding; very low relief.	VERY SEVERE - occurs on flood plain and is subject to high water table and frequent flooding.	VERY SEVERE - occurs on flood plain and is subject to high water table and frequent flooding.
11WY Same as No. 11W, Alluvial land, wet						
12 Wea silt loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on slopes over 6%. Erosion on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on slopes over 12%. Will support a good sod and a wide variety of shrubs; poor for trees unless planted; erosive on slopes.	MODERATE - trails and paths may become muddy and slippery for short periods when wet; may need surfacing.	SLIGHT on 0-6%, MODERATE on 6-12%. Will support a firm dense turf.	SLIGHT on 0-6%, MODERATE on 6-12%. Erosive on slopes; subject to frost heave.	MODERATE on 0-6%, and SEVERE on 6-12% slopes. Surface remains wet and soft after rains; walks and roads need surfacing.
14 Same as No. 288, Hackett loamy sand						
15 Hillside seepage	VERY SEVERE - high water table; difficult to drain; sod easily damaged when wet; low trafficability.	SEVERE - high water table; difficult to drain; low trafficability and compacts easily when wet.	SEVERE - high water table; wet for long periods; trails and paths need surfacing.	SEVERE - high water table; difficult to drain; low trafficability and turf easily damaged when wet.	VERY SEVERE - high water table; difficult to drain; low bearing capacity when wet.	VERY SEVERE - high water table; sites remain wet and soft for long periods; poor trafficability.
16 Rome silt loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on 6-12% slopes. Erosive on slopes; compacts easily when wet.	SLIGHT on 0-6% and MODERATE on slopes over 6%. Erosive on slopes; compacts easily when wet; poor for trees unless planted.	MODERATE - trails and paths may be muddy and slippery for short periods; may need surfacing; erosive on slopes.	SLIGHT on 0-6% and MODERATE on slopes over 6%. Erosive on slopes.	MODERATE - clayey subsoil makes sewage disposal difficult; high shrink-swell potential; low bearing capacity when wet.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Surface tends to remain wet and soft after rain; walks and roads should be surfaced.
18 Same as No. 266, Sisson silt loam						
18Y Same as No. 266, Sisson silt loam						
19 Same as No. 267, Sisson fine sandy loam						
21 Hebron loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on slopes over 6%. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on slopes over 12%. Erosive on slopes.	SLIGHT - will support heavy foot and hoof traffic; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on slopes over 12%. Erosive on slopes.	MODERATE on 0-12% and SEVERE on slopes over 12%. Sewage disposal difficult; low bearing capacity when wet; high shrink-swell potential.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Surface tends to remain wet after rain; erosive on slopes.
21Y Same as No. 21, Hebron loam						
22 Hebron sandy loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on slopes over 6%. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on slopes over 12%. Erosive on slopes.	SLIGHT - will support heavy foot and hoof traffic; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on slopes over 12%. Slightly drouthy; erosive on slopes.	MODERATE on 0-12% and SEVERE on slopes over 12%. Sewage disposal difficult; low bearing capacity when wet; high shrink-swell potential.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Slightly drouthy, vegetative cover harder to maintain.
23 Same as No. 54, Lawson silt loam						
24 Hebron silt loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on slopes over 12%. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on slopes over 12%. Erosive on slopes.	SLIGHT - trails and paths may be slippery for short periods following rain.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Will support a firm turf.	MODERATE on 0-12% and SEVERE on slopes over 12%. Sewage disposal difficult; low bearing capacity when wet; high shrink-swell potential.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Surface tends to remain wet after rain; erosive on slopes; roads and walks need surfacing.
26 Wauconda fine sandy loam	MODERATE - seasonal high water table; heavy foot traffic during wet seasons may cause damage to sod.	MODERATE - seasonal high water table; heavy foot traffic during wet seasons may cause damage to sod.	SLIGHT - heavy foot or hoof traffic may cause cutting of trail or path during periods of high water table and subsequent erosion.	MODERATE - seasonal high water table; needs water management.	VERY SEVERE - sewage disposal difficult; low bearing capacity when wet; subject to frost heave.	MODERATE - surface tends to remain wet for short periods due to seasonal high water table.
27 Wauconda silt loam	MODERATE - seasonal high water table; heavy foot traffic during wet seasons may cause damage to sod.	MODERATE - seasonal high water table; heavy foot traffic during wet seasons may cause damage to sod.	MODERATE - wet for short periods; muddy and slippery when wet; may need surfacing.	MODERATE - seasonal high water table; needs water management.	VERY SEVERE - sewage disposal difficult; low bearing capacity when wet; subject to frost heave.	MODERATE - sites remain wet and soft for short periods; walks and roads need surfacing; compacts easily.
27Z Same as No. 53, Aztalan silt loam						

TABLE 17.
THE USE OF SOILS FOR RECREATIONAL DEVELOPMENTS (Continued)

Map Number and Soil Name	Playgrounds, Athletic Fields and Other Intensive Play Areas	Picnic Areas, Parks and Other Extensive Use Areas	Bridle Paths, Nature and Hiking Trails	Golf Course Fairways	Cottages, Service and Utility Buildings	Tent and Trailer Camp Sites
28 Colwood fine sandy loam	SEVERE - high water table; needs drainage; limited in vegetation it will support.	SEVERE - high water table; difficult to maintain sod unless drained; limited as to variety of shrubs and trees that can be grown.	MODERATE - trails and paths remain wet for long periods due to high water table.	SEVERE - will support a firm turf when drained, heavy foot traffic during wet periods may damage turf; very low relief.	VERY SEVERE - high water table makes sanitary systems inoperative; liquefies easily; subject to frost heave.	SEVERE - high water table; sites remain wet for long periods; needs drainage or fill.
28Z Same as No. 330, Navan loam						
29 Colwood silt loam	SEVERE - high water table; needs drainage; limited in vegetation it will support.	SEVERE - high water table; difficult to maintain sod unless drained; limited as to variety of shrubs and trees that can be grown.	SEVERE - trails and paths remain wet for long periods due to high water table; they are slippery and muddy when wet; may need surfacing.	SEVERE - will support a firm turf when drained, heavy foot traffic during wet periods may damage turf; very low relief.	VERY SEVERE - high water table makes sanitary systems inoperative; liquefies easily; subject to frost heave.	SEVERE - high water table; sites remain wet and soft for long periods; poor trafficability when wet; walks and roads need surfacing.
29V Same as No. 29, Colwood silt loam						
29X Same as No. 76, Sebewa silt loam						
29Z Same as No. 340, Navan silt loam						
30 Same as No. 29, Colwood silt loam						
31 Rome loam	SLIGHT on 0-2% and MODERATE on 2-6% slopes. Erosive on slopes.	SLIGHT - erosive on slopes.	SLIGHT - will support heavy foot and hoof traffic; erosive on slopes.	SLIGHT - will support a firm turf; low and gently sloping relief; erosive on slopes.	MODERATE - clayey subsoil makes sewage disposal difficult; high shrink-swell potential; low bearing capacity when wet.	SLIGHT - erosive on slopes.
32 Rome sandy loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6% and MODERATE on steeper slopes. Erosive on slopes.	SLIGHT - will support heavy foot and hoof traffic; erosive on slopes.	MODERATE - will support a firm turf; slightly drouthy; erosive on slopes.	MODERATE - clayey subsoil makes sewage disposal difficult; high shrink-swell potential; low bearing capacity when wet.	SLIGHT on 0-6% and MODERATE on steeper slopes. Erosive on slopes; slightly drouthy.
33 Same as No. 267, Sisson fine sandy loam						
33Z Same as No. 22, Hebron sandy loam						
34 Same as No. 266, Sisson silt loam						
35 Same as No. 45, Yahara very fine sandy loam						
36 Same as No. 46, Yahara silt loam						
37 Kibbie fine sandy loam	MODERATE on 0-6% and SEVERE on steeper slopes. Seasonal high water table; needs water management; erosive on slopes.	MODERATE - seasonal high water table; heavy foot traffic may damage sod in wet seasons unless drained; erosive on slopes.	MODERATE - trails may become soft during periods of high water table.	MODERATE - will support a firm turf; seasonal high water table; needs water management; erosive on slopes.	VERY SEVERE - sewage disposal difficult; liquefies easily; subject to frost heave.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface tends to remain wet for short periods; may need drainage.
37Z Same as No. 370, Mosel sandy loam						
38 Kibbie silt loam	MODERATE - seasonal high water table; needs water management.	MODERATE - seasonal high water table; heavy foot traffic may damage sod in wet seasons unless drained.	MODERATE - trails may become soft and slippery during periods of high water table; may need surfacing.	MODERATE - will support a firm turf; seasonal high water table; needs water management; erosive on slopes.	VERY SEVERE - sewage disposal difficult; liquefies easily; subject to frost heave.	MODERATE - sites remain wet and soft for short periods; walks and roads need surfacing; compacts easily.
38R Same as No. 306, Knowles silt loam, wet variant						
38Z Same as No. 369, Mosel silt loam						
39 Saylesville loam	MODERATE on 0-6%, SEVERE on 6-12% and VERY SEVERE on steeper slopes. Moderately slow permeability; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12% and SEVERE on steeper slopes. Sloping areas have an erosion hazard; moderately slow permeability.	MODERATE on 0-12% and SEVERE on steeper slopes. Trails and paths remain wet for short periods following a rain due to tight subsoil; erosive on slopes.	MODERATE on 0-12% and SEVERE on steeper slopes. Moderately slow permeability; turf easily damaged when wet.	SEVERE - sewage disposal difficult; high shrink-swell potential; erosive on slopes.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface remains wet and soft after rains; walks and roads need surfacing; compacts easily.
39X Same as No. 72, Fox loam						
40 Saylesville silt loam	MODERATE on 0-6% and SEVERE on 6-12% slopes. Moderately slow permeability; erosive on slopes; compacts easily.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes; moderately slow permeability.	MODERATE on 0-12% and SEVERE on steeper slopes. Trails and paths are muddy and slippery when wet; may need surfacing; erosive on slopes.	MODERATE on 0-12% and SEVERE on steeper slopes. Erosive on slopes; moderately slow permeability; turf easily damaged when wet.	SEVERE - sewage disposal difficult; erosive on slopes; high shrink-swell potential.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface remains wet and soft after rains; walks and roads need surfacing; compacts easily.
40V Same as No. 266, Sisson silt loam						
40X Same as No. 73, Fox silt loam						
40Y Same as No. 161, Dodge silt loam						
41 Same as No. 42, Tichigan silt loam						
42 Tichigan silt loam	MODERATE on 0-6%, SEVERE on 6-12%, and VERY SEVERE on steeper slopes. Seasonal high water table; needs water management; compacts easily when wet.	MODERATE on 0-6% and SEVERE on steeper slopes. Seasonal high water table; needs water management; heavy foot traffic may damage sod in wet seasons unless drained.	MODERATE on 0-12% and SEVERE on steeper slopes. Trails and paths may be wet and slippery after a rain or during periods of high water table.	MODERATE on 0-12% and SEVERE on steeper slopes. Compacts easily; erosive on slopes; turf easily damaged when wet.	VERY SEVERE - sewage disposal questionable; seasonal high water table; high shrink-swell potential.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface tends to remain wet and soft for short periods due to tight clayey subsoil; walks and roads need surfacing; compacts easily.
42R Same as No. 306, Knowles silt loam, wet variant						
42V Same as No. 38, Kibbie silt loam						
42X Same as No. 87, Sleeth silt loam						
42Y Same as No. 364, Lamartine silt loam						
44 Jericho silt loam	SLIGHT on 0-2%, MODERATE on 2-6% and SEVERE on steeper slopes. Erosive on slopes; extensive leveling may expose the clayey subsoil.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Erosive on slopes; compacts easily when wet.	MODERATE - trails and paths are muddy and slippery for short periods after a rain; may need surfacing; erosive on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Erosive on slopes; compacts easily when wet.	SEVERE - sewage disposal difficult due to slowly permeable substratum; low bearing capacity when wet; high shrink-swell potential.	MODERATE on 0-6% and SEVERE on steeper slopes. Sites remain wet and soft for short periods; walks and roads need surfacing; compacts easily.
45 Yahara very fine sandy loam	MODERATE - seasonal high water table; needs water management; erosive on slopes.	MODERATE - seasonal high water table; needs water management; heavy foot traffic may damage sod in wet seasons.	SLIGHT - trails and paths remain wet for short periods during seasonal high water table; sloping areas have an erosion hazard.	MODERATE - will support a firm turf; low relief; seasonal high water table; needs water management.	VERY SEVERE - sewage disposal questionable due to periodic high water table; low bearing capacity when wet; liquefies easily.	MODERATE - surface tends to remain wet for short periods; areas may need drainage.
45Z Same as No. 370, Mosel sandy loam						
46 Yahara silt loam	MODERATE - seasonal high water table; needs water management; erosive on slopes.	MODERATE - seasonal high water table; needs water management; heavy foot traffic may damage sod in wet seasons.	MODERATE - trails and paths may remain wet for short periods; they are muddy and slippery when wet; may need surfacing.	MODERATE - will support a firm turf; low relief; seasonal high water table; needs water management.	VERY SEVERE - sewage disposal questionable due to periodic high water table; low bearing capacity when wet; liquefies easily.	MODERATE - sites remain wet and soft for short periods; walks and roads need surfacing.

TABLE 17.
THE USE OF SOILS FOR RECREATIONAL DEVELOPMENTS (Continued)

Map Number and Soil Name	Playgrounds, Athletic Fields and Other Intensive Play Areas	Picnic Areas, Parks and Other Extensive Use Areas	Bridle Paths, Nature and Hiking Trails	Golf Course Fairways	Cottages, Service and Utility Buildings	Tent and Trailer Camp Sites
47 Yahara loam	MODERATE - seasonal high water table; needs water management; erosive on slopes.	MODERATE - seasonal high water table; needs water management; heavy foot traffic may damage sod in wet seasons.	SLIGHT - trails and paths remain wet for short periods during seasonal high water table; sloping areas have an erosion hazard.	MODERATE - will support a firm turf; low relief; seasonal high water table; needs water management.	VERY SEVERE - sewage disposal questionable due to periodic high water table; low bearing capacity when wet; liquefies easily.	MODERATE - surface tends to remain wet for short periods; areas may need drainage.
47Z Same as No. 370, Mosel sandy loam						
48 Keowns silt loam	SEVERE - high water table; needs drainage; limited in vegetation it will support; compacts easily when wet.	SEVERE - high water table; needs drainage; limited in vegetation it will support.	SEVERE - trails and paths are often wet for long periods due to high water table; muddy and slippery when wet; may need surfacing.	SEVERE - high water table; needs drainage; very low relief; turf easily damaged when wet.	VERY SEVERE - high water table; sewage disposal difficult; liquefies easily; low bearing capacity when wet.	SEVERE - high water table; sites remain wet and soft for long periods; poor trafficability when wet; walk and roads need surfacing.
48Z Same as No. 340, Navan silt loam						
49 Keowns fine sandy loam	SEVERE - high water table; needs drainage; limited in vegetation it will support.	SEVERE - high water table; needs drainage; sod is easily damaged unless soils are drained; limited in vegetation it will support.	MODERATE - trails and paths are often wet for long periods due to high water table.	SEVERE - high water table; needs drainage; heavy traffic during periods of high water table may damage turf; very low relief.	VERY SEVERE - high water table; sewage disposal difficult; liquefies easily; low bearing capacity when wet.	SEVERE - high water table; sites remain wet for long periods; areas need drainage or fill.
49Y Same as No. 49, Keowns fine sandy loam						
51 Aztalan loam	MODERATE - seasonal high water table; needs water management; erosive on slopes.	MODERATE - seasonal high water table; needs water management; heavy foot traffic may damage sod in wet seasons unless drained.	MODERATE - trails may be wet during periods of seasonal high water table.	MODERATE - seasonal high water table; needs water management; low relief; turf easily damaged when wet.	VERY SEVERE - sewage disposal is difficult; seasonal high water table; high shrink-swell potential.	MODERATE - surface tends to remain wet for short periods; areas may need drainage.
52 Aztalan sandy loam	MODERATE - seasonal high water table; needs water management; erosive on slopes.	MODERATE - seasonal high water table; needs water management; heavy foot traffic may damage sod in wet seasons unless drained.	SLIGHT - trails may be wet during periods of seasonal high water table.	MODERATE - low relief; seasonal high water table; needs water management; erosive on slopes.	VERY SEVERE - sewage disposal is difficult; seasonal high water table; high shrink-swell potential.	MODERATE - surface tends to remain wet for short periods; areas may need drainage.
53 Aztalan silt loam	MODERATE on 0-6% and SEVERE on steeper slopes. Seasonal high water table; needs water management; erosive on slopes; compacts easily when wet.	MODERATE on 0-6% and SEVERE on steeper slopes. Seasonal high water table; needs water management; compacts easily when wet.	MODERATE - trails may be wet during periods of seasonal high water table; they are muddy and slippery when wet; may need surfacing.	MODERATE - seasonal high water table; needs water management; turf easily damaged when wet; compacts easily when wet.	VERY SEVERE - sewage disposal is difficult; seasonal high water table; high shrink-swell potential.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface tends to remain wet and soft for short periods; walks and roads need surfacing; compacts easily.
54 Lawson silt loam	SEVERE - frequent flooding; needs water management; compacts easily when wet.	SEVERE - frequent flooding; needs water management; compacts easily when wet.	MODERATE - frequent flooding; paths and trails are muddy and slippery when wet and dry out slowly; may need surfacing.	SEVERE - frequent flooding; very low relief; low trafficability and turf easily damaged when wet.	VERY SEVERE - frequent flooding; sewage disposal difficult.	VERY SEVERE - frequent overflow; sites need protection; walks and roads need surfacing.
59 Dousman sandy loam	MODERATE - seasonal high water table; needs water management.	MODERATE - seasonal high water table; needs water management.	SLIGHT - trails and paths may be wet during periods of seasonal high water table.	MODERATE - seasonal high water table; needs water management; low relief.	VERY SEVERE - sewage disposal is difficult; seasonal high water table.	MODERATE - sites remain wet for short periods; may need drainage.
59Z Same as No. 52, Aztalan sandy loam						
60 Same as No. 78, Dousman loam						
60Z Same as No. 51, Aztalan loam						
63 Same as No. 231, Brookston silt loam						
64 Same as No. 231, Brookston silt loam						
66 Same as No. 386, Granby fine sandy loam						
67 Same as No. 386, Granby fine sandy loam						
69 Casco-Fox silt loams	For interpretations, see No. 173, Casco silt loam and No. 73, Fox silt loam					
70 Fox sandy loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; extensive leveling may expose sand and gravel substratum.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Slightly drouthy; erosive on slopes.	SLIGHT on 0-12%, MODERATE on 12-20%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Drouthy; subject to erosion on sloping areas.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Slightly drouthy; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.
70V Same as No. 267, Sisson fine sandy loam						
70Y Same as No. 357, Hochheim loam						
70Z Same as No. 22, Hebron sandy loam						
71 Casco-Fox loams	For interpretations, see No. 172, Casco loam and No. 72, Fox loam					
72 Fox loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; extensive leveling may expose sand and gravel substratum.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Sloping areas have an erosion hazard.	SLIGHT on 0-12%, MODERATE on 12-20%, and SEVERE on steeper slopes. Sloping areas are subject to erosion.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosion is a hazard on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosion hazard on sloping areas; slightly drouthy.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Sloping areas have an erosion hazard.
72R Same as No. 204, Knowles loam						
72V Same as No. 266, Sisson silt loam						
72Y Same as No. 358, Miami loam						
72Z Same as No. 21, Hebron loam						
73 Fox silt loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; extensive leveling may expose sand and gravel substratum; compacts easily when wet.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on slopes over 12%. Steeper slopes have an erosion hazard; compacts easily.	MODERATE on 0-12% and SEVERE on slopes over 12%. Sloping areas are subject to erosion; paths and trails are muddy and slippery when wet; may need surfacing.	SLIGHT on 0-6%, MODERATE on 6-12%, SEVERE on steeper slopes. Erosion is a hazard on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Sewage disposal systems not suitable for steep slopes; erosion hazard on sloping areas; slightly drouthy.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Sloping areas have an erosion hazard; roads and trails should be surfaced.
73R Same as No. 208, Knowles silt loam						
73V Same as No. 266, Sisson silt loam						
73Y Same as No. 361, Miami silt loam						
73Z Same as No. 24, Hebron silt loam						
75 Rodman gravelly loam	SEVERE - drouthy; difficult to maintain vegetative cover; limited in vegetation it will support; often stony or gravelly.	MODERATE on 0-12% and SEVERE on steeper slopes. Drouthy; will not support a good sod and only a limited number of shrubs and trees; may be stony or gravelly.	SLIGHT on 0-12%, MODERATE on 12-20%, and SEVERE on steeper slopes. Erosion is a hazard on the slopes; may be stony or gravelly.	SEVERE - hard to maintain a turf; stony; steep slopes; drouthy; may be used for hazards.	MODERATE on 0-12% and SEVERE on steeper slopes. Drouthy; possible contamination of ground water; may be stony or gravelly.	MODERATE on 0-6% and SEVERE on steeper slopes. Erosive; drouthy; vegetative cover hard to maintain; often gravelly or stony.

TABLE 17.
THE USE OF SOILS FOR RECREATIONAL DEVELOPMENTS (Continued)

Map Number and Soil Name	Playgrounds, Athletic Fields and Other Intensive Play Areas	Picnic Areas, Parks and Other Extensive Use Areas	Bridle Paths, Nature and Hiking Trails	Golf Course Fairways	Cottages, Service and Utility Buildings	Tent and Trailer Camp Sites
76 Sebewa silt loam	SEVERE - high water table; needs drainage; compacts easily when wet.	SEVERE - high water table; needs drainage; compacts easily when wet.	SEVERE - high water table; wet for long periods; paths and trails muddy and slippery when wet; may need surfacing.	SEVERE - high water table; needs drainage; low trafficability and turf easily damaged when wet.	VERY SEVERE - high water table makes sanitary systems inoperative.	SEVERE - sites remain wet and soft for long periods; poor trafficability when wet; walks and roads need surfacing; compacts easily.
76R Same as No. 212R, Ehler silt loam, rock substratum						
76V Same as No. 29, Colwood silt loam						
76Y Same as No. 231, Brookston silt loam						
76Z Same as No. 340, Navan silt loam						
77 Dousman sandy loam	MODERATE - seasonal high water table; needs water management.	MODERATE - seasonal high water table; needs water management; heavy foot traffic may damage sod.	SLIGHT - trails are often wet during periods of seasonal high water table.	MODERATE - seasonal high water table; water may pond on the surface for short periods; very low relief.	VERY SEVERE - sewage disposal is difficult; seasonal high water table.	MODERATE - surface tends to remain wet for short periods due to seasonal high water table; may need drainage.
77Z Same as No. 52, Aztalan sandy loam						
78 Dousman loam	MODERATE - seasonal high water table; needs water management.	MODERATE - seasonal high water table; needs water management; heavy foot traffic may damage sod.	SLIGHT - trails are often wet during periods of seasonal high water table.	MODERATE - seasonal high water table; water may pond on the surface for short periods; very low relief.	VERY SEVERE - sewage disposal is difficult; seasonal high water table.	MODERATE - surface tends to remain wet for short periods due to seasonal high water table; may need drainage.
78V Same as No. 38, Kibbie silt loam						
78Y Same as No. 178, Crosby silt loam						
79 Waukechon loam	SEVERE - high water table; needs drainage.	SEVERE - high water table; needs drainage.	MODERATE - high water table; trails remain wet for long periods.	SEVERE - needs drainage; will support a firm turf when drained; heavy traffic during wet periods may damage turf; very low relief; may be suitable for ponds.	VERY SEVERE - high water table makes sanitary systems inoperative.	SEVERE - high water table; sites remain wet for long periods, areas need drainage or fill.
80 Sebewa loam	SEVERE - high water table; needs drainage.	SEVERE - high water table; needs drainage; heavy foot traffic may damage sod.	MODERATE - trails remain wet for long periods due to high water table.	SEVERE - high water table; needs drainage; low trafficability when wet; heavy traffic during wet periods may cause damage to turf; low relief; may be suitable for ponds.	VERY SEVERE - high water table; sanitary systems inoperative.	SEVERE - high water table; sites remain wet and soft for long periods; poor trafficability when wet; roads and walks need surfacing.
80V Same as No. 29, Colwood silt loam						
80Y Same as No. 231, Brookston silt loam						
80Z Same as No. 330, Navan loam						
81 Sebewa sandy loam	SEVERE - high water table; needs drainage.	SEVERE - high water table; needs drainage; heavy foot traffic may damage sod.	MODERATE - trails remain wet for long periods due to high water table.	SEVERE - high water table; needs drainage; heavy traffic during wet periods may damage turf; very low relief; may be suitable for ponds.	VERY SEVERE - high water table; sanitary systems inoperative.	SEVERE - sites remain wet and soft for long periods; poor trafficability when wet; walks and roads need surfacing.
82 Juneau silt loam	MODERATE on 0-6% and SEVERE on steeper slopes. Occasional overflow; needs water management.	MODERATE - occasional overflow; needs water management; compacts easily when wet.	MODERATE - trails and paths are slippery when wet; occasional overflow; erosive on slopes.	MODERATE - occasional overflow; gently sloping relief; turf easily damaged when wet.	SEVERE - occasional overflow; low bearing capacity when wet; liquefies easily.	SEVERE - overflow; sites need protection; walks and roads need surfacing; compacts easily.
84 Ockley silt loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; extensive leveling may expose sand and gravel substratum.	SLIGHT on 0-6% and MODERATE on steeper slopes. Erosive on slopes; compacts easily.	MODERATE - trails and paths may become muddy and slippery for short periods following a rain; erosive on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Erosive on slopes.	SLIGHT on 0-6% and MODERATE on steeper slopes. Subject to frost heave; erosive on slopes.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface remains wet and soft for short periods after rains; walks and roads need surfacing; compacts easily.
84R Same as No. 208, Knowles silt loam						
84V Same as No. 266, Sisson silt loam						
84Z Same as No. 24, Hebron silt loam						
86 Thackery silt loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; compacts easily when wet.	SLIGHT on 0-6% and MODERATE on steeper slopes. Erosive on slopes; compacts easily when wet.	MODERATE - trails and paths may become muddy and slippery for short periods following a rain; erosive on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Low to undulating relief; erosive on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Erosive on slopes; subject to frost heave; roads and walks need surfacing.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface tends to remain wet and soft for several days following a rain; roads and walks should be surfaced; compacts easily.
86V Same as No. 266, Sisson silt loam						
87 Sleeth silt loam	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; needs water management; heavy foot traffic may damage sod during wet seasons.	MODERATE - trails and paths often remain wet and slippery during periods of seasonal high water table; may need surfacing.	MODERATE - seasonal high water table; needs water management; very low relief; turf easily damaged when wet.	VERY SEVERE - sewage disposal is difficult; roads need to be surfaced.	MODERATE - surface tends to remain wet and soft for short periods during wet seasons; roads and walks should be surfaced; compacts easily.
87Z Same as No. 370, Mosel sandy loam						
89 Briggsville silty clay loam	MODERATE - moderately slow permeability; extensive leveling may expose the clayey subsoil; compacts easily when wet.	MODERATE - moderately slow permeability; compacts easily when wet.	MODERATE - trails and paths are muddy and slippery when wet; may need surfacing.	MODERATE - level relief; remains wet for short periods; turf easily damaged when wet.	MODERATE - sewage disposal is difficult due to clayey subsoil; roads should be surfaced; low bearing capacity when wet; high shrink-swell potential.	MODERATE - surface tends to remain soft and wet for several days following a rain; roads and walks should be surfaced; compacts easily when wet.
91 Parr silt loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; compacts easily when wet.	SLIGHT on 0-6% and MODERATE on steeper slopes. Erosive on slopes; compacts easily when wet; planted trees do well.	MODERATE - trails and paths are muddy and slippery for short periods following rains; may need surfacing; erosive on slopes.	SLIGHT on 0-6% and MODERATE on steeper slopes. Sloping areas have an erosion hazard.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Erosion hazard on sloping areas; roads should be surfaced; subject to frost heave.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface remains wet and soft after rains; erosion is a hazard on sloping areas; roads and walks should be surfaced.
91D Same as No. 91, Parr silt loam						
91N Same as No. 91, Parr silt loam						
92 Parr loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Planted trees do well; sloping areas have an erosion hazard.	SLIGHT on 0-12% and MODERATE on steeper slopes. Erosive on slopes; paths and trails may be muddy and slippery for short periods.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosion is a hazard on sloping areas; walks and roads may need surfacing.
92N Same as No. 92, Parr loam						

