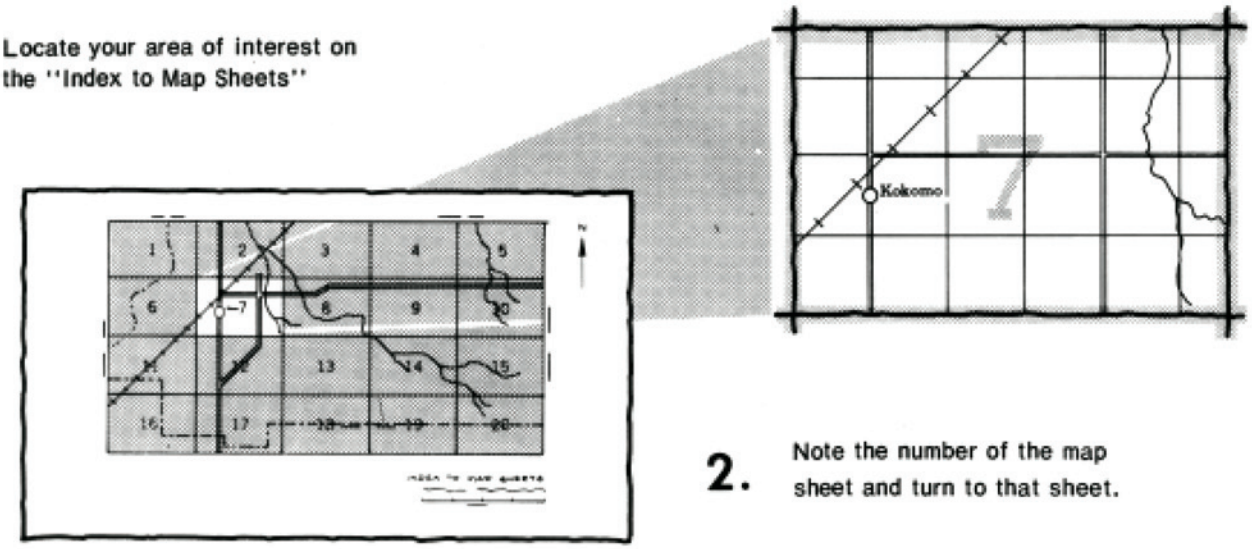
SOIL SURVEY OF
SCHUYLER COUNTY
NEW YORK

United States Department of Agriculture
Soil Conservation Service
in cooperation with the
Cornell University Agricultural Experiment Station

HOW TO USE

1. Locate your area of interest on the "Index to Map Sheets"



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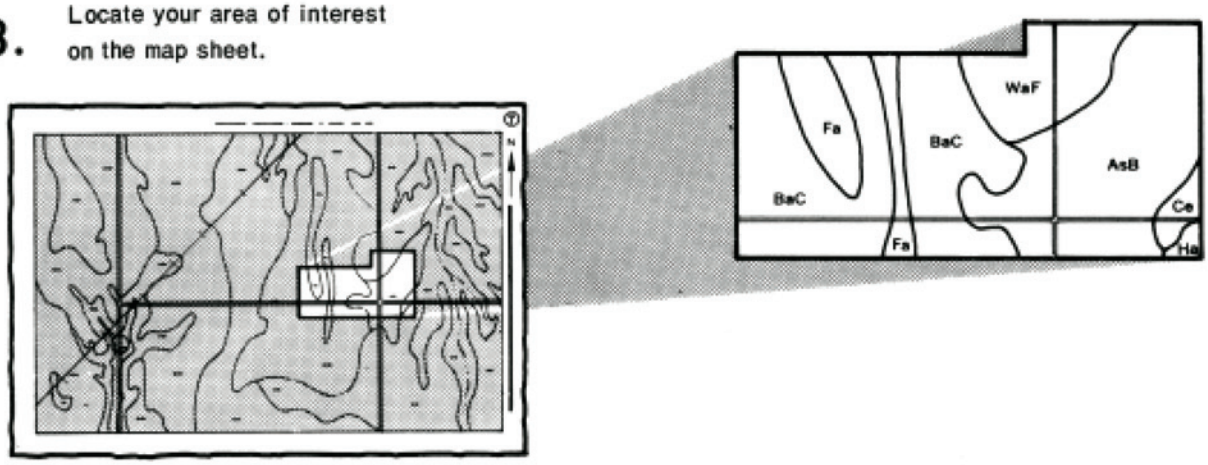

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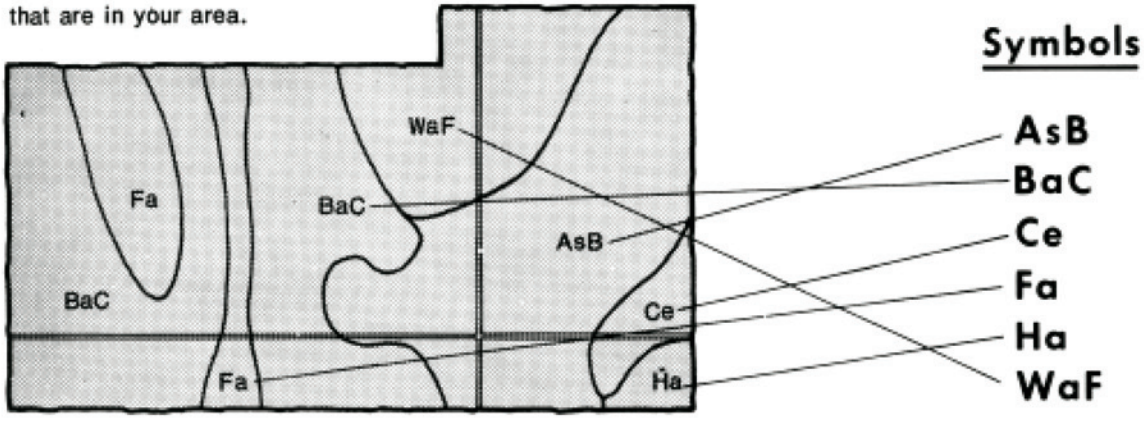
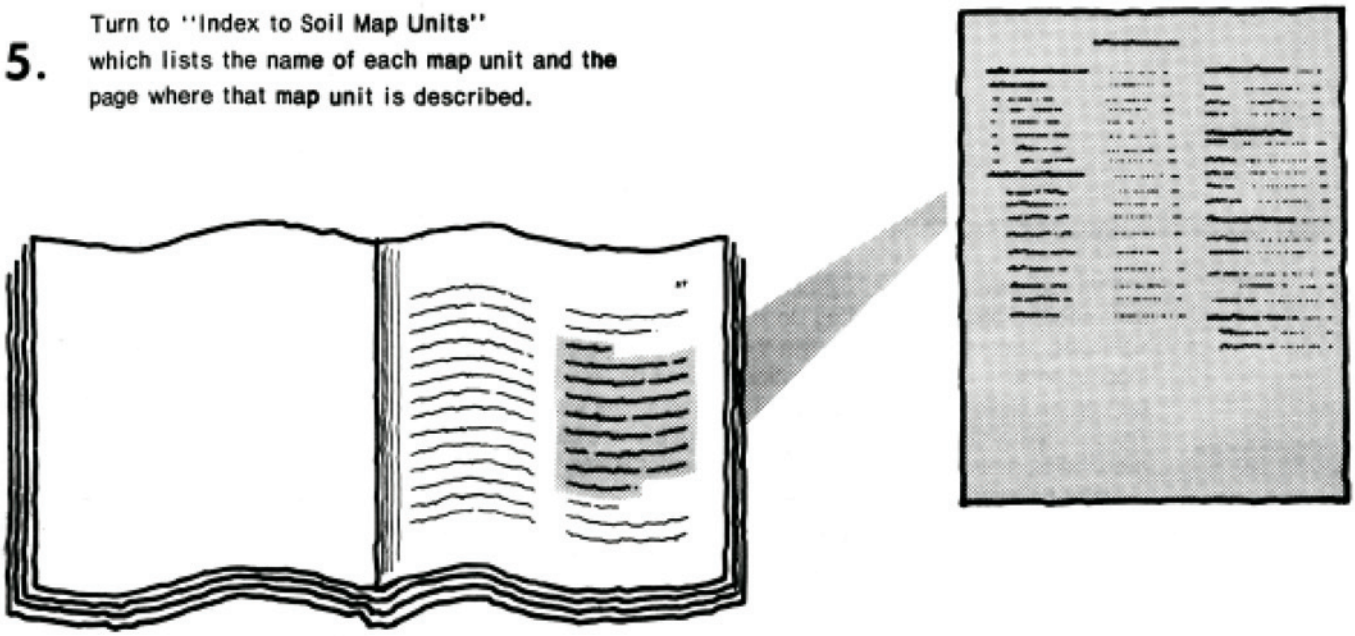
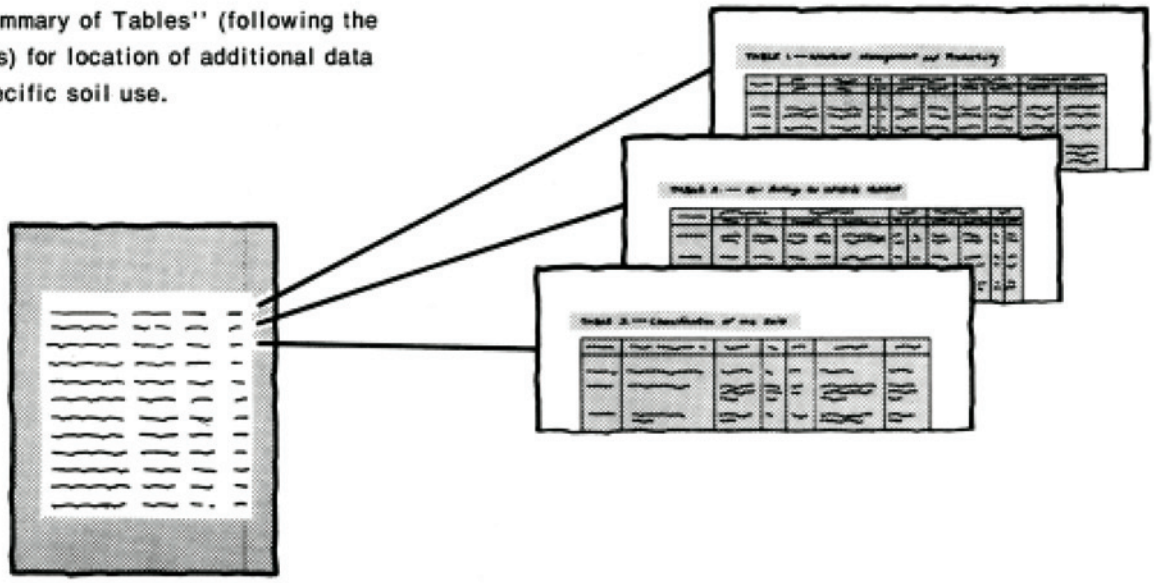


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1971-75. Soil names and descriptions were approved in 1975. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1975. This survey was made cooperatively by the Soil Conservation Service and the Cornell University Agricultural Experiment Station. It is part of the technical assistance furnished to the Schuyler County Soil and Water Conservation District. Financial assistance for this survey was provided by the Schuyler County Board of Supervisors and the Schuyler County Soil and Water Conservation District directors.

Soil maps in this survey may be copied without permission, but any enlargement of these maps can cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

Cover: Vineyards on Conesus and Lansing soils near Seneca Lake.

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Foreword

The Soil Survey of Schuyler County, New York, contains much information useful in any land-planning program. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

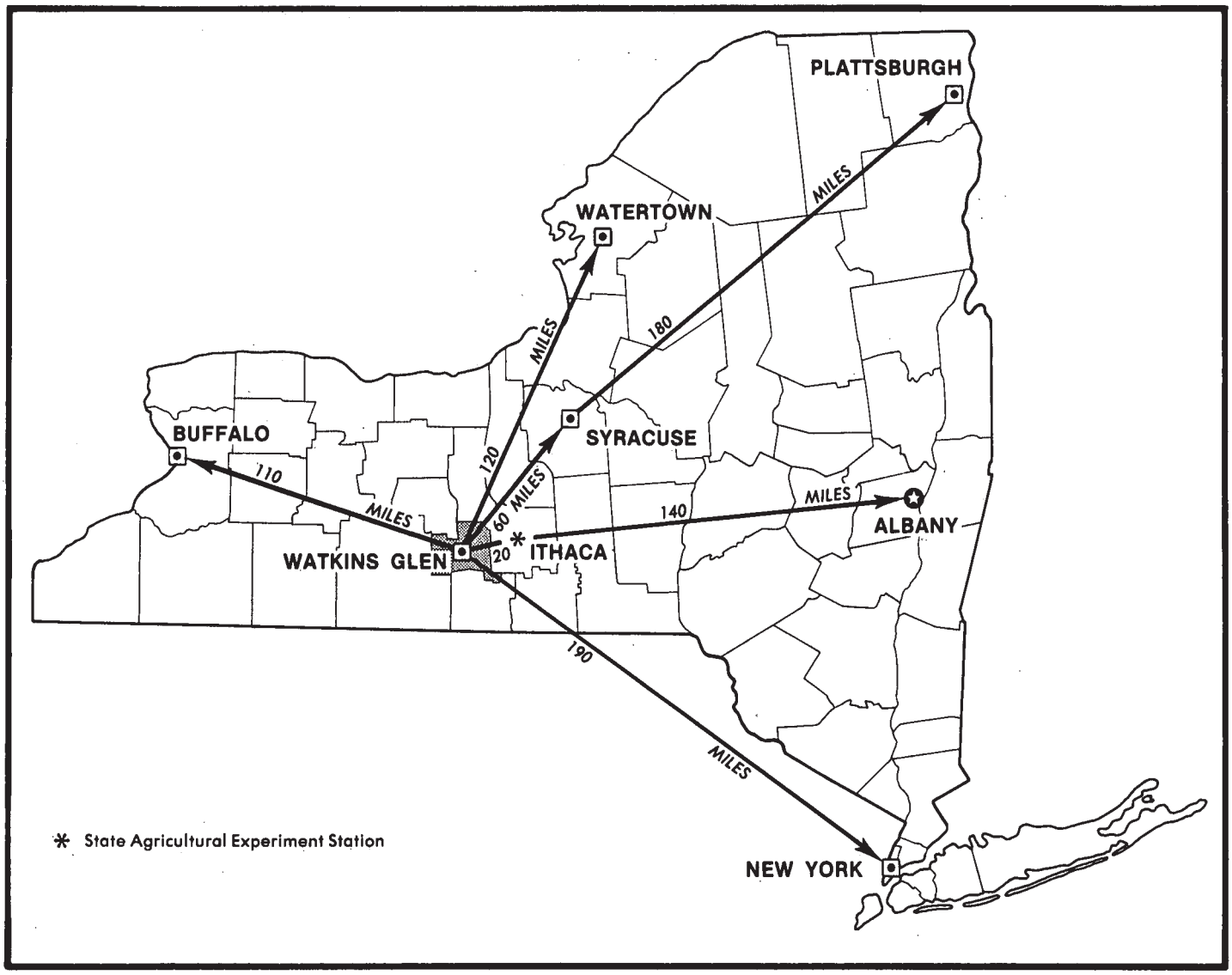
This soil survey has been prepared for many different users. Farmers, ranchers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and homebuyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the soil survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for specific uses. Additional information or assistance in using this publication can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

This soil survey can be useful in the conservation, development, and productive use of soil, water, and other resources.

Robert L. Hilliard
State Conservationist
Soil Conservation Service



Location of Schuyler County in New York.

SOIL SURVEY OF SCHUYLER COUNTY, NEW YORK

By Paul S. Puglia, Soil Conservation Service

Fieldwork by Paul R. Bauter, William A. Broad, Russell A. Parsons, Paul S. Puglia, and John P. Wulforst
Soil Conservation Service, and
Carl S. Pearson, Schuyler County Soil and Water Conservation District

United States Department of Agriculture, Soil Conservation Service, in cooperation with the
Cornell University Agricultural Experiment Station

SCHUYLER COUNTY is in the south-central part of New York State at the south end of Seneca Lake. The county has a north-south dimension of 16 miles and an east-west dimension of 21 miles. It has a total area of 331 square miles, or 211,840 acres. Watkins Glen is the county seat and is near Watkins Glen State Park.

The Forest Service of the United States Department of Agriculture manages the Hector land use area in the town of Hector. This area comprises about 9,750 acres. The New York State Department of Environmental Conservation manages about 15,000 acres in two major areas—the Connecticut Hill area, a game management area in the town of Catherine, and the Sugar Hill area, a multipurpose forest area in the towns of Orange and Tyrone. Arnot Forest, located in the town of Cayuta, is a research area managed by the New York State College of Agriculture at Cornell University. It contains about 3,000 acres. Most of the remaining land in the county is privately owned.

General nature of the county

This section provides general information about Schuyler County. It discusses physiography and geology, drainage, water supply, and climate. Other items of general interest also covered are history and development, farming, and transportation facilities.

Physiography and geology

Bernard S. Ellis, senior staff geologist, Soil Conservation Service, assisted in the preparation of this section.

Schuyler County is in the Allegheny Plateau physiographic province of south-central New York State. Seneca Lake, one of the Finger Lakes, divides the county into about equal portions. The lake trough is the dominant physiographic feature in the county. It extends from the center of the northern boundary to a point about 3 miles north of the center of the southern border. With the exception of the lake area, the topography of the county is typical of the southern tier counties in New York State: flat-topped hills and wide ridgetops. Most of the topography reflects the nearly level nature of the underlying bedrock.

Relatively steep valley walls are common in the county, as is typical of a mature plateau undergoing dissection by youthful streams. The valleys, which contain the troughs of the Finger Lakes, were extensively deepened by the scouring action of glacial ice. The side walls are steep, and "hanging valleys" are commonplace (*12*). As a result, a number of spectacular waterfalls occur in the region.

The elevation of the county ranges from 445 feet at Seneca Lake to 2,080 feet in the area of the Sugar Hill fire tower. Most of the relief in the county is uniformly distributed. The major exceptions to this are areas where glacial ice or meltwater has scoured the valleys.

All of the bedrock underlying the county is of Devonian age, especially Upper Devonian. Three basic rock types—shale, siltstone, and sandstone—make up 99 percent of the bedrock. The lowest, or oldest, rocks are along the lower valley slopes of Seneca Lake and the Catherine Creek Valley to the south (*3*). These rocks are of the Genesee group and the Ithaca formation. Higher on the valley walls, the Enfield formation of the Sonyea group outcrops (fig. 1). The highest areas in the northern and eastern portions of the county are underlain by the Lower West Falls group. In the southwestern corner of the county, the Middle West Falls group of rocks is at an elevation of more than 1,500 feet. These are the youngest and highest bedrock units in the county, and they cap the highest hills in the area.

The Schuyler County area went through several glacial advances and retreats during the Pleistocene Ice age (*13*). With each southward movement, the ice picked up soil material and pieces of bedrock and ultimately redeposited a mixture of unconsolidated material of various

sizes, shapes, and mineralogy. The last advance stripped earlier deposits and laid down the mantle in which most of the soils in the county have developed.

As the climate warmed and melting of the ice overcame the advance, the glacier began to recede. The ice was thinnest on the uplands; therefore, these were the first areas to be exposed. The remaining mixture of rock fragments and finer particles covering these upland areas is termed *glacial till*. The thickness of this till mantle is quite variable. In some areas on the hilltops the mantle is less than a foot thick. In areas below the higher ridges it is more than 10 feet thick. Soils formed in deep glacial till, such as Erie and Bath soils, make up 70 percent of the county. Lordstown, Aurora, Arnot, and Tuller soils formed in moderately deep and shallow glacial till and make up 14 percent of the county.

As the glacial ice melted and receded, further exposing valley areas, large quantities of meltwater discharging from the glacial front carried rock and soil debris that was deposited as valley train terraces, kames, and eskers. Nearly level or undulating valley train terrace deposits occupy the floor of many valleys. Kames are steep, rolling hills that were deposited at the edge of the ice. Eskers were deposited by subglacial streams. All of these proglacial fluvial deposits are generally called *outwash* and consist mainly of stratified sand and gravel. Howard and Chenango soils are examples of soils that formed in these deposits. They make up about 6 percent of the county.

The last advance of the glacier, called the Valley Heads substage in New York, left large recessional moraines plugging many of the major valleys (*12*). These moraines formed against the edge of the stagnant ice front and are generally composed of variable stratified deposits. As the glacier continued to retreat northward, meltwater was trapped between the valleys, blocking moraines and the ice front. Consequently, proglacial lakes formed in some valleys. Fine soil particles carried in suspension by the meltwater settled in the water of these lakes. Glaciolacustrine (lake-laid) deposits such as these occasionally are in a few areas on the floor of the valleys. Stone-free Schoharie and Collamer soils are examples of soils formed in these deposits. They cover approximately 7 percent of the county.

Isolated pockets of shallow water were associated with glacial meltwater. Profuse plant growth in these areas resulted in the formation of organic deposits. These deposits consist of Carlisle and Palms soils and are scattered throughout the county. They make up about 1 percent of the area.

Erosion and sedimentation are taking place everywhere in the area. Silty alluvial sediments near flood-prone streams and a continuing buildup of organic materials in swampy areas are examples of more recent deposits not related to glaciation. The recent alluvial deposits make up about 2 percent of the county. Philo and Teel soils are examples of soils that formed in these deposits.

Drainage

The main drainage system in the county consists of Catherine Creek and Seneca Lake. Catherine Creek flows north out of Chemung County and enters Seneca Lake at Watkins Glen. This drainage system essentially bisects the county into eastern and western segments. Seneca Lake drains into Lake Ontario through the Seneca and Oswego River systems.

In the southeastern part of the county, Cayuta Lake drains into the Chemung River. The western and southwestern portions are drained by Mud, Mead, and Post Creeks into the Chemung River.

For the most part, the remainder of the county drains directly into Seneca Lake through a number of minor tributaries.

Water supply

Domestic water for the rural areas of the county is obtained largely from drilled bedrock wells. A minor amount is obtained from dug wells. Dug wells are limited to a relatively shallow depth and tend to dry up when the water table is low. They are effective in the valley bottoms, where gravelly sandy outwash is encountered, but they are subject to contamination.

Watkins Glen obtains water from Seneca Lake; Montour Falls and Odessa have municipal water systems supplied by wells; and the villages of Valois, Hector, and Burdett are in a water district which is supplied by large-capacity wells.

In some instances domestic water supply is obtained from springs. Springs are naturally occurring areas where the water table reaches the surface of the ground in a confined area. This source of water is scattered and unpredictable.

Climate

In Schuyler County, winters are cold and summers are moderately warm with occasional hot spells. Plateau summits are markedly cooler than the main farming areas in the lowlands. Precipitation is well distributed throughout the year and is nearly always adequate for all crops. Winter snows occur frequently, occasionally as blizzards, and cover the ground much of the time.

Table 1 gives data on temperature and precipitation for the survey area, as recorded at Ithaca, New York, for the period 1951 to 1974. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 25 degrees F, and the average daily minimum temperature is 16 degrees. The lowest temperature on record, which oc-

curred at Ithaca on January 15, 1957, is -25 degrees. In summer the average temperature is 67 degrees, and the average daily maximum temperature is 79 degrees. The highest recorded temperature, which occurred on July 23, 1955, is 98 degrees.

Growing degree days, shown in table 1, are equivalent to heat units. During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 19 inches, or 56 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 17 inches. The heaviest 1-day rainfall during the period of record was 3.55 inches at Ithaca on June 22, 1972. Thunderstorms occur on about 31 days each year, and most occur in summer.

Average seasonal snowfall is 72 inches. The greatest snow depth at any one time during the period of record was 30 inches. On the average, 45 days have at least 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 83 percent. The percentage of possible sunshine is 65 in summer and 30 in winter. The prevailing wind is from the west-southwest. Average windspeed is highest, 12 miles per hour, in February.

Climatic data in this section were specially prepared for the Soil Conservation Service by the National Climatic Center, Asheville, North Carolina.