TABLE 17.
THE USE OF SOILS FOR RECREATIONAL DEVELOPMENTS (Continued)

Map Number and Soil Name	Playgrounds, Athletic Fields and Other Intensive Play Areas	Picnic Areas, Parks and Other Extensive Use Areas	Bridle Paths, Nature and Hiking Trails	Golf Course Fairways	Cottages, Service and Utility Buildings	Tent and Trailer Camp Sites
97 Same as No. 288, Hackett loamy sand						
99 Kewaunee soils	MODERATE on 0-6% and SEVERE on steeper slopes. Slow permeability; erosive on slopes; leveling exposes the clayey subsoil.	MODERATE on 0-12% and SEVERE on steeper slopes. Difficult to establish and maintain a good sod; clayey surface is slippery when wet and hard to manage; compacts easily when wet.	MODERATE on 0-12% and SEVERE on steeper slopes. Very slippery and muddy when wet and subject to a severe erosion hazard; usually needs surfacing.	MODERATE on 0-12% and SEVERE on steeper slopes. Difficult to establish a firm turf; severe erosion problem; turf easily damaged when wet.	SEVERE on 0-12% and VERY SEVERE on steeper slopes. Sewage disposal is difficult; moderate to severe limitations for road and foundation construction; erosion is a severe hazard; roads should be surfaced.	MODERATE on 0-6% and SEVERE on steeper slopes. Severe erosion hazard; surface tends to remain wet and soft following a rain; roads and walks need to be surfaced; compacts easily.
100 Kewaunee silt loam	MODERATE on 0-6% and SEVERE on steeper slopes. Slow permeability; erosive on slopes; leveling exposes the clayey subsoil.	MODERATE on 0-12% and SEVERE on steeper slopes. Sloping areas have an erosion hazard; compacts easily when wet.	MODERATE on 0-12% and SEVERE on steeper slopes. Slippery and muddy when wet; subject to erosion; may need surfacing.	MODERATE on 0-12% and SEVERE on steeper slopes. Erosive on slopes; slow permeability; turf easily damaged when wet.	SEVERE on 0-12% and VERY SEVERE on steeper slopes. Sewage disposal is difficult; moderate to severe limitations for road and foundation construction; erosion is a severe hazard; roads should be surfaced.	MODERATE on 0-6% and SEVERE on steeper slopes. Severe erosion hazard; surface tends to remain wet and soft following a rain; roads and walks need to be surfaced; compacts easily.
101 Kewaunee sandy loam	MODERATE on 0-6% and SEVERE on steeper slopes. Erosive on slopes; excessive leveling may expose the clayey subsoil.	MODERATE on 0-12% and SEVERE on steeper slopes. Sloping areas when not vegetated.	SLIGHT on 0-12% and MODERATE on steeper slopes. Slight erosion hazard on slopes.	MODERATE on 0-12% and SEVERE on steeper slopes. Droughty; erosive on slopes.	SEVERE - slow permeability makes sewage disposal difficult; erosion is a hazard; roads should be surfaced; low bearing capacity when wet; high shrink-swell potential.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosion is a hazard on sloping areas; slightly droughty.
102 Vilas loamy sand	MODERATE - droughty; erosive; hard to stabilize; difficult to maintain vegetative cover.	MODERATE - droughty; hard to maintain good vegetative cover; adapted trees and shrubs are limited; subject to wind erosion when not vegetated.	MODERATE - poor stability on slopes; difficult to maintain; may need surfacing; erosive.	SEVERE - will not support a good turf; very droughty; good source of sand for greens and traps; erosive.	MODERATE - care should be taken to avoid contamination of shallow wells; erosive; droughty; difficult to vegetate.	MODERATE - very sandy; droughty; hard to maintain a good vegetative cover; subject to erosion; roads should be surfaced.
103 Kewaunee loam	MODERATE on 0-6% and SEVERE on steeper slopes. Erosive on slopes; slow permeability; extensive leveling may expose the clayey subsoil.	MODERATE - sloping areas have an erosion hazard; slow permeability.	MODERATE - muddy and slippery when wet; slight erosion hazard on slopes.	MODERATE - erosive on slopes; slow permeability; turf easily damaged when wet.	SEVERE - slow permeability; sewage disposal is difficult; erosion is a hazard; roads should be surfaced; low bearing capacity when wet.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Erosion is a problem on sloping areas; roads and walks should be surfaced; surface remains wet and soft after rains.
106 Lorenzo silt loam	MODERATE on 0-6% and SEVERE on steeper slopes. Erosive on slopes; extensive leveling may expose the sand and gravel substratum; slightly droughty.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Planted trees do well; slightly droughty; sloping areas subject to erosion.	MODERATE on 0-12% and SEVERE on steeper slopes. Slippery and muddy when wet; sloping areas have an erosion hazard.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Slightly droughty; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosion hazard on sloping areas; road should be surfaced.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosion is a hazard on sloping areas; roads should be surfaced; slightly droughty.
106Z Same as No. 31, Rome loam						
108 Lorenzo-Rodman loams	For interpretations see No. 110, Lorenzo loam and No. 75 Rodman gravelly loam					
109 Same as No. 174, Fabius loam						
109V Same as No. 38, Kibbie silt loam						
109Y Same as No. 370, Mosel sandy loam						
109Z Same as 369, Mosel silt loam						
110 Lorenzo loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; extensive leveling may expose the sand and gravel substratum.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on slopes over 12%. Slightly droughty; erosion is a hazard on sloping areas.	SLIGHT on 0-12%, MODERATE on 12 to 20% and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12% and SEVERE on slopes over 12%. Sloping areas subject to erosion.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Sewage disposal system not suitable for steep slopes; erosion a hazard on sloping areas; slightly droughty.	MODERATE on 0-6% and SEVERE on steeper slopes. Walks and roads should be surfaced; walks and roads remain wet and soft after rains; compacts easily.
110R Same as No. 208, Knowles silt loam						
110Y Same as No. 191, Parr silt loam, shallow variant						
110Z Same as No. 31, Rome loam						
111 Same as No. 161, Dodge silt loam						
112 Same as No. 243, Calamus silt loam						
113 Same as No. 278, Clyman silt loam						
114 Same as No. 361, Miami silt loam						
116 Same as No. 343, Celina silt loam						
118 Same as No. 178, Crosby silt loam						
119 Warsaw silt loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; extensive leveling may expose the sand and gravel substratum.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes; compacts easily.	MODERATE on 0-12% and SEVERE on steeper slopes. Trails and paths are muddy and slippery after rains; sloping areas are subject to erosion.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosion is a hazard on sloping areas.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface remains wet and soft after rains; walks and roads need surfacing; compacts easily.
119V Same as No. 266, Sisson silt loam						
119Y Same as No. 91, Parr silt loam						
119Z Same as No. 31, Rome loam						
120 Warsaw loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; extensive leveling may expose sand and gravel substratum.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on slopes over 12%. Erosion a hazard on sloping areas.	SLIGHT on 0-12% and MODERATE on steeper slopes. Sloping areas are subject to erosion.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosion is a hazard on sloping areas; subject to frost heave.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes; walks and roads may need surfacing.
120Y Same as No. 91, Parr silt loam						
120Z Same as No. 31, Rome loam						
121 Same as No. 110, Lorenzo loam						
122 Same as No. 110, Lorenzo loam						
123 Tippecanoe silt loam	SLIGHT on 0-2% and MODERATE on 2-6% slopes. Erosive on slopes; compacts easily when wet.	SLIGHT - erosive on slopes; compacts easily when wet.	MODERATE - trails and paths may become muddy and slippery for short periods after a rain; may need surfacing.	SLIGHT - low relief	SEVERE - seasonal high water table restricts sanitary systems; subject to frost heave.	MODERATE - surface tends to remain wet for short periods following a rain; roads and walks should be surfaced; compacts easily.

TABLE 17.
THE USE OF SOILS FOR RECREATIONAL DEVELOPMENTS (Continued)

Map Number and Soil Name	Playgrounds, Athletic Fields and Other Intensive Play Areas	Picnic Areas, Parks and Other Extensive Use Areas	Bridle Paths, Nature and Hiking Trails	Golf Course Fairways	Cottages, Service and Utility Buildings	Tent and Trailer Camp Sites
123V Same as No. 266, Sisson silt loam						
123Z Same as No. 24, Hebron silt loam						
124 Crane silt loam	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - areas are subject to ponding for short periods of time; needs water management; compacts easily when wet.	MODERATE - trails and paths often remain wet and slippery during periods of high water table; may need surfacing.	MODERATE - subject to ponding for short periods of time; low relief; needs water management; turf easily damaged when wet.	VERY SEVERE - periodic high water table; questionable for sewage disposal; on-site investigation necessary.	MODERATE - subject to occasional ponding and periodic high water table; walks and roads need surfacing; compacts easily when wet.
125 Same as No. 206, Knowles silt loam, shallow variant						
126 Westland silt loam	SEVERE - high water table; compacts easily and has low trafficability when wet.	SEVERE - unless drained has high water table; heavy foot traffic may damage sod during wet periods.	SEVERE - trails and paths remain wet and slippery for long periods due to high water table; may need surfacing.	SEVERE - high water table; very low relief; may be suitable for ponds; low trafficability and turf easily damaged when wet.	VERY SEVERE - high water table makes sewage disposal systems usually inoperative.	SEVERE - high water table; sites remain wet and soft for long periods; poor trafficability; walks and roads need surfacing.
126V Same as No. 29, Colwood silt loam						
126Y Same as No. 212, Ehler silt loam						
126Z Same as No. 340, Navan silt loam						
133 Spinks fine sand	MODERATE on 0-6% and SEVERE on steeper slopes. Drouthy; erosive, difficult to maintain vegetative cover.	MODERATE on 0-12% and SEVERE on steeper slopes. Drouthy; will not support a good sod and only a limited number of trees and shrubs; subject to wind erosion.	MODERATE on 0-12% and SEVERE on steeper slopes. Paths and trails will become loose; difficult to maintain; subject to erosion.	SEVERE - on all slopes; drouthy; hard to maintain a good turf; may be good for sand traps and hazards; erosive.	MODERATE on 0-12% slopes and SEVERE on steeper slopes. Sewage disposal systems not suitable on steep slopes; erosion hazard on sloping areas; drouthy; difficult to maintain vegetative cover.	MODERATE on 0-6% and SEVERE on steeper slopes. Hard to maintain vegetative cover where there is heavy foot traffic; drouthy; erosive.
134 Same as No. 133, Spinks fine sand						
142 Manawa silt loam	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; heavy foot traffic may damage sod during wet periods; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; trails and paths become slippery and muddy when wet; may need surfacing.	MODERATE - seasonal high water table; heavy foot traffic may damage turf during wet periods; low to gently sloping relief; needs water management.	VERY SEVERE - slowly permeable soil material and fluctuating water table may make sewage disposal system inoperative; high shrink-swell potential; low bearing capacity when wet; roads should be surfaced.	MODERATE - subject to seasonal high water table; sites remain wet and soft for short periods; walks and roads need surfacing; compacts easily.
144 Same as No. 370, Mosel sandy loam						
152 Lapeer loam, shallow variant	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; slightly drouthy; may be stony or gravelly.	SLIGHT on 0-2%, MODERATE on 6-12%, and SEVERE on steeper slopes. May be stony or gravelly; erosion hazard on sloping areas; drouthy.	SLIGHT on 0-12%, MODERATE on 12-20%, and SEVERE on steeper slopes. Erosion is a hazard on sloping areas; may be stony or gravelly.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Drouthy; erosive on slopes; may be stony or gravelly.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Sewage disposal systems not suited on steep slopes; erosion is a hazard on sloping areas.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Drouthy; erosion a hazard on sloping areas; may be stony or gravelly.
153 Same as No. 152, Lapeer loam, shallow variant						
154 Same as No. 155, McHenry silt loam						
155 McHenry silt loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; compacts easily when wet.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes; compacts easily when wet.	MODERATE on 0-12% and SEVERE on steeper slopes. Trails and paths are muddy and slippery for short periods after rains; may need surfacing; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes; compacts easily when wet.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Roads and walks need surfacing; erosive on slopes.	MODERATE on 0-6% and SEVERE on steeper slopes. Erosion is a hazard on sloping areas; roads and walks need surfacing; compacts easily.
155Z Same as No. 24, Hebron silt loam						
156 Lapeer sandy loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; drouthy; may be stony or gravelly.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Drouthy; erosive on slopes; may be stony or gravelly.	SLIGHT on 0-12% and SEVERE on steeper slopes. Sloping areas are subject to erosion; may be stony or gravelly.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Drouthy; sloping areas are subject to erosion; may be stony or gravelly.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Sewage disposal systems not suited on steep slopes; erosion hazard on sloping areas; drouthy.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosion hazard on sloping areas; drouthy; may be stony and gravelly.
157 Same as No. 156, Lapeer sandy loam						
160 Hochheim-Casco-Sisson loams	For interpretations, see No. 357, Hochheim loam, No. 172, Casco loam, and No. 266 Sisson silt loam					
161 Dodge silt loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; compacts easily when wet.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes; compacts easily when wet.	MODERATE on 0-12% and SEVERE on steeper slopes. Trails and paths are muddy and slippery for short periods after rain; may need surfacing; erosion is a hazard on sloping areas.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Sloping areas subject to erosion; compacts easily when wet.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes; subject to frost heave; roads and walks need surfacing.	MODERATE on 0-6%, and SEVERE on steeper slopes. Surface remains wet and soft after rains. Erosion is a hazard on sloping areas; roads and walks need surfacing; compacts easily.
161R Same as No. 208, Knowles silt loam						
165 Poygan silt loam	SEVERE - high water table; needs drainage; slow permeability; low trafficability and compacts easily when wet.	SEVERE - unless drained; high water table; small areas may be used as pond sites; slow permeability; low trafficability and compacts easily when wet.	SEVERE - high water table; trails will be wet, slippery, and muddy during much of the year; generally need surfacing.	SEVERE - high water table; needs drainage; heavy traffic during wet periods may damage turf; low relief; suitable for ponds.	VERY SEVERE - high water table; slow permeability; sanitary systems will not operate; high shrink-swell potential.	SEVERE - high water table; sites remain wet and soft for long periods; walks and roads need surfacing; poor trafficability when wet.
170 Casco sandy loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; extensive leveling may expose the sand and gravel substratum; drouthy.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Drouthy, will support only a fair sod and is not easily revegetated; sod is easily damaged by intense foot traffic; erosive on slopes when sod is damaged.	SLIGHT on 0-12%, MODERATE on 12-20%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Drouthy; will support only a fair turf and is not easily revegetated.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Drouthy; making vegetation difficult; sewage systems are not suited on steep slopes; possible contamination of ground water.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Drouthy, making revegetation difficult; erosive on slopes.
170V Same as No. 267, Sisson fine sandy loam						
170Y Same as No. 22, Hebron sandy loam						
170Z Same as No. 22, Hebron sandy loam						
171 Poygan silt loam	SEVERE - high water table; slow permeability; low trafficability and compacts easily when wet.	SEVERE - unless drained; high water table; small areas may be used as pond sites; slow permeability; low trafficability and compacts easily when wet.	SEVERE - high water table; trails will be slippery and muddy during much of the year; may need surfacing.	SEVERE - will support a firm turf when drained; heavy traffic during wet periods may damage turf; low relief; suitable for ponds.	VERY SEVERE - high water table and slow permeability makes sanitary systems inoperative; high shrink-swell potential.	SEVERE - high water table; sites remain wet and soft for long periods; walks and roads need surfacing; poor trafficability when wet.

TABLE 17.
THE USE OF SOILS FOR RECREATIONAL DEVELOPMENTS (Continued)

Map Number and Soil Name	Playgrounds, Athletic Fields and Other Intensive Play Areas	Picnic Areas, Parks and Other Extensive Use Areas	Bridle Paths, Nature and Hiking Trails	Golf Course Fairways	Cottages, Service and Utility Buildings	Tent and Trailer Camp Sites
172 Casco loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; extensive leveling may expose sand and gravel substratum.	SLIGHT on 0-6%, MODERATE on 6-12% and SEVERE on steeper slopes. Slightly drouthy; erosive on slopes when sod is damaged.	SLIGHT on 0-12%, MODERATE on 12-20%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Slightly drouthy but will support a fair turf; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Slightly drouthy, but will support a fair sod; sewage systems not suited for steep slopes; erosive on slopes; possible contamination of ground water.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Slightly drouthy, but will support a fair sod; erosive on slopes.
172R Same as No. 204, Knowles loam						
172V Same as No. 268, Sisson loam						
172Y Same as No. 357, Hochheim loam						
172Z Same as No. 21, Hebron loam						
173 Casco silt loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; extensive leveling may expose sand and gravel substratum; compacts easily when wet.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Slightly drouthy; erosive on slopes; compacts easily when wet.	MODERATE on 0-12% and SEVERE on steeper slopes. Erosive on slopes; may be muddy and slippery when wet; may need surfacing.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Slightly drouthy but will support a fair turf; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Slightly drouthy; sewage systems not suited for steep slopes; possible contamination of ground water.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Slightly drouthy; surface slippery and muddy when wet; roads and walks should be surfaced.
173V Same as No. 266, Sisson silt loam						
173Y Same as No. 360, Hochheim silt loam						
173Z Same as No. 24, Hebron silt loam						
174 Fabius loam	MODERATE - seasonal high water table; needs water management.	MODERATE - seasonal high water table; needs water management; heavy foot traffic may damage sod during wet periods.	SLIGHT - trails and paths may be wet for short periods; subject to seasonal high water table.	MODERATE - seasonal high water table; heavy foot traffic may damage turf during wet periods; gently sloping relief.	VERY SEVERE - sewage disposal is difficult due to seasonal high water table; roads should be surfaced.	MODERATE - subject to seasonal high water table; sites remain wet for short periods; walks and roads should be surfaced.
174R Same as No. 306, Knowles silt loam, wet variant						
174Z Same as No. 370, Mosel sandy loam						
175 Fabius sandy loam	MODERATE - seasonal high water table; needs water management.	MODERATE - seasonal high water table; needs water management.	SLIGHT - trails and paths may be wet for short periods.	MODERATE - seasonal high water table; heavy foot traffic may damage turf during wet periods; gently sloping relief.	VERY SEVERE - sewage disposal is difficult due to seasonal high water table; roads should be surfaced.	MODERATE - subject to seasonal high water table; sites may be wet for short periods; roads should be surfaced.
175Z Same as No. 370, Mosel sandy loam						
176 Mussey loam	SEVERE - high water table; needs drainage; occasional overflow.	SEVERE - high water table and subject to occasional overflow; heavy foot traffic may damage sod during wet periods.	MODERATE - trails and paths remain wet and slippery for long periods; may need surfacing.	SEVERE - high water table; heavy foot traffic during wet periods may damage turf; very low relief; low trafficability when wet.	VERY SEVERE - high water table and overflow makes sewage disposal systems inoperative.	SEVERE - high water table and subject to frequent overflow; sites remain wet and muddy for long periods; needs drainage or fill.
176V Same as No. 176, Mussey loam						
176Z Same as No. 330, Navan loam						
178 Crosby silt loam	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; heavy foot traffic may damage sod during wet periods; needs water management; compacts easily when wet.	MODERATE - trails and paths may be slippery and muddy when wet; subject to seasonal high water table; may need surfacing.	MODERATE - seasonal high water table; needs water management; heavy foot traffic may damage turf during wet periods; gently sloping relief.	VERY SEVERE - sewage disposal is difficult due to seasonal high water table; roads should be surfaced.	MODERATE - seasonal high water table; surface tends to remain wet and muddy for short periods; walks and paths need surfacing; compacts easily.
179 Same as No. 231, Brookston silt loam						
180 Mussey sandy loam	SEVERE - high water table; needs drainage; occasional overflow.	SEVERE - high water table; subject to occasional overflow; heavy foot traffic may damage sod during wet periods.	MODERATE - trails and paths remain wet for long periods due to high water table and occasional periods of overflow.	SEVERE - high water table and subject to overflow; heavy foot traffic during wet periods may damage turf; very low relief.	VERY SEVERE - high water table and subject to overflow; sewage disposal systems often become inoperative.	SEVERE - high water table and subject to occasional overflow; sites remain wet for long periods; need drainage or fill.
181 Mussey silt loam	SEVERE - high water table; needs drainage; occasional overflow; compacts easily when wet.	SEVERE - high water table and subject to occasional overflow; heavy foot traffic may damage sod during wet periods; compacts easily when wet.	SEVERE - trails and paths remain wet and slippery for long periods due to high water table and occasional overflow; may need surfacing.	SEVERE - high water table and subject to overflow; heavy foot traffic during wet periods may damage turf; very low relief.	VERY SEVERE - high water table and subject to overflow; sewage disposal systems often become inoperative.	SEVERE - high water table and subject to occasional overflow; sites remain wet and soft for long periods; need drainage or fill.
181V Same as No. 29, Colwood silt loam						
181Y Same as No. 231, Brookston silt loam						
181Z Same as No. 340, Navan silt loam						
182 Fabius silt loam	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; needs water management; heavy foot traffic may damage sod during wet periods; compacts easily when wet.	MODERATE - trails and paths may be muddy and slippery when wet; remains wet for short periods; may need surfacing.	MODERATE - seasonal high water table; needs water management; heavy foot traffic may damage turf during wet periods; gently sloping relief.	VERY SEVERE - sewage disposal is difficult due to seasonal high water table; roads should be surfaced.	MODERATE - subject to seasonal high water table; sites remain wet and soft for short periods; walks and roads need to be surfaced; compacts easily when wet.
182V Same as No. 38, Kibbie silt loam						
182Y Same as No. 178, Crosby silt loam						
182Z Same as No. 369, Mosel silt loam						
188 Same as No. 178, Crosby silt loam						
189 Bristol silt loam	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - wet for short periods; muddy and slippery when wet; may need surfacing.	MODERATE - seasonal high water table; needs water management; turf easily damaged when wet.	VERY SEVERE - seasonal high water table makes sanitary systems inoperative; subject to frost heave; low bearing capacity when wet.	MODERATE - sites remain wet and soft for short periods; walks and roads need surfacing; compacts easily.
191 Parr silt loam, shallow variant	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; compacts easily when wet.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Planted trees and shrubs grow well; sloping areas subject to erosion; compacts easily when wet.	MODERATE on 0-12% and SEVERE on steeper slopes. Paths and trails slippery and muddy when wet; sloping areas have an erosion hazard; may need surfacing.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Sloping areas have an erosion hazard.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosion on slopes; sanitary systems not adapted to slopes over 12%; roads need surfacing.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface remains wet and soft after rains; walks and roads need surfacing; compacts easily when wet.
195 Same as No. 288, Hackett loamy sand						
195V Same as No. 267, Sisson fine sandy loam						
195Y Same as No. 156, Lapeer sandy loam						

TABLE 17.
THE USE OF SOILS FOR RECREATIONAL DEVELOPMENTS (Continued)

Map Number and Soil Name	Playgrounds, Athletic Fields and Other Intensive Play Areas	Picnic Areas, Parks and Other Extensive Use Areas	Bridle Paths, Nature and Hiking Trails	Golf Course Fairways	Cottages, Service and Utility Buildings	Tent and Trailer Camp Sites
195Z Same as No. 22, Hebron sandy loam						
203 Matherton loam	MODERATE - seasonal high water table; needs water management.	MODERATE - seasonal high water table; needs water management; heavy foot traffic will damage sod in wet weather.	MODERATE - trails and paths are wet for short periods; muddy and slippery when wet.	MODERATE - seasonal high water table; needs water management; low relief.	VERY SEVERE - seasonal high water table makes sanitary systems inoperative.	MODERATE - sites remain wet for short periods; areas may need drainage.
203V Same as No. 38, Kibbie silt loam						
203Y Same as No. 178, Crosby silt loam						
203Z Same as No. 370, Mosel sandy loam						
204 Knowles loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; extensive leveling may expose the limestone bedrock.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Bedrock may interfere with leveling operations on sloping areas; may be drouthy; erosive on slopes.	MODERATE on 0-12% and SEVERE on steeper slopes. Trails and paths may be muddy and slippery when wet; subject to erosion on sloping areas; may be rocky.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. May have occasional rock outcrops; erosive on slopes.	SEVERE - sewage disposal difficult because of limestone bedrock; may contaminate water supply; bedrock hinders excavation.	MODERATE on 0-6% and SEVERE on steeper slopes. May have occasional outcrops where tent stakes cannot be used; subject to erosion; surface remains wet and soft after rains; bedrock restricts use.
206 Knowles silt loam, shallow variant	MODERATE on 0-2% and SEVERE on steeper slopes. Bedrock restricts leveling; drouthy; erosive on slopes; may be rocky.	MODERATE on 0-6% and SEVERE on steeper slopes. Bedrock may interfere with leveling operations on sloping areas; drouthy and does not support a heavy sod; may have occasional bedrock outcrops.	MODERATE on 0-12% slopes; limestone outcrops are present throughout the area; subject to erosion on sloping areas; slippery and muddy when wet.	MODERATE on 0-6% and SEVERE on steeper slopes. Will support only a fair turf; many bedrock outcrops present; may be used for roughs and hazards; drouthy.	SEVERE - soil too shallow to install sewage disposal system; may contaminate water supply; bedrock restricts excavation.	MODERATE on 0-6% and SEVERE on steeper slopes. May have areas where bedrock interferes with use of tent stakes; outcrops may occur throughout the area; subject to erosion on sloping areas.
208 Knowles silt loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; extensive leveling may expose the limestone substratum.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Bedrock may interfere with leveling operations on sloping areas; may be drouthy; compacts easily when wet; may be rocky.	MODERATE on 0-12% and SEVERE on steeper slopes. Trails and paths may be muddy and slippery when wet; subject to erosion on sloping areas.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. May have occasional rock outcrops; erosive on slopes.	SEVERE - sewage disposal difficult because of limestone bedrock; may contaminate water supply; bedrock restricts excavation.	MODERATE on 0-6%, and SEVERE on steeper slopes. Surface remains wet and soft after rains; walks and roads need surfacing; bedrock restricts use; erosive on slopes; may have occasional rock outcrops.
212 Ehler silt loam	SEVERE - high water table; needs drainage; low trafficability and sod easily damaged when wet.	SEVERE - high water table; needs drainage; remains wet for long periods after rains; low trafficability and sod easily damaged when wet; compacts easily.	SEVERE - high water table; remains wet for long periods after rains; trails and paths are muddy and slippery when wet; may need surfacing.	SEVERE - high water table; low trafficability and turf easily damaged when wet.	VERY SEVERE - high water table; makes sanitary systems inoperative; low bearing capacity when wet; subject to frost heave.	SEVERE - high water table; sites remain wet and soft for long periods; poor trafficability when wet; walks and roads need surfacing.
212R Ehler silt loam, rock substratum	SEVERE - high water table; needs drainage; low trafficability when wet; dolomite bedrock restricts leveling operations.	SEVERE - high water table; needs water management; low trafficability and sod easily damaged when wet; compacts easily.	SEVERE - high water table; trails and paths are muddy and slippery for long periods; may need surfacing.	SEVERE - high water table; needs water management; low trafficability and turf easily damaged when wet.	VERY SEVERE - high water table makes sanitary systems inoperative; dolomite bedrock restricts excavations.	VERY SEVERE - sites remain wet and soft for long periods; poor trafficability when wet; walks and roads need surfacing.
212X Same as No. 126, Westland silt loam						
212Y Same as No. 212, Ehler silt loam						
213 Same as No. 212, Ehler silt loam						
213R Same as No. 212R, Ehler silt loam, rock substratum						
213V Same as No. 29, Colwood silt loam						
214 Same as No. 212, Ehler silt loam						
215 Same as No. 212, Ehler silt loam						
216 Same as No. 212, Ehler silt loam						
217 Bono silty clay loam	SEVERE - high water table; needs drainage; low trafficability when wet; slow permeability.	SEVERE - high water table; needs water management; low trafficability and sod easily damaged when wet; slow permeability.	SEVERE - high water table; trails and paths will be slippery and muddy during much of the year; may need surfacing.	SEVERE - heavy traffic during wet periods may damage turf; low trafficability when wet; needs drainage.	VERY SEVERE - high water table and slow permeability makes sanitary systems inoperative; high shrink-swell potential; low bearing capacity when wet.	SEVERE - high water table; sites remain wet and soft for long periods; poor trafficability when wet; walks and roads need surfacing.
218 Same as No. 217, Bono silty clay loam						
218V Same as No. 212, Ehler silt loam						
218Y Same as No. 212, Ehler silt loam						
226 Same as No. 226D, Keyser silt loam						
226D Keyser silt loam	SLIGHT on 0-2% and MODERATE on 2-6% slopes. Compacts easily when wet.	SLIGHT - erosive on slopes; compacts easily when wet.	MODERATE - trails may become muddy and slippery for short periods after a rain; may need surfacing.	SLIGHT - erosive on slopes; low and gently sloping relief.	MODERATE - seasonal high water table may restrict sanitary systems; subject to frost heave.	MODERATE - surface tends to remain wet and soft for short periods; roads and walks should be surfaced; compacts easily when wet.
228 Same as No. 458, Rollin muck, shallow phase						
231 Brookston silt loam	SEVERE - high water table; needs drainage; low trafficability and sod easily damaged when wet; compacts easily when wet.	SEVERE - needs drainage; low trafficability and sod easily damaged when wet; compacts easily when wet.	SEVERE - high water table; trails and paths are muddy and slippery during much of the year; may need surfacing; difficult to maintain.	SEVERE - heavy traffic during wet periods may damage turf; low relief; needs drainage.	VERY SEVERE - high water table makes sanitary systems inoperative; subject to occasional overflow.	SEVERE - high water table and subject to occasional overflow; sites remain wet and soft for long periods; poor trafficability when wet.
231Z Same as No. 298, Ashkum silty clay loam						
233 Matherton silt loam	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - trails and paths are wet and slippery during short periods; may need surfacing.	MODERATE - low relief seasonal high water table; needs water management; turf easily damaged when wet.	VERY SEVERE - sewage disposal is difficult.	MODERATE - surface remains wet for short periods; may have flooding along streams during periods of high water; areas need water management.
233V Same as No. 38, Kibbie silt loam						
233Y Same as No. 178, Crosby silt loam						
233Z Same as No. 369, Mosel silt loam						
234 Matherton sandy loam	MODERATE - seasonal high water table; needs water management.	MODERATE - heavy foot traffic may damage sod when wet; needs water management.	SLIGHT - trails and paths may be wet for short periods when water table is high.	MODERATE - needs water management.	VERY SEVERE - sewage disposal is difficult.	MODERATE - surface may remain wet during periods of high water table; may need drainage.
234V Same as No. 37, Kibbie fine sandy loam						
234Y Same as No. 178, Crosby silt loam						

TABLE 17.
THE USE OF SOILS FOR RECREATIONAL DEVELOPMENTS (Continued)

Map Number and Soil Name	Playgrounds, Athletic Fields and Other Intensive Play Areas	Picnic Areas, Parks and Other Extensive Use Areas	Bridle Paths, Nature and Hiking Trails	Golf Course Fairways	Cottages, Service and Utility Buildings	Tent and Trailer Camp Sites
243 Calamus silt loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; compacts easily when wet.	SLIGHT on 0-6% and MODERATE on steeper slopes.	MODERATE - trails and paths are slippery and muddy when wet; may need surfacing.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Erosive on slopes.	MODERATE - seasonal fluctuating water table may hinder sewage disposal systems; roads need surfacing; erosive on slopes.	MODERATE on 0-6% and SEVERE on steeper slopes. Sites remain wet and soft for short periods; walks and roads need surfacing.
250 Tedrow sandy loam	MODERATE - seasonal high water table; needs water management; sod easily damaged.	MODERATE - seasonal high water table; heavy foot traffic may damage sod during wet periods; will not support a wide variety of trees and shrubs.	SLIGHT - seasonal high water table; trails may become wet for short periods.	MODERATE - seasonal high water table; needs water management; heavy foot traffic may damage turf during wet periods; gently sloping relief.	VERY SEVERE - sewage disposal system may not operate due to high water table; erosive.	MODERATE - seasonal high water table; sites may be wet for short periods; may need drainage.
250V Same as No. 250, Tedrow sandy loam						
250Y Same as No. 250, Tedrow sandy loam						
250Z Same as No. 370, Mosel sandy loam						
251 Tedrow loamy sand	MODERATE - seasonal high water table; needs water management; sod easily damaged; erosive.	MODERATE - seasonal high water table; heavy foot traffic may damage sod; will not support a wide variety of trees and shrubs; erosive.	MODERATE - seasonal high water table; trails may become loose when dry; poor stability on slopes; difficult to maintain; erosive.	SEVERE - seasonal high water table; heavy foot traffic may damage turf; gently sloping relief; erosive.	VERY SEVERE - sewage disposal system may not operate due to high water table; erosive.	MODERATE - seasonal high water table; sites may be wet for short periods; areas may need drainage; erosive.
251Y Same as No. 251, Tedrow loamy sand						
251Z Same as No. 52, Aztalan sandy loam						
254 Tustin sandy loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6% and MODERATE on steeper slopes. Droughty; will not support a good sod with heavy foot traffic; erosive on slopes.	SLIGHT - subject to erosion on sloping areas; trails and paths may become loose when dry.	MODERATE - droughty; will not recover quickly after heavy foot traffic; erosive on slopes.	SLIGHT on 0-6% and MODERATE on steeper slopes. Subject to erosion; droughty; clayey substratum has a high shrink-swell potential.	SLIGHT on 0-6% and MODERATE on steeper slopes. Will not support firm sod for heavy foot traffic; droughty; erosive on slopes.
261 Same as No. 77, Dousman sandy loam						
262 Same as No. 251, Tedrow loamy sand						
266 Sisson silt loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; compacts easily when wet.	SLIGHT on 0-6% and MODERATE on steeper slopes. Erosive on slopes; compacts easily when wet.	MODERATE - erosive on slopes; trails and paths are muddy and slippery when wet; may need surfacing.	SLIGHT on 0-6% and MODERATE on steeper slopes. Erosive on slopes.	MODERATE - liquefies easily; subject to frost heave; low bearing capacity when wet; erosive on slopes.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface remains wet and soft after rains; roads and walks should be surfaced.
266R Same as No. 208, Knowles silt loam						
266X Same as No. 266, Sisson silt loam						
266Z Same as No. 24, Hebron silt loam						
267 Sisson fine sandy loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6% and MODERATE on steeper slopes. Slightly droughty making revegetation difficult; will support only a fair sod that is easily damaged by intense foot traffic; erosive on slopes.	SLIGHT - erosive on slopes.	SLIGHT on 0-6% and MODERATE on steeper slopes. Slightly droughty making revegetation difficult; will support only a fair turf that is easily damaged by intense foot traffic; erosive on slopes.	MODERATE - slightly droughty; subject to frost heave; liquefies easily; low bearing capacity when wet; erosive on slopes.	SLIGHT on 0-6% and MODERATE on steeper slopes. Slightly droughty; sod is easily damaged; erosive on slopes.
268 Sisson loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-12% and MODERATE on steeper slopes. Subject to erosion on sloping areas.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.	MODERATE on 0-12% and SEVERE on steeper slopes. Subject to frost heave; low bearing capacity when wet; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes; roads and walks may need to be surfaced.
269 Warsaw sandy loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Extensive leveling may expose the sand and gravel substratum; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Slightly droughty; sod is subject to damage by intense foot traffic; erosive on slopes.	SLIGHT on 0-12% and MODERATE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Slightly droughty; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Slightly droughty; erosive on slopes.
270 Same as No. 276, Boyer sandy loam						
270V Same as No. 267, Sisson fine sandy loam						
271 Same as No. 288, Hackett loamy sand						
272 Tustin loamy fine sand	MODERATE on 0-6% and SEVERE on steeper slopes. Droughty; erosive.	MODERATE on 0-12% and SEVERE on steeper slopes. Droughty; erosive; hard to maintain a good sod.	MODERATE on 0-12% and SEVERE on steeper slopes. Poor stability on slopes; erosive; difficult to maintain.	SEVERE - erosive; droughty; difficult to maintain a good turf.	MODERATE on 0-12% and SEVERE on steeper slopes. Droughty; erosive; difficult to maintain a good sod; clay has high shrink-swell potential.	MODERATE on 0-6% and SEVERE on steeper slopes. Erosive; droughty; vegetative cover hard to maintain.
276 Boyer sandy loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Slightly droughty; erosive on slopes; extensive leveling may expose the sandy substratum.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Droughty; erosive on slopes.	SLIGHT - erosive on slopes.	MODERATE - droughty; will support only a fair turf; turf easily damaged by intense foot traffic; erosive on slopes.	SLIGHT on 0-6% and MODERATE on steeper slopes. Droughty; difficult to establish lawns; erosive on slopes; possible contamination of ground water.	SLIGHT on 0-6% and MODERATE on steeper slopes. Droughty; hard to revegetate; sod easily damaged by intense foot traffic; erosive on slopes.
276Y Same as No. 156, Lapeer sandy loam						
276Z Same as No. 254, Tustin sandy loam						
277 Same as No. 276, Boyer sandy loam						
277Y Same as No. 156, Lapeer sandy loam						
277Z Same as No. 254, Tustin sandy loam						
278 Clyman silt loam	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; heavy foot traffic may damage sod during wet periods; compacts easily when wet.	MODERATE - trails and paths are muddy and slippery when wet; may need surfacing.	MODERATE - low relief; seasonal high water table; turf easily damaged when wet.	VERY SEVERE - sewage disposal is difficult; roads and walks should be surfaced.	MODERATE - surface remains wet and soft for short periods; compacts easily when wet; roads and walks need surfacing.
279 Same as No. 276, Boyer sandy loam						
280 Same as No. 316, Boyer loamy sand						
281 Same as No. 276, Boyer sandy loam						
282 Casco-Rodman loams	For interpretation, see No. 75, Rodman gravelly loam and No. 172, Casco loam					
283 Same as No. 370, Mosel sandy loam						
284 Same as No. 370, Mosel sandy loam						
285 Same as No. 176, Mussey loam						

TABLE 17.
THE USE OF SOILS FOR RECREATIONAL DEVELOPMENTS (Continued)

Map Number and Soil Name	Playgrounds, Athletic Fields and Other Intensive Play Areas	Picnic Areas, Parks and Other Extensive Use Areas	Bridle Paths, Nature and Hiking Trails	Golf Course Fairways	Cottages, Service and Utility Buildings	Tent and Trailer Camp Sites
286 Same as No. 181, Mussey silt loam						
287 Same as No. 176, Mussey loam						
288 Hackett loamy sand	MODERATE on 0-6% and SEVERE on steeper slopes. Drouthy; erosive; extensive leveling may expose sand substratum.	MODERATE on 0-12% and SEVERE on steeper slopes. Drouthy; will support a good sod; subject to wind erosion; limited variety of adapted trees and shrubs.	MODERATE on 0-12% and SEVERE on steeper slopes. Trails and paths become loose when dry; drouthy; subject to erosion.	SEVERE - drouthy; low vegetative potential and will not support a good turf; may be good for sand traps and hazards.	MODERATE on 0-12% and SEVERE on steeper slopes. Difficult to maintain good vegetation; subject to erosion; drouthy.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface becomes loose when dry; hard to maintain good vegetative cover; drouthy; subject to erosion.
288V Same as No. 267, Sisson fine sandy loam						
289 Same as No. 276, Boyer sandy loam						
289V Same as No. 156, Lapeer sandy loam						
289Z Same as No. 254, Tustin sandy loam						
295 Morley-Beecher silt loams	For interpretations, see No. 297, Morley silt loam and No. 336i, Beecher silt loam					
297 Morley silt loam	MODERATE on 0-6% and SEVERE on steeper slopes. Moderately slow permeability; compacts easily when wet.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Moderately slow permeability; compacts easily when wet; sloping areas are subject to erosion.	MODERATE on 0-12% and SEVERE on steeper slopes. Trails and paths are slippery and muddy when wet; erosion is a hazard on slopes; surface remains wet for short periods after rains due to heavy subsoil.	MODERATE on 0-12% and SEVERE on steeper slopes. Erosive on slopes; moderately slow permeability; turf easily damaged when wet.	SEVERE - slow permeability; restricts sanitary systems; low bearing capacity when wet; high shrink-swell potential.	MODERATE on 0-6% and SEVERE on steeper slopes. Sites remain wet and soft for short periods; subject to erosion on sloping areas; roads and walks should be surfaced.
297S Same as No. 297, Morley silt loam						
297V Same as No. 266, Sisson silt loam						
297X Same as No. 73, Fox silt loam						
297Y Same as No. 297, Morley silt loam						
298 Ashkum silty clay loam	SEVERE - high water table; needs drainage; low trafficability when wet; sod easily damaged; compacts easily when wet.	SEVERE - high water table; remains wet for long periods after rains; heavy foot traffic may damage sod when wet; compacts easily when wet.	SEVERE - high water table; surface remains wet much of the time; trails and paths are slippery and muddy when wet; may need surfacing.	SEVERE - high water table; needs water management; low relief; low trafficability and turf easily damaged when wet.	VERY SEVERE - high water table; sewage disposal systems are inoperative; high shrink-swell potential.	VERY SEVERE - high water table; sites remain wet and soft for long periods; poor trafficability when wet; roads and walks need surfacing.
299 Blount silt loam	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; paths and trails will be slippery and muddy when wet; may need surfacing; sloping areas have slight erosion hazard.	MODERATE - seasonal high water table; needs water management; low relief; turf easily damaged when wet.	VERY SEVERE - seasonal high water table and slow permeability makes sewage disposal difficult; high shrink-swell potential; low bearing capacity when wet.	MODERATE - seasonal high water table; sites remain wet and soft for short periods; poor trafficability when wet; walks and roads need surfacing.
300 Ashkum-Beecher silt loams	For interpretation, see No. 298, Ashkum silty clay loam and No. 336i, Beecher silt loam					
302 Same as No. 458, Rollin muck, shallow phase						
303 Alluvial land, rock substratum	SEVERE - frequent overflow, extensive leveling may expose bedrock substratum.	MODERATE - high water table and frequent overflow; needs water management.	MODERATE - high water table and frequent overflow; trails and paths may be slippery and muddy for short periods; rock outcrops may be common.	SEVERE - high water table and frequent overflow; bedrock will interfere with drainage; small areas may be used for roughs; low relief.	VERY SEVERE - high water table and frequent overflow; bedrock at shallow depth restricts excavations.	VERY SEVERE - high water table and frequent flooding; sites remain wet for short periods.
305 Same as No. 208, Knowles silt loam						
306 Knowles silt loam, wet variant	SEVERE - seasonally wet; bedrock restricts leveling; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; bedrock may hinder installation of playground equipment; compacts easily when wet.	MODERATE - seasonal high water table; trails and paths will be slippery and muddy for short periods; rock outcrops may occur.	MODERATE - seasonal high water table; may be difficult to drain because of bedrock; low relief.	VERY SEVERE - seasonal high water table; bedrock may allow effluent to contaminate water supply; not suitable for sewage disposal. bedrock restricts excavation.	SEVERE - seasonal high water table; sites remain wet and soft for short periods; walks and roads need surfacing; bedrock may interfere with camp layout.
307 Same as No. 306, Knowles silt loam, wet variant						
308 Same as No. 206, Knowles silt loam, shallow variant						
311 Manawa loam	MODERATE - seasonal high water table; needs water management; slow permeability; compacts easily when wet.	MODERATE - seasonal high water table; heavy foot traffic may damage sod during wet periods; slow permeability; compacts easily when wet.	MODERATE - seasonal high water table; trails and paths may be slippery when wet; may need surfacing.	MODERATE - seasonal high water table; heavy foot traffic will damage turf during wet periods; low relief.	VERY SEVERE - slowly permeable subsoil and fluctuating high water table makes sewage disposal systems inoperative; high shrink-swell potential; low bearing capacity when wet; roads should be surfaced.	MODERATE - seasonal high water table; sites remain wet and soft for short periods; walks and roads need surfacing; compacts easily when wet.
314 Same as No. 380, Sumner loamy sand						
315 Same as No. 316, Boyer loamy sand						
316 Boyer loamy sand	MODERATE on 0-2% and SEVERE on steeper slopes. Drouthy; erosive; extensive leveling may expose sand and gravel substratum.	MODERATE on 0-12% and SEVERE on steeper slopes. Drouthy; erosive; will not support a good sod.	MODERATE on 0-12% and SEVERE on steeper slopes. Trails and paths become loose when dry; erosive; poor stability on slopes; difficult to maintain; may need surfacing.	SEVERE - drouthy; will not support a good turf; subject to wind erosion on sparsely vegetated areas.	MODERATE on 0-12% and SEVERE on steeper slopes. Free draining; hard to maintain vegetative cover; subject to erosion; possible contamination of ground water.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface becomes loose when dry; vegetative cover hard to maintain; tent stakes tend to pull out easily; drouthy.
316V Same as No. 156, Lapeer sandy loam						
316Z Same as No. 272, Tustin loamy fine sand						
317 Oshtemo loamy fine sand	MODERATE on 0-6% and SEVERE on steeper slopes. Drouthy; erosive; excessive leveling may expose sandy substratum.	MODERATE on 0-12% and SEVERE on steeper slopes. Drouthy; erosive; difficult to maintain vegetative cover.	MODERATE on 0-12% and SEVERE on steeper slopes. Trails and paths become loose when dry; poor stability on slopes; subject to erosion.	SEVERE - drouthy; will not support a good turf; subject to wind erosion on sparsely vegetated areas.	MODERATE on 0-12% and SEVERE on steeper slopes. Hard to maintain vegetative cover; subject to erosion.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface becomes loose when dry; poor vegetative potential; tent stakes tend to pull out easily; drouthy.
320 Oshtemo sandy loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; excessive leveling may expose the sandy substratum.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes; slightly drouthy.	SLIGHT on 0-12% and SEVERE on steeper slopes. Erosive on slopes.	MODERATE on 0-12% and SEVERE on steeper slopes. Erosive on slopes; slightly drouthy.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes; liquefies easily.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.
323 Ionia sandy loam	MODERATE - seasonal high water table; excessive leveling may expose sand and gravel substratum.	MODERATE - seasonal high water table; heavy foot traffic may damage sod.	SLIGHT - wet for short periods; foot and hoof traffic may cause cutting and subsequent erosion on sloping areas.	MODERATE - seasonal high water table; turf may be damaged by heavy foot traffic in wet periods; nearly level relief.	MODERATE - seasonal high water table impedes sewage effluent disposal.	MODERATE - sites remain wet for short periods; may need drainage.
323V Same as No. 267, Sisson fine sandy loam						

TABLE 17.
THE USE OF SOILS FOR RECREATIONAL DEVELOPMENTS (Continued)