History and development

Schuyler County was formed in 1854 from parts of Chemung, Tompkins, and Steuben Counties. Watkins Glen was selected as the county seat. The first settlements, established in 1788, were the villages of Havana, now called Montour Falls, and Jefferson, which is now Watkins Glen. In 1855 Schuyler County had a population of 18,277. In 1974 the population was 16,737.

Farming

According to the 1969 Census of Agriculture (*10*), about 41.5 percent of the land area in the county, or 51,651 acres, is in farms. Of the land in farms, about 43 percent is in crops, 38 percent in pasture, and 19 percent in farm woodlots. Dairying is the main enterprise. The main crops, other than those grown in support of dairying, are grapes, dry beans, and wheat. About 52 percent of the county is wooded, and much of this is on the steeper soils.

The number of farms in the county has steadily declined over the years. In 1945 there were 1,160 farms, compared to 483 in 1969 (*11*). However, the average size of individual farms increased from 125.6 acres in 1945 to 181.5 acres in 1969. Of the 483 farms reported in 1969, 270 operated on a commercial basis and 213 on a part-time basis. The dominant crops were hay, corn, and small grain. In 1969, 14,054 acres was used for hay and 3,693 acres was used for corn, of which 2,054 acres was used for silage. There was 4,527 acres of small grains other than wheat, most of which was oats. Wheat was grown on 1,731 acres. About 19,288 acres of land was idle.

Vineyards accounted for 1,814 acres in 1969, and commercial forests covered about 109,600 acres (*7*).

Transportation

The county is served by two railroads which pass through the center of the county in a general north-south direction. The main north-south highways are State Routes 14 on the west side of Seneca Lake and 414 on the east side. State Route 79 is a main east-west highway. State Route 224 runs from Montour Falls to Chemung County.

How this survey was made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are, and how they can be used. The soil scientists went into the area knowing they likely would locate many soils they already knew something about and perhaps identify some they had never seen before. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material, which has been changed very little by leaching or by the action of plant roots.

The soil scientists recorded the characteristics of the profiles they studied, and they compared those profiles with others in counties nearby and in places more distant. Thus, through correlation, they classified and named the soils according to nationwide, uniform procedures.

After a guide for classifying and naming the soils was worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, roads, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called soil map units. Some map units are made up of one kind of soil, others are made up of two or more kinds of soil, and a few have little or no soil material at all. Map units are discussed in the sections "General soil map for broad land use planning" and "Soil maps for detailed planning."

While a soil survey is in progress, samples of soils are taken as needed for laboratory measurements and for engineering tests. The soils are field tested, and interpretations of their behavior are modified as necessary during the course of the survey. New interpretations are added to meet local needs, mainly through field observations of different kinds of soil in different uses under different levels of management. Also, data are assembled from other sources, such as test results, records, field experience, and information available from state and local specialists. For example, data on crop yields under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it is readily available to different groups of users, among them farmers, managers of woodland, engineers, planners, developers and builders, homebuyers, and those seeking recreation.

General soil map for broad land use planning

The general soil map at the back of this publication shows, in color, map units that have a distinct pattern of soils and of relief and drainage. Each map unit is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map provides a broad perspective of the soils and landscapes in the survey area. It provides a basis for comparing the potential of large areas for general kinds of land use. Areas that are, for the most part, suited to certain kinds of farming or to other land uses can be identified on the map. Likewise, areas of soils having properties that are distinctly unfavorable for certain land uses can be located.

Because of its small scale, the map does not show the kind of soil at a specific site. Thus, it is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The kinds of soil in any one map unit differ from place to place in slope, depth, stoniness, drainage, or other characteristics that affect their management.

The general soil map units in Schuyler County are discussed on the following pages. The terms for texture used in the introductory statement that describes each unit apply only to the surface layer of the major soils in the unit. The terms for drainage class used in the introductory statement also apply to only the major soils, and the range in slope covers only the dominant slopes of the soils in the unit.

1. Valois-Howard-Chenango

Dominantly gently sloping and sloping, deep, well drained and somewhat excessively drained, medium textured soils in valleys and on plains

This unit consists of soils that formed in morainic glacial till deposits and gravelly outwash deposits. The landscape consists of a few rolling plains and a series of low hills, benches, terraces, and alluvial fans mainly on lower valley sides and valley floors. Slope is mainly 3 to 15 percent but ranges from 0 to 60 percent.

This unit covers about 17 percent of the county. Valois soils make up about 35 percent of the unit, Howard soils 25 percent, Chenango soils 15 percent, and soils of minor extent 25 percent.

Valois soils formed in glacial till deposits derived from sandstone, siltstone, and shale. These deposits are commonly closely intermingled with or overlie gravelly glacial outwash deposits. Valois soils are well drained. The subsoil and substratum are medium textured or moderately coarse textured. The rate of water movement is moderate through the subsoil and moderate or moderately rapid through the substratum. The seasonal high water table is at a depth of more than 3 feet. Valois soils are gently sloping to very steep. They are on low knolls, ridges, and hills on lower valley sides and valley floors.

Howard soils formed in glacial outwash deposits with a high content of sand and gravel. Howard soils are well drained to somewhat excessively drained and have a medium textured subsoil. The substratum is commonly coarse textured, stratified sand and gravel with a high content of sandstone, siltstone, and shale and a smaller amount of limestone. The rate of water movement is moderate or moderately rapid through the subsoil and very rapid through the substratum. Howard soils are nearly level to very steep. They are on benches; terraces; long, narrow ridges; low, rolling hills and knolls on valley floors; and rolling or undulating plains.

Chenango soils formed in glacial outwash deposits with a high content of sand and gravel. Chenango soils are well drained to somewhat excessively drained and have a medium textured or moderately coarse textured subsoil. The substratum is coarse textured and generally stratified and has a high content of sandstone and siltstone gravel. The rate of water movement is moderate or moderately rapid through the subsoil and rapid through the substratum. These soils are nearly level and

gently sloping. They are on benches, terraces, and alluvial fans on valley floors.

Soils of minor extent include the Castile, Red Hook, Halsey, Philo, Teel, Atkins, Carlisle, Palms, Lansing, Bath, Schoharie, and Collamer soils. Moderately well drained Castile soils, somewhat poorly drained Red Hook soils, and very poorly drained Halsey soils formed in gravelly outwash and are on lower and wetter parts of the landscapes adjacent to the major soils. Moderately well drained Philo soils, poorly drained Atkins soils, and moderately well drained to somewhat poorly drained Teel soils are on alluvial flood plains adjacent to major streams in this unit. Very poorly drained Carlisle muck and Palms muck are in a few bogs and depressions containing organic deposits. Well drained Lansing soils are in a few areas and have a higher clay content in the subsoil than Valois soils. Well drained Bath soils are on a few side slopes and have a firm fragipan in the subsoil. Moderately well drained and well drained Schoharie soils are in a few large areas dominated by clayey, lake-laid deposits that have no stone fragments. Moderately well drained Collamer soils are in a few areas of glacial, lake-laid, silty deposits.

Most areas of this unit have been cleared and are used for farming. The less sloping areas of the major soils are well suited to corn, small grains, potatoes, and alfalfa. Droughtiness is a concern in some years, particularly in the gravelly Chenango soils. Some areas of the unit have good potential for community development, and most areas are excellent sources of water from wells. Slope and the high content of gravel fragments are the main limitations of this unit for most uses.

2. Conesus-Appleton-Lansing

Dominantly gently sloping, deep, well drained to somewhat poorly drained, medium textured soils that have a moderate lime content; on uplands

This unit consists of soils that formed in glacial till deposits derived from sandstone, shale, and limestone. The landscape is dominantly hilly. Slope is mainly 3 to 8 percent but ranges from 0 to 25 percent.

This unit covers about 10 percent of the county. Conesus soils make up about 30 percent of the unit, Appleton soils 20 percent, Lansing soils 15 percent, and soils of minor extent 35 percent.

Conesus soils are moderately well drained. The rate of water movement is moderate through the surface layer and subsoil and slow through the substratum. A seasonal high water table is in the lower part of the subsoil during early spring. Conesus soils are nearly level to sloping. They are on hilltops, in undulating areas, and on lower hillsides.

Appleton soils are somewhat poorly drained. The rate of water movement through the subsoil and substratum is moderately slow or slow. A seasonal high water table is in the upper part of the subsoil during the spring and other excessively wet periods. Appleton soils are nearly level and gently sloping. They are on concave footslopes, drainageways, and broad flats that receive runoff from higher adjacent Lansing and Conesus soils.

Lansing soils are well drained and medium textured. The rate of water movement is moderate in the surface layer and subsoil and slow in the substratum. A seasonal high water table is at a depth of 3 to 6 feet for very brief periods in early spring. Lansing soils are gently sloping to moderately steep. They are on hilltops and upper side slopes that receive little or no runoff from adjacent soils.

Soils of minor extent in this unit include the Burdett, Valois, Howard, Erie, Mardin, Alden, Dunkirk, Hudson, Rhinebeck, Aurora, and Angola soils. Somewhat poorly drained Burdett soils are in many areas and have a higher clay content in the lower part of the subsoil than Appleton soils. Well drained Valois soils are in areas where the soil material is more acid and coarser textured than in the Lansing soils. Somewhat excessively drained to well drained Howard soils are in a few areas of gravelly glacial outwash deposits. Somewhat poorly drained Erie soils and moderately well drained Mardin soils are in upland areas and have a dense fragipan. Very poorly drained Alden soils are in depressions and low flats. Well drained, silty Dunkirk soils; moderately well drained, clayey Hudson soils; and somewhat poorly drained, clayey Rhinebeck soils have no stone fragments and are in a few areas of glacial lake deposits. Moderately well drained Aurora soils and somewhat poorly drained Angola soils are in few areas where shale bedrock is at a depth of 20 to 40 inches.

Much of this unit is cleared and farmed. The soils are among the more suitable in the county for corn, dry beans, small grains, and alfalfa hay. Artificial drainage is the principal management requirement in many areas of this unit. Temporary seasonal wetness and slow water movement through the substratum are the main limitations of this soil for community development.

3. Fremont-Schuyler

Dominantly gently sloping and sloping, deep, somewhat poorly drained and moderately well drained, medium textured soils that have a low lime content; on uplands

This unit consists of soils that formed in silty glacial till deposits derived mainly from shale, siltstone, and sandstone. The landscape is dominantly broad summits and saddles and dissected side slopes on the plateau in the southwestern part of the county. Slope ranges from 0 to 35 percent but is dominantly 3 to 15 percent.

This unit covers about 8 percent of the county. Fremont soils make up about 40 percent of the unit, Schuyler soils 35 percent, and soils of minor extent 25 percent.

Fremont soils are somewhat poorly drained. The subsoil and substratum are medium textured or moderately fine textured. The rate of water movement is moderate or moderately slow through the subsoil and slow or very

slow through the substratum. A seasonal high water table is in the upper part of the subsoil during the spring. Fremont soils are nearly level to sloping. They are on broad upland flats and concave saddles.

Schuyler soils are moderately well drained. The subsoil and substratum are medium textured or moderately fine textured. The rate of water movement is moderate or moderately slow through the subsoil and slow through the substratum. A temporary seasonal high water table is in the lower part of the subsoil during early spring. Schuyler soils are sloping to steep. They are on convex plateau summits and dissected side slopes.

Soils of minor extent include the Hornell, Volusia, Mardin, Chippewa, Lordstown, Arnot, Tuller, and Chenango soils. Somewhat poorly drained Hornell soils are in many areas where soft shale bedrock is at a depth of 20 to 40 inches and have a subsoil that is high in clay content. Somewhat poorly drained Volusia soils, moderately well drained Mardin soils, and poorly drained and very poorly drained Chippewa soils are in fringe areas and have a dense fragipan in the subsoil. Well drained Lordstown soils are in a few areas where hard bedrock is at a depth of 20 to 40 inches. Well drained and moderately well drained Arnot soils and somewhat poorly drained and poorly drained Tuller soils have hard bedrock at a depth of 10 to 20 inches. Somewhat excessively drained to well drained Chenango soils contain gravelly glacial outwash deposits and are on benches on a few lower valley sides.

This unit is used for crops, pasture, woodland, and wildlife habitat. Many areas that were originally cleared and farmed have been reforested or are naturally reverting to woodland. The difficulty in installing drainage systems is the primary limitation for farming. Seasonal wetness, slope, and slow permeability in the substratum of the major soils are the main limitations for community development.

4. Mardin-Bath

Dominantly sloping and moderately steep, deep, moderately well drained and well drained, medium textured soils that have a fragipan; on uplands

This unit consists of soils that formed in glacial till deposits derived mainly from sandstone, shale, and siltstone. The landscape is dominantly plateau side slopes and hills. Slope is mainly 8 to 25 percent but ranges from 3 to 50 percent.

This unit covers 13 percent of the county. Mardin soils make up about 45 percent of the unit, Bath soils 20 percent, and soils of minor extent 35 percent.

Mardin soils are moderately well drained. They have a dense fragipan at a depth of 14 to 26 inches that restricts rooting and perches a seasonal high water table. The rate of water movement is moderate in the surface layer and upper part of the subsoil and slow or very slow in the fragipan and substratum. Mardin soils are gently sloping to moderately steep and are on hillsides and hilltops that commonly receive runoff from higher adjacent soils.

Bath soils are well drained. The subsoil and substratum are medium textured or moderately coarse textured. A dense fragipan at a depth of 26 to 40 inches restricts rooting and causes a temporary perched seasonal high water table in early spring. The rate of water movement through the soil is moderate above the fragipan and slow in the fragipan and substratum. Bath soils are gently sloping to steep. They are on ridgetops, hilltops, hill crests, and convex hillsides.

Soils of minor extent include the Volusia, Chippewa, Erie, Schuyler, Fremont, Lordstown, Arnot, Tuller, and Valois soils and areas of Fluvaquents-Udifluvents complex and Ochrepts-Orthents complex. Somewhat poorly drained Volusia soils and poorly drained Chippewa soils are in wetter areas such as footslopes, along field drainageways, in depressions, in seep areas, and on nearly level hilltops. Somewhat poorly drained Erie soils occupy landscape positions similar to those of the Volusia soils but have a coarser textured subsoil and have accumulated clay in the lower part of the subsoil. Moderately well drained Schuyler soils and somewhat poorly drained Fremont soils are on a few plateau summits and are slightly heavier textured than the major soils in this unit. Well drained Lordstown soils are on a few hilltops and are 20 to 40 inches deep to bedrock. Well drained and moderately well drained Arnot soils and somewhat poorly drained to poorly drained Tuller soils are on a few hilltops and plateau summits where the soil is 10 to 20 inches deep to bedrock. Well drained Valois soils are in a few areas mostly on lower valley sides. Fluvaquents-Udifluvents complex is in areas near a few streams and is subject to flooding. Ochrepts-Orthents complex, very steep, is in a few gullies produced by deeply dissected streams.

More than half of this unit is forested. The remaining areas are cleared and are commonly idle or used for hay or pasture. Some areas have potential for row crops such as potatoes or corn, but slope, low natural fertility, and a short growing season limit many areas for crops. Slow or very slow water movement through the fragipan, temporary seasonal wetness, and slope are the primary limitations for community development. Some areas have potential for recreational development.

5. Volusia-Mardin

Dominantly gently sloping and sloping, deep, somewhat poorly drained and moderately well drained, medium textured soils that have a fragipan; on uplands

This unit consists of soils that formed in glacial till deposits derived from siltstone, sandstone, and shale. The landscape is dominantly broad, till-plain divides and lower side slopes on the upland plateau. Slope is dominantly 3 to 15 percent but ranges from 0 to 25 percent.

This unit covers about 20 percent of the county. Volusia soils make up about 45 percent of the unit, Mardin soils 25 percent, and soils of minor extent 30 percent.

Volusia soils are somewhat poorly drained. The rate of water movement is moderate in the surface layer and upper part of the subsoil and slow or very slow in the fragipan and substratum. A dense fragipan at a depth of 10 to 16 inches restricts rooting and perches a seasonal high water table during spring. Volusia soils are nearly level to moderately steep and are mainly on lower hillsides and concave foot slopes that receive runoff from higher adjacent soils. Some areas are on the tops of broad, smooth divides.

Mardin soils are moderately well drained. The rate of water movement is moderate in the surface layer and upper part of the subsoil and slow or very slow in the fragipan and substratum. A dense fragipan at a depth of 14 to 26 inches restricts root penetration and perches a seasonal high water table for brief periods in the spring. Mardin soils are gently sloping to moderately steep and are on slightly convex hilltops, knolls, ridges, and hillsides.

Soils of minor extent include the Chippewa, Bath, Fremont, Alden, Tuller, Arnot, Lordstown, and Valois soils and areas of the Fluvaquents-Udifluvents complex. Poorly drained to very poorly drained Chippewa soils formed in deposits similar to those of the major soils and are on concave toe slopes, in seep areas, and in depressions. Well drained Bath soils are on knolls, ridge crests, and steep side slopes. Somewhat poorly drained Fremont soils are on several plateau summits. Very poorly drained Alden soils are in depressions in the lowest parts of the landscape. Somewhat poorly drained Tuller soils and well drained to moderately well drained Arnot soils are in several areas where bedrock is 10 to 20 inches below the surface. Well drained Lordstown soils are in a few areas where bedrock is 20 to 40 inches below the surface. Well drained Valois soils are on some ridges and knolls on lower valley sides. The Fluvaquents-Udifluvents complex is near a few small upland streams in areas that are subject to frequent flooding.

This unit is mainly used for hay, pasture, woodland, and wildlife habitat (fig. 2). A few areas are used for row crops. Many areas that were cleared for farming are idle or reverting to woodland. Drainage is the principal management requirement for crop production. Seasonal wetness and slow or very slow water movement through the fragipan are the main limitations for community development. Some areas have potential for recreational uses such as ponds.

6. Erie-Mardin

Dominantly nearly level and gently sloping, deep, somewhat poorly drained and moderately well drained, medium textured soils that have a fragipan; on uplands

This unit consists of soils that formed in glacial till deposits. The landscape dominantly is broad divides and hills on the upland plateau in the northern part of the county. Slope is mainly 0 to 8 percent but ranges from 0 to 25 percent.

This unit covers about 8 percent of the county. Erie soils make up about 40 percent of the unit, Mardin soils 35 percent, and soils of minor extent 25 percent.

Erie soils formed in glacial till deposits derived from siltstone, shale, and some limestone. These soils are somewhat poorly drained. The subsoil is less than 18 percent clay. The rate of water movement through the surface layer and upper part of the subsoil is moderate, and in the fragipan and substratum it is slow. The fragipan is at a depth of 10 to 16 inches. It restricts rooting and perches a seasonal high water table in the upper part of the subsoil during the spring. Erie soils are nearly level to sloping. They are on hilltops, concave foot slopes, lower hillsides, and broad divides. Many areas receive runoff from higher adjacent soils.

Mardin soils formed in glacial till deposits derived mainly from sandstone, siltstone, and shale. The soils are moderately well drained. The rate of water movement through the surface layer and upper part of the subsoil is moderate, and in the fragipan and substratum it is slow or very slow. The fragipan is at a depth of 14 to 26 inches. It restricts root penetration and perches a seasonal high water table in the subsoil for brief periods in the spring and other excessively wet periods. Mardin soils are gently sloping to moderately steep. They are on slightly convex hilltops and divides, ridges, low knolls, and hillsides. The areas commonly receive runoff from higher adjacent soils.

Soils of minor extent include the Chippewa, Bath, Appleton, Burdett, Angola, Aurora, Lordstown, and Volusia soils. Poorly drained to very poorly drained Chippewa soils formed in deposits similar to those of the major soils and are in depressions along seeps and in areas bordering field drainageways. Well drained Bath soils are on knolls, ridge crests, and steep side slopes. Somewhat poorly drained Appleton soils are in a few areas that have a higher content of limestone than is in the major soils. Somewhat poorly drained Burdett soils have a higher clay content in the subsoil than the Erie soils. Somewhat poorly drained Angola soils and moderately well drained Aurora soils are in areas where shale bedrock is 20 to 40 inches below the surface. Well drained Lordstown soils are in a few areas where hard siltstone and sandstone bedrock is 20 to 40 inches below the surface. Somewhat poorly drained Volusia soils have a subsoil with a clay content of more than 18 percent.

This unit is mainly used for crops, hay, pasture, woodland, and wildlife habitat. Many areas support dairy farms. Artificial drainage is the principal management requirement for crop production. Interceptor drains that divert surface runoff and subsurface seepage are needed in many areas. Seasonal wetness and slow or

very slow water movement through the fragipan are the main limitations for community devlopment.

7. Lordstown-Volusia-Mardin

Dominantly sloping to steep, moderately deep and deep, well drained to somewhat poorly drained, medium textured soils on uplands and valley sides

This unit consists of soils that formed in glacial till deposits of variable thickness over bedrock. The deep soils have a fragipan. The landscape is dominantly bedrock-controlled plateau summits, side slopes, and valley sides. Slope is mainly 8 to 35 percent but ranges from 3 to 70 percent.

This unit covers about 16 percent of the county. Lordstown soils make up about 35 percent of the unit, Volusia soils 20 percent, Mardin soils 15 percent, and soils of minor extent 30 percent.

Lordstown soils formed in moderately deep glacial till deposits derived primarily from sandstone and siltstone. These soils are well drained and are 20 to 40 inches deep to hard bedrock. The rate of water movement through the soil material above the bedrock is moderate. Generally, the bedrock is fractured and jointed sufficiently to allow relatively rapid infiltration of free water. Lordstown soils are gently sloping to very steep. They are on convex hilltops and summits, hillsides, and valley sides.

Volusia soils formed in glacial till deposits derived from siltstone, sandstone, and shale. The soils are deep, somewhat poorly drained, and medium textured and have a fragipan. The rate of water infiltration through the surface layer and upper part of the subsoil is moderate, and in the fragipan and substratum it is slow or very slow. The fragipan is at a depth of 10 to 16 inches. It restricts rooting and perches a seasonal high water table in the subsoil during the spring. Volusia soils are gently sloping to moderately steep. They are on lower hillsides and valley sides that receive runoff from higher adjacent soils and are on broad hilltops.

Mardin soils formed in glacial till deposits derived from siltstone, sandstone, and shale. The soils are deep, moderately well drained, and medium textured and have a dense fragipan. The rate of water infiltration through the surface layer and upper part of the subsoil is moderate, and in the fragipan and substratum it is slow or very slow. The fragipan is at a depth of 14 to 26 inches. It restricts root penetration and perches a seasonal high water table in the subsoil for brief periods in early spring. Mardin soils are gently sloping to moderately steep. They are on slightly convex hilltops, hillsides, and lower valley sides that commonly receive runoff from adjacent soils.

Soils of minor extent include the Arnot, Tuller, Bath, Aurora, Angola, Wayland, Philo, Conesus, and Valois soils and the Ochrepts-Orthents complex. Well drained to moderately well drained Arnot soils and somewhat poorly drained to poorly drained Tuller are in many areas where bedrock is 10 to 20 inches below the surface. Arnot soils are common on steep side slopes, and Tuller soils are on flats and in seep areas. Well drained Bath soils are in a few deep areas. Moderately well drained Aurora soils and somewhat poorly drained Angola soils are moderately deep to bedrock and are in a few areas where the soil material has a higher clay content than the Lordstown soils. Poorly drained and very poorly drained Wayland soils and moderately well drained Philo soils are on nearly level flood plains of a few streams that cross this unit. Deep, moderately well drained Conesus soils are in a few upland areas. Well drained Valois soils are along lower valley sides where the soil mantle is deep. Ochrepts-Orthents complex is on a few very steep side slopes of deep upland streams.

This unit is mainly in woodland, but some areas are used for hay and pasture or are idle. Slope is the principal limitation for crop production. Some of the less sloping areas have farming potential, but the short growing season, low natural fertility, droughtiness, and seasonal wetness are management concerns. Depth to bedrock in the moderately deep soils and restricted water movement through the fragipan in the deep soils are additional limitations for community development. Many areas overlooking large valleys have esthetic value.