Map Number and Soil Name	Playgrounds, Athletic Fields and Other Intensive Play Areas	Picnic Areas, Parks and Other Extensive Use Areas	Bridge Paths, Nature and Hiking Trails	Golf Course Fairways	Cottages, Service and Utility Buildings	Tent and Trailer Camp Sites
324 Same as No. 323, Ionia sandy loam						
324V Same as No. 268, Sisson loam						
324Y Same as No. 343, Celina silt loam						
324Z Same as No. 21, Hebron loam						
325 Varna silt loam	MODERATE on 0-6% and SEVERE on steeper slopes. Moderately slow permeability; erosive on slopes; compacts easily when wet.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Moderately slow permeability; erosive on slopes.	MODERATE - trails and paths are slippery and muddy when wet; may need surfacing; slopes are subject to erosion.	SLIGHT on 0-6% and MODERATE on steeper slopes. Erosion is a hazard on sloping areas.	SEVERE - sewage disposal difficult; roads should be surfaced; high shrink-swell potential; low bearing capacity when wet.	MODERATE on 0-6% and SEVERE on steeper slopes. Sites remain soft and wet after rains; roads and walks should be surfaced.
326 Abington silt loam	SEVERE - high water table; needs drainage; occasional overflow; low trafficability when wet.	SEVERE - high water table; heavy foot traffic may damage sod when wet; low trafficability when wet.	SEVERE - trails and paths remain wet and slippery for long periods; need surfacing.	SEVERE - high water table; needs drainage; heavy traffic when wet may damage turf; low relief.	VERY SEVERE - high water table makes sanitary systems inoperative; occasional overflow.	SEVERE - sites remain wet and soft for long periods; poor trafficability when wet; roads and walks need surfacing.
326Z Same as No. 212, Ehler silt loam						
327 Walkill silt loam	SEVERE - frequent overflow; seasonal high water table; needs water management; compacts easily when wet.	SEVERE - frequent overflow; seasonal high water table; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; frequent overflow; low trafficability; slippery and muddy during most of the year.	SEVERE - frequent overflow; seasonal high water table; small areas may be used as pond sites; low relief.	VERY SEVERE - organic material is very compressible and settles unevenly; high water table and frequent overflow; sanitary systems inoperative.	VERY SEVERE - high water table; frequent overflow; sites remain wet and soft for long periods.
328 Pistakee silt loam	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; trails and paths are slippery and muddy for short periods; may need surfacing.	MODERATE - seasonal high water table; needs water management; turf easily damaged when wet; low relief.	VERY SEVERE - seasonal high water table causes sewage systems to be inoperative; liquefies easily; low bearing capacity when wet.	MODERATE - seasonal high water table; sites remain wet and soft for short periods; walks and roads need surfacing; compacts easily when wet.
328Y Same as No. 328, Pistakee silt loam						
330 Navan loam	SEVERE - high water table; needs drainage; slow permeability; compacts easily when wet.	SEVERE - needs drainage; low trafficability and compacts easily when wet.	SEVERE - high water table; trails and paths are muddy and slippery for long periods; may need surfacing.	SEVERE - high water table; needs drainage; low trafficability and turf easily damaged when wet.	VERY SEVERE - high water table and slow permeability makes sewage systems inoperative; low bearing capacity when wet; high shrink-swell potential.	SEVERE - high water table; sites remain wet and soft for long periods; poor trafficability when wet; walks and roads need surfacing.
331 Markham-Elliott silt loam	For interpretation, see No. 336, Markham silt loam and No. 3251, Elliott silt loam					
332 Kane silt loam	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; needs water management; heavy foot traffic may damage sod during wet season; compacts easily when wet.	MODERATE - seasonal high water table; trails and paths will be muddy and slippery when wet; may need surfacing.	MODERATE - seasonal high water table; needs water management; turf easily damaged when wet; low relief.	VERY SEVERE - seasonal high water table makes sanitary systems inoperative.	MODERATE - seasonal high water table; sites remain wet and soft for short periods; walks and roads need surfacing; compacts easily.
332V Same as No. 27, Wauconda silt loam						
332Y Same as No. 178, Crosby silt loam						
332Z Same as No. 53, Azta'an silt loam						
333 Eagle silt loam	MODERATE - seasonal high water table; extensive leveling may expose sand and gravel substratum; compacts easily when wet.	SLIGHT - seasonal high water table; compacts easily when wet.	MODERATE - trails and paths may be slippery and muddy for short periods; may need surfacing.	MODERATE - seasonal high water table; turf easily damaged when wet; low relief.	SEVERE - seasonal high water table may fluctuate enough to affect sewage disposal.	MODERATE - surface remains wet and soft after rains; walks and roads need surfacing; compacts easily.
333Y Same as No. 91, Parr silt loam						
333Z Same as No. 16, Rome silt loam						
334 Same as No. 119, Warsaw silt loam						
335 Ionia silt loam	MODERATE on 0-6% and SEVERE on 6-12% slopes. Seasonal high water table; extensive leveling may expose sand and gravel substratum; compacts easily when wet.	MODERATE on 0-6% and SEVERE on steeper slopes. Seasonal high water table; needs water management; compacts easily when wet.	MODERATE - trails and paths may be slippery and muddy when wet; may need surfacing.	MODERATE - seasonal high water table; needs water management; turf is easily damaged when wet.	MODERATE - water table may fluctuate enough to affect sewage disposal.	MODERATE on 0-6% and SEVERE on steeper slopes. Sites remain wet and soft for short periods; walks and roads need surfacing; compacts easily.
335Y Same as No. 343, Celina silt loam						
335Z Same as No. 24, Hebron silt loam						
336 Markham silt loam	MODERATE on 0-6% and SEVERE on steeper slopes; moderately slow permeability; compacts easily when wet.	SLIGHT on 0-6% and MODERATE on steeper slopes. Erosive on slopes; compacts easily when wet.	MODERATE - trails and paths are slippery and muddy when wet; erosive on slopes; may need surfacing.	MODERATE - erosive on slopes; moderately slow permeability; turf easily damaged when wet.	SEVERE - slow permeability restricts sanitary systems; large volume change; low bearing capacity when wet.	MODERATE on 0-6% and SEVERE on steeper slopes. Sites remain wet and soft for short periods; walks and roads should be surfaced.
338 Same as No. 298, Ashkum silty clay loam						
339 Abington silty clay loam	SEVERE - high water table; needs drainage; occasional overflow; low trafficability; sod easily damaged, and compacts easily when wet.	SEVERE - high water table and subject to occasional overflow; need drainage; low trafficability; sod easily damaged, and compacts easily when wet.	SEVERE - high water table; paths and trails are wet and slippery for long periods; may need surfacing.	SEVERE - high water table and subject to occasional overflow; heavy foot traffic will damage turf when wet; may be suitable to develop water hazards; low relief.	VERY SEVERE - high water table and occasional overflow makes sanitary systems inoperative.	SEVERE - high water table and subject to occasional overflow; sites remain wet and soft for long periods; walks and roads need surfacing.
340 Navan silt loam	SEVERE - high water table; needs drainage; compacts easily when wet.	SEVERE - high water table; needs drainage; low trafficability and compacts easily when wet.	SEVERE - high water table; trails and paths are wet and slippery for long periods; may need surfacing.	SEVERE - high water table; needs drainage; heavy foot traffic will damage turf when wet; may be suitable to develop hazards; low relief.	VERY SEVERE - high water table and slow permeability makes sanitary systems inoperative; low bearing capacity when wet; high shrink-swell potential.	SEVERE - high water table; sites remain wet and soft for long periods; walks and roads need surfacing.
343 Celina silt loam	SLIGHT on 0-2% and MODERATE on 2-6% slopes. Erosive on slopes; compacts easily when wet.	SLIGHT - erosive on slopes; compacts easily when wet.	MODERATE - paths and trails are muddy and slippery when wet; slight erosion hazard on slopes; may need surfacing.	SLIGHT - slight erosion hazard on sloping areas; low relief.	MODERATE - seasonal high water table may restrict sanitary systems; subject to frost heave.	MODERATE - sites remain wet and soft for short periods of time after rains; roads and walks need surfacing; compacts easily when wet.
344 Ashford silt loam	SLIGHT on 0-2% and MODERATE on 2-6% slopes. Erosive on slopes; compacts easily when wet.	SLIGHT - erosive on slopes; compacts easily when wet.	MODERATE - trails and paths are slippery and muddy when wet; slight erosion hazard on slopes; may need surfacing.	SLIGHT - slight erosion hazard on sloping areas; low relief.	SLIGHT - seasonal high water table may restrict sanitary systems.	MODERATE - sites remain wet for short periods of time after rains; roads and walks should be surfaced.
345 Nenno silt loam	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; heavy foot traffic may damage sod during wet seasons; compacts easily when wet.	MODERATE - trails and paths are muddy and slippery during periods when water table is high or after a rain; may need surfacing.	MODERATE - heavy foot traffic may damage sod when wet; low relief; needs water management.	VERY SEVERE - seasonal high water table may cause sewage system to be inoperative.	MODERATE - sites remain wet and soft for short periods; walks and roads need surfacing; compacts easily.

TABLE 17.
THE USE OF SOILS FOR RECREATIONAL DEVELOPMENTS (Continued)

Map Number and Soil Name	Playgrounds, Athletic Fields and Other Intensive Play Areas	Picnic Areas, Parks and Other Extensive Use Areas	Bridle Paths, Nature and Hiking Trails	Golf Course Fairways	Cottages, Service and Utility Buildings	Tent and Trailer Camp Sites
346 Kane loam	MODERATE - seasonal high water table; needs water management.	MODERATE - seasonal high water table; needs water management; heavy foot traffic may damage sod during wet seasons.	MODERATE - trails and paths are wet and slippery during periods when water table is high or after a rain.	MODERATE - seasonal high water table; needs water management; low relief.	VERY SEVERE - seasonal high water table causes sewage systems to be inoperative.	MODERATE - sites remain wet and soft for short periods; areas may need drainage.
346Y Same as No. 178, Crosby silt loam						
346Z Same as No. 51, Aztalan loam						
352 Same as No. 152, Lapeer loam, shallow variant						
355 Same as No. 156, Lapeer sandy loam						
356 Same as No. 156, Lapeer sandy loam						
357 Hochheim loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Subject to erosion on sloping areas.	MODERATE on 0-12% and SEVERE on steeper slopes. Sloping areas are subject to erosion; trails and paths are muddy and slippery when wet.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Sewage disposal systems not suited to steep slopes; subject to erosion on sloping areas.	MODERATE on 0-6% and SEVERE on steeper slopes. Sites remain wet and soft for short periods after a rain.
357R Same as No. 204, Knowles loam						
357X Same as No. 172, Casco loam						
358 Miami loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Subject to erosion on sloping areas.	SLIGHT on 0-12%, MODERATE on 12-20%, and SEVERE on steeper slopes. Sloping areas are subject to erosion.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Sewage disposal systems not suited to steep slopes; subject to erosion on sloping areas.	MODERATE on 0-6% and SEVERE on steeper slopes. Sites remain wet and soft after rains; roads and walks should be surfaced; compacts easily.
359 Hennepin loam	MODERATE on 0-6% and SEVERE on steeper slopes. Erosive on slopes; may be stony; excessive leveling will expose the substratum.	MODERATE on 0-12% and SEVERE on steeper slopes. Drouthy; will support only a fair sod; erosive on slopes if sod is damaged.	SLIGHT on 0-12%, MODERATE on 12-20%, and SEVERE on steeper slopes. Erosive on sloping areas; may be stony or cobbly.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Drouthy; difficult to revegetate; will support only a fair turf; erosive on slopes.	MODERATE on 0-12% and SEVERE on steeper slopes. Drouthy; hard to establish lawns; erosive on slopes; may be stony.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Drouthy; revegetation difficult; erosive on slopes; may be stony.
360 Hochheim silt loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Subject to erosion on sloping areas; compacts easily when wet.	MODERATE on 0-12% and SEVERE on steeper slopes. Sloping areas are subject to erosion; trails and paths are muddy and slippery when wet; may need surfacing.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Sewage disposal systems not suited to steep slopes; subject to erosion on sloping areas.	MODERATE on 0-6% and SEVERE on steeper slopes. Sites remain wet and soft for short periods after rains; roads and walks should be surfaced; compacts easily.
360R Same as No. 208, Knowles silt loam						
360V Same as No. 266, Sisson silt loam						
360X Same as No. 173, Casco silt loam						
361 Miami silt loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; compacts easily when wet.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Subject to erosion.	MODERATE on 0-12% and SEVERE on steeper slopes. Sloping areas are subject to erosion; trails and paths are muddy and slippery when wet; may need surfacing.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Sewage disposal systems not suited to steep slopes; subject to erosion on sloping areas.	MODERATE on 0-6% and SEVERE on steeper slopes. Sites remain wet and soft after rains; roads and walks should be surfaced; compacts easily.
362 Theresa silt loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; compacts easily when wet.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes; compacts easily when wet.	MODERATE on 0-12% and SEVERE on steeper slopes. Trails and paths are slippery and muddy when wet; may need surfacing; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes; sewage systems not suited for steep slopes.	MODERATE on 0-6% and SEVERE on steeper slopes. Sites remain wet and soft after rains; erosive on slopes; walks and roads should be surfaced.
362R Same as No. 208, Knowles silt loam						
362V Same as No. 266, Sisson silt loam						
362X Same as No. 73, Fox silt loam						
362Z Same as No. 24, Hebron silt loam						
363 Mayville silt loam	SLIGHT on 0-2% and MODERATE on 2-6% slopes. Erosive on slopes; compacts easily when wet.	SLIGHT on 0-6% and MODERATE on steeper slopes. Erosive on slopes; compacts easily when wet.	MODERATE - trails and paths will remain muddy and slippery for several days following a rain; may need surfacing; erosive on slopes.	SLIGHT on 0-6% and MODERATE on steeper slopes. Erosive on slopes.	SEVERE - seasonal high water table restricts sanitary systems; subject to frost heave; erosive on slopes.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface remains wet and soft for short periods following a rain; walks and roads should be surfaced; compacts easily.
363R Same as No. 306, Knowles silt loam, wet variant						
363X Same as No. 335, Ionia silt loam						
363Y Same as No. 363, Mayville silt loam						
363Z Same as No. 24, Hebron silt loam						
364 Lamartine silt loam	MODERATE on 0-6% and SEVERE on steeper slopes. Seasonal high water table; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; needs water management; intense foot traffic may damage sod during wet periods; compacts easily when wet.	MODERATE - trails and paths are slippery and muddy for short periods; may need surfacing.	MODERATE - seasonal high water table; needs water management; turf easily damaged when wet.	VERY SEVERE - seasonal high water table makes sanitary systems inoperative.	MODERATE on 0-6% and SEVERE on steeper slopes. Seasonal high water table; sites remain wet and soft for short periods; walks and roads need surfacing.
364V Same as No. 38, Kibbie silt loam						
364X Same as No. 233, Matherton silt loam						
364Z Same as No. 369, Mosel silt loam						
365 Hochheim-Hennepin loams	For interpretations see No. 357, Hochheim loam and No. 359, Hennepin loam.					
365X Same as No. 172, Casco loam						
366 Hochheim-Theresa loams	For interpretations see No. 357, Hochheim loam and No. 362, Theresa silt loam.					
369 Mosel silt loam	MODERATE on 0-6% and SEVERE on steeper slopes. Seasonal high water table; needs water management; compacts easily when wet.	MODERATE on 0-6% and SEVERE on steeper slopes. High water table; needs water management; compacts easily when wet.	MODERATE - trails and paths stay wet and slippery for short periods; may need surfacing.	MODERATE - low to gently sloping relief; turf easily damaged when wet.	VERY SEVERE - sewage disposal is difficult due to seasonal high water table and slow permeability; low bearing capacity when wet; high shrink-swell potential.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface tends to remain wet and soft for short periods; walks and roads need surfacing; may need drainage.

TABLE 17.
THE USE OF SOILS FOR RECREATIONAL DEVELOPMENTS (Continued)

Map Number and Soil Name	Playgrounds, Athletic Fields and Other Intensive Play Areas	Picnic Areas, Parks and Other Extensive Use Areas	Bridle Paths, Nature and Hiking Trails	Golf Course Fairways	Cottages, Service and Utility Buildings	Tent and Trailer Camp Sites
370 Mosel sandy loam	MODERATE on 0-6% and SEVERE on steeper slopes. Seasonal high water table; needs water management; erosive on slopes.	MODERATE on 0-6% and SEVERE on steeper slopes. Seasonal high water table; needs water management.	SLIGHT - trails and paths stay wet and slippery for short periods.	MODERATE - low to gently sloping relief; seasonal high water table; needs water management.	VERY SEVERE - sewage disposal is difficult due to seasonal high water table and slow permeability; low bearing capacity when wet; high shrink-swell potential.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface tends to remain wet for short periods; may need drainage.
371 Same as for No. 370, Mosel sandy loam						
380 Sumner loamy sand	MODERATE on 0-6% and SEVERE on steeper slopes. Droughty; erosive; extensive leveling may expose the sand substratum.	MODERATE - droughty; erosive; will support only a fair sod cover.	MODERATE - trails and paths become loose when dry; erosive on sloping areas; may need surfacing.	SEVERE - will not support a firm turf; good for traps and hazards; droughty; erosive.	MODERATE - droughty; erosive; low vegetative potential; possible contamination of ground water.	MODERATE on 0-6% and SEVERE on steeper slopes. Droughty; erosive; vegetative cover difficult to maintain.
380Z Same as No. 254, Tustin sandy loam						
386 Granby fine sandy loam	SEVERE - high water table; needs drainage; erosive.	SEVERE - high water table; heavy foot traffic will damage sod when wet; limited in variety of trees and shrubs it will support.	MODERATE - high water table; trails and paths remain wet for long periods; may need surfacing.	SEVERE - will support a fair turf when drained; high water table; heavy foot traffic may damage turf when wet; low relief.	VERY SEVERE - high water table makes sanitary systems inoperative; erosive.	SEVERE - sites remain wet for long periods; areas need drainage or fill.
386Y Same as No. 386, Granby fine sandy loam						
386Z Same as No. 330, Navan loam						
387 Same as No. 386, Granby fine sandy loam						
387V Same as No. 26, Wauconda fine sandy loam						
391 Wea sandy loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-12% and MODERATE on steeper slopes. Erosive on slopes.	SLIGHT on 0-12% and MODERATE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes; subject to frost heave.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Trees and shrubs have to be planted; erosive on slopes.
392 Ockley loam	SLIGHT on 0-2% and MODERATE on 2-6% slopes. Extensive leveling may expose sand and gravel substratum.	SLIGHT - erosive on slopes.	MODERATE - trails and paths may be muddy and slippery when wet.	SLIGHT - low relief; erosive on slopes.	SLIGHT - subject to frost heave.	MODERATE - surface remains wet and soft after rains; walks and roads need surfacing; compacts easily.
393 Ockley sandy loam	SLIGHT on 0-2% and MODERATE on 2-6% slopes. Extensive leveling may expose sand and gravel substratum.	SLIGHT - erosive on slopes.	SLIGHT - erosive on slopes.	SLIGHT - low relief; erosive on slopes.	SLIGHT - subject to frost heave.	SLIGHT - erosive on slopes.
394 Parr sandy loam	SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-12% and MODERATE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Slightly droughty; erosive on slopes; sanitary systems do not function on steeper slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.
397 Ozaukee silt loam	MODERATE on 0-6% and SEVERE on steeper slopes. Moderately slow permeability; compacts easily when wet.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Slowly permeable substratum increases erosion potential on slopes; compacts easily when wet.	MODERATE on 0-12% and SEVERE on steeper slopes. Paths and trails are muddy and slippery when wet; may need surfacing; erosive on slopes.	MODERATE on 0-12% and SEVERE on steeper slopes. Erosive on slopes; moderately slow permeability; turf easily damaged when wet.	SEVERE - large volume change; low bearing strength when wet; slow permeability restricts sewage disposal systems.	MODERATE on 0-6% and SEVERE on steeper slopes. Will support a good sod and a variety of trees and shrubs; walks and roads should be surfaced.
397R Same as No. 208, Knowles silt loam						
397V Same as No. 397, Ozaukee silt loam						
397X Same as No. 73, Fox silt loam						
397Y Same as No. 397, Ozaukee silt loam						
398 Same as No. 298, Ashkum silty clay loam						
399 Mequon silt loam	MODERATE - seasonal high water table; needs water management.	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; paths and trails are slippery and muddy for short periods; may need surfacing.	MODERATE - seasonal high water table; needs water management; turf easily damaged when wet; low relief.	VERY SEVERE - seasonal high water table makes sanitary systems inoperative; large volume change; low bearing strength when wet.	MODERATE - seasonal high water table; surface remains wet for several days following a rain; walks and roads need surfacing.
410 Same as No. 133, Spinks fine sand						
411 Same as No. 267, Sisson fine sandy loam						
413 Same as No. 267, Sisson fine sandy loam						
413Z Same as No. 254, Tustin sandy loam						
414 Same as No. 288, Hackett loamy sand						
416 Terrace escarpments, till	VERY SEVERE - steep slopes.	VERY SEVERE - steep slopes.	VERY SEVERE - steep slopes.	VERY SEVERE - steep slopes.	VERY SEVERE - steep slopes.	VERY SEVERE - steep slopes.
417 Terrace escarpments, outwash	VERY SEVERE - steep slopes.	VERY SEVERE - steep slopes.	VERY SEVERE - steep slopes.	VERY SEVERE - steep slopes.	VERY SEVERE - steep slopes.	VERY SEVERE - steep slopes.
419 Beach sand	MODERATE - droughty; erosive; devoid of vegetation; usually has a high water table.	MODERATE - devoid of vegetation; generally high water table; droughty; erosive.	MODERATE - loose when dry; firm when moist; devoid of vegetation; erosive.	VERY SEVERE - does not support vegetation; good source of sand for traps and greens.	VERY SEVERE - high water table restricts sanitary systems; droughty; erosive; does not support vegetation.	SEVERE - sands are loose and subject to blowing; does not support vegetation.
420 Same as No. 361, Miami silt loam						
421 Same as No. 161, Dodge silt loam						
431 Knowles stony silt loam, shallow variant	SEVERE - difficult to level due to shallow depth to dolomite rock.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface often stony; dolomite bedrock close to surface prevents leveling; supports fair sod and limited variety of shrubs and trees.	MODERATE - surface is slippery and muddy when wet; trails should be laid out on low grades; frequent rock outcrops.	SEVERE - except for use as hazards; difficult to maintain a good turf.	VERY SEVERE - bedrock prevents installation of filter field for sewage disposal; possible contamination of ground water.	MODERATE on 0-6% and SEVERE on steeper slopes. Bedrock interferes with driving of tent stakes; erosive on slopes; difficult to maintain good vegetative cover.
449 Same as No. 450, Houghton muck						
450 Houghton muck	VERY SEVERE - high water table; needs drainage; sod easily damaged; low trafficability; subject to subsidence.	SEVERE - high water table; shrinks and settles when drained; sod easily damaged; low trafficability; erosive.	VERY SEVERE - high water table; trails and paths are soft and wet for long periods; low trafficability; difficult to maintain.	SEVERE - high water table; needs drainage; may be source of organic material; may be used as hazards; low relief.	VERY SEVERE - high water table; sewage disposal systems do not function; unstable for roads and foundations.	VERY SEVERE - high water table; surface is very soft; unstable for roads and paths.

TABLE 17.
THE USE OF SOILS FOR RECREATIONAL DEVELOPMENTS (Continued)

Map Number and Soil Name	Playgrounds, Athletic Fields and Other Intensive Play Areas	Picnic Areas, Parks and Other Extensive Use Areas	Bridle Paths, Nature and Hiking Trails	Golf Course Fairways	Cottages, Service and Utility Buildings	Tent and Trailer Camp Sites
451	Same as No. 450, Houghton muck					
452	Adrian muck VERY SEVERE - high water table; needs drainage; low trafficability when wet; sod easily damaged; erosive.	SEVERE - high water table; shrinks and settles when drained; sod easily damaged when wet; low trafficability when wet; erosive.	VERY SEVERE - high water table; trails and paths are soft and wet for long periods; low trafficability and difficult to maintain.	SEVERE - high water table; may be source of organic material; may be used as hazards; low relief.	VERY SEVERE - high water table; sewage disposal systems do not function; unstable for roads and foundations.	VERY SEVERE - high water table; surface is very soft; unstable for roads and paths.
452Z	Same as No. 454, Palms muck					
453	Same as No. 452, Adrian muck					
454	Palms muck VERY SEVERE - high water table; needs drainage; low trafficability when wet; sod easily damaged.	VERY SEVERE - shrinks and settles when drained; low trafficability when wet; sod easily damaged; erosive.	VERY SEVERE - high water table; trails and paths are soft and wet; low trafficability; difficult to maintain.	SEVERE - high water table; may be source of organic material; may be used as hazards; low relief.	VERY SEVERE - high water table; sewage disposal systems do not function; unstable for roads and foundations.	VERY SEVERE - high water table; surface is very soft; unstable for roads and paths.
455	Same as No. 454, Palms muck					
456	Same as No. 454, Palms muck					
457	Same as No. 454, Palms muck					
458	Rollin muck, shallow phase VERY SEVERE - high water table; needs drainage; low trafficability when wet; limited in vegetation it will support.	VERY SEVERE - high water table needs drainage; shrinks and settles when drained; low trafficability and sod easily damaged when wet; limited in vegetation it will support.	VERY SEVERE - high water table; trails and paths are soft and wet; low trafficability; difficult to maintain.	SEVERE - high water table; needs drainage; may be source of organic material; may be used as hazards; low relief.	VERY SEVERE - high water table; sewage disposal systems do not function; unstable for roads and foundations.	VERY SEVERE - high water table; surface is very soft; unstable for roads and paths.
459	Same as No. 458, Rollin muck, shallow phase					
460	Same as No. 458, Rollin muck, shallow phase					
461	Muskego muck VERY SEVERE - high water table; difficult to drain; low trafficability and sod easily damaged when wet; unstable and shrinks when drained.	VERY SEVERE - high water table; difficult to drain; shrinks and settles unevenly when drained; low trafficability and sod easily damaged when wet.	VERY SEVERE - high water table; too soft for trails and paths; difficult to maintain.	SEVERE - high water table; may be a source of organic material; may be used as hazards; low relief.	VERY SEVERE - high water table; sewage disposal systems do not function; unstable for roads and foundations.	VERY SEVERE - high water table; surface is very soft; unstable for roads and paths.
462	Same as No. 450, Houghton muck					
502	Same as No. 504, Flagg silt loam					
504	Flagg silt loam SLIGHT on 0-2% and MODERATE on 2-6% slopes. Erosive on slopes; compacts easily when wet.	SLIGHT - erosive on slopes; compacts easily when wet.	MODERATE - trails and paths are muddy and slippery when wet; may need surfacing.	SLIGHT - erosive on slopes; low relief.	SLIGHT - subject to frost heave; erosive on slopes.	MODERATE - surface remains wet and soft after rains; walks and roads need surfacing; compacts easily when wet.
505	Flagg silt loam, wet variant MODERATE on 0-6% and SEVERE on steeper slopes. Seasonal high water table; needs water management; compacts easily when wet.	MODERATE on 0-6% and SEVERE on steeper slopes. Seasonal high water table; intense foot traffic may damage sod during wet season; compacts easily when wet.	MODERATE - seasonal high water table; trails and paths are muddy and slippery for short periods; may need surfacing.	MODERATE - seasonal high water table; intense foot traffic may damage turf during wet seasons; erosive on slopes.	VERY SEVERE - seasonal high water table makes sewage disposal difficult; subject to frost heave; erosive on slopes.	MODERATE - seasonal high water table; surface remains wet and soft for short periods; walks and roads need surfacing; compacts easily.
508	Same as No. 510, Pecatonica silt loam					
510	Pecatonica silt loam SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; compacts easily when wet.	SLIGHT on 0-6% and SEVERE on steeper slopes. Erosive on slopes; compacts easily when wet.	MODERATE - paths and trails are muddy and slippery when wet; may need surfacing; erosive on slopes.	SLIGHT on 0-6% and MODERATE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6% and MODERATE on steeper slopes. Erosive on slopes; subject to frost heave; roads and walks should be surfaced.	MODERATE on 0-6% and SEVERE on steeper slopes. Surface remains wet and soft after rains; roads and walks should be surfaced; compacts easily.
511	Same as No. 505, Flagg silt loam, wet variant					
514	Same as No. 516, Westville silt loam					
516	Westville silt loam SLIGHT on 0-2%, MODERATE on 2-6%, and SEVERE on steeper slopes. Erosive on slopes; compacts easily when wet.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes; compacts easily when wet.	MODERATE on 0-12% and SEVERE on steeper slopes. Paths and trails are slippery when wet; may need surfacing; erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes.	SLIGHT on 0-6%, MODERATE on 6-12%, and SEVERE on steeper slopes. Erosive on slopes; roads and walks should be surfaced.	MODERATE on 0-6% and SEVERE on steeper slopes. Sites remain wet and soft after rains; roads and walks should be surfaced; compacts easily when wet.
550	Same as No. 212R, Ehler silt loam, rock substratum					
557	Same as No. 358, Miami loam					
560	Same as No. 361, Miami silt loam					
3251	Elliott silt loam MODERATE - seasonal high water table; needs water management; erosive on slopes; moderately slow permeability; compacts easily when wet.	MODERATE - seasonal high water table; needs water management; erosive on slopes; moderately slow permeability; compacts easily when wet.	MODERATE - wet for short periods; paths and trails are muddy and slippery when wet; may need surfacing.	MODERATE - seasonal high water table; needs water management; turf easily damaged when wet.	VERY SEVERE - seasonal high water table makes sanitary systems inoperative; high shrink-swell potential; low bearing capacity when wet.	MODERATE - sites remain wet and soft for short periods; walks and roads need surfacing; compacts easily when wet.
3251V	Same as No. 3251, Elliott silt loam					
3361	Beecher silt loam MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - seasonal high water table; needs water management; compacts easily when wet.	MODERATE - trails and paths are muddy and slippery when wet; may need surfacing.	MODERATE - seasonal high water table; needs water management; turf easily damaged when wet.	VERY SEVERE - seasonal high water table makes sanitary systems inoperative; high shrink-swell potential; low bearing capacity when wet.	MODERATE - sites remain wet and soft for short periods; walks and roads need surfacing; compacts easily.

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Chapter X

THE USE OF SOILS FOR WILDLIFE

Most species of wildlife range over a wide land area that includes several kinds of soils. It is possible, however, to appraise a specific kind of soil for wildlife on the basis of the degree that it provides habitat (food, shelter, and nesting area) for a given species. Ratings for each soil are based on major habitat requirements for the species in question. Only the major limitations and hazards for different kinds of wildlife are listed for each soil. Because of the large number of species in the Region, it is impractical to rate each soil for each species. Kinds of wildlife therefore have been grouped as migratory waterfowl, upland game birds, songbirds, small game, and fur bearers.



A nesting place for waterfowl constructed by excavating from the lagoon surrounding it.

Each soil has been appraised and rated according to its ability to furnish habitat for a specific wildlife group. These ratings are expressed as slight, moderate, severe, and very severe. The suitability of soils for the wildlife groupings can be predicted on the basis of the ratings. The suitability of soils for other related species can also be determined. The prairie chicken and Hungarian partridge, for example, have about the same soil requirements as pheasants.

The four degrees of limitations are defined as follows:

1. SLIGHT - relatively free of limitations or have limitations that are easy to overcome.
2. MODERATE - can be used with good management and careful design but is generally less productive.
3. SEVERE - limitations are difficult to overcome and number of any one species it will support is generally limited.
4. VERY SEVERE - generally provides little or none of the habitat requirements.

In appraising soils for wildlife in Table 18, no consideration was given to the size and shape of soil bodies, nor to the pattern they form with other soils on the landscape. These factors and the range of individual species should be considered when an evaluation is made of an area consisting of two or more soils. The kinds and amounts of wildlife that can be produced on a soil is directly related to the kinds and amount of vegetation and its distribution over a given area. Water is very important. Because of their mobility, wildlife species make use of the most suitable habitat on a number of soils. They may nest in one area, feed in another, and find protective cover in still another. A variety of soils, within the home range of a given species, usually provides the most productive habitat.

The degrees of limitations given in the table do not apply to severely eroded soils. They apply only to soils whose erosion ranges from little or none through moderate. Generally, the severely eroded soil areas have more severe limitations than do their less eroded counterparts because they will not produce similar kinds and amounts of food and cover.

Table 18 is not designed to eliminate the need for on-site appraisal of soils for wildlife production. The pattern of different soils and their use on landscape along with the vegetative cover must be considered in all on-site investigations. The degree of limitations and the restrictions given are intended to provide guidance in the selection and development of suitable sites for wildlife. It should be clearly understood that the degree of limitations assigned to each soil for the different wildlife species are based on the present state of available knowledge. As more information becomes available, some shifts in degree of limitation can be expected.



Quail do well on those soils that provide good cover and food. Courtesy Wisconsin Conservation Department

In evaluating specific soils for production of wildlife species, each was compared to an ideal soil capable of providing all of the habitat requirements and having slight or no limitations for the species. Where the degree of limitations differs for two or more species within a single column, different ratings and restrictions are given.

Migratory waterfowl (ducks, geese) need nearly level soils that are well suited for intensive production of grain, seed crops, grasses, legumes, and wild herbaceous food plants. The soils should not be subject to frequent overflow, to erosion, or to drouthiness. Shallow water developments are relatively easy to provide and maintenance of desired water levels should not be difficult. Good production of a variety of wetland food and cover plants may be expected on such soils. Wood ducks generally need nesting

boxes or trees in addition to the above habitat elements. Woodcock, herons, bitterns and cranes are marsh and shore birds that require about the same habitat as migratory waterfowl.

Upland game birds (grouse, quail, pheasants) need nearly level to gently sloping soils that are well suited to the production of grain, seed crops, legumes, wild herbaceous and woody plants. Although soil requirements are similar for all species in this group, pheasants and quail generally need more open areas while grouse can tolerate more heavily wooded areas. The soils should not be subject to frequent overflow or severe erosion and should not be drouthy. They should have good natural drainage and be relatively free of stones or bedrock obstructions. Hungarian partridge and prairie chicken require about the same habitat as quail and pheasants while sharp-tailed grouse require habitat that includes elements for both prairie chicken and ruffed grouse.



Many of the soils in Southeastern Wisconsin produce good food, cover, and habitat for pheasants. Courtesy Wisconsin Conservation Department

Songbirds are treated collectively and the most productive soils are those which can provide suitable habitat for large numbers as well as for many species. Soils with good natural drainage on slopes of less than 6 percent capable of growing good grain, seed crops, wild herbaceous and woody plants are the most desirable. The soils should not be excessively wet, drouthy, erosive when cultivated, stony or subject to overflow or flooding.

Small game (rabbits, squirrels) need nearly level to sloping soils (less than 12 percent slopes). The soils should have good natural soil drainage, be moderately fertile and productive of cover and natural food plants. Good growth of a variety of shrubs, thickets, mast and den trees is needed. The soils should not be drouthy, excessively stony, poorly drained or subject to frequent and prolonged overflow or flooding.

Cottontail rabbits and squirrels are the two types of small game for which the soils in Table 18 were specifically rated. Jackrabbits and snowshoe rabbits were not considered even though they are quite numerous in some parts of the State. In general, jackrabbits range over the heavily farmed areas, snowshoe rabbits inhabit brushy areas of conifer and hardwood stands, and both utilize many of the same food plants as the cottontail rabbit.



Where soils provide adequate food and cover, wildlife such as deer can be found even in the vicinity of urban areas. Courtesy Wisconsin Conservation Department

Big game such as deer are generally most productive on nearly level to sloping soils (less than 12 percent slopes). The soils should have fair to good natural soil drainage and should not be subject to overflow or flooding. They should produce good yields of grain, grasses, legumes, and woodland food plants. The soils should not be drouthy, poorly drained, erosive when cultivated, or excessively stony. Land use and cover patterns are especially important in appraising broad areas of soils for deer habitat.

Fur bearers (beaver, mink, muskrat) require a dependable water supply as well as a source of food. Soils with less than 6 percent slopes, where a suitable water habitat is easy to provide, have the best potential. They should also have a moderate natural fertility level and produce a wide range of aquatic food, cover, and woody plants. Mink, raccoon, and skunk, although not dependent entirely on water habitat, quite frequently find their best habitat in the vicinity of water areas.



Nature's own engineer, the beaver, helped provide water habitat for other kinds of wildlife. Courtesy Wisconsin Conservation Department

TABLE 18.
LIMITATIONS OF SOILS FOR PRODUCTION OF SELECTED WILDLIFE SPECIES

Soil number; ¹ Soil name; & Native Vegetation	Migratory Waterfowl (Ducks - Geese)	Upland Game Birds (Grouse-Quail-Pheasants)	Song Birds	Small Game (Rabbits-Squirrels)	Big Game (Deer)	Fur Bearers (Beaver-Mink-Muskrat)
1 Rough broken land (Southern Hardwood)	VERY SEVERE-steep slopes prohibit grain and seed crop production.	SEVERE-steep slopes prohibit grain and seed crop production.	SEVERE-steep slopes prohibit grain and seed crop production.	SEVERE-steep slopes have poor cover and natural foods.	VERY SEVERE-poor production of woodland food and cover plants.	VERY SEVERE-water habitat hard to provide.
2 Stinson silt loam (Southern Hardwood)	MODERATE-frequent overflow restricts production of grain and seed crops; nesting sites may flood.	MODERATE-frequent flooding restricts production of grain and seed crops; nesting sites may flood; woodland plant species scarce.	MODERATE-frequent overflow restricts production of grain and seed crops; ground nests may flood; woodland plants scarce.	MODERATE-frequent overflow may flood burrows and nests; mast trees scarce.	MODERATE-overflow hazard restricts production of grain; poor reproduction of woodland food and cover plants.	SLIGHT-no major soil limitations.
3 Stony colluvium (Southern Hardwood)	MODERATE-frequent overflow restricts production of grain and seed crops; nesting sites may flood; stones interfere with cultivation.	MODERATE-frequent flooding restricts production of grain and seed crops; nesting sites may flood; woodland plant species scarce.	MODERATE-frequent overflow restricts production of grain and seed crops; ground nests may flood; woodland plants scarce.	MODERATE-frequent overflow may flood burrows and nests; mast trees scarce.	MODERATE-overflow hazard restricts production of grain; poor reproduction of woodland food and cover plants.	SLIGHT-no major soil limitations.
4 Marsh (Sedges & Reeds)	SLIGHT-not suitable for cultivated seed and grain crops.	VERY SEVERE-not suitable for seed and grain crop production; nesting sites may flood.	SEVERE-not suitable for seed and grain crop production; ground nest may flood; poor shrub and tree production.	VERY SEVERE-very limited in natural food production; burrows and nests are flooded most of year; mast trees scarce.	SEVERE-very limited natural food production; not suitable for seed, grain, or legume production.	SLIGHT-poor production of woody plants for beavers.
5 Same as No. 54, Lawson silt loam.						
5W Sawmill silt loam (Wet Prairie)	MODERATE-frequent overflow restricts production of grain and seed crops; nesting sites may flood; drainage needed for production of grain, seed crops and legumes.	MODERATE for quail and pheasants. Frequent overflow restricts production of grain and seed crops; nesting sites may flood. SEVERE for grouse. Poor production of woodland plants.	MODERATE-frequent overflow restricts production of grain and seed crops; ground nests may flood; poor production of woodland plants for shrub and tree nesters.	MODERATE for rabbits. Frequent overflow may flood burrows and nests. SEVERE for squirrels. Poor woodland plant production.	MODERATE-poor production of woodland food and cover plants; drainage needed for production of grains, grasses and legumes.	SLIGHT-poor production of woodland plants for beaver.
7 Dorchester silt loam (Southern Hardwood)	MODERATE-frequent overflow restricts production of grain and seed crops; nesting sites may flood.	MODERATE-frequent overflow restricts production of grain and seed crops; nesting sites may flood; low reproduction of woodland plants.	MODERATE-frequent overflow restricts production of grain and seed crops; ground nests may flood; low reproduction of woodland plants for shrubs and tree nesters.	MODERATE-frequent overflow may flood burrows and nests of rabbits; poor woodland plant reproduction; mast trees scarce.	MODERATE-overflow hazard restricts production of grain; poor reproduction of woodland food and cover plants.	SLIGHT-poor reproduction of woodland plants for beaver.
7W Same as No. 54, Lawson silt loam.						
10 Same as No. 11, Alluvial land.						
10W Same as No. 11W, Alluvial land, wet.						
11 Alluvial land (Southern Hardwood)	MODERATE-frequent overflow restricts production of grain and seed crops; nesting sites may flood.	MODERATE-frequent overflow restricts production of grain and seed crops; nesting sites may flood; poor production of woodland plants.	MODERATE-frequent overflow restricts production of grain and seed crops; ground nest sites may flood.	MODERATE-frequent overflow may flood burrows and nests; mast trees scarce.	MODERATE-poor reproduction of woodland food and cover plants; overflow hazard restricts production of grain.	SLIGHT for muskrats and MODERATE for beaver. Poor reproduction of woodland plants.
11W Alluvial land, wet (Swamp Hardwoods)	MODERATE-frequent overflow restricts production of grain and seed crops; nesting sites may flood.	MODERATE-frequent overflow restricts production of grain and seed crops; nesting sites may flood; poor production of woodland plants.	MODERATE-frequent overflow restricts production of grain and seed crops; ground nest sites may flood.	SEVERE-frequent overflow may flood burrows and nests; few mast trees and low production of natural foods.	MODERATE-poor reproduction of woodland food and cover plants; overflow hazard restricts production of grain.	SLIGHT for muskrats and MODERATE for beaver. Poor reproduction of woodland plants.
11WY Same as No. 11W, Alluvial land, wet.						
12 Wea silt loam (Prairie)	MODERATE on 0-6% and SEVERE on 6-12% slopes. No wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes for quail and pheasants; sloping areas erosive when cultivated. SEVERE for grouse. Poor woodland plant production.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Sloping areas erosive when cultivated; poor production of woodland plants for shrub and tree nesters.	MODERATE-poor woodland plant production; thickets, mast and den trees may be widely scattered.	MODERATE-poor production of woodland food and cover plants.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide; poor production of woodland plants for beaver.
14 Same as No. 288, Hackett loamy sand.						
15 Hillside seepage (Prairie)	SLIGHT-drainage needed for production of grain seed crops and legumes.	MODERATE-drainage needed for production of grain, seed crops and legumes; nesting sites may flood; woodland plant species scarce.	MODERATE-drainage needed for production of grain and seed crops; ground nest sites may flood.	MODERATE for rabbits. Burrow and nests may flood. SEVERE for squirrels. Mast trees usually absent; natural foods limited.	MODERATE-drainage needed for production of grain, grasses and legumes; some legumes not adapted.	SLIGHT-no major soil limitations.
16 Same as No. 31, Rome loam						
18 Same as No. 266, Sisson silt loam.						
18Y Same as No. 266, Sisson silt loam.						
19 Same as No. 266, Sisson silt loam.						
21 Hebron loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. No wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Sloping areas erosive when cultivated.	SLIGHT-no major soil limitations.	SLIGHT-no major soil limitations.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide.
21Y Same as No. 21, Hebron loam.						
22 Same as No. 21, Hebron loam.						
23 Same as No. 54, Lawson silt loam.						
24 Same as No. 21, Hebron loam.						
26 Wauconda fine sandy loam (Southern Hardwood)	SLIGHT-drainage needed for best production of grain, seed crops and legumes.	MODERATE-drainage needed for best production of grain, seed crops and legumes; woodland plant species scarce.	SLIGHT-no major soil limitations.	SLIGHT for rabbits; MODERATE for squirrels. Mast trees scarce.	SLIGHT-drainage may be needed for best production of grain, grass and legumes.	SLIGHT-water habitat hard to provide.
27 Same as No. 26, Wauconda fine sandy loam.						
27Z Same as No. 51, Axtalan loam.						
28 Colwood fine sandy loam (Swamp Forest)	SLIGHT-drainage needed for production of grain, seed crops and legumes.	MODERATE-drainage needed for production of grain, seed crops and legumes; woodland plant species scarce.	MODERATE-drainage needed for grain and seed crop production; woodland plants scarce.	MODERATE for rabbits. Burrows and nests may flood; poor production of woody plants. SEVERE for squirrels. Mast trees usually absent; natural foods limited.	MODERATE-poor production of woodland food and cover plants; drainage needed for production of grains, grasses and legumes.	SLIGHT-no major soil limitations.

¹ Where ratings are not given for all slopes, the next steeper slope group will have one degree more severe limitation than the steepest one listed.

TABLE 18.
LIMITATIONS OF SOILS FOR PRODUCTION OF SELECTED WILDLIFE SPECIES (Continued)

Soil number; Soil name; & Native Vegetation	Migratory Waterfowl (Ducks - Geese)	Upland Game Birds (Grouse-Quail-Pheasants)	Song Birds	Small Game (Rabbits-Squirrels)	Big Game (Deer)	Fur Bearers (Beaver-Mink-Muskkrat)
28Z Same as No. 330, Navan loam.						
29 Same as No. 28, Colwood fine sandy loam.						
29V Same as No. 28, Colwood fine sandy loam.						
30 Same as No. 28, Colwood fine sandy loam.						
31 Rome loam (Prairie)	MODERATE on 0-6% and SEVERE on 6-12% slopes. Poorly suited for wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes for quail and pheasants. Sloping areas erosive when cultivated. SEVERE for grouse. Poor production of woodland plants.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Sloping areas erosive when cultivated; poor production of woodland plants for shrub and tree nesters.	MODERATE-poor woodland plant production; thickets, mast and den trees widely scattered.	MODERATE-poor production of woodland food and cover plants.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide; poor production of woodland plants for beaver.
32 Same as No. 31, Rome loam.						
33 Same as No. 266, Sisson silt loam.						
33Z Same as No. 21, Hebron loam.						
34 Same as No. 266, Sisson silt loam.						
35 Same as No. 37, Kibbie fine sandy loam.						
35Z Same as No. 371, Mosel loam.						
36 Same as No. 47, Yahara loam.						
37 Kibbie fine sandy loam (Southern Hardwood)	SLIGHT-drainage needed for best production of grains, seed crops and legumes.	MODERATE-drainage needed for best production of grain, seed crops and legumes; woodland plant species scarce.	SLIGHT-no major soil limitations.	SLIGHT for rabbits; MODERATE for squirrels. Mast trees scarce.	SLIGHT-drainage may be needed for best production of grains, grasses and legumes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Water habitat may be hard to provide.
38 Same as No. 37, Kibbie fine sandy loam.						
38R Same as No. 306, Knowles silt loam, wet variant.						
38Z Same as No. 371, Mosel loam.						
39 Same as No. 40, Saylesville silt loam.						
39X Same as No. 72, Fox loam.						
40 Saylesville silt loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. Poorly suited for wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated.	SLIGHT on 0-12% and MODERATE on 12-20% slopes. Steeper slopes generally have less cover and natural foods.	SLIGHT on 0-12% and MODERATE on 12-20% slopes. Sloping areas are erosive when cultivated.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide.
40V Same as No. 266, Sisson silt loam.						
40X Same as No. 72, Fox loam.						
40Y Same as No. 161, Dodge silt loam.						
41 Same as No. 42, Tichigan silt loam.						
42 Tichigan silt loam (Southern Hardwood)	SLIGHT-drainage needed for best production of grain, seed crops and legumes.	MODERATE-drainage needed for best grain, seed crop and legume production; woodland plant species scarce.	SLIGHT-no major soil limitations.	SLIGHT for rabbits. MODERATE for squirrels. Mast trees scarce.	SLIGHT-drainage may be needed for best production of grain, grasses and legumes.	SLIGHT-water habitat may be hard to provide.
42R Same as No. 306, Knowles silt loam, wet variant.						
42V Same as No. 37, Kibbie fine sandy loam.						
42X Same as No. 87, Sleeth silt loam.						
42Y Same as No. 364, Lamartine silt loam.						
44 Jericho silt loam (Prairie-Oak)	MODERATE on 0-6% and SEVERE on 6-12% slopes. Poorly suited for wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes for quail and pheasants. Slopes erosive when cultivated. MODERATE for grouse. Woodland plant species scarce.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Sloping areas erosive when cultivated.	MODERATE-moderate woodland plant production; mast trees scarce.	MODERATE-poor production of woodland food and cover plants.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide. Poor production of woodland plants for beaver.
45 Same as No. 47, Yahara loam.						
45Z Same as No. 371, Mosel loam.						
46 Same as No. 47, Yahara loam.						
47 Yahara loam (Prairie-Oak)	SLIGHT-drainage needed for best production of grain, seed crops and legumes.	MODERATE-drainage needed for best production of grain, seed crops and legumes; woodland plant species scarce.	SLIGHT-no major soil limitations.	SLIGHT for rabbits. MODERATE for squirrels. Mast trees scarce.	MODERATE-limited production of woodland food and cover plants.	SLIGHT-water habitat hard to provide.
47Z Same as No. 371, Mosel loam.						
48 Same as No. 49, Keowns fine sandy loam.						
48Z Same as No. 330, Navan loam.						
49 Keowns fine sandy loam (Swamp Forests)	SLIGHT-drainage needed for grain, seed crop and legume production.	MODERATE-drainage needed for grain, seed crop and legume production; woodland plant species scarce.	MODERATE-drainage needed for grain and seed crop production; woodland plants scarce.	MODERATE for rabbits. Burrows and nests may flood. SEVERE for squirrels. Mast trees usually absent, natural food limited.	MODERATE-drainage needed for production of grains, grasses and legumes.	SLIGHT-no major soil limitations.
49Y Same as No. 49, Keowns fine sandy loam.						
51 Aztalan loam (Prairie)	SLIGHT-some legumes will not grow.	MODERATE for quail and pheasants. Poorly suited for intensive production of grain, seed crops and legumes. SEVERE for grouse. Poor production of woodland plants.	MODERATE-poor production of woodland plants for shrub and tree nesters.	MODERATE-poor woodland plant production; thickets, mast and den trees widely scattered.	MODERATE-poor production of woodland food and cover plants; drainage needed for best production of grains, grasses and legumes.	SLIGHT-water habitat may be hard to provide; poor reproduction of woodland plants for beaver.
52 Same as No. 51, Aztalan loam.						
53 Same as No. 51, Aztalan loam.						