8. Schoharie-Hudson-Rhinebeck

Dominantly gently sloping and sloping, deep, well drained to somewhat poorly drained, moderately fine textured and medium textured soils on lowland plains and valley sides

This unit consists of soils that formed in glacial lake deposits high in content of clay and silt. The landscape is dominantly a series of knolls, low hills, and ridges interrupted by a few broad flats and drainageways (fig. 3). Some areas are on valley sides adjacent to Seneca Lake. Slope is dominantly 3 to 15 percent but ranges from 0 to 25 percent.

This unit covers about 6 percent of the county. Schoharie soils make up about 30 percent of the unit, Hudson soils 20 percent, Rhinebeck soils 10 percent, and soils of minor extent 40 percent.

The Schoharie soils are well drained to moderately well drained and have a moderately fine textured surface layer. The subsoil and substratum are fine textured or moderately fine textured. In some areas bedrock is within 20 to 40 inches of the surface. The rate of water movement through the subsoil and substratum is slow or very slow. A seasonal high water table is in the lower part of the subsoil for brief periods in early spring. Schoharie soils are gently sloping to moderately steep. They are on dissected and severely eroded valley sides, hillsides, and ridges.

Hudson soils are moderately well drained and have a gravelly, medium textured surface layer. The subsoil is fine textured or moderately fine textured. The rate of water movement through the subsoil and substratum is

slow. A seasonal high water table is in the subsoil during early spring. Hudson soils are gently sloping and sloping. They are on undulating and rolling knolls, ridges, and low hills.

Rhinebeck soils are somewhat poorly drained and have a medium textured surface layer. The subsoil is moderately fine textured or fine textured. Gravel fragments are common in the surface layer. The rate of water movement through the subsoil and substratum is slow. A seasonal high water table is in the upper part of the subsoil during the spring and other excessively wet periods. Rhinebeck soils are nearly level to gently sloping. They are on broad flats, between ridges, and on concave foot slopes.

Soils of minor extent include the Madalin, Odessa, Dunkirk, Collamer, Canandaigua, Teel, Wayland, Lordstown, and Arnot soils. Poorly drained and very poorly drained Madalin soils are in low bogs and depressions. Somewhat poorly drained Odessa soils are on foot slopes and flats. Well drained Dunkirk soils, moderately well drained Collamer soils, and poorly drained and very poorly drained Canandaigua soils are in many areas where the clay content is lower than in the major soils. Moderately well drained to somewhat poorly drained Teel soils and poorly drained to very poorly drained Wayland soils are on flood plains of a few major streams that cross this unit. Moderately deep, well drained Lordstown soils and shallow, well drained and moderately well drained Arnot soils are on steep side slopes mostly near Seneca Lake.

Many areas of this unit are used for row crops, small grains, hay, and pasture. A few areas are in vineyards. The more sloping soils and wetter soils are generally idle or reverting to woodland. The soils in this unit need cross-slope tillage, minimum tillage, sod crops in the cropping system, and cover crops to control erosion. Drainage is needed in some areas. The farming potential of this unit is good. Slow water movement through the subsoil, temporary seasonal wetness, instability of the clayey sediments, and tendency of the soils to slip or slump in more sloping areas are the main concerns for community development. Construction sites should be protected with plant cover or artificial cover to prevent erosion and sedimentation.

9. Wayland-Teel-Aquepts and Saprists

Dominantly level, deep, very poorly drained to moderately well drained, medium textured mineral soils and inundated organic soils; on flood plains and ponded lowlands

This unit consists of soils that formed in alluvial deposits on flood plains and of soils in very low areas adjacent to ponds and lakes. The landscape is dominantly broad flats adjacent to streams and open bodies of water. A large area of this unit extends south from the end of Seneca Lake. Slope is dominantly less than 2 percent but ranges from 0 to 3 percent.

This unit covers about 2 percent of the county. Wayland soils make up about 30 percent of the unit, Teel soils 30 percent, Aquepts and Saprists 10 percent, and soils of minor extent 30 percent.

Wayland soils formed in silty alluvial deposits. The soils are poorly drained and very poorly drained. They have a medium textured surface layer and a medium textured or moderately fine textured subsoil and substratum. These soils are subject to frequent flooding from adjacent streams. The rate of water movement through the subsoil and substratum is slow. A high water table is at or near the surface for prolonged periods during the year. Wayland soils are nearly level. They are in low-lying areas, old oxbows, and slackwater areas on the flood plain.

Teel soils formed in silty alluvial deposits. The soils are moderately well drained to somewhat poorly drained and are medium textured. These soils are subject to periodic flooding. The rate of water movement through the subsoil and substratum is moderate. A seasonal high water table is in the subsoil during early sping. Teel soils are nearly level. They are on slightly higher areas on the flood plain than adjacent Wayland soils.

Aquepts and Saprists are commonly called fresh water marsh. These soils are covered by shallow water nearly the year around. Aquepts are in areas of varying mineral soil deposits, and Saprists are in areas of organic muck deposits. Some areas have both of these soils. Cattails and other water-tolerant plants are the principal vegetation. These soils are level and are on broad flats adjacent to open bodies of water.

Soils of minor extent include the Wallkill, Philo, Atkins, Palms, and Canandaigua soils. Very poorly drained Wallkill soils are in a few areas on flood plains where alluvial sediments overlie organic deposits. Moderately well drained Philo soils and poorly drained Atkins soils are in areas where gravelly deposits are 20 to 40 inches below the silty alluvial mantle. Very poorly drained Palms soils are in a few areas where muck deposits extend to a depth of 16 to 50 inches. Poorly drained and very poorly drained Canandaigua soils are in a few areas containing lake-laid deposits of silt.

Some of the drier areas of this unit, particularly where Teel soils dominate, are used for crops. Many areas support marshgrasses and water-tolerant brush and shrubs which provide habitat for wetland wildlife. Drainage is required to bring additional acres into crop production. However, drainage outlets are extremely difficult to establish because of the very low position of this unit on the landscape. Prolonged wetness, ponding, and flooding are the main limitations for community development.

Soil maps for detailed planning

The map units shown on the detailed soil maps at the back of this publication represent the kinds of soil in the survey area. They are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each map unit, or soil, is given in the section "Use and management of the soils."

Preceding the name of each map unit is the symbol that identifies the soil on the detailed soil maps. Each soil description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated, and the management concerns and practices needed are discussed.

The map units on the detailed soil maps represent an area on the landscape made up mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map are phases of soil series.

Soils that have a profile that is almost alike make up a *soil series*. Except for allowable differences in texture of the surface layer or of the underlying substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped. The Valois series, for example, was named for the town of Valois in Schuyler County.

Soils of one series can differ in texture of the surface layer or in the underlying substratum and in slope, erosion, stoniness, salinity, wetness, or other characteristics that affect their use. On the basis of such differences, a soil series is divided into phases. The name of a *soil phase* commonly indicates a feature that affects use or management. For example, Mardin channery silt loam, 3 to 8 percent slopes, is one of several phases within the Mardin series.

Some map units are made up of two or more dominant kinds of soil. Such map units are called soil complexes and undifferentiated groups.

A *soil complex* consists of areas of two or more soils that are so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area includes some of each of the two or more dominant soils, and the pattern and proportion are somewhat similar in all areas. Lordstown-Arnot complex, steep, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because there is little value in separating them. The pattern and proportion of the soils are not uniform. An area shown on the map has at least one of the dominant (named) soils or may have all of them. Valois and Howard soils, very steep, is an undifferentiated group in this survey area.

Most map units include small, scattered areas of soils other than those that appear in the name of the map unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of the map unit. These soils are described in the description of each map unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special symbol on the soil map.

Most mapped areas include places that have little or no soil material and support little or no vegetation. Such places are called *miscellaneous areas*; they are delineated on the soil map and given descriptive names. Pits, gravel, is an example. Some of these areas are too small to be delineated and are identified by a special symbol on the soil map.

The acreage and proportionate extent of each map unit are given in table 4, and additional information on properties, limitations, capabilities, and potentials for many soil uses is given for each kind of soil in other tables in this survey. (See "Summary of Tables.") Many of the terms used in describing soils are defined in the Glossary.

Ad—Alden silt loam. This deep, very poorly drained, nearly level soil is commonly in low areas, depressions, or headwater areas of streams. Slope ranges from 0 to 3 percent. Areas are oblong or circular.

Typically, the surface layer of this soil is black silt loam 8 inches thick. The subsoil is 22 inches thick. The upper part of the subsoil is friable, light brownish gray silt loam with prominent mottles, and the lower part is firm, grayish brown light silty clay loam with prominent mottles. The substratum is grayish brown heavy gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of poorly drained, silty Canandaigua soils. Also included are a few small areas of soils with a weak fragipan in the lower part of the subsoil and areas of soils in deeper depressions that have a mucky surface layer.

This soil has a water table at or near the surface for prolonged periods during the year. Most areas are briefly ponded early in the spring. Permeability is moderately slow. Available water capacity is high. Runoff is intermittently ponded to very slow. Unless the soil is drained, the root zone is mainly confined to a depth of 8 to 14 inches. Organic matter content is high. In unlimed areas the surface layer and subsoil are commonly slightly acid or neutral.

Most of the acreage of this soil is idle and supports water-tolerant shrubs and trees. Some areas are cleared and used mainly for pasture. The soil has very poor potential for cultivated crops and most urban uses. It has

better potential for water-tolerant grasses and shrubs than for most other uses.

Unless drained, this soil is not suited to most crops. If the soil is adequately drained and protected from ponding, it can be used for cultivated crops. Tilth is good, and tile drainage is suitable where outlets are available. Minimum tillage, incorporating crop residue into the soil, tillage at proper moisture levels, and crop rotation help to improve tilth and maintain organic matter content. Cultivating within the proper range of moisture content also reduces compaction and clodding.

Prevention of overgrazing and restriction of grazing when the soil is wet are major concerns of pasture management. If the pasture is grazed when the soil is wet, the surface layer compacts easily. Proper stocking rates, water-tolerant plant species, pasture rotation deferred grazing, and weed and brush control are the chief management needs. Partial drainage of this soil improves pasture production.

This soil is suited to water-tolerant trees such as red maple, eastern hemlock, and white spruce. Wetness restricts the use of logging equipment and makes machine planting of tree seedlings unfeasible. Seedlings can be planted by hand.

Prolonged wetness and moderately slow permeability limit this soil for many nonfarm uses. Many areas are well suited to wetland wildlife habitat or the development of recreational ponds. Capability subclass IVw.

AnA—Angola silt loam, 0 to 3 percent slopes. This nearly level, somewhat poorly drained, moderately deep soil is on uplands which receive runoff from higher adjacent soils.

Typically, the surface layer of this soil is dark grayish brown silt loam 8 inches thick. The subsurface layer is distinctly mottled, grayish brown channery silt loam 6 inches thick. The subsoil is 13 inches thick. The upper part of the subsoil is firm, olive gray channery silt loam with distinct mottling, and the lower part is firm, olive brown channery light silty clay loam. Fine-grained sandstone bedrock is at a depth of 27 inches.

Included with this soil in mapping are small areas of poorly drained soils in depressions and drainageways, Aurora soils on slight knolls or higher ridges, and Tuller soils that have a channery silt loam surface layer and have bedrock at a depth of 10 to 20 inches.

This soil has a perched seasonal high water table in the upper part of the subsoil during early spring or other wet periods. Permeability is slow in the subsoil. Available water capacity is moderate in this soil, and runoff is slow. Root penetration is restricted by the seasonal high water table and by bedrock at a depth or 20 to 40 inches. Organic matter content is medium to high. In unlimed areas reaction ranges from slightly acid to neutral in the surface layer and medium acid to mildly alkaline in the subsoil.

This soil has fair potential for farming. Most of the acreage is used for hay or pasture. Cultivated areas are used for crops grown in support of dairying.

If adequately drained, this soil is suited to selected crops grown in the area. Undrained areas are better suited to short season crops, hay, or pasture because wetness delays spring tillage operations. Drainage is often difficult to establish because of the shallow depth to bedrock. Open drains such as grassed waterways intercept and divert runoff from higher adjacent areas. Minimum tillage, incorporating crop residue into the soil, tillage at proper moisture levels, and crop rotations help to improve tilth and maintain organic matter content.

This soil is suited to pasture and hay. Prevention of overgrazing and restriction of grazing when the soil is wet are major concerns of pasture management. If pastured when wet, the soil compacts easily, thus destroying tilth and reducing permeability. Proper stocking rates, pasture rotation, deferred grazing, weed and brush control, water-tolerant plant species, and adequate applications of lime and fertilizer are the chief management needs.

This soil is suited to woodland species such as northern hardwoods, white pine, Norway spruce, and white spruce.

The seasonal high water table, slow permeability, and moderate depth to bedrock limit this soil for many nonfarm uses. Capability subclass IIIw.

AnB—Angola silt loam, 3 to 8 percent slopes. This gently sloping, moderately deep, somewhat poorly drained soil is on foot slopes and lower hillsides of upland areas. It commonly receives runoff from adjacent areas.

Typically, the surface layer is dark grayish brown silt loam 8 inches thick. The subsurface layer is distinctly mottled, grayish brown channery silt loam 6 inches thick. The subsoil is 13 inches thick. The upper 4 inches is firm, olive gray, distinctly mottled channery silt loam, and the lower 9 inches is firm, olive brown channery light silty clay loam. Fine-grained sandstone bedrock is at a depth of 27 inches.

Included with this soil in mapping are small areas of poorly drained soils in depressions and along drainageways, Aurora soils on slight knolls or higher ridges, and Burdett and Erie soils in areas where the bedrock is at a depth of more than 40 inches. Also included are a few small areas of soils that have a surface layer of channery silt loam and channery silty clay loam.

This soil has a perched seasonal high water table in the upper part of the subsoil during early spring or other wet periods. Permeability is slow in the subsoil. Available water capacity is moderate in this soil, and runoff is moderate. The root zone is restricted to a depth of 20 to 40 inches by the seasonal high water table and the depth to bedrock. Organic matter content is medium to high. In unlimed areas the surface layer ranges from

slightly acid to neutral and the subsoil from medium acid to mildly alkaline.

This soil has fair potential for farming. Most of the acreage is used for hay or pasture. Cultivated areas are used for crops grown in support of dairying.

Unless this soil is adequately drained, spring planting is delayed and harvesting is difficult. The undrained areas are suitable for short term crops, hay, and pasture. If drained, this soil is suited to selected crops grown in the area. Drainage is often difficult to establish because of the moderate depth to bedrock, and open drains such as grassed waterways are effective in some areas. Minimum tillage, incorporating crop residue into the soil, tillage at proper moisture levels, and crop rotations help to improve soil tilth, maintain the content of organic matter, and reduce the hazard of erosion. Using diversions or terraces, waterways, contour tillage, and stripcropping also helps to control erosion and wetness.

This soil is suited to pasture and hay. Prevention of overgrazing and restriction of grazing when the soil is saturated are the major concerns of management. If this soil is pastured when wet, the surface layer compacts easily, thus increasing runoff and erosion. Proper stocking rates, pasture rotation, deferred grazing, weed and brush control, water-tolerant plants, and adequate applications of lime and fertilizer are the chief management needs.

This soil is suited to woodland species such as northern hardwoods and pine and spruce trees. Placing logging roads and skid trails on the contour helps to control erosion.

The seasonal high water table, slow permeability, and moderate depth to bedrock limit this soil for many nonfarm uses. Capability subclass IIIw.

AnC—Angola silt loam, 8 to 15 percent slopes. This sloping, moderately deep, somewhat poorly drained soil is on lower side slopes of uplands. Areas are in long, narrow belts oriented in a north-south direction and commonly receive runoff from adjacent higher areas.

Typically, the surface layer is dark grayish brown silt loam 8 inches thick. The subsurface layer is distinctly mottled, grayish brown channery silt loam 6 inches thick. The subsoil is 11 inches thick. The upper part of the subsoil is firm, olive gray channery silt loam with distinct mottling, and the lower part is firm, olive brown channery light silty clay loam. Fine-grained sandstone bedrock is at a depth of 25 inches.

Included with this soil in mapping are small areas of Aurora soils on slightly higher knolls, areas of Burdett and Erie soils that have bedrock at a depth of more than 40 inches, and areas of poorly drained soils in seepage spots along toe slopes. Also included are a few small areas of soils that have a surface layer of channery silt loam and channery silty clay loam.

In the spring and other excessively wet periods, this soil has a seasonal high water table perched above the slowly permeable subsoil. Available water capacity is moderate. Runoff is moderate to rapid. Rooting depth is restricted by the seasonal high water table and the depth to bedrock, which ranges from 20 to 40 inches. Organic matter content is medium to high. In unlimed areas reaction ranges from slightly acid to neutral in the surface layer and from medium acid to mildly alkaline in the subsoil. The hazard of erosion is moderate.

This soil has fair potential for farming. Most of the acreage is used for hay, pasture, or woodland.

If adequately drained, this soil is suited to selected crops grown in the area. The undrained areas are better suited to short term crops, permanent hay, or pasture. If the soil is used for cultivated crops, it needs drainage and protection from erosion. Drainage systems are difficult to install because of the moderate depth to bedrock. Interceptor drains such as diversion ditches help to divert and remove runoff from higher adjacent soils. Contour tillage, stripcropping, cover crops, and minimum tillage control the erosion hazard and improve water infiltration. Crop rotations, incorporating crop residue into the soil, and tillage at proper moisture levels help to improve soil tilth and maintain organic matter content.

This soil is suited to pasture. Prevention of overgrazing and restriction of grazing when the soil is saturated are the major concerns of pasture management. If this soil is pastured when wet, the surface layer compacts easily, thus increasing runoff and erosion. Proper stocking rates, rotation of pastures, deferred grazing, weed and brush control, and adequate applications of lime and fertilizer are the chief management needs.

This soil is suited to woodland species such as northern hardwoods and pine and spruce trees. Placing logging roads and skid trails on the contour helps to control erosion.

The seasonal high water table, slow permeability, moderate depth to bedrock, and slope limit this soil for many nonfarm uses. Capability subclass IIIe.

ApA—Appleton silt loam, 0 to 3 percent slopes. This deep, nearly level, somewhat poorly drained soil is in large, broad areas and long, narrow areas along drainageways. Some areas receive runoff from higher adjacent areas.

Typically, the surface layer of this soil is very dark grayish brown silt loam 9 inches thick. The subsurface layer is mottled, light brownish gray silt loam 3 inches thick. The subsoil is 23 inches thick. The upper 6 inches is firm, dark grayish brown, distinctly mottled gravelly silt loam; the next 13 inches is distinctly mottled, firm, dark brown gravelly loam; and the lower 4 inches is mottled, firm, dark brown gravelly loam. The substratum is firm, dark grayish brown gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter soils in depressions and drainageways. Also included are small areas of moderately well drained Cone-

sus soils on knolls, somewhat poorly drained Erie soils on uplands, and soils with a gravelly or stony surface layer.

This soil has a perched seasonal high water table in the subsoil early in the growing season and during rainy periods later in the season. Permeability is moderately slow or slow in the subsoil and substratum. Available water capacity is moderate in this soil, and runoff is slow. The root zone is confined to the upper part of the subsoil early in the sping, but later in the growing season roots extend to a depth of 2 feet or more. Organic matter content is medium to high. In unlimed areas reaction ranges from medium acid to neutral in the surface layer and from medium acid to mildly alkaline in the subsoil.

This soil has fair to good potential for farming. Drained cultivated areas are used for dry beans or row crops in support of dairy farms.

If this soil is not drained, spring planting is delayed and its use is limited to short term annual crops, hay, or pasture. Harvesting in the fall during prolonged wet periods is more difficult on this soil than on adjacent, more sloping Appleton soils. With adequate drainage, this soil is suited to a variety of crops grown in the area. In some areas wetness can be reduced by diverting runoff from adjacent slopes and by using tile drains and open-ditch drainage. Minimum tillage, incorporating crop residue into the soil, use of cover crops, and tillage at proper moisture levels help to improve soil tilth and maintain organic matter content.

This soil is suited to pasture or hay. Prevention of overgrazing and restriction of grazing when the soil is wet are the major concerns of pasture management. If this soil is pastured when wet, the surface layer compacts easily, thus reducing water infiltration and the chances of seedling survival. Proper stocking rates, pasture rotation, deferred grazing, weed and brush control, adequate applications of lime and fertilizer, and seeding with water-tolerant varieties are the main management needs.

This soil is suited to woodland species such as northern hardwoods, spruce, and larch.

The seasonal high water table and slow or moderately slow permeability of the subsoil and substratum limit this soil for many nonfarm uses. Some areas provide excellent pond sites. Capability subclass IIIw.

ApB—Appleton silt loam, 3 to 8 percent slopes. This deep, gently sloping, somewhat poorly drained soil is in areas that generally receive runoff from higher adjacent soils. The areas are large, broad, and smooth or are long and narrow along foot slopes.

Typically, the surface layer is very dark grayish brown silt loam 8 inches thick. The subsurface layer is mottled, light brownish gray silt loam 3 inches thick. The subsoil is 23 inches thick. The upper 6 inches is firm, dark grayish brown, distinctly mottled gravelly silt loam; the next 13 inches is distinctly mottled, firm, dark brown gravelly loam; and the lower 4 inches is mottled, firm, dark brown gravelly loam. The substratum is firm, dark grayish brown gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter soils in depressions and along drainageways. Also included are areas of moderately well drained Conesus soils on rises, somewhat poorly drained Erie soils on uplands, and a few small areas of soils with a surface layer of gravelly silt loam.

This soil has a perched seasonal high water table in the subsoil early in the growing season and during rainy periods later in the season. Permeability is moderately slow or slow in the subsoil and substratum. Available water capacity is moderate in this soil, and runoff is slow to moderate. The root zone is confined to the upper part of the subsoil early in the spring, but later in the growing season roots extend into the lower part of the subsoil. Organic matter content is medium to high. In unlimed areas reaction ranges from medium acid to neutral in the surface layer and medium acid to mildly alkaline in the subsoil.

This soil has fair to good potential for farming. Drained cultivated areas are used for dry beans or row crops in support of dairy operations.

If this soil is used for cultivated crops, it needs drainage and protection from erosion. Interceptor drains are suitable in some areas for diverting runoff from adjacent higher soils, and tile drains and open-ditch drainage help to remove excess water. Because of the slow or moderately slow permeability, tile drains should be close to each other. Practices that help to control erosion and wetness include stripcropping, contour tillage, and using cover crops. Minimum tillage, incorporating crop residue into the soil, and tillage at the proper moisture levels improve soil tilth and maintain organic matter content.

This soil is suited to pasture and hay. Prevention of overgrazing and restriction of grazing when the soil is wet are the major concerns of pasture management. The surface layer compacts easily if this soil is pastured when wet, thus increasing the erosion potential and decreasing the chances of seedling survival. Proper stocking rates, pasture rotation, deferred grazing, weed and brush control, adequate applications of lime and fertilizer, and seeding with water-tolerant varieties are the main management needs.

This soil is suited to woodland species such as northern hardwoods, spruce, and larch. The seasonal high water table and slow or moderately slow permeability limit this soil for many nonfarm uses. Capability subclass IIIw.

AQ—Aquepts and Saprists, ponded. This unit consists of shallow, inundated areas near lakes and ponds on uplands. The areas are commonly called freshwater marsh. The level of water fluctuates with the level of the

adjacent bodies of water. Some of the ponded areas are in their natural state, some are manmade, and some formed as a result of the construction of beaver dams. Cattails, rushes, and other water-tolerant herbaceous plants make up the dominant vegetation. The areas normally do not support trees, except along the edges where the water is shallow.

Onsite investigation is needed to determine the feasibility of using specific areas of this unit. The unit is suitable for wetland wildlife habitat. Capability subclass VIIIw.

ArB—Arnot channery silt loam, 3 to 8 percent slopes. This gently sloping, well drained to moderately well drained soil is on smooth ridgetops or hilltops on uplands.

Typically, the surface layer is dark gray channery silt loam 2 inches thick. The subsurface layer is light grayish brown channery silt loam 3 inches thick. The subsoil is 14 inches thick. It is friable, strong brown channery silt loam in the upper 3 inches and friable, yellowish brown very channery silt loam in the lower 11 inches. Sandstone bedrock is at a depth of 19 inches.