TABLE 18.
LIMITATIONS OF SOILS FOR PRODUCTION OF SELECTED WILDLIFE SPECIES (Continued)

Soil number; Soil name; & Native Vegetation	Migratory Waterfowl (Ducks - Geese)	Upland Game Birds (Grouse-Quail-Pheasants)	Song Birds	Small Game (Rabbits-Squirrels)	Big Game (Deer)	Fur Bearers (Beaver-Mink-Moskrat)
54 Lawson silt loam (Prairie)	MODERATE-frequent overflow restricts production of grain and seed crops; nesting sites may flood.	MODERATE for quail and pheasants. Frequent overflow restricts production of grain and seed crops; nesting sites may flood. SEVERE for grouse. Poor production of woodland plants.	MODERATE-frequent overflow restricts production of grain and seed crops; ground nest sites may flood; poor production of woodland plants for shrub and tree nesters.	MODERATE for rabbits. Frequent overflow may flood burrows and nests. SEVERE for squirrels. Poor woodland plant production.	SEVERE-poor reproduction of woodland food and cover plants; overflow hazard restricts production of grain.	SLIGHT-poor production of woodland plants for beaver.
59 Dousman sandy loam (Prairie)	MODERATE-drainage needed for best production of grain, seed crops and legumes; only fair production of grain and seed crops.	MODERATE-drainage needed for best production of grain, seed crops and legumes; woodland plant species scarce.	SLIGHT-no major soil limitations.	SLIGHT for rabbits. MODERATE for squirrels. Mast trees scarce.	SLIGHT-drainage may be needed for best production of grains, grasses and legumes.	MODERATE-water habitat may be hard to provide; low natural fertility; moderate production of food and cover plants.
59Z Same as No. 51, Aztalan loam.						
60 Same as No. 59, Dousman sandy loam.						
60Z Same as No. 51, Aztalan loam.						
63 Same as No. 231, Brookston silt loam.						
64 Same as No. 231, Brookston silt loam.						
66 Same as No. 386, Granby fine sandy loam.						
67 Same as No. 386, Granby fine sandy loam.						
69 Casco part, same as No. 172, Casco loam. Fox part, same as No. 72, Fox loam.						
70 Same as No. 72, Fox loam.						
70V Same as No. 266, Sisson silt loam.						
70Y Same as No. 357, Hochheim loam.						
70Z Same as No. 21, Hebron loam.						
71 Casco part, same as No. 172, Casco loam. Fox part, same as No. 72, Fox loam.						
72 Fox loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. No wetland food and cover plants; open water areas hard to provide; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Steeper slopes generally provide less cover and natural food.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Sloping areas are erosive when cultivated; steeper slopes provide less cover and natural foods.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide.
72R Same as No. 204, Knowles loam.						
72V Same as No. 266, Sisson silt loam.						
72Y Same as No. 358, Miami loam.						
72Z Same as No. 21, Hebron loam.						
73 Same as No. 72, Fox loam.						
73R Same as No. 204, Knowles loam.						
73V Same as No. 266, Sisson silt loam.						
73Y Same as No. 358, Miami loam.						
73Z Same as No. 21, Hebron loam.						
75 Rodman loam (Southern Hardwood)	VERY SEVERE-drouthy; open water areas hard to provide; poor grain, seed crop, cover and wild herbaceous food plant production.	SEVERE-drouthy; poor production of grain, seed crops cover and woodland plants.	SEVERE-drouthy; poor grain and seed crop production; poor production of cover and woodland plants.	SEVERE-poor production of cover, natural food plants and mast trees scarce.	SEVERE-poor production of cover, woodland food plants, grains, grasses and legumes; drouthy.	VERY SEVERE-not practical to provide water habitat.
76 Sebewa silt loam (Swamp Forests)	SLIGHT-drainage needed for production of grain, seed crops and legumes.	MODERATE-drainage needed for production of grain, seed crops and legumes; woodland plant species scarce.	MODERATE-drainage needed for grain and seed crop production; woodland plants scarce.	MODERATE for rabbits. Burrows and nests may flood. SEVERE for squirrels. Mast trees usually absent; natural foods scarce.	MODERATE-drainage needed for production of grain, grasses and legumes.	SLIGHT-no major soil limitations.
76R Same as No. 306, Knowles silt loam, wet variant.						
76V Same as No. 28, Colwood fine sandy loam.						
76Y Same as No. 231, Brookston silt loam.						
76Z Same as No. 330, Navan loam.						
77 Same as No. 59, Dousman sandy loam.						
77Z Same as No. 51, Aztalan loam.						
78 Same as No. 59, Dousman sandy loam.						
78V Same as No. 37, Kibbie fine sandy loam.						
78Y Same as No. 178, Crosby silt loam.						
79 Waukechon loam (Wet Prairie)	SLIGHT-drainage needed for production of grain and seed crops.	SLIGHT for quail and pheasants. Drainage needed for production of grain, seed crops and legumes; SEVERE for grouse. Poor production of woodland plants.	MODERATE-drainage needed for grain and seed crop production; poor production of woodland plants for shrub and tree nesters.	MODERATE for rabbits. Burrows and nests may flood. SEVERE for squirrels. Mast trees usually absent; poor production of woodland plants.	MODERATE-poor production of woodland food and cover plants; drainage needed for production of grain, grasses and legumes.	SLIGHT-poor production of woodland plants for beaver.
80 Same as No. 76, Sebewa silt loam.						
80V Same as No. 28, Colwood fine sandy loam.						
80Y Same as No. 231, Brookston silt loam.						
80Z Same as No. 330, Navan loam.						
81 Same as No. 76, Sebewa silt loam.						

TABLE 18.
LIMITATIONS OF SOILS FOR PRODUCTION OF SELECTED WILDLIFE SPECIES (Continued)

Soil number; Soil name; & Native Vegetation	Migratory Waterfowl (Ducks - Geese)	Upland Game Birds (Grouse-Quail-Pheasants)	Song Birds	Small Game (Rabbits-Squirrels)	Big Game (Deer)	Fur Bearers (Beaver-Mink-Muskrat)
82 Juneau silt loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. Poorly suited for wetland food and cover plants; nesting sites may flood; poorly suited for intensive production of grain and seed crops on slopes.	MODERATE on 0-6% and SEVERE on 6-12% slopes for quail and pheasants; frequent overflow restricts production of grain and seed crops; nesting sites may flood.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Sloping areas erosive when cultivated; nesting sites may flood.	MODERATE-burrows and nests may flood; mast trees scarce; poor reproduction of woody plants.	SLIGHT-overflow hazard restricts production of grain.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide.
84 Ockley silt loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. No wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6% and MODERATE on steeper slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6% and MODERATE on steeper slopes. Sloping areas erosive when cultivated.	SLIGHT-no major soil limitation.	SLIGHT-no major soil limitation.	MODERATE on 0-6% and SEVERE on steeper slopes. Water habitat hard to provide.
84R Same as No. 204, Knowles loam.						
84V Same as No. 266, Sisson silt loam.						
84Z Same as No. 21, Hebron loam.						
86 Thackery silt loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. Poorly suited for wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% slopes. Poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Sloping areas erosive when cultivated.	SLIGHT-no major soil limitations.	SLIGHT-no major soil limitations.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide.
86V Same as No. 266, Sisson silt loam.						
87 Sleeth silt loam (Southern Hardwood)	SLIGHT-drainage needed for best production of grain, seed crops and legumes.	MODERATE-drainage needed for best production of grains, seed crops and legumes; woodland plant species scarce.	SLIGHT-no major soil limitations.	SLIGHT for rabbits. MODERATE for squirrels. Mast trees scarce.	SLIGHT-drainage may be needed for best production of grain, grasses and legumes.	SLIGHT-water habitat hard to provide.
87Z Same as No. 371, Mosel loam.						
89 Briggsville silty clay loam (Southern Hardwoods)	MODERATE on 0-6% and SEVERE on 6-12% slopes. No wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Sloping areas erosive when cultivated.	SLIGHT-no major soil limitations.	SLIGHT-no major soil limitations.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat may be hard to provide.
91 Same as No. 358, Miami loam.						
91D Same as No. 161, Dodge silt loam.						
91N Same as No. 358, Miami loam.						
92 Same as No. 358, Miami loam.						
92N Same as No. 358, Miami loam.						
97 Same as No. 288, Hackett loamy sand.						
99 Same as No. 100, Kewaunee silt loam.						
100 Kewaunee silt loam (Northern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes; poorly suited for wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Slopes are erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Steeper slopes generally provide less cover and natural foods.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Sloping areas are erosive when cultivated; steeper slopes provide less cover and natural foods.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide.
101 Same as No. 100, Kewaunee silt loam.						
102 Vilas loamy sand (Southern Hardwoods)	VERY SEVERE-drouthy; erosive when cultivated; open water areas hard to provide; no wetland food and cover plants; poor grain, seed crop, cover and wild herbaceous food plant growth.	SEVERE for quail and pheasants. MODERATE on 0-6% and SEVERE on 6-12% slopes for grouse. Drouthy; woodland plant species scarce.	SEVERE-drouthy; erosive when cultivated; poor grain and seed crop production; woodland plants scarce.	SEVERE-poor production of cover, natural food plants and mast trees.	SEVERE-poor production of cover and woodland food plants; drouthy; erosive when cultivated; poor production of grain, grasses and legumes.	VERY SEVERE-not practical to provide water habitat; low natural fertility; poor production of food and cover plants.
103 Same as No. 100, Kewaunee silt loam.						
106 Same as No. 110, Lorenzo loam.						
106Z Same as No. 31, Rome loam.						
108 Lorenzo part, same as No. 110, Lorenzo loam. Rodman part, same as No. 75, Rodman loam.						
109 Same as No. 174, Fabius loam.						
109V Same as No. 37, Kibbie fine sandy loam.						
109Y Same as No. 371, Mosel loam.						
109Z Same as No. 371, Mosel loam.						
110 Lorenzo loam (Prairie)	SEVERE-open water areas hard to provide; no wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	MODERATE on 0-6% and SEVERE on 6-12% slopes for quail and pheasants. Slightly drouthy; only fair production of grain and seed crops; sloping areas erosive when cultivated. SEVERE for grouse. Poor production of woodland plants.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Slightly drouthy; sloping areas erosive when cultivated; poor production of woodland plants for shrub and tree nesters	MODERATE on 0-12% and SEVERE on 12-20% slopes. Poor woodland plant production; thickets, mast and den trees widely scattered.	MODERATE-poor production of woodland food and cover plants.	SEVERE-not practical to provide water habitat; poor production of woodland plants for beaver.
110R Same as No. 204, Knowles loam.						
110Y Same as No. 357, Hochheim loam.						
110Z Same as No. 31, Rome loam.						
111 Same as No. 161, Dodge silt loam.						
112 Same as No. 243, Calamus silt loam.						
113 Same as No. 278, Clyman silt loam.						
114 Same as No. 358, Miami loam.						
116 Same as No. 343, Celina silt loam.						

TABLE 18.
LIMITATIONS OF SOILS FOR PRODUCTION OF SELECTED WILDLIFE SPECIES (Continued)

Soil number; Soil name; & Native Vegetation	Migratory Waterfowl (Ducks - Geese)	Upland Game Birds (Grouse-Quail-Pheasants)	Song Birds	Small Game (Rabbits-Squirrels)	Big Game (Deer)	Fur Bearers (Beaver-Mink-Muskrat)
118 Same as No. 178, Crosby silt loam.						
119 Same as No. 120, Warsaw loam.						
119V Same as No. 266, Sisson silt loam.						
119Y Same as No. 358, Miami loam.						
119Z Same as No. 31, Rome loam.						
120 Warsaw loam (Prairie)	SEVERE-open water areas hard to provide; no wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes for quail and pheasants. Sloping areas erosive when cultivated. SEVERE for grouse. Poor production of woodland plants.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Sloping areas erosive when cultivated; poor production of woodland plants for shrub and tree nesters.	MODERATE-poor woodland plant production; thickets, mast and den trees widely scattered.	MODERATE-poor production of woodland food and cover plants.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide; poor production of woodland plants for beaver.
120Y Same as No. 358, Miami loam.						
120Z Same as No. 31, Rome loam.						
121 Same as No. 110, Lorenzo loam.						
122 Same as No. 110, Lorenzo loam.						
123 Tippecanoe silt loam (Prairie)	MODERATE-poorly suited for wetland food and cover plants.	SLIGHT for quail and pheasants. SEVERE for grouse. Poor production of woodland plants.	MODERATE-poor production of woodland plants for shrub and tree nesters.	MODERATE-poor woodland plant production; thickets, mast and den trees widely scattered.	MODERATE-poor production of woodland food and cover plants.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide; poor production of woodland plants for beaver.
123V Same as No. 266, Sisson silt loam.						
123Z Same as No. 21, Hebron loam.						
124 Crane loam (Prairie)	SLIGHT-drainage needed for best production of grain, seed crops and legumes.	MODERATE for quail and pheasants. Drainage needed for best production of grain, seed crops and legumes. SEVERE for grouse. Poor production of woodland plants.	MODERATE-poor production of woodland plants for shrub and tree nesters.	MODERATE-poor woodland plant production; thickets, mast and den trees widely scattered.	MODERATE-poor production of woodland food and cover plants; drainage needed for best production of grains, grasses and legumes.	MODERATE-water habitat hard to provide; poor production of woodland plants for beaver.
125 Same as No. 206, Knowles silt loam, shallow variant.						
126 Wetland silt loam (Wet Prairie)	SLIGHT-drainage needed for production of grain, seed crops and legumes.	MODERATE for quail and pheasants. Drainage needed for production of grain, seed crops and legumes. SEVERE for grouse. Poor woodland plant production.	MODERATE-drainage needed for grain and seed crop production; poor production of woodland plants for shrub and tree nesters.	MODERATE for rabbits. Burrows and nests may flood. SEVERE for squirrels. Mast trees usually absent; poor production of woodland plants.	MODERATE-poor production of woodland food and cover plants; drainage needed for production of grain, grasses and legumes.	SLIGHT-poor production of woodland plants for beaver.
126V Same as No. 28, Colwood fine sandy loam.						
126Y Same as No. 212, Ehler silt loam.						
126Z Same as No. 330, Navan loam.						
133 Spinks fine sand (Southern Hardwood)	VERY SEVERE-drouthy; erosive when cultivated; poor grain, seed crops, cover and wild herbaceous food plant production; no wetland food and cover plants; open water areas hard to provide.	SEVERE for quail and pheasants. Drouthy; erosive when cultivated; poor grain and seed crop production; MODERATE for grouse. Woodland plant species scarce.	SEVERE-drouthy; erosive when cultivated; poor grain, seed crop and cover production; woodland plants scarce.	SEVERE-poor production of cover, natural food plants and mast trees scarce.	SEVERE-poor production of woodland food and cover plants; drouthy; erosive when cultivated.	VERY SEVERE-not practical to provide water habitat; low natural fertility; poor production of food and cover plants.
134 Same as No. 133, Spinks fine sand.						
142 Manawa silt loam (Northern Hardwood)	SLIGHT-drainage needed for best production of grain, seed crops and legumes.	MODERATE-drainage needed for best production of grains, seed crops and legumes; woodland plant species scarce.	SLIGHT-no major soil limitations.	SLIGHT for rabbits. MODERATE for squirrels. Mast trees scarce.	SLIGHT-drainage may be needed for best production of grains, grasses and legumes.	SLIGHT-water habitat hard to provide.
144 Same as No. 371, Mosel loam.						
152 Same as No. 357, Hochheim loam.						
153 Lapeer loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. No wetland food and cover plants; open water areas hard to provide; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12%; and SEVERE on steeper slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6% and MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Steeper slopes generally provide less cover and natural foods.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Sloping areas are erosive when cultivated.	MODERATE on 0-6% and SEVERE on steeper slopes. Water habitat hard to provide.
154 Same as No. 155, McHenry silt loam.						
155 McHenry silt loam (Southern Hardwoods)	MODERATE on 0-6% and SEVERE on 6-12% slopes. No wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Steeper slopes generally provide less cover and natural food.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Sloping areas are erosive when cultivated.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat may be hard to provide.
155Z Same as No. 155, McHenry silt loam.						
156 Same as No. 153, Lapeer loam.						
157 Same as No. 153, Lapeer loam.						
160 Hochheim part, same as No. 357, Hochheim loam. Sisson part, same as No. 266, Sisson silt loam. Casco part, same as No. 172, Casco loam.						
161 Dodge silt loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. No wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated.	SLIGHT on 0-12%; MODERATE on 12-20% slopes. Steeper slopes generally provide less cover and natural food.	SLIGHT on 0-12% and MODERATE on 12-20% slopes. Sloping areas are erosive when cultivated.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide.
161R Same as No. 204, Knowles loam.						
165 Same as No. 171, Poygan silty clay loam.						
170 Same as No. 172, Casco loam.						
170V Same as No. 266, Sisson silt loam.						
170Y Same as No. 21, Hebron loam.						

TABLE 18.
LIMITATIONS OF SOILS FOR PRODUCTION OF SELECTED WILDLIFE SPECIES (Continued)

Soil number; Soil name; & Native Vegetation	Migratory Waterfowl (Ducks - Geese)	Upland Game Birds (Grouse-Quail-Pheasants)	Song Birds	Small Game (Rabbits-Squirrels)	Big Game (Deer)	Fur Bearers (Beaver-Mink-Muskrat)
170Z Same as No. 21, Hebron loam.						
171 Poygan silty clay loam (Swamp Forests)	SLIGHT-drainage needed for production of grain, seed crops and legumes.	MODERATE-drainage needed for production of grain, seed crops and legumes; woodland plant species scarce.	MODERATE-drainage needed for grain and seed crop production; woodland plants scarce.	MODERATE for rabbits. Burrows and nests may flood. SEVERE for squirrels. Mast trees usually absent; natural foods limited.	MODERATE-drainage needed for production of grain, grasses and legumes.	SLIGHT-no major soil limitations.
172 Casco loam (Southern Hardwood)	SEVERE-open water areas hard to provide; no wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Steeper slopes generally provide less cover and natural foods.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Slopes are erosive when cultivated.	SEVERE on 0-6% and VERY SEVERE on 6-12% slopes; not practical to provide water habitat.
172R Same as No. 204, Knowles loam.						
172V Same as No. 266, Sisson silt loam.						
172Y Same as No. 357, Hochheim loam.						
172Z Same as No. 21, Hebron loam.						
173 Same as No. 172, Casco loam.						
173V Same as No. 266, Sisson silt loam.						
173Y Same as No. 357, Hochheim loam.						
173Z Same as No. 21, Hebron loam.						
174 Fabius loam (Southern Hardwood)	SLIGHT-drainage needed for best production of grain, seed crops and legumes.	MODERATE-drainage needed for best production of grain, seed crops and legumes; woodland plant species scarce.	SLIGHT-no major soil limitations.	SLIGHT for rabbits; MODERATE for squirrels. Mast trees scarce.	SLIGHT-drainage may be needed for best production of grain, grasses and legumes.	MODERATE-water habitat hard to provide.
174R Same as No. 306, Knowles silt loam, wet variant.						
174Z Same as No. 371, Mosel loam.						
175 Same as No. 174, Fabius loam.						
175Z Same as No. 371, Mosel loam.						
176 Mussey loam (Wet Prairie)	SLIGHT-drainage needed for production of grains, seed crops and legumes.	MODERATE for quail and pheasants. Drainage needed for production of grain, seed crops and legumes. SEVERE for grouse. Poor production of woodland plants.	MODERATE-drainage needed for production of grain and seed crops; poor production of woodland plants for shrub and tree nesters.	MODERATE for rabbits. Burrows and nests may flood; poor woodland plant production. SEVERE for squirrels. Mast trees usually absent.	MODERATE-drainage needed for production of grain, grasses and legumes.	SLIGHT-poor production of woodland plants for beaver.
176V Same as No. 176, Mussey loam.						
176Z Same as No. 330, Navan loam.						
178 Crosby silt loam (Southern Hardwood)	SLIGHT-drainage needed for best production of grain, seed crops and legumes.	MODERATE-drainage needed for best production of grains, seed crops and legumes; woodland plant species scarce.	SLIGHT-no major soil limitations.	SLIGHT for rabbits. MODERATE for squirrels. Mast trees scarce.	SLIGHT-drainage may be needed for best production of grain, grasses and legumes.	SLIGHT-water habitat hard to provide.
179 Same as No. 231, Brookston silt loam.						
180 Same as No. 176, Mussey loam.						
181 Same as No. 176, Mussey loam.						
181V Same as No. 28, Colwood fine sandy loam.						
181Y Same as No. 231, Brookston silt loam.						
181Z Same as No. 330, Navan loam.						
182 Same as No. 174, Fabius loam.						
182V Same as No. 37, Kibbie fine sandy loam.						
182Y Same as No. 178, Crosby silt loam.						
182Z Same as No. 371, Mosel loam.						
188 Same as No. 178, Crosby silt loam.						
189 Bristol silt loam (Prairie)	SLIGHT-drainage needed for best production of grain, seed crops and legumes.	MODERATE for quail and pheasants. Drainage needed for best production of grains, seed crops and legumes. SEVERE for grouse. Poor production of woodland plants.	MODERATE-poor production of woodland plants for shrub and tree nesters.	MODERATE-thickets, mast and den trees may be widely scattered; poor woodland plant production.	MODERATE-poor production of woodland food and cover plants.	MODERATE-water habitat may be hard to provide; poor woodland plant production for beaver.
191 Same as No. 357, Hochheim loam.						
195 Same as No. 288, Hackett loamy sand.						
195V Same as No. 266, Sisson silt loam.						
195Y Same as No. 153, Lapeer loam.						
195Z Same as No. 21, Hebron loam.						
203 Matherton loam (Southern Hardwoods)	SLIGHT-drainage needed for best production of grain, seed crops and legumes.	MODERATE-drainage needed for best production of grain seed crops and legumes; woodland plant species scarce.	SLIGHT-no major soil limitations.	SLIGHT for rabbits. MODERATE for squirrels. Mast trees scarce.	SLIGHT-drainage may be needed for best production of grain, grasses and legumes.	SLIGHT-water habitat hard to provide.
203V Same as No. 37, Kibbie fine sandy loam.						
203Y Same as No. 178, Crosby silt loam.						
203Z Same as No. 371, Mosel loam.						
204 Knowles loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. No wetland food and cover plants; bedrock restricts construction of open water areas; erosive on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Steeper slopes generally provide less cover and natural foods.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Sloping areas are erosive when cultivated; steeper slopes provide less cover and natural foods.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide.

TABLE 18.
LIMITATIONS OF SOILS FOR PRODUCTION OF SELECTED WILDLIFE SPECIES (Continued)

Soil number; Soil name; & Native Vegetation	Migratory Waterfowl (Ducks - Geese)	Upland Game Birds (Grouse-Quail-Pheasants)	Song Birds	Small Game (Rabbits-Squirrels)	Big Game (Deer)	Fur Bearers (Beaver-Mink-Muskrat)
206 Knowles silt loam, shallow variant (Southern Hardwood)	VERY SEVERE-drouthy; bedrock restricts construction of open water areas; no wetland food and cover plants; poor grain and seed crop production.	SEVERE-drouthy; poor grain, seed crop, cover and woodland plant production.	SEVERE-drouthy; poor grain and seed crop production; erosive on slopes when cultivated; poor production of woodland plants for shrub and tree nesters.	SEVERE-poor production of cover, natural food plants and adapted mast trees.	SEVERE-poor production of woodland food and cover plants; drouthy; poor production of grain and legumes.	VERY SEVERE-not practical to provide water habitat; poor production of woodland plants for beaver.
208 Same as No. 204, Knowles loam.						
212 Ehler silt loam (Wet Prairie)	SLIGHT-drainage needed for grain, seed crop and legume production.	MODERATE-drainage needed for production of grain, seed crop and legumes; woodland plant species scarce; nesting sites may flood.	MODERATE-drainage needed for grain and seed crop production; woodland plants scarce.	MODERATE for rabbits. Burrows and nests may flood. SEVERE for squirrels. Mast trees usually absent; natural foods limited.	MODERATE-drainage needed for production of grains, grasses and legumes.	SLIGHT-no major soil limitations.
212R Same as No. 306, Knowles silt loam, wet variant.						
212X Same as No. 126, Westland silt loam.						
212Y Same as No. 212, Ehler silt loam.						
213 Same as No. 212, Ehler silt loam.						
213R Same as No. 306, Knowles silt loam, wet variant.						
213V Same as No. 28, Colwood fine sandy loam.						
214 Same as No. 212, Ehler silt loam.						
215 Same as No. 212, Ehler silt loam.						
216 Same as No. 212, Ehler silt loam.						
217 Bono silty clay loam (Wet Prairie)	SLIGHT-drainage needed for production of grain, seed crops and legumes.	MODERATE for quail and pheasants. Drainage needed for production of grain, seed crops and legumes. SEVERE for grouse. Poor production of woodland plants.	MODERATE-drainage needed for production of grain and seed crops; poor production of woodland plants for shrub and tree nesters.	MODERATE for rabbits. Burrows and nests may flood; poor woodland plant production. SEVERE for squirrels. Mast trees usually absent; natural foods limited.	MODERATE-drainage needed for production of grasses, grains and legumes; poor production of woodland food and cover plants.	SLIGHT-poor reproduction of woodland plants for beaver.
218 Same as No. 217, Bono silty clay loam.						
218V Same as No. 212, Ehler silt loam.						
218Y Same as No. 212, Ehler silt loam.						
226 Keyser silt loam (Prairie)	MODERATE-poorly suited for wetland food and cover plants.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Slopes are erosive when cultivated and poorly suited for intensive production of grain and seed crops.	MODERATE-poor production of woodland plants for shrub and tree nesters.	MODERATE-poor woodland plant production; thickets, mast and den trees widely scattered.	MODERATE-poor production of woodland food and cover plants.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat may be hard to provide; poor production of woodland plants for beaver.
226D Same as No. 226, Keyser silt loam.						
228 Same as No. 459, Rollin muck.						
231 Brookston silt loam (Wet Prairie)	SLIGHT-drainage needed for production of grain, seed crops and legumes.	MODERATE-drainage needed for production of grain, seed crops and legumes; nesting sites may flood; woodland plant species scarce.	MODERATE-poor production of woodland plants for shrub and tree nesters; drainage needed for grain and seed crop production.	MODERATE for rabbits. Burrows and nests may flood; poor production of woody plants. SEVERE for squirrels. Mast trees usually absent. Natural foods scarce.	MODERATE-poor production of woodland food and cover plants; drainage needed for production of grains, grasses and legumes.	SLIGHT-no major soil limitation.
231Z Same as No. 298, Ashkum silty clay loam.						
233 Same as No. 203, Matherton loam.						
233V Same as No. 37, Kibbie fine sandy loam.						
233Y Same as No. 178, Crosby silt loam.						
233Z Same as No. 371, Mosel loam.						
234 Same as No. 203, Matherton loam.						
234V Same as No. 37, Kibbie fine sandy loam.						
234Y Same as No. 178, Crosby silt loam.						
243 Calamus silt loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. Poorly suited for wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Sloping areas erosive when cultivated.	SLIGHT-no major soil limitations.	SLIGHT-no major soil limitations.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide.
250 Tedrow sandy loam (Southern Hardwood)	MODERATE-drainage needed for best production of grain, seed crops and legumes; erosive when cultivated; poorly suited for wetland food and cover plants.	MODERATE-drainage needed for best production of grain, seed crops and legumes; erosive when cultivated; woodland plant species scarce.	MODERATE-erosive when cultivated; woodland plants scarce.	MODERATE-limited production of cover and natural food plants; adapted mast trees scarce.	MODERATE-drainage may be needed for best production of grain, grasses and legumes; limited production of cover and woodland food plants.	MODERATE-water habitat may be hard to provide; low natural fertility; poor production of food and cover plants.
250V Same as No. 250, Tedrow sandy loam.						
250Y Same as No. 250, Tedrow sandy loam.						
250Z Same as No. 371, Mosel loam.						
251 Same as No. 250, Tedrow sandy loam.						
251Y Same as No. 250, Tedrow sandy loam.						
251Z Same as No. 51, Aztalan loam.						
254 Same as No. 21, Hebron loam.						
261 Same as No. 250, Tedrow sandy loam.						
262 Same as No. 250, Tedrow sandy loam.						

TABLE 18.
LIMITATIONS OF SOILS FOR PRODUCTION OF SELECTED WILDLIFE SPECIES (Continued)

Soil number; Soil name; & Native Vegetation	Migratory Waterfowl (Ducks - Geese)	Upland Game Birds (Grouse-Quail-Pheasants)	Song Birds	Small Game (Rabbits-Squirrels)	Big Game (Deer)	Fur Bearers (Beaver-Mink-Muskrat)
266 Sisson silt loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. No wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated.	SLIGHT on 0-12% and MODERATE on 12-20% slopes. Steeper slopes generally have less cover and natural foods.	SLIGHT on 0-12% and MODERATE on 12-20% slopes. Sloping areas are erosive when cultivated.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat may be hard to provide.
266R Same as No. 204, Knowles loam.						
266X Same as No. 266, Sisson silt loam.						
266Z Same as No. 21, Hebron loam.						
267 Same as No. 266, Sisson silt loam.						
268 Same as No. 266, Sisson silt loam.						
269 Same as No. 120, Warsaw loam.						
270 Same as No. 288, Hackett loamy sand.						
270V Same as No. 266, Sisson silt loam.						
271 Same as No. 288, Hackett loamy sand.						
272 Same as No. 21, Hebron loam.						
276 Boyer sandy loam (Southern Hardwood)	SEVERE-drouthy; open water areas hard to provide; no wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Drouthy; erosive when cultivated and poorly suited for intensive production of grain and seed crops; woodland plant species scarce.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Erosive when cultivated; drouthy; woodland plants scarce.	MODERATE on 0-12% and SEVERE on 12-20% slopes. Limited production of cover and natural foods; mast trees scarce.	MODERATE on 0-12% and SEVERE on 12-20% slopes. Limited production of cover, woodland food plants, grain, grasses and legumes.	SEVERE on 0-6% and VERY SEVERE on 6-12% slopes. Water habitat difficult to provide; low natural fertility; poor production of food and cover.
276Y Same as No. 153, Lapeer loam.						
276Z Same as No. 21, Hebron loam.						
277 Sumner sandy loam (Dry Prairie)	SEVERE-drouthy; open water areas hard to provide; no wetland food and cover plants; poor grain and seed crop production.	MODERATE on 0-6% and SEVERE on 6-12% slopes for quail and pheasants. Drouthy; erosive when cultivated. SEVERE for grouse. Poor production of woodland plant species.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Drouthy; erosive when cultivated; woodland plants scarce.	MODERATE on 0-12% and SEVERE on 12-20% slopes. Poor woodland plant production; limited production of cover and natural food plants.	MODERATE on 0-12% and SEVERE on 12-20% slopes. Drouthy; poor production of woodland food and cover plants.	SEVERE-water habitat is hard to provide; poor production of woodland plants for beaver.
277Y Same as No. 153, Lapeer loam.						
277Z Same as No. 21, Hebron loam.						
278 Clyman silt loam (Southern Hardwood)	SLIGHT-drainage needed for production of grain, seed crops and legumes.	MODERATE drainage needed for best production of grains, seed crops and legumes; woodland plant species scarce.	SLIGHT-no major soil limitations.	SLIGHT for rabbits; MODERATE for squirrels. Mast trees scarce.	SLIGHT-drainage may be needed for best production of grains, grasses and legumes.	SLIGHT-water habitat hard to provide.
279 Same as No. 276, Boyer sandy loam.						
280 Same as No. 276, Boyer sandy loam.						
281 Same as No. 172, Casco loam.						
282 Casco part, same as No. 172, Casco loam. Rodman part, same as No. 75, Rodman loam.						
283 Same as No. 371, Mosel loam.						
284 Same as No. 371, Mosel loam.						
285 Same as No. 176, Mussey loam.						
286 Same as No. 176, Mussey loam.						
287 Same as No. 176, Mussey loam.						
288 Hackett loamy sand (Southern Hardwood)	VERY SEVERE-drouthy; erosive when cultivated; poor grain and seed crop production, open water areas hard to provide; no wetland food and cover plants.	SEVERE-drouthy; erosive when cultivated; poor grain and seed crop production; woodland plant species scarce.	SEVERE-drouthy; erosive when cultivated; woodland plants scarce.	MODERATE-limited production of cover and natural food plants; mast trees scarce.	SEVERE-poor production of woodland food and cover plants, grasses, grains and legumes; drouthy; erosive when cultivated.	VERY SEVERE-water habitat hard to provide; low natural fertility; poor production of food and cover.
288V Same as No. 266, Sisson silt loam.						
289 Same as No. 288, Hackett loamy sand.						
289Y Same as No. 153, Lapeer loam						
289Z Same as No. 21, Hebron loam.						
295 Morley part, same as No. 297, Morley silt loam. Beecher part, same as No. 3361, Beecher silt loam.						
297 Morley silt loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. Poorly suited for wetland food and cover plants; poorly suited for intensive production of seed and grain crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated.	SLIGHT on 0-12% and MODERATE on 12-20% slopes. Steeper slopes generally provide less cover and natural foods.	SLIGHT on 0-12% and MODERATE on 12-20% slopes. Sloping areas are erosive when cultivated.	MODERATE on 0-6% and SEVERE on steeper slopes. Water habitat hard to provide.
297S Same as No. 297, Morley silt loam.						
297V Same as No. 266, Sisson silt loam.						
297X Same as No. 72, Fox loam.						
297Y Same as No. 297, Morley silt loam.						
298 Ashkum silty clay loam (Wet Prairie)	SLIGHT-drainage needed for production of grains, seed crops and legumes.	MODERATE for quail and pheasants. Drainage needed for production of grain, seed crops and legumes. SEVERE for grouse. Poor production of woodland plants.	MODERATE-drainage needed for production of grain and seed crops; poor production of woodland plants for shrub and tree nesters.	MODERATE for rabbits. Barrows and nests may flood; poor production of woodland plants. SEVERE for squirrels. Mast trees usually absent; natural foods limited.	MODERATE-drainage needed for production of grains, grasses and legumes; some legumes not adapted.	SLIGHT-no major soil limitations; poor reproduction of woodland plants for beaver.

TABLE 18.
LIMITATIONS OF SOILS FOR PRODUCTION OF SELECTED WILDLIFE SPECIES (Continued)

Soil number; Soil name; & Native Vegetation	Migratory Waterfowl (Ducks - Geese)	Upland Game Birds (Grouse-Quail-Pheasants)	Song Birds	Small Game (Rabbits-Squirrels)	Big Game (Deer)	Fur Bearers (Beaver-Mink-Muskrat)
299 Blount silt loam, (Southern Hardwood)	SLIGHT-drainage needed for best production of grain, seed crops and legumes.	MODERATE-drainage needed for best production of grain, seed crops and legumes; woodland plant species scarce.	MODERATE-limited in kinds of adapted woodland plants; drain- age needed for best production of grain and seed crops.	SLIGHT for rabbits. MODERATE for squir- rels. Mast trees scarce.	SLIGHT-drainage may be needed for best pro- duction of grasses, grains and legumes.	SLIGHT-water habitat hard to provide.
300 Ashkum part, same as No. 298, Ashkum silty clay loam. Beecher part, same as No. 3361, Beecher silt loam.						
302 Same as No. 459, Rollin muck.						
303 Same as No. 306, Knowles silt loam, wet variant.						
305 Same as No. 204, Knowles loam.						
306 Knowles silt loam, wet variant (Swamp Forest)	MODERATE-drainage needed for production of grains, seed crops and legumes; bedrock re- stricts construction of open water areas.	MODERATE-drainage needed for production of grains, seed crops and legumes; woodland plants scarce.	MODERATE-drainage needed for grain and seed crop production; woodland plants scarce.	MODERATE for rab- bits. Burrows and nests may flood. SEVERE for squirrels. Mast trees usually absent; natural foods limited.	MODERATE-drainage needed for production of grains, grasses and legumes.	MODERATE-may be difficult to provide water habitat due to shallow depth to dolomite bedrock.
307 Same as No. 306, Knowles silt loam, wet variant.						
308 Same as No. 206, Knowles silt loam, shallow variant.						
311 Same as No. 142, Manawa silt loam.						
314 Same as No. 277, Sumner sandy loam.						
315 Same as No. 320, Oshemo sandy loam.						
316 Same as No. 276, Boyer sandy loam.						
316Y Same as No. 153, Lapeer loam.						
316Z Same as No. 21, Hebron loam.						
317 Same as No. 320, Oshemo sandy loam.						
320 Oshemo sandy loam (Southern Hardwood)	SEVERE-drouthy; only FAIR for grain and seed crop production; no wet- land food and cover plants; open water areas hard to provide.	MODERATE on 0-6% and SE- VERE on 6-12% slopes. Drouthy; erosive when culti- vated; only fair grain and seed crop production; wood- land plant species scarce.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Drouthy; ero- sive when cultivated; woodland plants scarce.	MODERATE on 0-12% and SEVERE on 12-20% slopes. Low production of cover, natural food plants and mast trees.	MODERATE on 0-12% and SEVERE on 12-20% slopes. Limited pro- duction of cover and woodland plants; drouthy.	SEVERE on 0-6% and VERY SEVERE on 6-12% slopes. Water habitat hard to pro- vide.
323 Same as No. 324, Ionia loam.						
323V Same as No. 266, Sisson silt loam.						
324 Ionia loam (Southern Hardwood)	MODERATE-wetland food and cover plants poorly adapted; adequate open water areas hard to main- tain.	SLIGHT-no major soil limitations.	SLIGHT-no major soil limitations.	SLIGHT-no major soil limitations.	SLIGHT-no major soil limitations.	MODERATE-water habitat may be hard to provide.
324V Same as No. 266, Sisson silt loam.						
324Y Same as No. 343, Celina silt loam.						
324Z Same as No. 21, Hebron loam.						
325 Varna silt loam (Prairie)	MODERATE on 0-6% and SEVERE on 6-12% slopes. Poorly suited for wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6% and MODER- ATE on 6-12% slopes for quail and pheasants. Sloping areas erosive when cultivated. SEVERE for grouse. Poor production of woodland plants.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Sloping areas erosive when cultivated; poor production of woodland plants.	MODERATE-poor wood- land plant production; thickets, mast and den trees widely scattered.	MODERATE-poor pro- duction of woodland food and cover plants.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat may be hard to provide; poor production of woodland plants for beaver.
326 Abington silt loam (Wet Prairie)	SLIGHT-drainage needed for production of grain, seed crops and legumes.	MODERATE for quail and pheasants. Drainage needed for production of grain, seed crops and legumes; nesting sites may flood; SEVERE for grouse. Poor production of woodland and wild food plants.	MODERATE-drainage needed for production of grain and seed crops; ground nest sites may flood; poor production of woodland plants for shrub and tree nesters.	MODERATE for rabbits. Burrows and nests may flood. SEVERE for squirrels. Mast trees usually absent; natural foods limited.	MODERATE-poor pro- duction of woodland food and cover plants; drain- age needed for produc- tion of grains, grasses and legumes.	SLIGHT-no major soil limitations.
326Z Same as No. 212, Ehler silt loam.						
327 Walkill silt loam	MODERATE-frequent overflow restricts grain and seed crop production; drainage needed for pro- duction of grain, seed crops and legumes; nest- ing sites may flood.	MODERATE-drainage needed for grain, seed crop and le- gume production; nesting sites may flood; woodland plant species scarce.	MODERATE-frequent overflow restricts production of grain and seed crops; ground nest sites may flood; woodland plants scarce.	MODERATE for rabbits. Burrows and nests may flood. SEVERE for squirrels. Mast trees usually absent; poor pro- duction of woodland plants.	MODERATE-drainage needed for production of grain, grasses and legumes.	SLIGHT-no major soil limitations.
328 Pistakee silt loam (Southern Hardwoods)	MODERATE-frequent overflow restricts produc- tion of grain and seed crops; nesting sites may flood; drainage needed for best production of grain, seed crops and legumes.	MODERATE-frequent over- flow restricts production of grain and seed crops; nesting sites may flood; woodland plant species scarce.	MODERATE-frequent overflow restricts production of grain and seed crops; ground nests may flood; poor woodland plant produc- tion.	MODERATE-frequent overflow may flood bur- rows and nests; limited number of adapted mast trees.	MODERATE-overflow hazard restricts produc- tion of grain; poor re- production of woodland food and cover plants.	SLIGHT-no major soil limitations.
328Y Same as No. 328, Pistakee silt loam.						
330 Navan loam (Wet Prairie)	SLIGHT-drainage needed for production of grain, seed crops and legumes.	MODERATE-drainage needed for production of grain, seed crops and legumes; woodland plant species scarce.	MODERATE-drainage needed for grain and seed crop production; poor production of woodland plants for shrub and tree nest- ers.	MODERATE for rab- bits. Burrows and nests may flood; poor woodland plant produc- tion. SEVERE for squirrels. Mast trees usually absent.	MODERATE-drainage needed for production of grain, grasses and legumes; poor woodland food and cover plant production.	SLIGHT-poor production of woodland plants for beaver.
331 Markham part, see No. 336, Markham silt loam. Elliott part, see No. 3251, Elliott silt loam.						
332 Same as No. 203, Matherton loam.						
332V Same as No. 37, Kibbie fine sandy loam.						
332Y Same as No. 178, Crosby silt loam.						
332Z Same as No. 371, Mosel loam.						
333 Eagle silt loam (Prairie)	MODERATE-adequate open water areas hard to maintain; poorly suited for wetland food and cover plants.	SLIGHT for quail and pheas- ants. SEVERE for grouse. Poor production of woodland plants.	MODERATE-poor pro- duction of woodland plants for shrub and tree nesters.	MODERATE-poor wood- land plant production; thickets, mast and den trees widely scattered.	MODERATE-poor pro- duction of woodland food and cover plants.	MODERATE-water habitat hard to provide; poor wood- land plant production for beaver.

TABLE 18.
LIMITATIONS OF SOILS FOR PRODUCTION OF SELECTED WILDLIFE SPECIES (Continued)

Soil number; Soil name; & Native Vegetation	Migratory Waterfowl (Ducks - Geese)	Upland Game Birds (Grouse-Quail-Pheasants)	Song Birds	Small Game (Rabbits-Squirrels)	Big Game (Deer)	Fur Bearers (Beaver-Mink-Muskrat)
333Y Same as No. 358, Miami loam.						
333Z Same as No. 31, Rome loam.						
334 Same as No. 120, Warsaw loam.						
335 Same as No. 324, Ionia loam.						
335Y Same as No. 343, Celina silt loam.						
335Z Same as No. 21, Hebron loam.						
336 Markham silt loam (Prairie-Oak)	MODERATE on 0-6% and SEVERE on 6-12% slopes. Poorly suited for wetland food and cover plants; poorly suited for intensive production of seed and grain crops on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes for quail and pheasants. Sloping areas erosive when cultivated; MODERATE for grouse. Woodland plants scarce.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Sloping areas erosive when cultivated; low woodland plant reproduction.	MODERATE-poor woodland plant production; thickets, mast and den trees may be widely scattered.	MODERATE-poor production of woodland food and cover plants.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat may be hard to provide; poor production of woodland plants for beaver.
338 Same as No. 298, Ashkum silty clay loam.						
339 Same as No. 326, Abington silt loam.						
340 Same as No. 330, Navan loam.						
343 Celina silt loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. Poorly suited for wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6%; MODERATE on 6-12% slopes. Sloping areas erosive when cultivated.	SLIGHT-no major soil limitations.	SLIGHT-no major soil limitations.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide.
344 Ashford silt loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. Poorly suited for wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Sloping areas are erosive when cultivated.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Sloping areas erosive when cultivated.	SLIGHT-no major soil limitations.	SLIGHT-sloping areas erosive when cultivated for grain.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide.
345 Nenno silt loam (Southern Hardwood)	SLIGHT-drainage needed for best production of grain, seed crops and legumes.	MODERATE-drainage needed for best production of grain, seed crops and legumes; woodland plant species scarce.	SLIGHT-no major soil limitations.	SLIGHT for rabbits; MODERATE for squirrels. Mast trees scarce.	SLIGHT-drainage needed for best production of grains, grasses and legumes.	SLIGHT-water habitat hard to provide.
346 Same as No. 203, Matherton loam.						
346Y Same as No. 178, Crosby silt loam.						
346Z Same as No. 371, Mosel loam.						
352 Same as No. 153, Lapeer loam.						
355 Same as No. 153, Lapeer loam.						
356 Same as No. 153, Lapeer loam.						
357 Hochheim loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. No wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12%; and SEVERE on steeper slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6%; MODERATE on 6-12%; and SEVERE on steeper slopes. Sloping areas erosive when cultivated.	SLIGHT on 0-12%; MODERATE on 12-20%; and SEVERE on steeper slopes. Steeper slopes generally provide less cover and natural food.	SLIGHT on 0-12%; MODERATE on 12-20%; and SEVERE on steeper slopes. Sloping areas are erosive when cultivated; steeper slopes provide less cover and natural foods.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide.
357R Same as No. 204, Knowles loam.						
357X Same as No. 172, Casco loam.						
358 Miami loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. No wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Steeper slopes generally provide less cover and natural food.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Sloping areas are erosive when cultivated.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide.
359 Hennepin loam (Southern Hardwood)	SEVERE-no wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Slightly droughty; only fair grain and seed crop production; sloping areas erosive when cultivated; woodland plant species scarce.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Steeper slopes generally provide less cover and natural food.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Sloping areas are erosive when cultivated; steeper slopes provide less cover and natural foods.	SEVERE-water habitat hard to provide.
360 Same as No. 357, Hochheim loam.						
360R Same as No. 204, Knowles loam.						
360V Same as No. 266, Sisson silt loam.						
360X Same as No. 172, Casco loam.						
361 Same as No. 358, Miami loam.						
362 Theresa silt loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. No wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated.	SLIGHT on 0-12% and MODERATE on 12-20% slopes. Steeper slopes generally provide less cover and natural foods.	SLIGHT on 0-12% and MODERATE on 12-20% slopes. Sloping areas are erosive when cultivated.	MODERATE on 0-6% and SEVERE on steeper slopes. Water habitat hard to provide.
362R Same as No. 204, Knowles loam.						
362V Same as No. 266, Sisson silt loam.						
362X Same as No. 72, Fox loam.						
362Z Same as No. 21, Hebron loam.						

TABLE 18.
LIMITATIONS OF SOILS FOR PRODUCTION OF SELECTED WILDLIFE SPECIES (Continued)

Soil number; Soil name; & Native Vegetation	Migratory Waterfowl (Ducks - Geese)	Upland Game Birds (Grouse-Quail-Pheasants)	Song Birds	Small Game (Rabbits-Squirrels)	Big Game (Deer)	Fur Bearers (Beaver-Mink-Muskrat)
363 Mayville silt loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. Poorly suited for wetland food and cover plants. Poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Sloping areas erosive when cultivated.	SLIGHT-no major soil limitations.	SLIGHT-no major soil limitations.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide.
363R Same as No. 204, Knowles loam.						
363X Same as No. 324, Ionia loam.						
363Y Same as No. 363, Mayville silt loam.						
363Z Same as No. 21, Hebron loam.						
364 Lamartine silt loam (Southern Hardwood)	SLIGHT-drainage needed for best production of grain, seed crops and legumes.	MODERATE-drainage needed for best grain, seed crop and legume production; woodland plant species scarce.	SLIGHT-no major soil limitations.	SLIGHT for rabbits. MODERATE for squirrels. Mast trees scarce.	SLIGHT-drainage needed for best production of grains, grasses and legumes.	MODERATE-water habitat hard to provide.
364V Same as No. 37, Kibbie fine sandy loam.						
364X Same as No. 203, Matheron loam.						
364Z Same as No. 371, Mosel loam.						
365 Hochheim part, same as No. 357, Hochheim loam. Hennepin part, same as No. 359, Hennepin loam.						
365X Same as No. 172, Casco loam.						
366 Hochheim part, same as No. 357, Hochheim loam. Theresa part, same as No. 362, Theresa silt loam.						
367 Same as No. 357, Hochheim loam.						
369 Same as No. 371, Mosel loam.						
370 Same as No. 371, Mosel loam.						
371 Mosel loam (Southern Hardwood)	SLIGHT-drainage needed for best production of grains, seed crops and legumes.	MODERATE-drainage needed for best production of grains, seed crops and legumes; woodland plant species scarce.	SLIGHT-no major soil limitations.	SLIGHT for rabbits; MODERATE for squirrels. Mast trees scarce.	SLIGHT-drainage needed for best production of grains, grasses and legumes.	SLIGHT-water habitat hard to provide.
380 Same as No. 277, Sumner sandy loam.						
380Z Same as No. 21, Hebron loam.						
386 Granby sandy loam (Wet Prairie)	MODERATE-drainage needed for production of grain, seed crops and legumes; poorly suited for wetland food and cover plants.	MODERATE-drainage needed for production of grain, seed crops and legumes; woodland plant species scarce.	MODERATE-drainage needed for grain and seed crop production; woodland plants scarce.	MODERATE for rabbits. Burrows and nests may flood; poor woodland plant production. SEVERE for squirrels. Mast trees usually absent; natural foods limited.	MODERATE-drainage needed for grain, grass and legume production; poor production of woodland food and cover plants.	SLIGHT-low natural fertility; moderate production of food and cover plants.
386Y Same as No. 26, Wauconda fine sandy loam.						
386Z Same as No. 330, Navan loam.						
387 Same as No. 386, Granby sandy loam.						
387V Same as No. 26, Wauconda fine sandy loam.						
391 Same as No. 12, Wea silt loam.						
392 Same as No. 84, Ockley silt loam.						
393 Same as No. 84, Ockley silt loam.						
394 Same as No. 358, Miami loam.						
397 Ozaukee silt loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. Poorly suited for wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12%; and SEVERE on steeper slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6%; MODERATE on 6-12%; and SEVERE on steeper slopes. Sloping areas erosive when cultivated.	SLIGHT on 0-12% and MODERATE on steeper slopes. Steeper slopes generally provide less cover and natural foods.	SLIGHT on 0-12% and MODERATE on steeper slopes. Sloping areas are erosive when cultivated.	MODERATE on 0-6% and SEVERE on steeper slopes. Water habitat hard to provide.
397R Same as No. 204, Knowles loam.						
397V Same as No. 397, Ozaukee silt loam.						
397X Same as No. 72, Fox loam.						
397Y Same as No. 397, Ozaukee silt loam.						
398 Same as No. 298, Ashkum silty clay loam.						
399 Mequon silt loam (Southern Hardwood)	SLIGHT-drainage needed for best production of grain, seed crops and legumes.	MODERATE-drainage needed for best production of grain, seed crops and legumes; woodland plant species scarce.	SLIGHT-no major soil limitations.	SLIGHT for rabbits; MODERATE for squirrels. Mast trees scarce.	SLIGHT-drainage needed for best production of grains, grasses and legumes.	SLIGHT-water habitat hard to provide.
410 Same as No. 133, Spinks fine sand.						
411 Same as No. 320, Oshtemo sandy loam.						
413 Same as No. 320, Oshtemo sandy loam.						
413Z Same as No. 21, Hebron loam.						
414 Same as No. 288, Hackett loamy sand.						
416 Same as No. 297, Morley silt loam.						
417 Same as No. 75, Rodman loam.						
419 VERY SEVERE for all wildlife - will not support vegetation.						
420 Same as No. 358, Miami loam.						
421 Same as No. 161, Dodge silt loam.						
431 Same as No. 206, Knowles silt loam, shallow variant.						
449 Same as No. 450, Houghton muck.						