Included with this soil in mapping are small areas of moderately deep Lordstown soils and areas of somewhat poorly drained Tuller soils in small depressions. Also included are areas of soils that are deeper to bedrock than this Arnot soil and areas that are shallower and that have rock outcrops.

Some areas of this soil where the bedrock is not fractured have a water table perched above the bedrock during prolonged wet periods. Permeability is moderate. Available water capacity is low. Runoff is moderate. The root zone is generally restricted by bedrock at a depth of 10 to 20 inches, but root penetration is commonly deeper where the bedrock is fractured. Organic matter content is medium to low. In unlimed areas the surface layer and subsoil range from very strongly acid to medium acid. This soil is droughty.

This soil has fair potential for farming. Most of the cleared areas are used for hay or pasture. Very little acreage is used for row crops. Many idle areas of the soil are slowly reverting to woodland.

This soil is moderately suited to cultivated crops. Generally it is at the highest elevations in the county, and the growing season is shorter than in adjacent valleys and lowlands. Tillage is difficult because of the shallow depth to bedrock and the few included areas of rock outcrops. If cultivated, the soil requires frequent applications of lime and fertilizer. This soil is droughty and thus is better suited to crops that mature early in the year. Minimum tillage, use of cover crops, incorporating crop residue into the soil, stripcropping, contour tillage, and mulching help to improve tilth, conserve moisture, and control the erosion hazard.

This soil is suited to pasture. Most areas are suitable for pasturing early in the spring, and pasture growth is usually very sparse by midsummer. Prevention of overgrazing, use of proper stocking rates, pasture rotation, deferred grazing, weed and brush control, and adequate applications of lime and fertilizer are the chief pasture management needs.

This soil can be used for some woodland species, but root penetration is restricted by bedrock. Machine planting of tree seedlings is practical on large areas of this soil.

The shallow depth to bedrock limits this soil for many nonfarm uses. Some areas have esthetic value. Capability subclass IIIs.

ArC—Arnot channery silt loam, 8 to 15 percent slopes. This sloping, well drained to moderately well drained soil is on upper side slopes commonly adjacent to areas of less sloping Arnot soils. Areas of this soil are in narrow strips around upper hillsides that receive runoff from higher adjacent soils.

Typically, the surface layer is dark gray, very friable channery silt loam 2 inches thick. The subsurface layer is light grayish brown channery silt loam 3 inches thick. The subsoil is 14 inches thick. It is friable, strong brown channery silt loam in the upper part and yellowish brown very channery silt loam in the lower part. Thin interbedded sandstone, siltstone, and shale bedrock is at a depth of 19 inches.

Included with this soil in mapping are small areas of moderately deep Lordstown soils. Also included are wetter Tuller soils in seepage spots along toe slopes, areas of soils that are deeper to bedrock than this Arnot soil or that are shallower and have areas of rock outcrop, and areas of shallow soils with a fine textured subsoil.

During wet periods the water table is perched above the bedrock in areas of this soil where the bedrock is poorly fractured. Permeability is moderate. Available water capacity is low. Runoff is moderate to rapid. The root zone is generally restricted by bedrock at a depth of 10 to 20 inches, but the bedrock is fractured in places, allowing deeper root penetration and rapid infiltration of free water. Organic matter content is medium to low. In unlimed areas the surface layer and subsoil range from very strongly acid to medium acid. This soil is droughty.

This soil has fair to poor potential for farming, and a few areas are used for crops. Many areas are wooded, idle, or used for pasture and hay.

Some areas of this soil can be used for cultivated crops, but the shallow depth to bedrock, slope, rock outcrops, and small stone fragments in the surface layer are major limitations. Controlling erosion and conserving moisture are the main management concerns. Frequent applications of lime and fertilizer are needed on this soil. Minimum tillage, use of cover crops, incorporating crop residue into the soil, stripcropping, contour tillage, and mulching help to maintain soil tilth, conserve moisture, and control erosion.

This soil is suited to pasture. It dries out early in the spring and is droughty by midsummer. Consequently, it is better suited to spring pasture, and pasture growth is very sparse by midsummer. Prevention of overgrazing, use of proper stocking rates, pasture rotation, deferred grazing, especially during summer, weed and brush control, and applications of lime and fertilizer are the chief management needs.

This soil is suited to some woodland species. Machine planting of tree seedlings is practical on large areas of this soil.

Shallow depth to bedrock and slope limit this soil for many nonfarm uses. Some areas have esthetic value. Capability subclass IVe.

At—Atkins silt loam. This deep, poorly drained, nearly level soil is on low-lying flood plains of major streams and in slackwater areas at the outer edge of higher flood plains. Most areas are long and narrow and are parallel to streams. Slope ranges from 0 to 3 percent.

Typically, the surface layer of this soil is dark grayish brown silt loam 4 inches thick. The subsoil is 23 inches thick. The upper 14 inches is mottled, friable, dark grayish brown and olive gray silt loam; the lower 9 inches is mottled, firm, gray heavy silt loam. The substratum is gray very gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat poorly drained soils. Also included are spots of very poorly drained soils in depressions and soils with a gravelly surface layer.

This soil has a water table at or near the surface for prolonged periods. The soil is subject to periodic flooding. Permeability is moderate to slow in the subsoil and moderately rapid to rapid in the substratum. The root zone is determined by the depth to the water table and is mainly restricted to the upper part of the subsoil. Available water capacity is moderate to high. Runoff is slow to occasionally ponded. Organic matter content is high. The surface layer and subsoil are strongly acid or very strongly acid.

This soil has fair to poor potential for farming. Cleared areas are used for pasture and some crops. The remaining acreage is in low-grade woodland.

Unless drained, this soil is generally too wet for cultivated crops. It is well suited to most crops if it is drained and protected from periodic flooding. Response to tile and open-ditch drainage is good. For the most part, however, suitable outlets for drains are not available. Some degree of drainage can be established by shallow ditches and land shaping to improve surface drainage. This type of drainage permits the growth of some short-season crops. Protection from streambank erosion and channel improvement are needed in places. Cultivating these soils when wet causes surface compaction. Growing sod crops, returning crop residue to the soil, and keeping tillage to a minimum help to maintain good tilth.

This soil is suited to summer pasture. Trampling from early grazing damages the sod and compacts the surface layer. Reseeding with a mixture of birdsfoot trefoil and timothy, which can tolerate some wetness, and topdressing with lime and fertilizer are suitable pasture management practices. Proper stocking rates, pasture rotation, restricted grazing during wet periods, selection of water-tolerant varieties, and yearly mowing to control weeds and brush are the main management needs.

This soil is suited to water-tolerant trees such as red maple, white spruce, and white ash. The use of heavy equipment is restricted during excessively wet periods. Tree seedling mortality can be reduced if planting is delayed in spring to allow the water table to recede.

Prolonged wetness and flooding limit the soil for many nonfarm uses. Some areas are suitable for wetland wildlife habitat. Capability subclass IVw.

AuB—Aurora channery silt loam, 3 to 8 percent slopes. This gently sloping, moderately well drained, moderately deep soil is on hilltops. Areas are round or oblong.

Typically, the surface layer of this soil is dark grayish brown channery silt loam 8 inches thick. The subsurface layer is brown silt loam 6 inches thick. The subsoil is 13 inches thick. The upper part of the subsoil is firm, light olive brown light silty clay loam; the lower part is mottled, firm, dark yellowish brown shaly silty clay loam. Thin, bedded shale bedrock is at a depth of 27 inches.

Included with this soil in mapping are small areas of somewhat poorly drained Angola soils in depressions and along drainageways. Also included are Lansing and Conesus soils in areas where bedrock is at a depth of more than 40 inches.

A perched seasonal high water table rises into the subsoil of this soil during early spring or other prolonged wet periods. Bedrock is at a depth of 20 to 40 inches. Permeability is slow in the subsoil. Available water capacity and runoff are moderate. The root zone mainly extends to a depth of 20 to 30 inches, depending on the depth to bedrock. Organic matter content is medium to low. In unlimed areas the surface layer and the subsoil range from medium acid to neutral.

This soil has good potential for farming. It is mainly used for row crops, hay, pasture, vineyards, and Christmas trees. Some large areas are in woodland.

This soil is suited to crops, mainly corn, small grain, and hay. Removal of excess water, control of erosion, and applying lime and fertilizer are the main management needs. Tile installation is difficult to establish in places because of the moderate depth to bedrock. In undrained areas planting is slightly delayed in the spring. Methods that control the erosion hazard include using diversions and sod waterways, contour tillage, and stripcropping. Cover crops, minimum tillage, incorporating crop residue into the soil, and tillage at proper moisture levels help to maintain tilth and organic matter content.

Small stone fragments in the surface layer interfere with some tillage and harvesting operations. Before orchards or vineyards are established, adequate drainage systems for disposal of surface water are required.

This soil is well suited to pasture and hay. Prevention of overgrazing and restriction of grazing when the soil is wet are the major concerns of pasture management. Overgrazing can cause loss of pasture and can restrict growth. If the pasture is grazed when the soil is saturated, compaction occurs, growth is restricted, and runoff is increased. Proper stocking rates, pasture rotation, deferred grazing when the soil is wet, weed and brush control, and adequate applications of lime and fertilizer are the chief management needs.

This soil is suited to northern hardwoods and conifers. The soil is limited for many nonfarm uses by the perched seasonal high water table, moderate depth to bedrock, and slowly permeable subsoil. Capability subclass IIe.

AuC—Aurora channery silt loam, 8 to 15 percent slopes. This sloping, moderately well drained, moderately deep soil is on upper side slopes below hilltops and ridges. Areas of this soil commonly receive runoff from higher adjacent soils.

Typically, the surface layer of this soil is dark grayish brown channery silt loam 6 inches thick. The subsurface layer is friable, brown silt loam 6 inches thick. The subsoil is 11 inches thick. The upper part of the subsoil is firm, light olive brown silty clay loam; the lower part is mottled, firm, dark yellowish brown shaly silty clay loam. Thin, bedded shale bedrock is at a depth of 23 inches.

Included with this soil in mapping are small wet areas of Angola soils along drainageways and in seepage spots. Also included are areas of Lansing and Conesus soils where the depth to bedrock is more than 40 inches and a few small areas of soils where the depth to bedrock is less than 20 inches.

In the spring and other excessively wet periods, a seasonal high water table is perched above the bedrock in this soil. Bedrock is at a depth of 20 to 40 inches. Permeability is slow in the subsoil. Available water capacity is moderate. Runoff is moderate to rapid. The root zone is mainly confined to a depth of 20 to 30 inches, depending on the depth to bedrock. Organic matter content is medium to low. In unlimed areas the surface layer and subsoil range from medium acid to neutral. The hazard of erosion is moderate.

This soil has fair potential for farming. It is mainly used for row crops, hay, pasture, vineyards, and Christmas trees. Some large areas are in woodland.

This soil is moderately well suited to row crops, mainly corn and small grain, and to some fruit crops. Adequate applications of lime and fertilizer and control of erosion and runoff are the main management needs. Interceptor drains are suitable for diverting runoff from higher adjacent soils. Artificial drainage is needed but is often difficult to install because of the moderate depth to bedrock. Diversions, contour tillage, stripcropping, cover crops, and minimum tillage control the erosion hazard. Incorporating crop residue into the soil and tillage at proper moisture levels help to maintain tilth. Small stone fragments in the surface layer interfere with planting and cultivating of certain crops.

This soil is well suited to pasture. Prevention of overgrazing and restriction of grazing when the soil is wet are the major pasture management concerns. Overgrazing causes sparse plant growth and encourages weeds. Grazing when the soil is wet causes severe compaction of the surface layer, thus restricting growth and increasing runoff. Proper stocking rates, pasture rotation, deferred grazing when the soil is wet, weed and brush control, and adequate applications of lime and fertilizer are the chief management needs.

This soil is suited to northern hardwoods and conifers. Machine planting of tree seedlings is practical on large, open areas of this soil.

The soil is limited for many nonfarm uses by slope, moderate depth to bedrock, the slowly permeable subsoil, and temporary seasonal wetness. Capability subclass IIIe.

AuD—Aurora channery silt loam, 15 to 25 percent slopes. This moderately steep, moderately deep, moderately well drained soil is on side slopes of valley walls that receive runoff from adjacent higher soils. Most areas are long and narrow.

Typically, the surface layer is dark grayish brown channery silt loam about 4 inches thick. The subsurface layer is friable, brown silt loam 6 inches thick. The subsoil is 11 inches thick. The upper part of the subsoil is firm, light olive brown light silty clay loam; the lower part is mottled, firm, dark yellowish brown shaly silty clay loam. Thin, bedded shale bedrock is at a depth of 21 inches.

Included with this soil in mapping are small pockets of Lansing and Conesus soils where the depth to bedrock is more than 40 inches, small areas of soil where the depth to bedrock is less than 20 inches, and a few severely eroded areas where gullies commonly extend to the underlying bedrock. Also included are a few areas of steep soils and a few small areas of rock outcrop.

A seasonal high water table is perched above the bedrock in this soil in early spring. Bedrock is at a depth of 20 to 40 inches. Permeability is slow in the subsoil. Available water capacity is moderate. Runoff is rapid. The root zone is mainly confined to a depth of 20 to 30 inches, depending on the depth to bedrock. Organic matter content is medium to low. In unlimed areas the surface layer and subsoil range from medium acid to neutral.

This soil has poor potential for farming. It is used mostly for pasture, hay, and woodland.

This soil can be used for selected row crops but is better suited to long-term hay and pasture. If the soil is cultivated, the erosion hazard increases and the oper-

ation of machinery is limited. In some places tillage operations are limited by shallow depth to bedrock or by the areas of rock outcrop. Using diversions, working across the slope, using cover crops, stripcropping, and minimum tillage help to control erosion and runoff. Interceptor drains are suitable for diverting runoff from higher adjacent soils. Incorporating crop residue into the soil and tillage at proper moisture levels maintain tilth and organic matter content.

This soil is suited for pasture. Prevention of overgrazing and restriction of grazing early in spring are the major pasture management concerns. Overgrazing causes sparse plant growth and encourages weeds. Grazing when the soil is wet causes severe compaction of the surface layer, thus reducing plant growth and increasing runoff and erosion. Proper stocking rates, pasture rotation, deferred grazing when the soil is wet, weed and brush control, and applications of lime and fertilizer are the chief management needs.

This soil is suited to northern hardwoods and conifers. Placing logging roads and skid trails on the contour helps to control erosion.

Moderately steep slopes, moderate depth to bedrock, and the slowly permeable subsoil limit this soil for most nonfarm uses. Capability subclass IVe.

BaB—Bath channery silt loam, 3 to 8 percent slopes. This deep, well drained, gently sloping soil is in convex areas on uplands.

Typically, the surface layer of this soil is dark brown channery silt loam 8 inches thick. The upper part of the subsoil is friable, yellowish brown channery loam 14 inches thick; the middle part is firm, pale brown channery silt loam 6 inches thick; and the lower part is a very firm fragipan of mottled, brown gravelly loam 24 inches thick. The substratum is firm, brown gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Mardin soils in slightly depressional areas, spots of Chippewa soils that are indicated by a spot symbol on the soil maps, and a few small areas where bedrock is within 40 inches of the surface.

In early spring and other excessively wet periods, a seasonal high water table is perched above the fragipan of this soil. The fragipan is at a depth of 26 to 40 inches and restricts root growth. Permeability in the surface layer and upper part of the subsoil is moderate. Permeability in the fragipan and substratum is slow. Available water capacity is moderate. Runoff is moderate. Organic matter content is low. In unlimed areas the surface layer and upper part of the subsoil are very strongly acid to medium acid.

This soil has good potential for farming. It is suited to most cultivated crops commonly grown in the region. Most of the acreage is cultivated or in small woodlots.

This soil is suited to cultivated crops commonly grown in the area. However, continuous cultivation increases erosion. Contour tillage, contour stripcropping, use of cover crops, and use of diversions to break long slopes help to control the erosion hazard and conserve moisture. The surface layer contains many flat stone fragments that interfere with tillage and some harvesting operations, but they do not prevent cultivation. Lime is needed for most crops, especially legumes, and crops respond well to applications of fertilizer. Incorporating crop residue into the soil, minimum tillage, and mulching are needed to increase water infiltration during the growing season and to maintain tilth and organic matter content.

This soil is well suited to pasture, especially for early-season grazing. Prevention of overgrazing is the major concern of pasture management. Overgrazing causes loss of pasture and commonly results in increased runoff. Adequate applications of lime and fertilizer, proper stocking rates to maintain key plant species, pasture rotation, yearly mowing to help control weeds and brush, and restricted grazing during dry summer months are the chief management needs.

This soil is suited to woodland. Machine planting of tree seedlings is feasible on large, open areas of this soil.

Slow permeability in the fragipan and substratum and flat stone fragments in the surface layer are the main limitations for most nonfarm uses. Capability subclass IIe.

BaC—Bath channery silt loam, 8 to 15 percent slopes. This deep, well drained, sloping soil is on ridges and sides of ridges at higher elevations of dissected uplands. Some runoff is commonly received by this soil from adjacent higher soils.

Typically, the surface of this soil in an undisturbed area is covered by a 1-inch-thick leaf mat. The surface layer is very dark gray channery silt loam 1 inch thick. The subsurface layer is pinkish gray channery silt loam 1 inch thick. The upper part of the subsoil is friable, yellowish brown channery loam 20 inches thick; the middle part is firm, pale brown channery silt loam 5 inches thick; and the lower part is a very firm fragipan of mottled, brown gravelly loam 25 inches thick. The substratum is firm, brown gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Mardin soils in areas along drainageways and in slightly concave areas. Also included are well drained Valois soils on valley sides and a few small areas of soils that have bedrock within 40 inches of the surface.

The seasonal high water table in this soil is generally at a depth of more than 2 feet. In the early spring the water table is perched for brief periods above the fragipan. Permeability in the surface layer and upper part of the subsoil is moderate, and it is slow in the fragipan and substratum. The rooting depth is restricted by the fragipan, which is at a depth of 26 to 40 inches. Available

water capacity is moderate. Runoff is moderate to rapid. Organic matter content is low. In unlimed areas the surface layer and upper part of the subsoil are very strongly acid to medium acid. The hazard of erosion is moderate.

This soil has fair potential for farming. Most of the acreage is cultivated or in woodland.

This soil is moderately well suited to most cultivated crops commonly grown in the area. The use of this soil for cultivated crops is limited by erosion and runoff. Contour tillage, contour stripcropping, use of cover crops, use of diversions to break long slopes, and using sod crops in the cropping system help to control the erosion hazard. Incorporating crop residue into the soil, minimum tillage, and mulching are needed to increase water infiltration during the growing season and to help maintain tilth and improve organic matter content.

This soil is well suited to pasture, especially early-season grazing. Prevention of overgrazing is the major concern of pasture management, particularly during the dry summer months. Overgrazing can cause loss of pasture and can increase runoff. Adequate applications of lime and fertilizer, proper stocking rates to maintain key plant species, pasture rotation, yearly mowing to control weeds and brush, and restricted grazing during dry summer months are the chief management needs.

This soil is suited to woodland. Machine planting of tree seedlings is feasible and practical on large, open areas of this soil.

The main limitations for most nonfarm uses of this soil are the slow permeability in the fragipan and substratum, sandstone fragments in the surface layer, and slope. Capability subclass IIIe.

BaD—Bath channery silt loam, 15 to 25 percent slopes. This deep, well drained, moderately steep soil is on side slopes of upland hills and in narrow areas on the sides of ridges. The soil commonly receives runoff from higher adjacent soils.

Typically, the surface of this soil in an undisturbed area is covered by a 1-inch-thick leaf mat. The surface layer is very dark gray silt loam 1 inch thick. The upper part of the subsoil is friable, yellowish brown channery loam 21 inches thick; the middle part is firm, pale brown channery silt loam 5 inches thick; and the lower part is a very firm fragipan of mottled, brown gravelly loam 21 inches thick. The substratum is firm, brown gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Mardin soils, spots of Valois soils in the Waneta Lake and Lamoka Lake valleys, and a few small areas of soils that have bedrock within 40 inches of the surface.

In early spring a temporary seasonal high water table is perched above the fragipan for very brief periods. The fragipan is at a depth of 26 to 40 inches. Permeability in the surface layer and upper part of the subsoil is moderate, and it is slow in the fragipan and substratum. Rooting depth is restricted to the zone above the fragipan. Available water capacity is moderate. Runoff is rapid. Organic matter content is low. In unlimed areas the surface layer and upper part of the subsoil are very strongly acid to medium acid.

This soil has poor to fair potential for farming. It is used mostly for hay, pasture, and woodland.

This soil can be used to a limited extent for cultivated crops, but steepness of slope and the associated erosion hazard are major limitations. Slope limits the operation of farm equipment, and flat sandstone fragments in the surface layer limit crop selection. Sod-forming crops are better suited to this soil. If the soil is cultivated, a protective plant cover needs to be maintained for as long as possible. Minimum tillage, cover crops, and diversions help to control runoff. If slope permits, contour tillage and stripcropping can also be used. Large amounts of lime and fertilizer are needed to maintain plant growth.

This soil is suited to pasture, especially pasture for early-season grazing. Applications of lime and fertilizer are needed to maintain cover and assure growth, and topdressing helps to maintain the pasture. Prevention of overgrazing, especially during the dry summer months, proper stocking rates, and yearly mowing to control weeds and brush are pasture management requirements.

This soil is suited to woodland. Machine planting is limited by the steepness of slope, and logging roads should be on the contour.

Slope is the major limitation of this soil for many nonfarm uses. Slow permeability in the fragipan and substratum and sandstone fragments in the surface layer are lesser limitations. Capability subclass IVe.

BHE—Bath soils, steep. These deep, well drained soils mainly are on side slopes just below the crests of upland hills and ridges. Some areas are along the sides of dissecting gullies. Slope ranges from 25 to 50 percent. These soils commonly receive runoff from higher soils.

Typically, the surface of these soils in an undisturbed area is covered by a 1-inch-thick leaf mat. The surface layer is very dark gray silt loam 1 inch thick. The upper part of the subsoil is friable, yellowish brown channery loam 21 inches thick; the middle part is pale brown channery silt loam 4 inches thick; and the lower part is a very firm fragipan of mottled, brown gravelly loam 22 inches thick. The substratum is firm, brown gravelly loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Valois soils mainly in the Waneta Lake and Lamoka Lake valleys. Also included are spots of moderately well drained Mardin soils in slightly lower areas and a few areas of soils that have bedrock within 40 inches of the surface.

The seasonal high water table in these soils is generally at a depth of more than 2 feet. In early spring the water table is perched for brief periods above the fragi-

pan. Permeability above the fragipan is moderate, and it is slow in the fragipan and substratum. Rooting depth is confined to the zone above the fragipan. Available water capacity is moderate. Runoff is rapid. Organic matter content is low. In unlimed areas the surface layer and upper part of the subsoil are very strongly acid to medium acid.

These soils have poor potential for farming. Most areas are idle, pastured, or in woodland.

These soils are not suited to cultivation. Steep slopes and the hazard of erosion are the main limitations. The slope is too steep for safe use of farm machinery. Droughtiness is a concern in some years because of the rapid rate of runoff. These soils are better suited to permanent plant cover, such as sod crops for pasture.

The soils are suited to pasture, but cover vegetation needs to be maintained and grazing controlled to protect the soil from erosion. Lime and fertilizer are needed to maintain stands and assure growth, but application is difficult because of the steep slope. Droughtiness is a concern in some years. Protection from overgrazing and maintenance of plant cover are the main pasture management needs.

These soils are suited to woodland. On exposed areas, such as logging roads and skid trails, the erosion hazard is severe. Machine planting of seedlings is generally not feasible because of slope.

These soils are limited for most nonfarm uses mainly by slope and, to a lesser extent, slow permeability in the fragipan and substratum and sandstone fragments in the surface layer. Most areas are better suited to reforestation, woodland, wildlife habitat, or natural open areas. Capability subclass VIe.

BuB—Burdett silt loam, 3 to 8 percent slopes. This deep, somewhat poorly drained, gently sloping soil is on lower slopes that receive runoff from higher adjacent soils.

Typically, the surface layer of this soil is dark grayish brown silt loam 8 inches thick. The upper part of the subsoil is mottled, friable, light olive brown silt loam 6 inches thick; the middle part is mottled, friable, grayish brown heavy silt loam 5 inches thick; and the lower part is mottled, firm, dark grayish brown heavy silt loam 13 inches thick. The substratum is firm, grayish brown shaly heavy silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter soils in slight depressions and along drainageways. Also included are areas of better drained soils on rises and a few areas of Angola soils where bedrock is within a depth of 40 inches.

In the spring and other excessively wet periods, a seasonal high water table is perched above the lower part of the subsoil. Permeability is moderate in the surface layer and upper part of the subsoil and slow in the lower part of the subsoil and in the substratum. Early in spring, the rooting depth is confined to the upper part of the subsoil, but as the water table recedes some roots extend into the lower part of the subsoil. Available water capacity is moderate to high. Runoff is slow to moderate. Organic matter content is medium to high. In unlimed areas reaction ranges from strongly acid to neutral in the surface layer and upper part of the subsoil.

This soil has fair potential for farming. Cultivated areas are used for row crops in support of dairy operations. Areas near Seneca Lake are used for vineyards.

This soil is moderately well suited to many field crops commonly grown in the area. If this soil is used for cultivated crops, the choice of crops is limited unless adequate drainage is provided. Drainage allows early spring planting. In some areas excess surface water can be removed by diverting runoff from adjacent soils. The soil is suited to tile drainage and open-ditch drainage. Practices that control erosion include stripcropping, contour tillage, and use of cover crops. If the soil is drained, row crops can be grown frequently, but crop residue should be returned to the soil. Keeping tillage to a minimum, tillage at the proper moisture levels, and using a cropping system that includes sod crops help to maintain soil structure and organic matter content.

This soil is moderately well suited to pasture and hay. Prevention of overgrazing and restriction of grazing when the soil is wet are the major concerns of pasture management. This soil compacts easily when wet. Overgrazing and compaction cause loss of pasture plants and usually result in increased runoff. Proper stocking rates to maintain key plant species, rotation of pasture, yearly mowing to help control weeds and brush, and restricted grazing during wet periods are the chief management needs.

This soil is suited to woodland. Equipment use is restricted during excessively wet periods. The surface layer compacts when wet, forming deep ruts.

The perched seasonal high water table and slow permeability in the lower part of the subsoil and in the substratum limit this soil for many nonfarm uses. Capability subclass IIIw.

BuC—Burdett silt loam, 8 to 15 percent slopes. This deep, somewhat poorly drained, sloping soil is on side slopes of valley walls that receive some runoff from higher adjacent soils. Most areas are dissected by intermittent drainageways.

Typically, the surface layer of this soil is dark grayish brown silt loam 6 inches thick. The upper part of the subsoil is mottled, friable, light olive brown heavy silt loam 8 inches thick; the middle part is mottled grayish brown heavy silt loam 5 inches thick; and the lower part is mottled, firm, dark grayish brown silty clay loam 16 inches thick. The substratum is firm, grayish brown shaly heavy silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter soils in slight depressions and along drainageways. Also included are small areas of better drained

soils and areas of Fremont and Volusia soils near the Glen Creek area.

This soil has a perched seasonal high water table in the upper part of the subsoil during early spring. The water table is perched above the lower part of the subsoil. Permeability is moderate in the surface layer and upper part of the subsoil and slow in the lower part of the subsoil. Early in spring, roots are restricted by the high water table to the upper part of the subsoil, but as the water table recedes they extend into the firm, lower part of the subsoil. Available water capacity is moderate to high. Runoff is moderate to rapid. Organic matter content is medium to high. In unlimed areas reaction ranges from strongly acid to neutral in the surface layer and upper part of the subsoil.

This soil has fair potential for farming. Cultivated areas are used for row crops in support of dairy operations. Areas near Seneca Lake are used for vineyards.

This soil can be used for some field crops commonly grown in the area. If this soil is used for cultivated crops, it needs to be adequately drained and protected from erosion. Wetness delays spring planting and limits use of the soil to short-term crops. In some areas interceptor drains can divert runoff from higher adjacent soils, or tile drainage and sod waterways can be used to remove excess water. Practices that control erosion include strip-cropping, contour tillage, and use of cover crops. This soil tends to be cloddy if plowed when wet. Minimum tillage, incorporating crop residue into the soil, and tillage at the proper moisture levels improve soil tilth and increase organic matter content.

This soil is moderately well suited to pasture and hay. It is not suited to early spring grazing and will compact very easily if grazed when the surface is wet. Overgrazing and compaction can cause loss of pasture and result in increased runoff. Proper stocking rates to maintain desired plant species, pasture rotation, yearly mowing to help control weeds and brush, and restricted grazing during wet periods are the chief management needs.

This soil is suited to woodland. Placing logging roads and skid trails on the contour helps control erosion on exposed areas. Equipment use is restricted during excessively wet periods; the surface layer of the soil compacts, forming deep ruts.

Slope, the perched seasonal high water table, and slow permeability in the lower part of the subsoil and in the substratum limit this soil for many nonfarm uses. Capability subclass IIIw.

BuD—Burdett silt loam, 15 to 25 percent slopes. This deep, somewhat poorly drained, moderately steep soil is on side slopes of valley walls that receive runoff from adjacent higher soils. The areas are dissected by intermittent drainageways.

Typically, the surface layer of this soil is dark grayish brown heavy silt loam 5 inches thick. The upper part of the subsoil is mottled, friable, light olive brown heavy silt loam 7 inches thick; the middle part is mottled, friable, grayish brown heavy silt loam 4 inches thick; and the lower part is mottled, firm, dark grayish brown silty clay loam 14 inches thick. The substratum is firm, grayish brown channery heavy silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of better drained soils on slightly higher areas. Also included are silty Fremont soils and coarser textured Volusia soils in the Glen Creek area and a few severely eroded areas.

A seasonal high water table is perched above the lower part of the subsoil in early spring. Permeability is moderate in the surface layer and in the upper part of the subsoil and slow in the lower part of the subsoil and in the substratum. Early in the spring, plant roots are confined to the zone above the water table, but as the water table recedes some roots extend into the lower part of the subsoil. Available water capacity is moderate to high. Runoff is rapid. Organic matter content is medium. In unlimed areas reaction ranges from strongly acid to neutral in the surface layer and upper part of the subsoil.

This soil has poor potential for cultivated crops. Most cleared areas are used for pasture or hay. Many areas are wooded.

This soil is poorly suited to cultivated crops because of the hazard of erosion. The use of machinery is difficult and hazardous because of moderately steep slopes. This soil tends to be cloddy if plowed when wet. If the soil is cultivated, incorporating crop residue into the soil, cover crops, crop rotations, and tillage at the proper moisture levels help to maintain tilth and increase organic matter content. The content of organic matter has been depleted as a result of past erosion. In some areas excess water can be removed by diverting runoff from adjacent soils. Sod waterways, contour tillage, and minimum tillage remove excess water and control erosion.

This soil is suited to permanent pasture. Open areas that have satisfactory seedings should be topdressed with lime and fertilizer, but application is difficult because of slope. Grazed areas need a permanent plant cover to prevent further erosion. Proper stocking rates, pasture rotation, yearly mowing to control weeds and brush, and restricted grazing during wet periods are the chief management needs.

This soil is suited to woodland. Placing logging roads and skid trails on the contour where possible helps control erosion. Equipment use is restricted during excessively wet periods.

Moderately steep slopes, the perched seasonal high water table, and the slow permeability in the lower part of the subsoil and in the substratum limit this soil for most nonfarm uses. Capability subclass IVe.

Ca—Canandaigua silt loam. This deep, nearly level or depressional, poorly drained and very poorly drained

soil is in areas where water is ponded on the surface or runs off very slowly and where large amounts of runoff are received from surrounding areas.

Typically, the surface layer of this soil is very dark gray silt loam 9 inches thick. The subsoil is 29 inches thick. The upper 6 inches is mottled, friable, dark gray silt loam; the lower 23 inches is mottled, firm, dark gray and grayish brown silty clay loam. The substratum is mottled, yellowish brown silty clay loam to a depth of 50 inches and is loose, dark grayish brown fine sand to a depth of more than 60 inches.

Included with this soil in mapping are small areas of somewhat better drained soils on benches, finer textured Madalin soils and very poorly drained Alden soils, and small areas of soils that have a mucky surface layer in deeper depressional areas and potholes.

This soil has a water table at or near the surface for prolonged periods during the year. Most areas have water ponded on the surface early in the spring. Permeability is moderately slow in the subsoil and upper part of the substratum. The rooting depth is restricted to the upper part of the subsoil by the high water table. Available water capacity is high. Runoff is intermittently ponded to very slow. Organic matter content is high. In unlimed areas the surface layer and subsoil are slightly acid or neutral.

Undrained areas of this soil have poor potential for farming and many urban uses. Most areas are idle and support water-tolerant shrubs and trees. Some cleared areas and woodlots are used for low quality pasture, and a few drained areas are used for hay. The soil has good potential for wildlife marshes, ponds, and natural open areas.

This soil is suited to cultivated crops if it is properly drained and protected from runoff from the surrounding uplands. Tile drainage and open-ditch drainage are suitable where outlets are available. If tile drainage is installed, care is needed to prevent plugging from silt and very fine sand. Good tilth is fairly easy to maintain. The use of cover crops, minimum tillage, tillage at proper moisture levels, and returning crop residue to the soil help to maintain the organic matter content and a friable surface layer.

Undrained areas of this soil can be used for summer pasture. They cannot be pastured in early spring because compaction can cause loss of desired plant species and ponding on the surface layer. Proper stocking rates, rotation of pastures, yearly mowing to help control weeds and brush, and restricted grazing during wet periods are the chief management needs.

This soil is suited to water-tolerant tree species. This soil is too wet for machine planting of tree seedlings, but hand planting is feasible.

Prolonged wetness, temporary ponding in the spring, and moderately slow permeability limit this soil for most nonfarm uses. Some areas have good potential for development of wildlife habitat. Capability subclass IVw.

Cc—Carlisle muck. This deep, very poorly drained soil is in bogs and swamps in the lowest parts of the landscape. Most areas are adjacent to lakes.

Typically, this soil is black and very dark gray, well decomposed organic material to a depth of more than 60 inches.

Included with this soil in mapping are small areas of Palms muck, which has organic deposits to a depth of less than 51 inches, mainly at the edges of areas of this Carlisle soil.

This soil has a water table at or near the surface much of the time. It is subject to flooding and ponding in the spring. Permeability is moderate to moderately rapid. The rooting depth is determined by the depth to the water table but is mainly 10 inches. Available water capacity is high. Runoff is very slow to occasionally ponded. Organic matter content is very high. Reaction ranges from medium acid to neutral.

This soil has poor potential for farming. It is permanently wet and extremely difficult to drain. Carlisle muck supports water-tolerant grasses, reeds, sedges, and water-tolerant trees. It is best suited to use for wetland wildlife habitat.

If drainage is feasible, this soil can be used for vegetables. This soil is not suited to pasture. The natural cover provides little forage for use by cattle.

A few water-tolerant trees are suited to this soil. Most trees are established on windthrow mounds. Planting of tree seedlings is generally not feasible on this excessively wet soil.

The main limitations of this soil for most nonfarm uses are the prolonged high water table, frequent flooding, and instability. Capability subclass VIw.

Ce—Castile gravelly silt loam. This deep, moderately well drained, nearly level soil is on low outwash stream terraces and moderately low areas, is in or adjacent to areas of better drained outwash soils, and is on the lower ends of many alluvial fans where they merge with the main valley bottomland.

Typically, the surface layer is dark brown gravelly silt loam 11 inches thick. The subsoil is friable, brown and yellowish brown very gravelly loam 24 inches thick and is mottled in the middle part. The substratum is dark grayish brown very gravelly loam to a depth of 42 inches, and it is loose, dark grayish brown very gravelly sandy loam to a depth of more than 60 inches.

Included with this soil in mapping are small lower areas of slightly wetter Red Hook soils, small areas of gently sloping Castile soils, and areas of drier Chenango and Howard soils on rises.

This soil has a temporary seasonal high water table in the lower part of the subsoil during early spring and excessively wet periods. Permeability is moderately rapid in the subsoil and rapid or very rapid in the substratum. The rooting depth is mainly 2 feet, but some roots extend to a depth of more than 2 feet as the season

progresses and the water table recedes. Available water capacity is moderate. Organic matter content is medium to low in the surface layer. In unlimed areas the surface layer and subsoil are very strongly to medium acid.

This soil has good potential for farming. Cultivated areas are used for dry beans, potatoes, or row crops in support of dairy operations.

This soil can be used intensively for a wide variety of crops. Spring planting is slightly delayed because of temporary wetness, but the soil is easily tilled once it dries. Wet spots need to be tile drained so that fields can be used more uniformly. Runoff from adjacent higher soils can be controlled by diversions. Frequent applications of lime and fertilizer are needed. The content of gravel in the surface layer interferes with some tillage and mechanical harvesting equipment. Erosion is generally not a concern, but keeping tillage to a minimum helps to prevent compaction and maintains tilth. Practices such as incorporating crop residue into the soil and using cover crops also improve tilth and increase organic matter content.

This soil is suited to pasture or hay. Prevention of overgrazing and restriction of grazing when the soil is wet are the major concerns of pasture management. Overgrazing can cause loss of pasture and can restrict growth; grazing when the soil is wet compacts the surface layer. Proper stocking rates, pasture rotation, deferred grazing when the soil is wet, yearly mowing to control weeds, and adequate applications of lime and fertilizer are the chief management needs.

This soil is suited to woodland. Machine planting of tree seedlings is practical on large areas of this soil.

The temporary seasonal high water table and gravel fragments in the surface layer limit this soil for some nonfarm uses. Capability subclass IIw.

ChA—Chenango silt loam, 0 to 3 percent slopes. This deep, well drained to somewhat excessively drained, nearly level soil is on outwash plains and stream terraces.

Typically, the surface layer is dark grayish brown silt loam 9 inches thick (fig. 4). The subsoil is 28 inches thick. The upper part of the subsoil is friable, yellowish brown silt loam 5 inches thick; the lower part is friable, strong brown very gravelly loam 23 inches thick. The substratum is loose, brown very gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of soils that have a thicker silty layer than this Chenango soil. Also included are small areas of gravelly Chenango soils and moderately well drained Castile soils.

The water table in this soil is generally at a depth of more than 6 feet. Permeability is moderate to moderately rapid in the surface layer and subsoil and rapid in the substratum. The rooting depth is generally unrestricted. Available water capacity is moderate. Runoff is slow. Organic matter content is low in the surface layer. In unlimed areas the surface layer is very strongly acid to strongly acid and the subsoil is very strongly acid to medium acid.

This soil has excellent potential for farming. Cultivated areas are used for dry beans, potatoes, and crops associated with dairying, such as alfalfa, corn, and oats. The soil has good potential for residential development.

This soil can be cultivated early in the spring. It is well suited to most crops and can be used intensively for row crops. Deep-rooted perennial crops such as alfalfa are especially well suited to this soil. Crops respond well to frequent application of lime and fertilizer. Continuous irrigation of this soil can cause crusting and sealing of the surface. Row crops can be grown repeatedly if practices such as incorporating crop residue into the soil, using cover crops or occasional sod crops, and minimum tillage are used to maintain tilth and the organic matter content. Droughtiness is a concern in some dry years, and mulching helps to conserve moisture.

This soil is suited to pasture. It tends to be droughty in some years. Plant growth is sparse in midsummer, and care must be taken not to allow overgrazing during this period. Proper stocking rates, pasture rotation, weed and brush control, and adequate applications of lime and fertilizer are the chief management needs.

This soil is suited to woodland. Most areas can be machine planted.

This soil has few, if any, limitations for nonfarm uses. Some areas are a source of sand and gravel. Capability class I.

CnA—Chenango gravelly silt loam, 0 to 3 percent slopes. This deep, well drained to somewhat excessively drained, nearly level soil is on glacial outwash plains and stream terraces.

Typically, the surface layer is very dark grayish brown gravelly silt loam 9 inches thick. The subsoil is 28 inches thick. The upper part of the subsoil is friable, strong brown gravelly silt loam 13 inches thick; the lower part is friable, strong brown very gravelly loam 15 inches thick. The substratum is loose, very dark grayish brown very gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of slightly wetter Castile soils in lower areas and along valley fringes, small areas of soils that are more alkaline in the subsoil than this Chenango soil, and small areas of moderately well drained, silty soils that are adjacent to areas of Philo soils.

The water table in this soil is generally at a depth of more than 6 feet. Permeability is moderate or moderately rapid in the subsoil and rapid in the substratum. The rooting depth is unrestricted, but most roots are in the upper 3 feet of soil. Available water capacity is moderate to low. Runoff is slow. Organic matter content is low in the surface layer. In unlimed areas the surface layer is very strongly acid or strongly acid and the subsoil is very strongly acid to medium acid.

This soil has good potential for farming. Cultivated areas are used for snap beans, potatoes, and crops such as alfalfa, corn, and oats that are commonly grown in association with dairy farming. This soil has good potential for residential development, and it is suited to woodland.

This soil is easy to work and can be cultivated early in spring. It is suited to most crops and can be used intensively for row crops. Deep-rooted perennial crops such as alfalfa are especially well suited to the soil. Gravel on the surface interferes somewhat with cultivation and harvesting equipment (fig. 5). This soil tends to be droughty, and irrigating during the dry summer months and mulching to conserve moisture are suitable practices. This soil generally has good tilth. Returning crop residue to the soil, keeping tillage to a minimum, and providing a cover crop help to maintain tilth and increase organic matter content. Tile drainage is suitable for the wetter included soils.

This soil is suited to pasture, mainly for early spring grazing, and deep-rooted legumes are especially well suited to this soil. The soil tends to be droughty. Plant growth is sparse by midsummer, and care must be taken to prevent overgrazing during this period. Proper stocking rates, pasture rotation, yearly mowing for weed control, and adequate applications of lime and fertilizer are the chief management needs.

This soil is suitable for nonfarm uses. Gravel on the surface is a concern for some uses. Capability subclass IIs.

CnB—Chenango gravelly silt loam, 3 to 8 percent slopes. This deep, well drained to somewhat excessively drained, gently sloping soil is on outwash plains and stream terraces. Some areas receive runoff from higher adjacent soils.

Typically, the surface layer is very dark grayish brown gravelly silt loam 8 inches thick. The subsoil is 25 inches thick. The upper part of the subsoil is friable, strong brown gravelly silt loam 11 inches thick; the lower part is friable, strong brown very gravelly loam 14 inches thick. The substratum is loose, very dark grayish brown very gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter Castile soils in lower areas and along the fringes of terraces. Also included are soils in the Cayuta Valley that are more alkaline than this Chenango soil and small areas of moderately well drained, silty soils adjacent to areas of Philo soils.

The water table in this soil is generally at a depth of more than 6 feet. Permeability is moderate or moderately rapid in the subsoil and rapid in the substratum. The rooting depth is not restricted, but most roots are in the upper 3 feet of soil. Available water capacity is moderate to low. Runoff is slow. Organic matter content is low. In unlimed areas the surface layer is very strongly acid or strongly acid.

This soil has good potential for farming. Cultivated areas are used for dry beans, potatoes, and crops such as alfalfa, corn, and oats commonly grown in association with dairy farms. The soil has good potential for residential development and is suited to woodland.

This soil is well suited to intensive use for most crops. Crops that require early season planting and deep-rooted perennial crops such as alfalfa are especially well suited to this soil. A high content of gravel on the surface interferes somewhat with cultivation and harvesting equipment. This soil tends to be droughty, and the longer sloping areas are subject to erosion if they are intensively cultivated and not protected. Irrigation is suitable during dry months. Returning crop residue to the soil, use of cover crops, and minimum tillage help to maintain tilth and increase organic matter content. Generally, this soil is easy to keep in good tilth. Contour tillage and stripcropping help to conserve moisture and control erosion.

This soil is suited to pasture, mainly for early spring grazing, and deep-rooted legumes are especially well suited. The soil tends to be droughty, and plant growth is sparse during the dry summer months. Care must be taken to prevent overgrazing during this period. Proper stocking rates, pasture rotation, yearly mowing to control weeds, and adequate applications of lime and fertilizer are the chief pasture management needs.

This soil is suitable for nonfarm uses. Gravel in the surface layer is a concern for some uses, and some areas are good sources of sand and gravel. Capability subclass IIs.

CoB—Chenango channery silt loam, fan, 0 to 8 percent slopes. This gently sloping, well drained to somewhat excessively drained soil is on alluvial fans. These fans are in outlet areas where narrow side streams enter main valleys.

Typically, the surface layer is very dark grayish brown channery silt loam 8 inches thick. The subsoil is 24 inches thick. The upper part of the subsoil is friable, strong brown channery silt loam 10 inches thick; the lower part is friable, strong brown very channery loam 14 inches thick. The substratum is loose, very dark grayish brown very gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter Castile soils near the lower fan margins. Also included are small areas of soils that are more alkaline in the subsoil than this Chenango soil.

This soil is subject to rare flooding from the tributary side stream that traverses the fan. The main stream generally does not flood the fan, except at the lowest margins where the fan merges with the main valley. A water table is in this soil at a depth of 3 to 6 feet for very brief periods in early spring. Permeability is moderate or moderately rapid in the surface layer and subsoil and is rapid in the substratum. The rooting depth is not restrict-

ed and commonly is more than 30 inches for deep-rooted crops. Available water capacity is moderate to low. Runoff is slow. Organic matter content is low. In unlimed areas the surface layer is very strongly acid to strongly acid.

This soil has good potential for farming. Cultivated areas are used for dry beans, potatoes, or row crops in support of dairy operations. The smaller fan areas are used for hay or pasture. Wooded areas are scattered, quite small, and generally adjacent to streams.

This soil is easy to work and can be cultivated early in spring. It is suited to most crops commonly grown in this region. Deep-rooted perennial crops are especially well suited to the soil. The high content of small stone fragments interferes somewhat with tillage operations and harvesting equipment. This soil tends to be droughty, and the longer sloping areas are subject to erosion if they are intensively cultivated and not protected. The soil is suited to irrigation and generally is easy to keep in good tilth. Incorporating crop residue into the soil, use of cover crops, and minimum tillage improve tilth and maintain organic matter content. Contour tillage and stripcropping help to control erosion and conserve moisture.

This soil is suited to pasture, mainly for early spring grazing. Deep-rooted legumes in the pasture are especially well suited to the soil. The fans that are too small to make cultivation feasible are commonly used for early grazing. This soil tends to be droughty. Plant growth is sparse by midsummer, and care must be taken to prevent overgrazing during dry summer months. Proper stocking rates, pasture rotation, weed control, and adequate applications of lime and fertilizer are the chief management needs.

This soil is suited to woodland. The stone fragments in the surface layer are a limitation for some tree planting equipment.

Possible flooding from tributary streams and the small stone fragments in the surface layer are the main limitations for nonfarm uses. Capability subclass IIs.

Cp—Chippewa silt loam. This deep, poorly drained and very poorly drained, nearly level soil is in depressions, drainageways, and seeps on upland areas that receive runoff from adjacent higher soils. Slope ranges from 0 to 3 percent.

Typically, the surface layer is 15 inches thick. It is very dark grayish brown silt loam in the upper 9 inches and mottled, firm, light brownish gray channery silt loam in the lower 6 inches. The subsoil is a very firm fragipan of mottled, grayish brown channery silt loam 27 inches thick. The substratum is firm, dark gray gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat better drained Volusia and Erie soils on slightly higher knolls. Also included are small areas of soils that have a mucky surface layer; thin, silty soils near some drainageways and in depressions; wet pockets of soils that have a less firm and less dense fragipan than this Chippewa soil; and a few large areas of gently sloping Chippewa soils.

This soil has a water table at or near the surface in the spring and during wet periods. The water table is perched above the fragipan, which is slowly permeable or very slowly permeable. Permeability is moderate above the fragipan. The rooting depth is severely restricted by the prolonged high water table and the dense fragipan. Available water capacity is moderate to low. Runoff is intermittently ponded to very slow. Organic matter content is medium to high in the surface layer. In unlimed areas the surface layer and upper part of the subsoil are very strongly acid to slightly acid.