TABLE 18.
LIMITATIONS OF SOILS FOR PRODUCTION OF SELECTED WILDLIFE SPECIES (Continued)

Soil number; Soil name; & Native Vegetation	Migratory Waterfowl (Ducks - Geese)	Upland Game Birds (Grouse-Quail-Pheasants)	Song Birds	Small Game (Rabbits-Squirrels)	Big Game (Deer)	Fur Bearers (Beaver-Mink-Muskrat)
450 Houghton muck (Swamp Forests)	SLIGHT-drainage needed for production of grains, seed crops and legumes; erosive when cultivated.	MODERATE-drainage needed for production of grain, seed crops and legumes; nesting sites may flood; woodland plant species scarce.	MODERATE-drainage needed for production of grain and seed crops; woodland plants scarce.	MODERATE for rabbits. Burrows and nests may flood. SEVERE for squirrels. Mast trees usually absent; natural foods limited.	MODERATE-drainage needed for production of grain, grasses and legumes.	SLIGHT-low natural fertility; moderate production of food and cover plants.
451 Same as No. 450, Houghton muck.						
452 Adrian muck (Swamp Forests)	MODERATE - drainage needed for production of grain, seed crops and legumes; some legumes will not grow; erosive when cultivated.	MODERATE-drainage needed for production of grain, seed crops and legumes; poor production of wild food plants unless drained.	MODERATE-drainage needed for production of grain and seed crops; woodland plants scarce.	MODERATE for rabbits. Burrows and nests may flood. SEVERE for squirrels. Mast trees usually absent; natural foods limited.	MODERATE-drainage needed for production of grain, grasses and legumes.	SLIGHT-low natural fertility; restricts production of food and cover plants when flooded.
452Z Same as No. 454, Palms muck.						
453 Same as No. 452, Adrian muck.						
454 Palms muck (Swamp Forests)	SLIGHT-erosive when cultivated; drainage needed for production of grain, seed crops and legumes.	MODERATE for quail and pheasants. Drainage needed for production of grains, seed crops and legumes; erosive when cultivated; woodland species scarce.	MODERATE-drainage needed for production of seed and grain crops; ground nests may flood; woodland plants scarce.	MODERATE for rabbits. Burrows and nests may flood. SEVERE for squirrels. Mast trees usually absent; natural foods limited.	MODERATE-drainage needed for production of grains, grasses and legumes; erosive when cultivated.	SLIGHT-low natural fertility; moderate production of food and cover plants.
455 Same as No. 454, Palms muck.						
456 Ogden muck (Swamp Forest)	SLIGHT-drainage needed for production of grain, seed crops and legumes; erosive when cultivated.	MODERATE-drainage needed for production of grain, seed crops and legumes; nesting sites may flood; woodland plant species scarce.	MODERATE-drainage needed for grain and seed crop production; woodland plants scarce.	MODERATE for rabbits. Burrows and nests may flood. SEVERE for squirrels. Mast trees usually absent; natural foods limited.	MODERATE-drainage needed for production of grain, grasses and legumes; erosive when cultivated.	SLIGHT-low natural fertility; moderate production of food and cover plants.
457 Same as No. 456, Ogden muck.						
458 Same as No. 459, Rollin muck.						
459 Rollin muck (Swamp Forest)	MODERATE-drainage needed for grain, seed crop and legume production; erosive when cultivated; nesting sites may flood.	MODERATE-drainage needed for production of grain, seed crops and legumes; erosive when cultivated; woodland plant species scarce; nesting sites may flood.	MODERATE-drainage needed for grain and seed crop production; woodland plants scarce.	MODERATE for rabbits. Burrows and nests may flood. SEVERE for squirrels. Mast trees usually absent; natural foods limited.	MODERATE-drainage needed for production of grains, grasses and legumes.	SLIGHT-low natural fertility; moderate production of food and cover plants.
460 Same as No. 459, Rollin muck.						
461 Same as No. 459, Rollin muck.						
462 Same as No. 450, Houghton muck.						
502 Same as No. 504, Flagg silt loam.						
504 Flagg silt loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. No wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6% and MODERATE on 6-12% slopes. Sloping areas erosive when cultivated.	SLIGHT-no major soil limitations.	SLIGHT-no major soil limitations.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide.
505 Same as No. 278, Clyman silt loam.						
508 Same as No. 510, Pecatonica silt loam.						
510 Pecatonica silt loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. No wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated and poorly suited for intensive production of grain and seed crops.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Steeper slopes generally provide less cover and natural foods.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Sloping areas are erosive when cultivated.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide.
511 Same as No. 278, Clyman silt loam.						
514 Same as No. 516, Westville silt loam.						
516 Westville silt loam (Southern Hardwood)	MODERATE on 0-6% and SEVERE on 6-12% slopes. No wetland food and cover plants; poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT on 0-6%; MODERATE on 6-12% and SEVERE on 12-20% slopes. Sloping areas erosive when cultivated.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Steeper slopes generally provide less cover and natural foods.	SLIGHT on 0-12%; MODERATE on 12-20% and SEVERE on 20-30% slopes. Sloping areas are erosive when cultivated.	MODERATE on 0-6% and SEVERE on 6-12% slopes. Water habitat hard to provide; poor production of woodland plants for beaver.
550 Same as No. 306, Knowles silt loam, wet variant.						
557 Same as No. 358, Miami loam.						
560 Same as No. 358, Miami loam.						
3251 Elliott silt loam (Prairie)	SLIGHT-drainage needed for best production of grain, seed crops and legumes.	MODERATE for quail and pheasants. Drainage needed for best production of grains, seed crops and legumes. SEVERE for grouse. Poor production of woodland plants.	MODERATE-poor production of woodland plants for shrub and tree nesters.	MODERATE-poor woodland plant production; thickets, mast and den trees widely scattered.	MODERATE-poor production of woodland food and cover plants; drainage needed for best production of grains, grasses and legumes.	MODERATE-water habitat hard to provide; poor woodland plant production for beaver.
3251V Same as No. 3251, Elliott silt loam.						
3361 Beecher silt loam (Prairie Oak)	MODERATE-poorly suited for intensive production of grain and seed crops; poorly suited for wetland food and cover plants.	SLIGHT for quail and pheasants. MODERATE for grouse. Woodland plants scarce.	SLIGHT-poorly suited for intensive production of grain and seed crops on slopes.	SLIGHT-moderate woodland plant production.	SLIGHT-limited production of cover and woodland food plants.	MODERATE-water habitat hard to provide.

HERBACEOUS PLANTINGS FOR WILDLIFE HABITAT IMPROVEMENT

The kind and number of wildlife in a given area are determined by both species factors and environmental factors. Man has little control over these factors but he can change habitat by changing water, vegetative cover, and food availability. For effective utilization, food must be plentiful, near good cover, and available in seasons when needed. Cover is needed to provide concealment for nests and young, shelter from adverse weather, and avenues of escape from enemies.

The soils of the Region differ greatly in their suitability for the production of food and cover plants and in their capacity to provide water areas. One of the most important factors that affect the suitability of soils for plant growth is the ability of the soil to permit the development of an adequate root system and to provide optimum moisture and plant food. Other significant properties

and characteristics of the soil that affect plant growth are thickness of surface soil, slope, soil reaction, permeability, aeration, and depth to water table. Flooding frequency and degree of wetness along with position in the landscape are important site factors affecting plant selection. The capacity of soils to provide suitable water areas also differs greatly. While some wildlife species are not as demanding as others, many species prefer areas where water is available.

Table 19 lists the principal suitable species of vegetation that can be used for wildlife habitat improvement by land capability units for a few of the more common species of wildlife in the region. Other species such as skunk, beaver, mink, muskrat, squirrel, and fox can be expected to thrive along with the species listed.

Soil groups are based mainly on the soil drainage, soil productivity, susceptibility to drouth and gradient.

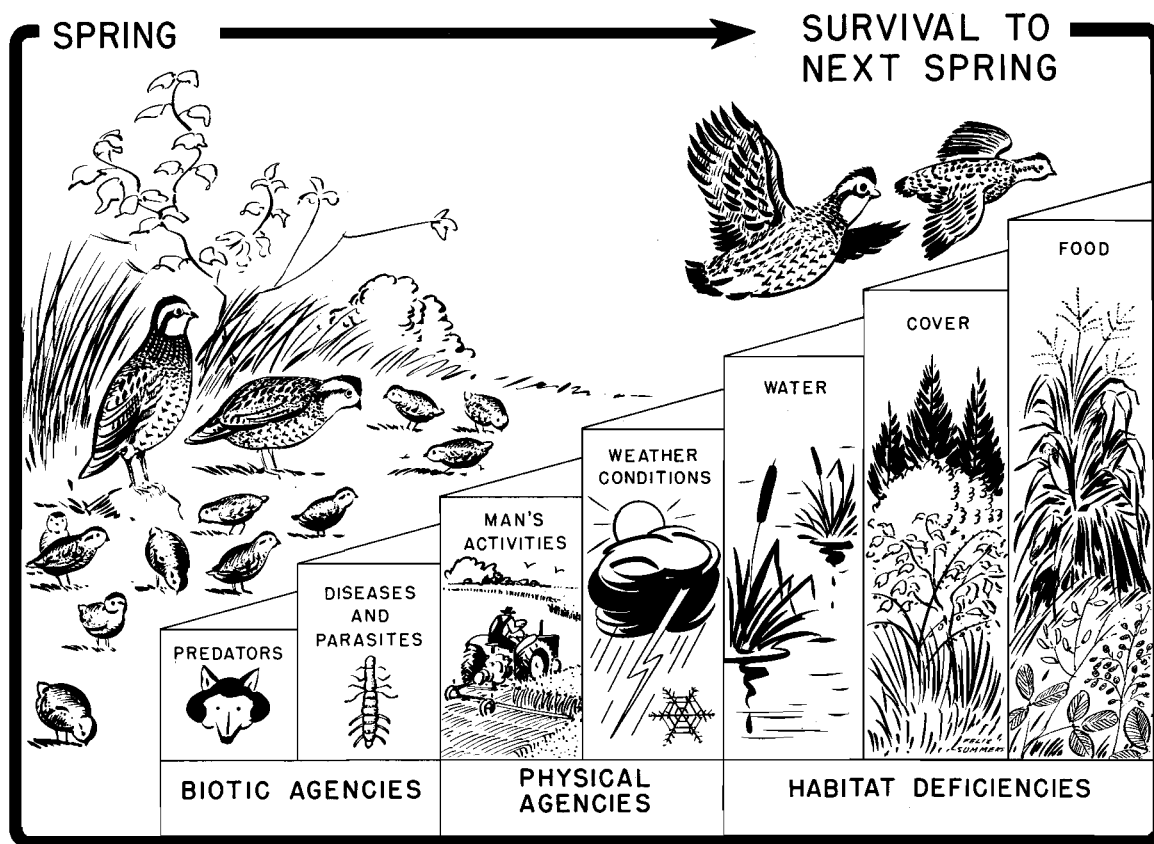


TABLE 19.
HERBACEOUS PLANTINGS FOR WILDLIFE HABITAT IMPROVEMENT

Groupings of Land Capability Units for Wildlife	Plant Species	Bobwhite Quail	Ringneck Pheasants	Song Birds	Cottontail Rabbits	Whitetail Deer	Migratory Waterfowl	
							Ducks	Geese
Well to moderately well drained soils with good moisture-holding capacity and moderate to high productivity I IIe-1 IIe-2 IIe-5 IIe-6 IIe-7 IIs-1 IIs-7 IIw-11 IIIe-1 IIIe-2 IIIe-5 IIIe-6 IIIe-7 IVe-1 IVe-2 IVe-6 IVe-7	GRAINS							
	Barley	F	F	F	F	F	F	F
	Buckwheat	F	F	F	F	F	F	F
	Corn	F-C	F-C	-	F-C	F-C	F	F
	Oats	F	F	F	F	F	F	F
	Rye	F	F	F	F	F	F	F
	Sorghum	C	F-C	-	-	F	-	-
	Wheat	F	F	F	F	F	F	F
	GRASSES							
	Kentucky bluegrass	C	C	C	F-C	-	-	-
	Orchard grass	C	C	-	-	-	-	-
	Redtop	C	C	C	C	-	-	-
	Smooth brome	C	C	C	F-C	F	-	-
	Switchgrass	F-C	F-C	F-C	F-C	-	F	-
	Tall fescue	C	C	C	F-C	F	-	-
	Timothy	C	C	F-C	F-C	F	-	-
	LEGUMES							
	Alfalfa	F-C	F-C	C	F-C	F	F	F
	Birdsfoot trefoil	F-C	F-C	C	F-C	F	F	F
	Cowpeas	F	F	-	-	F	-	-
	Crownvetch	F-C	F-C	C	F-C	F	F	F
	Ladino clover	-	C	F	F	F	-	-
	Red clover	-	C	F	F	F	-	-
	Sweet clover	C	F-C	F	C	F	-	-
Somewhat poorly and poorly drained soils with high water tables within 1 to 3 feet of the surface most of the year. Moderate to high productivity. IIw-1 IIw-2 IIw-3 IIw-5 IIw-8 IIw-13 IIIe-8 IIIw-1 IIIw-3 IIIw-5 IIIw-6 IIIw-8 IIIw-9 IVe-8 IVw-5 IVw-7 Vw-7 1/ Vw-13 1/ Vw-16 1/ VIIIw-10 1/ VIIIw-15 1/	ADEQUATE ARTIFICIAL DRAINAGE All the plant species named for the well and moderately well drained soils group are suitable for artificially drained soils in this group.							
	WHERE WATER TABLE HAS BEEN REGULATED							
	Browntop millet	F	-	F	-	-	F	-
	Buckwheat	F	F	F	F	F	F	F
	Reed canarygrass	-	C	-	F-C	-	C	C
	Wild millet	F-C	F-C	F	-	-	F-C	F-C
	WHERE FLOODED							
	Cattail	-	-	-	-	-	C	F
	Floating leaf pondweed	-	-	-	-	-	F	F
	Sago pondweed	-	-	-	-	-	F	F
	Wild celery	-	-	-	-	-	F	F
	Wild rice	-	-	F	-	-	F	F

1/ Not well suited for drainage.

Z/ Generally not suited for cultivation. Make maximum use of natural food and cover plants.

Legend

F - Plant can be used as *food* for a given wildlife species.

C - Plant can be used as *cover* for a given wildlife species.

F-C - Plant can be used for both *food* and *cover* for a given wildlife species.

- - Crop is generally not well suited for *food* or *cover* for a given wildlife species.

TABLE 19.
HERBACEOUS PLANTINGS FOR WILDLIFE HABITAT IMPROVEMENT (Continued)

Groupings of Land Capability Units for Wildlife	Plant Species	Bobwhite Quail	Ringneck Pheasants	Song Birds	Cottontail Rabbits	Whitetail Deer	Migratory Waterfowl	
							Ducks	Geese
Thin, sandy, stony and drouthy soils with moderately low to low productivity. IIIe-3 IIIe-4 IIIs-2 IIIs-4 IIIs-8 IVe-3 IVe-4 IVe-9 IVs-3 IVs-5 VIe-3 VIe-4 VIe-9 VIs-5 VIIe-4 $\frac{2}{1}$ / VIIe-7 $\frac{2}{1}$ / VIIe-9 $\frac{2}{1}$ / VIIs-3 $\frac{2}{1}$ / VIIs-5 $\frac{2}{1}$ / VIIs-9 $\frac{2}{1}$ / VIIIs-10 $\frac{2}{1}$	GRAINS							
	Barley	-	F	F	F	F	F	F
	Buckwheat	F	F	F	F	F	F	F
	Corn	F-C	F-C	-	F-C	F-C	F	F
	Oats	-	F	F	F	F	F	F
	Rye	-	F	F	F	F	F	F
	Sorghum	C	F-C	-	-	F	-	-
	Wheat	-	F	F	F	F	F	F
	GRASSES							
	Kentucky bluegrass	C	C	C	F-C	-	-	-
	Orchard grass	C	C	C	C	F	-	-
	Smooth brome	C	C	C	F-C	F	-	-
	Switchgrass	F-C	C	F-C	F-C	-	-	-
	Tall fescue	C	C	C	C	F	-	-
	LEGUMES							
	Alfalfa	F-C	F-C	C	F-C	F	F	F
	Birdsfoot trefoil	F-C	F-C	-	F-C	F	F	F
	Crownvetch	F-C	F-C	-	F-C	F	F	F
	Red clover	-	C	F	F	F	-	-
	Sweet clover	C	F-C	F	C	F	-	-
Moderate to deep loamy soils with good drainage on strongly sloping to steep relief with moderate productivity, but having a severe erosion hazard. VIe-1 VIe-2 VIe-6 VIIe-1 $\frac{1}{1}$ / VIIe-2 $\frac{1}{1}$ / VIIe-6 $\frac{1}{1}$	GRASSES							
	Smooth brome	C	C	C	F-C	F	-	-
	Switchgrass	F-C	F-C	F-C	F-C	-	F	-
	Tall fescue	C	C	C	F-C	F	-	-
	LEGUMES							
	Birdsfoot trefoil	F-C	F-C	-	F-C	F	F	F
	Crownvetch	F-C	F-C	-	F-C	F	F	F
	Sweet clover	C	F-C	F	C	F	-	-

GLOSSARY OF SOIL TERMS

Aeration, Soil. The process by which oxygen and other gases in the soil are renewed. The rate of soil aeration is influenced mainly by the size and number of soil pores and the amount of water occupying these pores.

Aggregate, Soil. Many soil particles held together as a mass or cluster.

Alluvial Soils. Soils formed from recently deposited material (alluvium) in lowlands near streams. These soils are young and have little or no horizon development.

Alluvium. Soil material deposited by streams.

Bottom Land. Nearly level land in the lower parts of valleys that have streams flowing through them. Subject to flooding and often referred to as flood plains.

Calcareous Soil. A soil that has sufficient calcium carbonate, in some places mixed with magnesium carbonate, to effervesce (bubble) visibly when dilute (0.1 normal) hydrochloric acid is applied.

Classification - AASHO. The American Association of State Highway Officials system of classifying soil materials is an engineering property classification based on field performance of highways. Grouping soils of about the same general load-carrying capacity and service results in seven basic groups that are designated A-1 through A-7.

Classification - Unified. The Unified Soil Classification System is based on the identification of soil materials according to their textural and plasticity qualities and their performance as engineering construction materials. In this system soils are identified as coarse grained (8 classes), fine grained (6 classes) or highly organic (1 class).

Cobble. Rounded and subrounded rock fragments with diameters ranging between 3 and 10 inches.

Color, Soil. Soil color is determined by comparison with the Munsell Soil Color Chart.

Compressibility, Soil. The property of compressing vertically under load without lateral movement and with a proportional decrease in air or moisture content.

Consistence, Soil. The resistance of the soil mass to deformation without breaking. It is estimated for dry, moist or wet soil. In this report, consistence is generally given for moist soils and sometimes for wet soils.

The terms used for moist soils are:

Loose. Noncoherent.

Very friable. Soil material crushes under very gentle pressure but coheres when pressed together.

Friable. Crushes easily under moderate pressure and coheres when pressed together.

Firm. Crushed under moderate pressure but resistance is distinctly noticeable.

Very firm. Crushes under strong pressure.

The terms used for wet soils are:

Sticky. After pressure, soil material adheres to other material and tends to stretch somewhat and pull apart rather than pull free from other material.

Plastic. Readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Continental Glacier. A large ice sheet that completely buried the country upon which it rested. Its shape was a nearly level topped dome which had little relation to the underlying topography or land forms.

Depressions. Low-lying areas that have no surface outlets for the water that accumulates in them or that have only poor outlets.

Depth, Soil. The depth in inches to a root-impeding layer in the soil.

Deep	36 to 60 inches
Moderately deep	20 to 36 inches
Shallow	10 to 20 inches
Very Shallow	Less than 10 inches

Diversion Terrace. A waterway constructed to divert runoff water so that it will flow around the slope to a safe outlet.

Drainage, Soil. Also called natural drainage or internal drainage. The term refers to the frequency and duration of periods when the soil is saturated and is identified by the colors of the soil profile. Slow drainage conditions are due to a high water table, to a slowly permeable layer within the profile, to seepage, or to some combination of these conditions. In the absence of organic matter, the iron in saturated soils has a grey color; under dry conditions (excess of air), the iron is yellow or red. Mottling generally indicates alternate wet and dry conditions.

Drainage classes used are:

Very poorly drained. Water is removed from the soil so slowly that the water table remains at or on the surface most of the time.

Poorly drained. Water is removed from the soil so slowly that the soils remain wet all or most of the year. The water table is commonly at or near the surface.

Somewhat poorly drained. The rate of water removal is slow enough to keep the soil wet for significant periods. During extended periods of low rainfall the soils will be relatively dry.

Moderately well drained. Water is removed from the soil somewhat slowly so that the profile is wet for short periods but dry much of the time.

Well drained. Water is removed from the soil readily to somewhat slowly, so that the profile is wet only a small part of the year.

Somewhat excessively drained. Water is removed from the soil so rapidly that the profile is wet for very short periods.

Dolomite. A calcium-magnesium carbonate mineral or a stone containing a high content of magnesium carbonate. This is commonly called dolomitic limestone but in this report is called dolomite.

Drouthy Soil. Soil that has less available water-holding capacity than is normally needed by growing crops.

Drumlin. A smooth oval hill composed mainly of glacial till which has its long axis parallel to the direction of the ice movement.

Dug Ponds. As used in this report, ponds excavated in a low-lying area and depending on the ground water table or a drainage tile for recharge. Very little surface water is allowed to enter the ponds.

Elasticity, Soil. The property of deforming under load and rebounding upon the removal of load without changing moisture content.

End Moraine. A deposit of glacial material, generally a ridge which was formed at the margin of a moving ice sheet. Often called terminal moraine.

Erosion, Soil. The detachment and movement of the solid material of the land surface by wind, moving water, or ice, and by such processes as landslides and creep.

Esker. A long, narrow generally winding ridge of sandy and gravelly deposits formed by a sub-glacial stream tunneling beneath melting glacial ice.

Field Capacity. The amount of moisture remaining in a soil after the free water has been allowed to drain away; usually expressed as a percentage of the oven-dry weight of soil.

Glacial Drift. A collective term referring to any material deposited by a glacier or glacial waters.

Glacial Moraine. Any deposit of glacial drift, generally a ridge, which was formed by moving ice.

Glacial Outwash. Stratified, assorted glacial materials deposited by the melt waters from glaciers.

Glacial Till. A deposit of earth, sand, gravel and boulders transported and deposited by glaciers. Till is unstratified.

Gradation, Soil. The distribution of soil particles of different sizes in a soil mass. Well graded - all particle sizes from largest to smallest are represented. Poorly graded - uniform, most particles are about the same size. Skip (or gap) gradation - absence of one or more intermediate sizes.

Gravel. Mass of rounded and subrounded rock fragments with diameters ranging between 0.08 inch and 3 inches (2 millimeters and 8 centimeters).

Ground Moraine. Glacial till laid down by retreating ice sheets, forming blankets of till over older topograph surfaces.

Interpretation, Soil. The art of explaining the meaning or significance of basic soil information.

Kame. A cone shaped hill or generally rounded hill formed at the border of a glacier when the melt waters poured over the edge of the glacier; usually composed of poorly sorted sand and gravel.

Kame, Moulin. A cone shaped hill which formed beneath the ice when melt water poured through a funnel shaped hole (moulin) melted in the ice. The melt waters deposited poorly sorted sands and gravel at the base of the ice beneath this moulin or ice funnel resulting in a cone shaped hill.

Kettle. A steep sided depression or pit in the landscape which formed by the melting of an ice block that was previously buried by glacial debris.

Lacustrine or Lakebed Sediments. Deposits in the waters of lakes.

Lake Plain. Nearly level to gently sloping old glacial lake basins.

Leaching, Soil. The removal of soluble soil components by the percolation of water through the soil.

Loess. Deposition of relatively uniform fine soil material (mainly silt) that has been transported by wind.

Mapping Unit. Delineation on a soil map of an area having defined soil, slope and erosion characteristics.

- Marl.** An earthy deposit consisting mainly of calcium carbonate commonly mixed with clay or other impurities. It is formed chiefly at the margins of fresh water lakes.
- Massive.** Descriptive term for structureless soils or large uniform masses of cohesive soil, with ill-defined and irregular breakage.
- Mechanical Analysis, Soil.** A procedure for the quantitative determination of the distribution of particle sizes in soils. Includes a grain-size analysis of material coarser than the No. 10 sieve size, and passing the No. 10 sieve (2.0 mm.) size but retained on the No. 200 sieve (0.74 mm.) as well as the hydrometer analysis for the materials passing the No. 200 sieve.
- Morphology, Soil.** The physical, chemical, and biological properties of the various horizons that make up the soil profile.
- Mottling.** Patch of different color than the mass of color.
- Muck.** Peat that has undergone sufficient decomposition to make recognition of plant parts impossible. Muck generally has a higher mineral content than peat.
- Outwash Plain.** Nearly level areas formed by glacial streams or melt waters from glacial ice.
- Parent Material.** The relatively unaltered geological deposits that are similar to those from which at least part of the various horizons of the soil has developed.
- Peat.** Undecomposed or slightly decomposed organic remains of plants that have accumulated under conditions of excessive moisture. Plant forms can be identified.
- Pebble.** An individual piece of gravel ranging in diameter from .08 inch to 3 inches.
- Ped, Soil.** An individual natural soil aggregate such as crumb, prism, or block.
- Pervious.** The term "pervious", as used in Table 5, refers to water permeability in feet per day.
- | | |
|--------------------------------|---------------------------|
| 1. Very pervious | 20 feet per day or more |
| 2. Pervious | 3 to 20 feet per day |
| 3. Semi-pervious to impervious | .003 to 3 feet per day |
| 4. Impervious | .003 feet per day or less |
- Renovation.** Method of increasing pasture productivity without causing excessive soil loss by erosion. It involves cultivating the old sod, use of lime and fertilizers, and reseeding with suitable grass-legume mixtures.
- Shear Strength, Soil.** The resistance in two contiguous parts of a soil body to movement in a direction parallel to their plane of contact. The stability and, hence, the structural properties of soil are determined to a large extent by the combined effects of internal friction and cohesion which are combined in most soils to make up the shearing strength.
- Site Index (Forestry).** The ability of a given area to produce trees of a given quality and height at 50 years of age.
- Stability, Soil.** The property of a water saturated soil to resist lateral flow under a load.
- Stones.** Coarse, rounded and subrounded rock fragments with diameters exceeding 10 inches.
- Stratified.** Composed of, or arranged in, strata, or layers, i. e., stratified alluvium. The form is confined to geological materials. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.
- Stream Flood Plain.** Land along streams that is subject to periodic flooding.

Structure, Soil. The aggregation of primary soil particles into compound particles, or clusters. Soil structure is classified according to grade, class and type.

Grade: Distinctness of aggregation. Grade expresses the differential between cohesion within aggregates and adhesion between aggregates. Terms: Structureless (single grain or massive), weak, moderate, and strong.

Class: Size of soil aggregates. Terms: Very fine or very thin, fine or thin, coarse or thick, and very coarse or very thick.

Type: Shape and arrangement of individual, natural soil aggregates. Terms: Platy, prismatic, columnar, blocky, subangular blocky, and granular. (Example of soil-structure grade, class, and type: Moderate, coarse, subangular blocky.

Terrace, Stream. Areas that lie above the present flood plain; they are generally underlain by stratified stream sediments.

Terracing. Construction of nearly level shallow ditches with gentle slopes that can be farmed. Terraces are used to control runoff water.

Upland. High ground that is above the low areas along rivers or between hills.

Water Table. The upper limit of the part of the soil or underlying rock material that is saturated with water. In some places an upper or perched water table may be separated from a lower one by a dry zone.

Wilting Point. The moisture content of soil, on an over-dry basis, at which plants wilt and fail to recover their turgidity.