Most of the cleared areas of this soil are pastured. Other areas support water-tolerant shrubs and trees. A few drained areas are used for row crops and hay, and some areas are used for wetland wildlife habitat. This soil has poor potential for cultivated crops and most urban uses.

This soil is suited to selected crops if it is properly managed, drained, and protected from ponding. Undrained areas are too wet for cultivated crops. Where outlets are available, the soil is suited to tile drainage. Open ditches, surface drainage, land shaping, or some combination of these practices with tile drainage is needed to remove water in low pockets. Diversions can be used to intercept runoff from adjacent soils. Cultivating within the proper range of moisture content reduces soil compaction and clodding. Growing cover crops, returning crop residue to the soil, and minimum tillage help to maintain the organic matter content and a friable surface layer. The more sloping areas are subject to erosion if cultivated and not protected. Most areas of this soil are better suited to pasture than to cultivated crops.

The use of undrained open areas is generally limited to pasture. Prevention of overgrazing and restriction of grazing when the soil is wet are the major concerns of pasture management. The surface layer compacts easily and water is ponded on the surface if the soil is grazed when wet. Water-tolerant plant species are needed, and preparation of seedbed and seeding need to be done during the drier summer months, when soil is less likely to be wet. Proper stocking rates, pasture rotation, and yearly mowing to control weeds and brush are the chief pasture management needs.

This soil is suited to water-tolerant trees such as red maple. The soil is generally too wet for machine planting of tree seedlings. Hand planting of seedlings is feasible. The use of heavy machinery during wet periods severely compacts the surface layer.

This soil is limited for many nonfarm uses by prolonged wetness, ponding, and slow or very slow permeability in the fragipan. Capability subclass IVw.

CrA—Collamer silt loam, 0 to 3 percent slopes. This deep, moderately well drained, nearly level soil is in areas that receive runoff from higher adjacent soils.

Typically, the surface layer is dark grayish brown silt loam 11 inches thick. The subsoil is about 28 inches thick. The upper 6 inches of the subsoil is friable, brown silt loam; the next 11 inches is mottled, firm, brown light silty clay loam; and the lower 11 inches is mottled, friable, brown heavy silt loam. The substratum is friable, brown, stratified very fine sand and silt to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter soils along drainageways and in slight depressions. Also included are small areas of well drained Dunkirk soils on knolls and a few spots of finer textured Hudson soils.

A perched water table is in the subsoil of this soil for brief periods early in spring and during prolonged wet periods. Permeability is moderate in the upper part of the subsoil and is moderately slow in the lower part of the subsoil and in the substratum. Available water capacity is high. The rooting depth is mainly 20 inches, but as the water table recedes a few roots extend into the substratum. Runoff is slow. Organic matter content is medium to low in the surface layer. In unlimed areas the surface layer ranges from strongly acid to neutral and the upper part of the subsoil is medium acid to neutral.

This soil has good potential for farming. Cultivated areas are used for small grains, corn, or hay in support of dairy operations. Areas adjacent to Seneca Lake are used for grapes.

This soil is well suited to most crops grown in the area. Seasonal wetness delays planting somewhat in the spring. Random drainage of wet spots by surface drains and tile is necessary in many places. Frost heaving is a concern, and there are some instances of winterkill of perennial deep-rooted crops. This soil is generally free of stones and is easy to cultivate. Crusting and compaction of the surface layer are concerns if the soil is tilled when it is too wet. Keeping tillage to a minimum, providing a winter cover crop, returning crop residue to the soil, and tilling at the proper moisture level maintain good tilth and increase organic matter content.

This soil is suited to pasture. Prevention of overgrazing and restriction of grazing when the soil is wet are the major concerns of management. Overgrazing causes loss of pasture, and grazing when the soil is wet compacts the surface layer. Topdressing the soil with lime and fertilizer, use of proper stocking rates, pasture rotation, and yearly mowing to control weeds are the chief needs of pasture management.

This soil is suited to woodland. Machine planting is practical on large areas of this soil. Heavy equipment easily compacts the surface layer when the soil is wet.

The temporary seasonal high water table and moderately slow permeability in the lower part of the subsoil and in the substratum limit this soil for many nonfarm uses. Capability subclass IIw.

CrB—Collamer silt loam, 3 to 8 percent slopes. This deep, moderately well drained, gently sloping or undulating soil is commonly dissected by small drainageways.

Typically, the surface layer is dark grayish brown silt loam 10 inches thick. The subsoil is 28 inches thick. The upper 6 inches of the subsoil is mottled, friable, brown silt loam; the next 11 inches is mottled, firm, brown light silty clay loam; the lower 11 inches is mottled, friable, brown heavy silt loam. The substratum is brown, stratified very fine sand and silt to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter soils near drainageways and in slight depressions. Also included are small areas of better drained Dunkirk soils on knolls, a few spots of finer textured Hudson soils, and a few small areas of eroded soils.

This soil has a seasonal high water table perched in the subsoil in early spring and during prolonged wet periods. Permeability is moderate in the surface layer and upper part of the subsoil and is moderately slow in the lower part of the subsoil and in the substratum. Available water capacity is high. The rooting depth is mainly 20 inches, but as the water table recedes in midsummer roots extend into the substratum. Runoff is moderate. Organic matter content is medium to low in the surface layer. In unlimed areas the surface layer ranges from strongly acid to neutral and the upper part of the subsoil is medium acid to neutral.

This soil has good potential for farming. Cultivated areas are used for small grains, corn, pasture, or hay in support of dairy operations. Areas adjacent to Seneca Lake are used for vineyards.

This soil is well suited to most crops grown in the area. It is generally free of stones and is easy to cultivate. The soil is very erodible in cultivated areas, especially where slopes are long. Management is needed to reduce surface crusting and compaction and to control erosion. Using cover crops, incorporating crop residue into the soil, minimum tillage, and tillage at the proper moisture level help to maintain tilth and increase organic matter content. Terracing, contour stripcropping where topography permits, contour tillage, and maintaining year-round surface cover are desirable practices for erosion control. Drainage of wet spots by land smoothing and random tile drains allows earlier spring tillage and helps to make this soil more suitable to all crops. Frost heaving is a hazard that causes winterkill of some perennial deep-rooted crops.

This soil is suited to pasture. Prevention of overgrazing and restriction of grazing when the soil is wet are the major concerns of pasture management. Overgrazing causes loss of pasture and results in erosion; grazing when the soil is wet causes surface sealing and compac-

tion. Proper stocking rates, pasture rotation, and yearly mowing to help control weeds are the chief management needs.

This soil is suited to woodland. Machine planting is practical on large areas of this soil. Heavy equipment compacts the surface layer when the soil is wet.

This soil is limited for some nonfarm uses by the temporary seasonal high water table and the moderately slow permeability in the lower part of the subsoil. The hazard of erosion is severe if the soil is disturbed. Capability subclass IIe.

CsA—Conesus silt loam, 0 to 3 percent slopes. This deep, moderately well drained, nearly level soil is on the tops of ridges or at lower elevations where small amounts of runoff keep the soil saturated for brief periods.

Typically, the surface layer is dark grayish brown silt loam 9 inches thick. The subsoil is mottled, friable and firm, brown silt loam and heavy silt loam 34 inches thick. The substratum extends to a depth of more than 60 inches. It is firm, brown silt loam in the upper part; friable, yellowish brown silt loam in the middle part; and brown gravelly silt loam in the lower part.

Included with this soil in mapping are small areas of somewhat poorly drained Appleton soils in shallow depressions and along drainageways. Also included are small areas of well drained Lansing soils on slight rises or knolls, small areas of soils that contain more clay in the subsoil than this Conesus soil, and soils that have a gravelly surface layer.

This soil has a temporary seasonal high water table in the subsoil during prolonged wet periods and in early spring. The water table is perched above the substratum, which is slowly permeable. Permeability is moderate in the subsoil. The rooting depth is 2 feet early in the season, but roots penetrate to a depth of more than 2 feet as the water table recedes. Available water capacity is moderate to high. Runoff is slow. Organic matter content is medium to low in the surface layer. In unlimed areas the surface layer and subsoil are strongly acid to neutral.

This soil has good potential for farming. Cultivated areas are used for dry beans, row crops in support of dairy operations, hay, and pasture. A few small areas are wooded. Areas near Seneca Lake are used primarily for vineyards.

This soil is well suited to most crops grown in the area. Seasonal wetness delays spring planting for short periods, but the soil is easily worked at the proper moisture content. Drainage by surface drains or tile is often necessary so that the fields can be used more uniformly. Practices that maintain tilth and increase organic matter content include minimum tillage, tillage at the proper moisture content, returning crop residue to the soil, and providing a winter cover crop. Crops on this soil respond to applications of nitrogen, especially in spring.

This soil is suited to pasture. Prevention of overgrazing and restriction of grazing when the soil is wet are the major concerns of pasture management. Overgrazing causes loss of pasture, and grazing when the soil is wet compacts the surface layer and causes temporary ponding. Topdressing the soil with lime and fertilizer, use of proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are the chief management needs.

This soil is suited to woodland. Machine planting is practical on large areas of this soil. Heavy logging equipment compacts the surface layer when the soil is wet.

This soil is limited for many nonfarm uses by the seasonal high water table and the slow permeability in the substratum. Capability subclass IIw.

CsB—Conesus silt loam, 3 to 8 percent slopes. This deep, moderately well drained, gently sloping soil is on knolls or in long, smooth areas on upland till plains. The areas receive runoff from higher adjacent soils.

Typically, the surface layer is dark grayish brown silt loam 7 inches thick. The subsoil is mottled, friable and firm, brown silt loam and heavy silt loam 34 inches thick. The substratum extends to a depth of more than 60 inches. The upper part of the substratum is firm, brown silt loam; the middle part is friable, yellowish brown silt loam; and lower part is firm, brown gravelly silt loam.

Included with this soil in mapping are small areas of somewhat poorly drained Appleton soils in slight depressions and near drainageways. Also included are better drained Lansing soils on slight rises and knolls and areas of soils mainly near Seneca Lake that contain more clay in the subsoil than this Conesus soil.

This soil has a temporary seasonal high water table in the subsoil during prolonged wet periods and in early spring. The seasonal water table is perched above the substratum, which is slowly permeable. Permeability is moderate in the subsoil. Rooting depth is mainly 2 feet early in the season, but some roots penetrate to a depth of more than 2 feet as the water table recedes. Available water capacity is moderate to high. Runoff is medium or slow. Organic matter content is medium to low in the surface layer. In unlimed areas the surface layer and subsoil are strongly acid to neutral.

This soil has good potential for farming. Cultivated areas are used for dry beans, row crops in support of dairy operations, hay, and pasture. Areas near Seneca Lake are primarily used for vineyards.

This soil is well suited to most crops grown in the area. Erosion is a hazard, particularly on long slopes. Seasonal wetness delays spring planting for a short period, but the soil is easily worked once it dries. Drainage by surface drains or tile is often necessary so that the fields can be used more uniformly. Runoff from higher adjacent soils can be removed by using diversion ditches or interceptor drains. Practices that maintain tilth, increase organic matter content, and control erosion in-

clude minimum tillage, tillage at the proper moisture content, returning crop residue to the soil, and providing a winter cover crop. Contour tillage and stripcropping help to control erosion on long slopes. Crops on this soil respond to applications of nitrogen, especially in spring.

This soil is suited to pasture. Prevention of overgrazing and restriction of grazing when the soil is wet are the major concerns of pasture management. Overgrazing causes loss of pasture; grazing when the soil is wet compacts the surface layer and causes temporary ponding. Topdressing with lime and fertilizer, using proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are the chief pasture management needs.

This soil is suited to woodland. Machine planting is practical on large areas of this soil. Heavy logging equipment compacts the surface layer when the soil is wet.

The seasonal high water table and the slow permeability in the substratum limit this soil for many nonfarm uses. Capability subclass IIe.

CsC—Conesus silt loam, 8 to 15 percent slopes. This deep, moderately well drained, sloping soil is on hillsides and ridges that receive runoff from higher surrounding soils. Slopes are commonly short and dissected by shallow drainageways.

Typically, the surface layer is dark grayish brown silt loam 6 inches thick. The subsoil is friable and firm, brown silt loam and heavy silt loam 28 inches thick. The substratum is firm, brown silt loam and gravelly silt loam to a depth of more than 60 inches.

Included with this soil in mapping are small areas of somewhat poorly drained Appleton soils near drainageways. Also included are areas of better drained Lansing soils on slightly higher areas, small areas of soils near Seneca Lake that contain a finer textured subsoil than this Conesus soil, spots of soils that have a gravelly surface layer, and areas of severely eroded soils.

This soil has a seasonal high water table perched above the substratum in early spring. Permeability is moderate in the subsoil and slow in the substratum. The rooting depth is 2 feet early in the season, but as the water table recedes roots penetrate to a depth of more than 2 feet. Available water capacity is moderate to high. Runoff is medium to rapid. Organic matter content is medium to low in the surface layer. In unlimed areas the surface layer and subsoil are strongly acid to neutral.

This soil has fair potential for farming. It is not as suitable for row crops as the less sloping Conesus soils. Cultivated areas are used for small grains and for corn in support of dairy operations. Areas near Seneca Lake are primarily used for grapes and other fruit crops, and large areas are in hay or pasture.

This soil is suited to most crops commonly grown in the area, but careful management is needed to control erosion and maintain fertility. Drainage is needed on the wetter included soils to permit more uniform field management. Contour tillage and contour stripcropping used with diversions, terraces, or grassed waterways help to control erosion and conserve moisture. This soil is easy to work. Incorporating crop residue into the soil, crop rotation, minimum tillage, and use of cover crops help to maintain tilth and increase organic matter content.

This soil is suited to pasture. Restriction of overgrazing and prevention of grazing when the soil is wet are the major concerns of pasture management. Overgrazing causes loss of pasture and results in increased runoff and erosion; grazing when the soil is wet causes compaction and increased runoff. Topdressing with lime and fertilizer, using proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are the chief pasture management needs.

This soil is suited to woodland. Heavy logging equipment severely compacts the surface layer when the soil is wet. Logging roads and skid trails established on the contour where possible help to reduce the hazard of erosion.

The seasonal high water table, slow permeability in the substratum, and slope limit this soil for many nonfarm uses. Capability subclass IIIe.

DkB—Dunkirk silt loam, 3 to 8 percent slopes. This deep, well drained, gently sloping soil is in areas in larger valleys. The areas receive little runoff from adjacent areas.

Typically, the surface layer of this soil is brown silt loam 9 inches thick. The subsurface layer is friable, brown silt loam 5 inches thick. The subsoil is 30 inches thick. The upper 6 inches of the subsoil is friable, yellowish brown silt loam; the lower 24 inches is friable and firm, yellowish brown and brown light silty clay loam. The substratum is firm, dark grayish brown silt loam to a depth of more than 60 inches.

Included with this soil in mapping are small areas of moderately well drained Collamer soils and somewhat poorly drained soils on foot slopes of drainageways and in slight depressions. Also included are small areas of finer textured Hudson soils and areas of soils with a surface layer of gravelly silt loam.

The seasonal high water table in this soil is generally at a depth of more than 6 feet. Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part of the subsoil and in the substratum. Most roots are in the upper 30 inches of the soil, but some roots, especially tap roots, extend to a depth of more than 30 inches. Available water capacity is high. Runoff is moderate. Organic matter content is low. In unlimed areas the surface layer and upper part of the subsoil are strongly acid to neutral.

This soil has good potential for farming. Cultivated areas are used for corn and small grains in support of dairy operations. A few areas are used for hay, pasture, and woodland.

This soil is well suited to most crops grown in the area. The soil is very erodible, and intensively cultivated areas need terracing, contour tillage, contour stripcropping, and a year-round surface cover to control erosion and conserve moisture. The soil is generally free of stone fragments and is easy to cultivate, but tilth is difficult to maintain. Careful management is needed to reduce surface crusting and compaction. Using cover crops, incorporating crop residue into the soil, and minimum tillage help to maintain tilth and increase organic matter content. Drainage of wet spots by land smoothing or random installation of tile drains allows earlier tillage and permits more uniform field management.

This soil is suited to pasture. Prevention of overgrazing and restriction of grazing when the soil is wet are the major concerns of pasture management. Overgrazing results in loss of soil by erosion, and grazing when the soil is wet causes surface sealing and compaction. Topdressing the soil with lime and fertilizer, using proper stocking rates, pasture rotation, and yearly mowing to help control weeds are the chief pasture management needs.

This soil is suited to woodland. Machine planting is practical on large areas of this soil. Heavy logging equipment compacts the surface layer when the soil is wet.

The moderately slow permeability in the lower part of the subsoil and the erosion hazard in cleared areas limit this soil for many nonfarm uses. Capability subclass IIe.

DkC—Dunkirk silt loam, 8 to 15 percent slopes. This deep, well drained, sloping soil is on convex valley sides dissected by shallow gullies. Areas commonly receive runoff from higher adjacent soils.

Typically, the surface layer is brown silt loam 7 inches thick. The subsurface layer is friable, brown silt loam 4 inches thick. The subsoil is 26 inches thick. The upper 6 inches of the subsoil is friable, yellowish brown silt loam; the lower 22 inches is friable and firm, yellowish brown and brown light silty clay loam. The substratum is firm, dark grayish brown silt loam to a depth of more than 60 inches.

Included with this soil in mapping are small areas of moderately well drained Collamer soils. Also included are areas of severely eroded soils and small areas of finer textured Hudson soils.

The water table in this soil is generally at a depth of more than 6 feet. Permeability is moderate in the surface layer and upper part of the subsoil and is moderately slow in the lower part of the subsoil and in the substratum. Most roots are in the upper 30 inches of the soil, but some roots, especially tap roots, extend to a depth of more than 30 inches. Available water capacity is high. Runoff is rapid. Organic matter content is low. In unlimed areas the surface layer and upper part of the subsoil are strongly acid to neutral.

This soil has good potential for farming. Cultivated crops such as corn, small grains, and alfalfa are grown in support of dairy operations. Some areas are used for hay, pasture, and woodland.

This soil is suited to most crops commonly grown in the area. However, it is very erodible and erosion-control practices such as using sod crops in the cropping system, contour tillage, use of cover crops and contour stripcropping, and use of diversions or terraces are needed in cultivated areas. This soil is generally free of stone fragments and easy to cultivate, but tilth is difficult to maintain. Careful management is needed to reduce surface crusting and compaction. Using sod crops, incorporating crop residue into the soil, minimum tillage, and using winter cover crops help to maintain tilth and increase organic matter content.

This soil is suited to pasture. Restriction of overgrazing and prevention of soil compaction are the major concerns of pasture management. Compaction results in surface sealing and increased runoff; overgrazing causes a loss of soil by erosion. This soil is suitable for forage, including deep-rooted legumes, if properly limed and fertilized and if pasture management practices include proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush.

This soil is suited to woodland. Heavy logging equipment compacts the surface layer when the soil is wet. Logging roads and skid trails placed on the contour where possible help to control erosion.

This soil is limited for many nonfarm uses by the moderately slow permeability in the lower part of the subsoil, by slope, by instability, and by severe erodibility of cleared areas (fig. 6). Capability subclass IIIe.

DUE3—Dunkirk and Hudson soils, steep, severely eroded. This unit consists of deep, well drained Dunkirk soils and deep, moderately well drained Hudson soils. These soils are on valley sides. Slope ranges from 25 to 35 percent. Areas of this unit consist of Dunkirk soils or Hudson soils, or both. The mapped acreage of the unit is about 45 percent Dunkirk soils, 40 percent Hudson soils, and 15 percent included soils.

Typically, the surface layer of the Dunkirk soils is brown silt loam 4 inches thick. The subsoil is 22 inches thick. The upper 6 inches of the subsoil is friable, yellowish brown silt loam; the lower 16 inches is friable and firm, yellowish brown and brown light silty clay loam. The substratum is firm, dark grayish brown silt loam to a depth of more than 60 inches.

Typically, the surface layer of the Hudson soils is dark brown silty clay loam 5 inches thick. The subsurface layer is friable, brown silty clay loam, 8 inches thick. The upper part of the subsoil is firm, dark brown silty clay loam 7 inches thick; the lower part is very firm, dark brown silty clay 8 inches thick. The substratum is dark brown silty clay to a depth of more than 60 inches.

Included with this soil in mapping are less sloping areas of Hudson and Dunkirk soils. Also included are soils with a surface layer of very fine sandy loam.

A seasonal high water table in the Hudson soils is perched in the lower part of the subsoil for brief periods in the spring. In the Dunkirk soils the water table is mainly at a depth of more than 6 feet. Permeability in the Dunkirk soils is moderately slow in the lower part of the subsoil and in the substratum. In the Hudson soils it is slow in the subsoil and substratum. Plant roots are not restricted in Dunkirk soils, but in Hudson soils the rooting depth is mostly confined to 2 feet. Available water capacity is high in Dunkirk soils and moderate to high in Hudson soils. Runoff is rapid or very rapid on both soils, and organic matter content is low in both soils. In unlimed areas the surface layer and upper part of the subsoil are strongly acid to neutral in the Dunkirk soils and medium acid to neutral in the Hudson soils.

These soils have very poor potential for farming. They can be used for permanent pasture, and some areas are used for pasture. Many areas are better suited to woodland.

These soils are suitable for long-term pasture. They are not suited to hay or cultivated crops. The soils are very susceptible to further erosion if cultivated. Slopes are generally too steep for safe use of farm machinery. Open areas are suitable for pasture, but renovation, reseeding, and applying fertilizer are difficult. Overgrazing increases the hazards of erosion and gullying. These soils can be grazed early in spring, but droughtiness in midsummer is a limitation. Management practices that maintain stands of protective cover are needed.

These soils are suited to woodland. Hand planting of seedlings is generally needed.

These soils are limited for most nonfarm uses by steep slopes and extreme susceptibility to further erosion and gullying. Excavation of toe slopes can result in mass slumps or slides. Capability subclass VIIe.

ErA—Erie silt loam, 0 to 3 percent slopes. This deep, somewhat poorly drained, nearly level soil is mainly on broad hilltops that receive little or no runoff from adjacent areas.

Typically, the surface layer is very dark grayish brown silt loam 8 inches thick. The subsoil is 37 inches thick. The upper 7 inches of the subsoil is friable, yellowish brown silt loam and mottled, light brownish gray channery silt loam; the lower 30 inches is a firm fragipan of mottled, dark grayish brown channery heavy loam and mottled, dark grayish brown and olive brown channery light silty clay loam. The substratum is olive brown channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter Chippewa soils in slight depressions and near drainageways. Also included are small convex areas of moderately well drained Mardin soils and areas of soils with a surface layer of channery silt loam.

In the spring and during other excessively wet periods, a seasonal high water table is perched above the fragipan in this soil. Water moves laterally across the top of the fragipan and can be observed in exposures such as road cuts. Depth to the fragipan ranges from 10 to 16 inches. Permeability above the fragipan is moderate, and it is slow in the fragipan and substratum. The rooting zone is confined mainly to the depth to the fragipan. Available water capacity is moderate to low. Runoff is slow. Organic matter content is medium to high. In unlimed areas the surface layer is strongly acid to medium acid and the subsoil is strongly acid to neutral.

This soil has fair potential for farming. Cultivated areas are used for small grains, corn, hay, and pasture. A large acreage of this soil is wooded or idle and is in the Hector land use area.

This soil is suited to most field crops commonly grown in the county. Seasonal wetness is the major limitation. A combination of surface drainage and tile drainage is generally needed, and tile drains are suitable for random drainage of wet spots to allow more uniform use of fields. Keeping tillage to a minimum, tillage at the proper moisture content, incorporating crop residue into the soil, using cropping systems that include sod crops, and using a winter cover crop help to maintain tilth and increase organic matter content.

This soil is suited to pasture, mainly a mixture of grasses and water-tolerant legumes. Prevention of overgrazing and restriction of grazing when the soil is wet are the major concerns of pasture management. Overgrazing causes loss of pasture; grazing when the soil is wet compacts the surface layer. The main pasture management needs include applications of lime and fertilizer, proper stocking rates, pasture rotation, and yearly mowing to help control weeds.

This soil is suited to woodland. Machine planting of tree seedlings is practical on large areas of this soil. Heavy equipment used during wet periods severely compacts the surface layer.

The main limitations for nonfarm uses of this soil are the perched seasonal high water table and the slowly permeable fragipan. Capability subclass IIIw.

ErB—Erie silt loam, 3 to 8 percent slopes. This deep, somewhat poorly drained, gently sloping soil is on upland areas that receive runoff from higher adjacent soils.

Typically, the surface layer is dark brown silt loam 3 inches thick. The subsoil is 42 inches thick. The upper 12 inches of the subsoil is friable, yellowish brown silt loam and mottled, light brownish gray channery silt loam; the lower 30 inches is a firm fragipan of mottled, dark grayish brown channery heavy loam and mottled, dark grayish brown and olive brown channery light silty clay loam. The substratum is olive brown channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter Chippewa soils in slight depressions and near drainageways. Also included are better drained Mardin soils on slight rises or knolls, finer textured Appleton

soils at lower elevations, and Volusia soils at higher elevations.

In the spring and during other excessively wet periods, a seasonal high water table is perched above the fragipan in this soil. Water moves laterally across the top of the fragipan and can be observed in exposures such as road cuts. Depth to the fragipan ranges from 10 to 16 inches. Permeability above the fragipan is moderate, and it is slow in the fragipan and substratum. The rooting zone is confined mainly to the depth to the fragipan, but some roots penetrate the fragipan. Available water capacity is moderate to low. Organic matter content is medium to high in the surface layer. Runoff is moderate. In unlimed areas the surface layer is strongly acid to medium acid and the subsoil is strongly acid to neutral.

This soil has fair potential for farming. Cultivated crops such as small grains, corn, and hay are grown in support of dairy operations in some areas. A large acreage of this soil is idle or wooded and is in the Hector land use area.

This soil is suited to many field crops commonly grown in the county. If it is used for intensive cultivation, the soil needs drainage and protection from erosion. Tile and open-ditch drainage systems are suitable for this soil. Also, tile drains are suitable for random drainage of wetter included soils to make field management more uniform. In some areas excess water can be removed by diverting runoff from adjacent soils. Practices that control erosion and wetness include contour tillage, use of cover crops, and stripcropping. Minimum tillage, incorporating crop residue into the soil, and tillage at the proper moisture levels improve tilth and maintain organic matter content.

This soil is suited to pasture, mainly a mixture of grasses and water-tolerant legumes. Prevention of overgrazing and restriction of grazing when the soil is wet are the major pasture management concerns. Overgrazing causes loss of pasture; grazing when the soil is wet compacts the surface layer and increases runoff and erosion. Adquate applications of lime and fertilizer, proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are the chief pasture management needs.

This soil is suited to woodland. Machine planting of tree seedlings is practical on this soil. Heavy equipment severely compacts the surface layer, especially when the soil is wet.

The main limitations for nonfarm uses of this soil are the perched seasonal high water table and the slowly permeable fragipan and substratum. Capability subclass IIIw.

ErC—Erie silt loam, 8 to 15 percent slopes. This deep, somewhat poorly drained, sloping soil is on toe slopes that receive runoff from higher adjacent soils.

Typically, the surface layer is dark brown silt loam 3 inches thick. The subsoil is 42 inches thick. The upper 9 inches of the subsoil is mottled, friable, yellowish brown silt loam and mottled, light brownish gray channery silt loam; the lower 33 inches is a firm fragipan of mottled, dark grayish brown channery heavy loam and mottled, olive brown channery light silty clay loam. The substratum is olive brown channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Volusia soils and better drained Mardin soils. Also included are spots of wetter Chippewa soils that are indicated on the soil map with a spot symbol and areas of soils that have bedrock within 40 inches of the surface.

In early spring and during other excessively wet periods, a seasonal high water table is perched above the fragipan. Water moves laterally across the top of the fragipan. Depth to the fragipan ranges from 10 to 16 inches. Permeability above the fragipan is moderate, and it is slow in the fragipan and substratum. The rooting zone is confined to the depth to the fragipan. Available water capacity is moderate to low. Runoff is rapid. Organic matter content is medium to high in the surface layer. In unlimed areas the surface layer is strongly acid to medium acid and the subsoil is strongly acid to neutral.

This soil has fair potential for farming. A large acreage of this soil is wooded and is in the Hector land use area.

This soil can be used for general row crops if runoff and erosion are controlled and drainage is installed. Wetness delays spring planting, and short-term crops are suitable for undrained areas. Diverting runoff from higher adjacent soils and using tile drainage, sod waterways, and diversions help to remove excess water. Practices that control erosion include contour tillage, stripcropping, and use of cover crops. Minimum tillage, incorporating crop residue into the soil, and tillage at the proper moisture levels improve tilth and increase organic matter content. Because of the shallow rooting depth, droughtiness in midsummer is a concern in some years.

This soil is suited to late-season pasture, mainly a mixture of grasses and water-tolerant legumes. Prevention of overgrazing and restriction of grazing when the soil is wet are the major pasture management concerns. Early grazing compacts the surface layer and increases erosion. Adequate applications of lime and fertilizer, proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are the main management needs.

This soil is suited to woodland. Heavy logging equipment severely compacts the surface layer when the soil is wet. Logging roads and skid trails placed on the contour help to reduce the erosion hazard.

The main limitations for nonfarm uses of this soil are the perched seasonal high water table, the slowly permeable fragipan, and slope. Capability subclass IIIe.

FF—Fluvaquents-Udifluvents complex, frequently flooded. These nearly level soils consist of unconsoli-

dated alluvium deposited in long, narrow strips along secondary streams. The soils are subject to frequent flooding, stream cutting, and erosion, all of which shift the deposits from one place to another. Some areas are stony or gravelly, and others are free of stones.

These soils are deep but show very little development. The soil characteristics are highly variable within a short distance. The soils range from moderately well drained to very poorly drained but are mainly somewhat poorly drained to very poorly drained.

These soils have little potential for farming. Some cleared areas are in pasture but are slowly reverting to brush and weeds. Most areas are in native grasses or support water-tolerant trees such as willow, soft maple, and hemlock. Some areas consist of gravelly riverwash and do not support vegetation. Areas that are suitable for pasture are difficult to manage because they are commonly inaccessible, long and narrow, and dissected by old stream channels.

The hazard of annual flooding and the variability of texture and drainage of these soils are the main limitations for most uses. Capability subclass Vw.

FrA—Fremont silt loam, 0 to 3 percent slopes. This deep, somewhat poorly drained, nearly level soil is generally in areas that receive runoff from higher adjacent soils. Some areas are on hilltops that receive little or no runoff.

Typically, the surface layer is dark grayish brown silt loam 8 inches thick. The subsoil is 26 inches thick. The upper 5 inches is mottled, friable, light yellowish brown heavy silt loam; the lower 21 inches is mottled, firm, grayish brown and light olive brown light silty clay loam. The substratum is firm, olive very channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are spots of poorly drained soils in small low pockets and along drainageways. Also included are small areas of Volusia soils and areas of soils that have shale bedrock within a depth of 40 inches.

This soil has a seasonal high water table perched in the upper part of the subsoil in the spring and other excessively wet periods. Permeability is moderately slow or moderate in the subsoil and slow or very slow in the substratum. Plant roots are mainly confined to the upper part of the subsoil, but as the water table recedes some roots extend into the substratum. Available water capacity is moderate to high. Runoff is slow. Organic matter content is medium to high in the surface layer. In unlimed areas the surface layer and subsoil are very strongly acid to medium acid.

This soil has fair potential for farming. Cultivated areas are used for small grains, corn, and hay in support of dairy operations. Most areas are idle or are farmed at a low level of intensity. Some areas are idle and are reverting to woodland, and some areas have been reforested.

Undrained cultivated areas of this soil are limited to short-term crops. Seasonal wetness is a major limitation. Spring planting is delayed, and harvesting in the fall is difficult in some years. A combination of surface drains and tile drainage is needed to adequately drain this soil. Tile is suitable for random drainage of wet spots to allow more uniform use of fields, and some areas can be improved by diverting runoff from adjacent soils. Because of the high silt and clay content of this soil, careful management is required to maintain tilth. Plowing at the proper moisture content, fall plowing, using cover crops and minimum tillage, and incorporating crop residue into the soil help to maintain tilth and increase organic matter content.

Undrained areas of this soil are better suited to water-tolerant pasture species such as birdsfoot trefoil and timothy than to most other uses. Prevention of overgrazing and restriction of grazing when the soil is wet are the major concerns of pasture management. This soil compacts if grazed during excessively wet periods. Overgrazing and compaction cause loss of pasture and result in ponding. The main pasture management needs are proper stocking rates, pasture rotation, and yearly mowing to help control weeds.

This soil is suited to most northern hardwoods and to spruce and larch. The use of equipment during excessively wet periods compacts the surface layer, causing deep ruts.

This soil is limited for many nonfarm uses by the perched seasonal high water table and the slow or very slow permeability of the substratum. Capability subclass IIIw.

FrB—Fremont silt loam, 3 to 8 percent slopes. This deep, somewhat poorly drained, gently sloping soil is on convex areas on uplands and is on lower toe slopes that receive runoff from higher adjacent soils.

Typically, the surface layer is dark grayish brown silt loam 5 inches thick. The subsoil is 26 inches thick. The upper 8 inches of the subsoil is mottled, friable, light yellowish brown heavy silt loam; the lower 18 inches is mottled, firm, grayish brown and light olive brown light silty clay loam. The substratum is firm, olive very channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter soils in depressions and along drainageways. Also included are small areas of coarser textured Volusia soils mainly on toe slopes, areas of heavier textured, moderately deep Hornell soils, and areas of better drained Schuyler soils on rises and knolls.

In the spring and other excessively wet periods, a seasonal high water table is perched above the substratum of this soil. Permeability is moderate or moderately slow in the subsoil and slow or very slow in the substratum. The rooting depth is mostly confined to the upper part of the subsoil. Available water capacity is moderate to high. Runoff is slow or moderate. Organic matter con-

tent is medium to high. In unlimed areas the surface layer and subsoil are very strongly acid to medium acid.

This soil has fair potential for farming. Most areas are idle or are farmed at a low level of intensity. In a few areas cultivated crops such as small grains, corn, and hay are grown in support of dairy operations. Many idle areas are reverting to woodland or have been replanted to conifer plantations.

If this soil is used for cultivated crops, it needs to be drained and protected from erosion. With artificial drainage, the soil is suited to many crops grown in the area. Tile drains and open-ditch drainage systems can be used but must be closely spaced because of the slow permeability of the soil. Tile is suitable for random drainage of wetter included soils to allow more uniform use of fields. In some areas water can be removed by diverting runoff from adjacent higher soils. Practices that control erosion include stripcropping, contour tillage, and use of cover crops. Plowing at the proper moisture content, fall plowing, using cover crops, minimum tillage, and incorporating crop residue into the soil help to maintain tilth and increase organic matter content.

This soil is suited to pasture. Prevention of overgrazing and restriction of grazing when the soil is wet are the major pasture management concerns. This soil compacts if grazed during excessively wet periods. Overgrazing and compaction of the surface layer restrict plant growth and result in increased runoff. Proper stocking rates to maintain desired plant species, selection of water-tolerant varieties, rotation of pastures, and yearly mowing to help control weeds and brush are the chief management needs.

This soil is suited to woodland. The use of heavy equipment during excessively wet periods compacts the surface layer.

This soil is limited for many nonfarm uses by the perched seasonal high water table and the slow or very slow permeability of the substratum. Capability subclass IIIw.

FrC—Fremont silt loam, 8 to 15 percent slopes. This deep, somewhat poorly drained, sloping soil is on foot slopes and toe slopes that receive runoff from higher adjacent soils.

Typically, the surface layer is dark grayish brown silt loam 4 inches thick. The subsoil is 24 inches thick. The upper 6 inches of the subsoil is friable, light yellowish brown silt loam; the lower 18 inches is mottled, firm, grayish brown and light olive brown light silty clay loam. The substratum is firm, olive very channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of better drained Schuyler soils, poorly drained soils in seepage spots and drainageways, and heavier textured, moderately deep Hornell soils. Also included are small areas of coarser textured Volusia soils mainly on toe slopes and a few areas of soils that have a surface layer of channery silt loam and channery silty clay loam.

This soil has a seasonal high water table in the upper part of the subsoil in spring and other excessively wet periods. The water table is perched above the substratum. Permeability is moderate or moderately slow in the subsoil and slow or very slow in the substratum. The rooting depth is mostly confined to the upper part of the subsoil. Available water capacity is moderate to high. Runoff is moderate to rapid. Organic matter content is medium to high. In unlimed areas the surface layer and subsoil are very strongly acid to medium acid.

This soil has fair to poor potential for farming. Most areas are idle or are farmed at a low level of intensity. In a few areas cultivated crops such as small grains and hay are grown in support of dairy farms. Many idle areas are reverting to woodland or have been replanted to conifer plantations.

This soil can be used for cultivated crops if runoff and erosion are controlled. Undrained areas are suited to short-term crops. Wetness delays spring planting, and the soil tends to be cloddy if plowed when wet. Excess surface water can be removed by diverting runoff from higher adjacent soils and by using tile drainage and sod waterways. Practices that control erosion include contour tillage, contour stripcropping, and use of cover crops. Minimum tillage, incorporating crop residue into the soil, and tillage at the proper moisture levels improve tilth and increase organic matter content.

This soil is suited to late spring or early summer grazing. Prevention of overgrazing and restriction of grazing when the soil is wet are the major pasture management concerns. Grazing when the soil is wet and overgrazing result in increased runoff and erosion. Proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are the chief management needs.

This soil is suited to northern hardwoods, spruce, and pine. The use of heavy equipment is restricted during excessively wet periods. Logging roads and skid trails placed on the contour help to reduce erosion.

This soil is limited for many nonfarm uses by the perched high water table, the slow or very slow permeability of the substratum, and slope. Capability subclass IIIe.

Ha—Halsey mucky silt loam. This deep, very poorly drained, nearly level soil is commonly in low areas and depressions. These areas receive large amounts of runoff and subsurface seepage from adjacent soils.

Typically, the surface layer of this soil is black mucky silt loam 10 inches thick. The subsoil is mottled, friable, greenish gray and dark grayish brown gravelly loam 15 inches thick. The substratum is gray very gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat poorly drained Fredon soils on slightly higher rises and benches. Also included are areas of soils that

have a finer textured subsoil than this Halsey soil and small areas of soils that have a nonmucky surface layer.

This soil has a water table at or near the surface for prolonged periods during the year. Water is ponded on most areas early in the spring. Permeability is moderate to moderately rapid in the subsoil and rapid in the substratum. The rooting depth is severely limited by the prolonged high water table. Available water capacity is moderate, but the substratum is saturated most of the year. Runoff is intermittently ponded to very slow. Organic matter content is high. In unlimed areas the surface layer and subsoil are medium acid to neutral.

Most areas of this soil are idle and support water-tolerant shrubs and trees. Some cleared areas and woodlots are used for low-quality pasture. A few drained fields are used for general crops and hay. This soil has poor to fair potential for cultivated crops and most urban uses; it has better potential for wildlife habitat and natural open areas.

Undrained areas of this soil are too wet for cultivated crops. The use of undrained areas is generally limited to pasture, but in some dry years the soil can be used for some short-season crops. The soil is suited to cultivated crops if it is drained and protected from flooding or ponding. Tile drainage and open-ditch drainage are suitable where outlets are available. Where tile drainage is installed, special care is needed to prevent plugging with silt and fine sand. Use of cover crops, minimum tillage, and tillage at proper moisture levels help to maintain a friable surface layer.

This soil is suitable for midsummer grazing. The surface layer compacts easily when wet, and overgrazing and compaction cause loss of desired plant species and ponding on the surface layer. The use of water-tolerant grasses and the control of ponding are needed. Plowing, preparing seedbeds, and seeding need to be done during dry periods of summer. Proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are the chief management needs.

This soil is suited to water-tolerant trees such as red maple, eastern hemlock, and white spruce. The use of heavy equipment is restricted during excessively wet periods. The soil is generally too wet for machine planting of tree seedlings, but hand planting is feasible.

This soil is limited for most nonfarm uses by prolonged wetness and temporary ponding in early spring. Capability subclass IVw.

HnB—Hornell channery silt loam, 3 to 8 percent slopes. This moderately deep, somewhat poorly drained, gently sloping soil is on toe slopes that receive runoff from higher adjacent soils.

Typically, the surface layer of this soil is dark grayish brown channery silt loam 6 inches thick. The subsurface layer is friable, pale brown silt loam 2 inches thick. The upper part of the subsoil is mottled, firm, yellowish brown silty clay loam 6 inches thick. The lower part of the subsoil is mottled, firm, light olive brown shaly silty clay loam 14 inches thick. The substratum is reddish brown shaly silty clay loam 11 inches thick. Hard, dark grayish brown shale bedrock is at a depth of 39 inches.

Included with this soil in mapping are small areas of slightly wetter soils in small depressions and along drainageways. Also included are areas of coarser textured and deeper Fremont soils and soils that have shale bedrock at a depth of more than 40 inches.

This soil has a seasonal high water table perched in the upper part of the subsoil in the spring and other excessively wet periods. Permeability is moderately slow in the subsoil and very slow in the substratum. Bedrock is at a depth of 20 to 40 inches. The root zone is mainly confined to the upper 2 feet of the soil. Available water capacity is moderate. Runoff is moderate to slow. Organic matter content is medium to high. In unlimed areas the surface layer and subsoil are very strongly acid to medium acid.

This soil has fair potential for farming. Most cleared areas are idle or farmed at a low level of intensity. Some cultivated crops are grown in support of dairy operations. The idle areas are slowly reverting to woodland or have been replanted to conifer plantations. The remaining areas are forested.

This soil is suited to small grains, corn, and hay. Seasonal wetness, the hazard of erosion, and very low fertility are the major limitations of this soil for crop production. Using diversions that break up long slopes, diverting runoff from adjacent soils, use of grassed waterways, drainage of wetter spots with subsurface drains, and general surface drainage can improve the drainage of this soil. Installations of subsurface drains is difficult in places because of the depth to bedrock. Using contour tillage, stripcropping, and cover crops controls erosion. If the soil is cultivated or worked when wet, it is subject to clodding and crusting of the surface layer. Fall plowing, using cover crops and minimum tillage, and incorporating crop residue into the soil help to maintain tilth and increase organic matter content.

This soil is suited to summer pasture. Prevention of overgrazing and restriction of grazing when the soil is wet are the major pasture management concerns. This soil compacts if grazed during wet periods, and overgrazing and compaction result in increased runoff and erosion. Proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are the chief management needs.

This soil is suited to woodland. Use of heavy equipment during excessively wet periods compacts the surface layer.

This soil is limited for many nonfarm uses by the perched seasonal high water table, the very slowly permeable substratum, depth to bedrock, and small stone fragments in the surface layer. Capability subclass IIIw.

HnC—Hornell channery silt loam, 8 to 15 percent slopes. This moderately deep, somewhat poorly drained, sloping soil is on valley walls and hillsides that receive runoff from higher adjacent soils.

Typically, the surface layer is dark grayish brown channery silt loam 4 inches thick. The upper part of the subsoil is mottled, firm, yellowish brown silty clay loam 8 inches thick. The lower part of the subsoil is mottled, firm, light olive brown shaly silty clay loam 12 inches thick. The substratum is reddish brown shaly silty clay loam 12 inches thick. Dark grayish brown shale bedrock is at a depth of 36 inches.

Included with this soil in mapping are small areas of Fremont soils that are deeper to bedrock and coarser textured than this Hornell soil. Also included are small areas of poorly drained soils in wet spots and seepage spots that are indicated on the soil maps by a spot symbol and small areas of soils where depth to bedrock is more than 40 inches.

In the spring and other excessively wet periods, a seasonal high water table is perched above the substratum. Bedrock is at a depth of 20 to 40 inches. Permeability is moderately slow in the subsoil and very slow in the substratum. The root zone is mostly confined to the upper 2 feet of the soil. Available water capacity is moderate. Runoff is moderate to rapid. Organic matter content is medium to high in the surface layer. In unlimed areas the surface layer and subsoil are very strongly acid to medium acid.

This soil has fair to poor potential for farming. Most areas are idle or farmed at a low level of intensity. In a few areas cultivated crops such as small grains and hay are grown for dairy operations. Many idle areas are reverting to woodland or have been replanted to conifer plantations. The remaining areas are forested.

This soil is suited to general row crops grown in the area if runoff and erosion are controlled. Wetness delays spring planting, and undrained areas are suited to short-term crops. Excess water can be controlled by diverting runoff from higher adjacent soils. Tile drainage and sod waterways are suitable for this soil, but installation of drainage systems is difficult in places because of the depth to bedrock. Practices that control erosion and runoff include contour tillage, stripcropping, and use of cover crops and sod crops in the cropping system. This soil tends to be cloddy if plowed when wet. Cultivated areas must be managed to maintain tilth and increase organic matter content.

This soil is suited to late spring pasture and summer pasture. Prevention of overgrazing and restriction of grazing when the soil is wet are the major pasture management concerns. This soil compacts if grazed during excessively wet periods. Overgrazing and compaction of the surface layer result in increased runoff and erosion. Proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are the chief management needs.

This soil is suited to woodland. The use of heavy equipment is restricted during excessively wet periods. Logging roads and skid trails placed on the contour where possible help to control erosion.

The main limitations for many nonfarm uses of this soil are the perched high water table, moderate depth to bedrock, slope, the very slow permeability of the substratum, and small stone fragments in the surface layer. Capability subclass IIIe.

HnD—Hornell channery silt loam, 15 to 25 percent slopes. This moderately deep, somewhat poorly drained, moderately steep soil is on valley walls commonly dissected by V-shaped gullies. The areas receive runoff from higher adjacent soils.

Typically, the surface layer is very dark grayish brown channery silt loam 3 inches thick. The upper part of the subsoil is mottled, firm, yellowish brown silty clay loam 9 inches thick. The lower part of the subsoil is mottled, firm, light olive brown shaly silty clay loam 10 inches thick. The substratum is reddish brown shaly silty clay loam 8 inches thick. Dark grayish brown shale bedrock is at a depth of 30 inches.

Included with this soil in mapping are areas of soils with bedrock at a depth of more than 40 inches. Also included are areas of severely eroded soils with a surface layer of silty clay loam, small wet spots and seepage areas at the base of some slopes, and soils that are steeper than this Hornell soil.

In the spring and other excessively wet periods, a seasonal high water table is perched above the substratum of this soil. Bedrock is at a depth of 20 to 40 inches. Permeability is moderately slow in the subsoil and very slow in the substratum. The root zone is mostly confined to the upper 2 feet of the soil. Available water capacity is moderate. Runoff is rapid. Organic matter content is medium to high. In unlimed areas the surface layer and subsoil are very strongly acid.

This soil has poor potential for farming. It is used mostly for pasture or woodland, and some areas are used for hay.

This soil is poorly suited to cultivated crops because of the severe erosion hazard. If cultivated crops are grown, intercepting and diverting runoff and subsurface seepage and using sod waterways, contour tillage, and minimum tillage help to control wetness and erosion. The content of organic matter has been depleted as a result of past erosion, and the soil tends to be cloddy if plowed when wet. Incorporating crop residue into the soil, using cover crops, and tilling at the proper moisture content help to maintain tilth and increase organic matter content. The moderately steep slopes and dissecting gullies in some areas limit the use of farm machinery.

This soil is suited to permanent pasture. Reseeding by renovation, returning plant residue to the soil, and top-dressing open sodded areas with adequate applications of lime and fertilizer are suitable pasture management

practices. Maintenance of plant cover to control erosion and reduce runoff, use of proper stocking rates, rotation of pastures, weed and brush control, and restricted grazing during wet periods are the chief pasture management needs.

This soil is suited to woodland. Placing logging roads and skid trails on the contour where possible helps reduce erosion and runoff. The use of heavy equipment is restricted during wet periods.

The main limitations for most nonfarm uses of this soil are the moderate depth to bedrock, slope, the very slow permeability of the substratum, and erodibility. Capability subclass IVe.

HrA—Howard gravelly loam, 0 to 3 percent slopes. This deep, well drained to somewhat excessively drained, nearly level soil is on terraces and the tops of former deltas in valleys.

Typically, the surface layer is dark brown gravelly loam 10 inches thick. The subsurface layer is friable, pale brown gravelly loam 5 inches thick. The upper part of the subsoil is friable, brown very gravelly loam 13 inches thick. The lower part of the subsoil is firm, dark brown very gravelly silt loam 12 inches thick. The substratum is dark yellowish brown, stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Castile soils in slight depressions and along lower fringe areas and small areas of Valois soils.

The seasonal high water table in this soil is generally at a depth of more than 6 feet. Permeability is moderate to moderately rapid in the subsoil and very rapid in the substratum. Most roots are in the upper 3 feet of the soil. Available water capacity is low to moderate. Runoff is slow. Organic matter content is low. In unlimed areas the surface layer and upper part of the subsoil are medium acid to neutral.

This soil has good potential for farming. Cultivated areas are used for dry beans, corn, small grains, and alfalfa. Areas near Seneca Lake are used for grapes. The soil is suited to woodland.

This soil is easy to work and can be cultivated early in spring. It is well suited to all crops commonly grown in the county, especially deep-rooted perennial crops and specialized fruit and vegetable crops. Gravel in the surface layer interferes somewhat with cultivation and harvesting equipment. Droughtiness in some years limits crop growth. Irrigation during the dry summer months is suitable for some high-value crops. Tile drainage of the wetter included soils helps to make field management more efficient. This soil generally has good tilth. Returning crop residue to the soil, keeping tillage to a minimum, and providing a cover crop help to maintain tilth. Timely application of fertilizer is important.

This soil is suited to early spring grazing. Droughtiness is a concern, and growth is sparse during the drier summer months. Care must be taken to prevent overgrazing during summer. Deep-rooted legumes are well suited to this soil, but applications of lime and fertilizer are required to maintain stands and assure good growth. Proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are the chief management needs.

This soil has few limitations for nonfarm uses. Gravel on the surface is a concern for some uses. Some areas are good sources of sand and gravel. Capability subclass IIs.

HrB—Howard gravelly loam, 3 to 8 percent slopes. This deep, well drained to somewhat excessively drained, gently sloping or undulating soil is on terraces and former deltas in valleys.

Typically, the surface layer is dark brown gravelly loam 8 inches thick. The subsurface layer is friable, pale brown gravelly loam 7 inches thick. The upper part of the subsoil is friable, brown very gravelly loam 13 inches thick. The lower part of the subsoil is firm, dark brown very gravelly silt loam 8 inches thick. The substratum is dark yellowish brown, stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Castile soils in slightly lower areas, areas of Valois soils, and small areas of soils that have a subsoil of loamy sand.

The seasonal high water table in this soil is generally at a depth of more than 6 feet. Permeability is moderate to moderately rapid in the subsoil and very rapid in the substratum. Most roots are within the upper 3 feet of the soil. Available water capacity is moderate to low. Runoff is slow. Organic matter content is low. In unlimed areas the surface layer and upper part of the subsoil are medium acid to neutral.

This soil has good potential for farming. Cultivated areas are used for dry beans, corn, small grains, and alfalfa. The areas near Seneca Lake are used primarily for grapes.

This soil is suited to all crops commonly grown in the county, especially deep-rooted perennial crops and specialized fruit and vegetable crops. Gravel on the surface interferes somewhat with cultivation and harvesting equipment. During long, dry periods droughtiness is a concern, and irrigation during dry months is suitable for some high value crops. The erosion hazard is a concern in places if this soil is cultivated and not protected. Incorporating crop residue into the soil, minimum tillage, and use of cover crops help to maintain tilth and increase organic matter content. Contour tillage and stripcropping help to conserve moisture and control erosion. Timely application of lime and fertilizer is important.

This soil is suited to early spring grazing. The soil tends to be droughty. Plant growth is sparse during summer, and care must be taken to prevent overgrazing during this period. Deep-rooted legumes are well suited

to this soil, but applications of lime and fertilizer are required to maintain stands and assure good growth. Prevention of overgrazing, use of proper stocking rates, rotation of pastures, and weed and brush control are the major pasture management needs.

This soil is suited to woodland. Gravel on the surface interferes with machine planting.

This soil has few limitations for nonfarm uses. Gravel on the surface is a limitation for some uses. Some areas are good sources of sand and gravel. Capability subclass IIs.

HrC—Howard gravelly loam, 8 to 15 percent slopes. This deep, well drained to somewhat excessively drained, sloping soil generally is on the sides of the larger terraces and deltas where the slope is mainly in one direction.

Typically, the surface layer is dark brown gravelly loam 7 inches thick. The subsurface layer is friable, pale brown gravelly loam 6 inches thick. The upper part of the subsoil is friable, brown very gravelly loam 11 inches thick. The lower part of the subsoil is firm, dark brown very gravelly loam 11 inches thick. The substratum is dark yellowish brown, stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are small areas of eroded soils. Also included are areas of Valois soils, small areas of soils mainly near Seneca County that have a finer textured subsoil than this Howard soil, and spots of wetter Castile soils in slight depressions.

The seasonal high water table in this soil is generally at a depth of more than 6 feet. Permeability is moderate to moderately rapid in the subsoil and very rapid in the substratum. Plant roots are not restricted, but most roots are in the upper 3 feet of the soil. Available water capacity is moderate to low. Runoff is slow to moderate. Organic matter content is low. In unlimed areas the surface layer and upper part of the subsoil are medium acid to neutral.

This soil has fair potential for farming. Cultivated areas are used for corn, small grains, alfalfa, and hay. Areas near Seneca Lake are used primarily for grapes. Some areas are in pasture. This soil has good potential for urban uses.

This soil is suited to most crops commonly grown in the county. It is especially suited to grapes, tree fruits, and forage crops that require good drainage and deep rooting. Intensively cultivated areas are subject to erosion, and measures are needed to control runoff and erosion. Contour farming, stripcropping, minimum tillage, returning crop residue to the soil, and using winter cover crops and a high percentage of sod crops in the cropping system are suitable management practices. Irrigation is limited by the erosion hazard. Good tilth is easy to maintain, and tillage can be performed early in the spring.

This soil is suited to pasture, especially for early season grazing. Prevention of overgrazing is the major concern of pasture management, especially during the dry summer months. Deep-rooted legumes are well suited to this soil, but timely applications of lime and fertilizer are required to maintain stands and assure good growth. Furrowing to increase infiltration, particularly during the summer months, use of proper stocking rates, rotation of pastures, and yearly mowing to control weeds and brush are the chief management needs.

This soil is suited to woodland. Gravel on the surface limits machine planting in some areas.

The main limitations of this soil for many nonfarm uses are slope and gravel on the surface. Some areas are good sources of sand and gravel. Capability subclass IIIe.

HrCK—Howard gravelly loam, rolling. This deep, well drained to somewhat excessively drained soil has a rolling topography that typically consists of a series of ridges and knolls that slope in many directions. The soil is mainly on dissected terraces, long eskers, and kettle-kame deposits.

Typically, the surface layer is dark brown gravelly loam 6 inches thick. The subsurface layer is friable, pale brown gravelly loam 6 inches thick. The upper part of the subsoil is friable, brown very gravelly loam 12 inches thick. The lower part of the subsoil is firm, dark brown very gravelly silt loam 11 inches thick. The substratum is dark yellowish brown, stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are small areas of severely eroded soils on the steeper parts of the knolls and areas of soils in pockets between the knolls with a surface layer that commonly is thicker than that of this Howard soil. Also included are spots of Valois soils.

The seasonal high water table in this soil is generally at a depth of more than 6 feet. Permeability is moderate to moderately rapid in the subsoil and very rapid in the substratum. Plant roots are not restricted, but most roots are in the upper 3 feet of the soil. Available water capacity is moderate to low. Runoff is slow to moderate. Organic matter content is low. In unlimed areas the surface layer and upper part of the subsoil are medium acid to neutral.

This soil has fair potential for farming. Most areas are used for hay and pasture. A few are used for cultivated crops.

The complex topography of this soil makes intensive cropping impractical. The hazard of erosion is difficult to control. The use of cover crops and minimum tillage and returning crop residue to the soil are the chief needs if cultivated crops are grown. Most areas need no drainage, but a few wet spots need random tile drains. Timely applications of lime and fertilizer are important on this soil.

This soil is suited to pasture, especially for early-season grazing. Prevention of overgrazing during the dry summer months is the major concern of pasture management. Deep-rooted legumes are well suited to this soil, but applications of lime and fertilizers are required to maintain stands and assure good growth. Furrowing during the summer months to increase infiltration, use of proper stocking rates, rotation of pastures, and yearly mowing to control weeds and brush are the main management needs.

This soil is suited to woodland. Gravel fragments in the surface layer limit some machine planting operations.

The main limitations of this soil for nonfarm uses are slope and gravel in the surface layer. Many areas are good sources of sand and gravel. Capability subclass VIe.

HSD—Howard soils, moderately steep. These deep, well drained to somewhat excessively drained, moderately steep soils are on valley walls and in hilly areas. Slopes range from 15 to 25 percent and are simple and complex.

The surface layer of these soils is variable in texture and thickness. It ranges from dark brown gravelly silt loam to gravelly sandy loam and is about 5 inches thick. The subsurface layer is friable, pale brown gravelly loam 6 inches thick. The subsoil is 22 inches thick. The upper 12 inches of the subsoil is friable, brown very gravelly loam; the lower 10 inches is firm, dark brown very gravelly silt loam. The substratum is dark yellowish brown, stratified sand and gravel to a depth of 60 inches or more.

Included with these soils in mapping are areas of soils that are more sandy than these Howard soils. Also included are small areas of soils mainly near Seneca County that have a finer textured subsoil than these Howard soils and spots of loamy Valois soils on hills.

The seasonal high water table in these soils is generally at a depth of more than 6 feet. Permeability is moderate to moderately rapid in the subsoil and very rapid in the substratum. Plant roots are not restricted, but most are in the upper 3 feet of these soils. Available water capacity is moderate to low. Runoff is moderate. Organic matter content is low. In unlimed areas the surface layer and upper part of the subsoil are medium acid to neutral.

These soils have poor potential for farming. Some areas are used for corn or small grains, but most are in hay, pasture, or woodland. Areas near Seneca Lake are commonly used for grapes or fruit trees. These soils have poor potential for many urban uses.

These soils are limited for cultivated crops by slope and the severe erosion hazard, which make the operation of farm equipment hazardous. The soils tend to be droughty by midsummer. If the soils are cultivated, maintaining a protective cover, minimum tillage, and use of cover crops and diversions are needed to conserve moisture and control runoff. Contour tillage and stripcropping can be used for erosion control on the less sloping areas.

These soils are suited to pasture, especially for early-season grazing. Prevention of overgrazing during dry summer months is the major concern of pasture management. Deep-rooted legumes are well suited to this soil. If plowing is necessary to reestablish cover, plowing across the slope and leaving strips of sod help to control runoff. Topdressing with lime and fertilizer, using proper stocking rates, pasture rotation, and yearly mowing to control weeds and brush are the main management needs.

These soils are suited to woodland. Machine planting of seedlings is difficult because of slope and gravel in the surface layer.

The main limitation of these soils for nonfarm uses is slope; gravel in the surface layer limits some uses. Most areas are good sources of sand and gravel. Capability subclass IVe.

HSE—Howard soils, steep. These deep, well drained to somewhat excessively drained soils are on valley walls that are commonly dissected by V-shaped gullies and are on small, hilly areas. Slope ranges from 25 to 35 percent.

The surface layer of these soils is variable in texture and thickness. It ranges from gravelly silt loam to gravelly sandy loam and in undisturbed areas is as much as several inches thick. The subsurface layer is friable, pale brown gravelly loam 5 inches thick. The subsoil is 22 inches thick. The upper 12 inches of the subsoil is friable, brown very gravelly loam; the lower 10 inches is firm, dark brown very gravelly silt loam. The substratum is dark yellowish brown, stratified sand and gravel to a depth of 60 inches or more.

Included with these soils in mapping are areas of soils that are more sandy than these Howard soils. Also included are small areas of Valois soils and a few areas of soils that have slopes of as much as 60 percent.

The seasonal high water table in these soils is at a depth of more than 6 feet. Permeability is moderate to moderately rapid in the subsoil and very rapid in the substratum. Plant roots are not restricted, but most roots are in the upper 3 feet of these soils. Available water capacity is low to moderate. Runoff is moderate to rapid. Organic matter content is low. In unlimed areas the surface layer and upper part of the subsoil are medium acid to neutral.

These soils have poor potential for farming. Cleared areas are used for long-term pasture, but most areas are wooded.

These soils are not suited to cultivation because of slope and a severe erosion hazard. Some areas are suited to permanent pasture. Deep-rooted legumes are well suited to these soils for pasture seedings, but reseeding can be difficult because of the hazard of operat-

ing farm machinery on the steep slopes. The soils are droughty because of the rapid rate of runoff and limited available water capacity. Topdressing of pastures with fertilizer, protection from overgrazing, and maintaining adequate cover are the main pasture management needs.

These soils are suited to woodland. Machine planting of seedlings is limited by slope.

The main limitation of these soils for most nonfarm uses is slope. Most areas are good sources of sand and gravel. Capability subclass VIe.

HuB—Hudson gravelly silt loam, 3 to 8 percent slopes. This deep, moderately well drained, gently sloping soil is in areas that receive little runoff from adjacent soils.

Typically, the surface layer is dark brown gravelly silt loam 8 inches thick. The subsurface layer is friable, brown gravelly silt loam 10 inches thick. The subsoil is 22 inches thick. The upper 6 inches of the subsoil is firm, dark brown silty clay loam; the lower 16 inches is mottled, very firm, dark brown silty clay. The substratum is very firm, dark brown silty clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter Rhinebeck soils in slight depressions and along drainageways. Also included are small areas of Collamer and Dunkirk soils and areas of soils that do not have the gravelly surface layer typical of this Hudson soil.

This soil has a seasonal high water table in the lower part of the subsoil during early spring. Permeability is moderate to moderately slow in the surface and subsurface layers and slow in the subsoil and substratum. Most roots are in the upper 2 feet of the soil and rooting depth is somewhat restricted by the seasonal high water table and the dense, clayey subsoil. Available water capacity is moderate to high. Runoff is moderate. Organic matter content is medium to low in the surface layer. In unlimed areas the surface layer and subsoil are medium acid to neutral.

This soil has good potential for farming. Crops such as small grains, corn, and hay are grown in support of dairy operations.

This soil is suited to most crops commonly grown in the area. It is easily eroded and needs intensive management to prevent soil loss. Eroded areas are cloddy and subject to crusting if tilled at an improper moisture content. Using cover crops, incorporating crop residue into the soil, tillage at the proper moisture content, and minimum tillage help to maintain tilth and control the erosion hazard. Terracing, contour stripcropping where topography permits, contour tillage, and maintaining year-round cover crops also help to control erosion. Planting is often delayed briefly in spring by temporary wetness. Drainage of wet spots by land shaping and random installation of tile lines allows more uniform management of fields.

This soil is suited to pasture. Prevention of overgrazing and restriction of grazing when the soil is wet are the major management concerns. This soil compacts easily if grazed during excessively wet periods. Overgrazing and compaction of the surface layer result in increased runoff. Proper stocking rates, pasture rotation, and yearly mowing to help control weeds are the major management needs.

This soil is suited to woodland. Use of heavy equipment during excessively wet periods compacts the surface layer.

The main limitations for most nonfarm uses of this soil are the seasonal high water table and the slow permeability of the subsoil and substratum. Gravel in the surface layer is a limitation for some uses. Capability subclass IIe.

HuC—Hudson gravelly silt loam, 8 to 15 percent slopes. This deep, moderately well drained, sloping soil is on convex valley walls dissected by shallow gullies. The areas receive runoff from higher adjacent soils.

Typically, the surface layer is dark brown gravelly silt loam 5 inches thick. The subsurface layer is friable, brown gravelly silt loam 10 inches thick. The subsoil is 21 inches thick. The upper 6 inches of the subsoil is firm, dark brown silty clay loam; the lower 15 inches is mottled, very firm, dark brown silty clay. The substraum is dark brown silty clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat poorly drained Rhinebeck soils along drainageways. Also included are small areas of Collamer and Dunkirk soils, a few areas of severely eroded soils, and areas of soils that have steep slopes.

This soil has a temporary seasonal high water table in the lower part of the subsoil. Permeability is moderate to moderately slow in the surface and subsurface layers and slow in the subsoil and substratum. The rooting depth is 2 feet and is restricted somewhat by the seasonal high water table and the clayey subsoil. Available water capacity is moderate to high. Organic matter content is medium to low in the surface layer. In unlimed areas the surface layer and subsoil are medium acid to neutral.

This soil has fair potential for farming. Crops such as small grains, corn, and hay are grown in support of dairy operations. Many areas are used for hay, pasture, or woodland.

If runoff and erosion are controlled, this soil is suited to row crops grown in the area. Contour tillage and stripcropping used in combination with diversions and grassed waterways are practices that control erosion. Eroded areas are cloddy and subject to crusting if plowed at an improper moisture content. The surface layer has good tilth. Tillage at optimum moisture content, minimum tillage, incorporating crop residue into the soil, and using cover crops and sod crops in the cropping system help to maintain tilth. Interceptor drains that

divert runoff and subsurface seepage help eliminate temporary wetness in the spring.

This soil is suited to pasture. Prevention of overgrazing and compaction are the major concerns of pasture management. Overgrazing and compaction of the surface layer result in increased runoff and erosion. Proper stocking rates, pasture rotation, yearly mowing to help control weeds and brush, and restricted grazing when the soil is wet are chief management needs.

This soil is suited to woodland. The use of heavy equipment is restricted during excessively wet periods. Logging roads and skid trails placed on the contour where possible help to reduce the erosion hazard.

The main limitations of this soil for most nonfarm uses are the seasonal high water table, the slow permeability of the subsoil and substratum, and slope. Capability subclass IIIe.

LnB—Lansing gravelly silt loam, 3 to 8 percent slopes. This deep, well drained, gently sloping or undulating soil is in areas dissected by shallow drainageways and is on hilltops.

Typically, the surface layer is dark grayish brown gravelly silt loam 7 inches thick. The subsurface layer is very friable, brown silt loam 4 inches thick. The next layer is 6 inches thick. It is a mixture of the subsurface layer and subsoil and consists of friable, pale brown gravelly silt loam. The subsoil is friable and firm, brown gravelly silt loam 21 inches thick. The substratum is firm, dark grayish brown gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Conesus soils on foot slopes. Also included are wet spots of Appleton soils along drainageways, a few areas of soils that have bedrock within 40 inches of the surface, and areas of nongravelly soils.

A seasonal high water table is at a depth of 3 to 6 feet in this soil for brief periods in spring. Permeability is moderate in the surface layer and subsoil and slow in the substratum. Available water capacity is moderate to high. Runoff is moderate to slow. Organic matter content is low. In unlimed areas the surface layer is strongly acid to slightly acid.

This soil has good potential for farming. Cultivated areas are used for corn, small grains, hay, pasture, and dry beans. Areas near Seneca Lake are primarily used for grapes.

This soil is well suited to most forage and field crops commonly grown in the county. It is among the better soils in the county for farming. Gravel fragments in the surface layer are a slight limitation for some tillage and harvesting operations, but the soil is easily cultivated. If random drainage is used on the wetter included soils, the areas can be plowed fairly early in the spring. Erosion is a moderate hazard, especially on long slopes. Stripcropping, contour tillage, minimum tillage, and returning crop residue to the soil are practices that control erosion. Crops that provide a cover in winter help to maintain tilth and control erosion.

This soil is suited to early-season pasture. Prevention of overgrazing is the major concern of pasture management. Overgrazing causes loss of pasture and generally results in increased runoff and erosion. Use of proper stocking rates, rotation of pastures, and yearly mowing to help control weeds and brush are the chief pasture management needs.

This soil is suited to woodland. Machine planting of tree seedlings is practical on large areas of this soil.

This soil is suited to many nonfarm uses. Slow permeability in the substratum and the seasonal high water table in early spring are limitations for some nonfarm uses. Capability subclass IIe.

LnC—Lansing gravelly silt loam, 8 to 15 percent slopes. This deep, well drained, sloping soil is in convex areas that occasionally receive runoff from higher adjacent soils.

Typically, the surface layer is dark grayish brown gravelly silt loam 5 inches thick. The subsurface layer is very friable, brown silt loam 3 inches thick. The next layer is 7 inches thick. It is a mixture of the subsurface layer and the subsoil and consists of friable, pale brown gravelly silt loam. The subsoil is friable and firm, brown gravelly silt loam 21 inches thick. The substratum is firm, dark grayish brown gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter Conesus and Appleton soils near drainageways and on toe slopes and small areas of soils in the north-central part of the county that have a finer textured subsoil and contain more shale fragments than this Lansing soil. Also included are a few areas of soils that have bedrock within 40 inches of the surface.

A seasonal high water table is at a depth of 3 to 6 feet in this soil for brief periods in early spring. Permeability is moderate in the surface layer and subsoil and slow in the substratum. Available water capacity is moderate to high. Runoff is moderate to rapid. Organic matter content is low. In unlimed areas the surface layer is strongly acid to slightly acid.

This soil has fair potential for farming. Cultivated areas are used for small grains, corn, and hay in support of dairying. Areas near Seneca Lake are primarily used for grapes and other small fruits.

This soil is suited to all crops grown in the area, but contour tillage, contour stripcropping, and diversions are needed to control runoff and erosion. Gravel fragments in the surface layer are a slight limitation for tillage operations, but the soil is fairly easy to keep in good tilth. Incorporating crop residue into the soil, minimum tillage, and use of cover crops help to maintain tilth and improve organic matter content.

This soil is suited to early-season pasture, especially to deep-rooted forage crops. Prevention of overgrazing is

the major concern of pasture management. Topdressing the soil with lime and fertilizer, maintaining a permanent plant cover to prevent erosion, use of proper stocking rates, rotation of pastures, and yearly mowing to help control brush and weeds are the chief management needs.

This soil is suited to woodland. Logging roads and skid trails placed on the contour where possible help to reduce the erosion hazard.

The main limitations of this soil for nonfarm uses are slope and the slow permeability of the substratum. The seasonal high water table in early spring is a limitation for some uses. Capability subclass IIIe.

LnD—Lansing gravelly silt loam 15 to 25 percent slopes. This deep, well drained, moderately steep soil is on valley sides and hillsides on uplands. The areas receive runoff from higher adjacent soils.

Typically, the surface layer is dark grayish brown gravelly silt loam 5 inches thick. The subsurface layer is very friable, brown silt loam 2 inches thick. The next layer is 6 inches thick. It is a mixture of the subsurface layer and the subsoil and consists of friable, pale brown gravelly silt loam. The subsoil is friable and firm, brown gravelly silt loam 21 inches thick. The substratum is firm, dark grayish brown gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter Conesus soils on toe slopes. Also included are small areas of soils with a nongravelly surface layer, small areas of eroded soils, small areas of soils with slopes of more than 25 percent, and a few areas of soils that have bedrock within 40 inches of the surface.

A seasonal high water table is at a depth of 3 to 6 feet in this soil for brief periods in early spring. Permeability is moderate in the surface layer and subsoil and slow in the substratum. Root growth is restricted by the substratum. Available water capacity is moderate to high. Runoff is rapid. Organic matter content is low. In unlimed areas the surface layer is strongly acid to slightly acid.

This soil has poor potential for farming. Many areas are used for small grains, hay, or pasture. Areas near Seneca Lake are primarily used for grapes and other small fruits.

This soil is poorly suited to cultivated crops. The operation of farm equipment is difficult and hazardous because of slope, and the hazard of erosion is severe. If this soil is cultivated, a protective plant cover needs to be maintained for as long as possible and management practices such as minimum tillage, use of cover crops, and return of crop residue to the soil are needed to improve tilth and control runoff. If slope permits, contour tillage and stripcropping can be used to control erosion.

This soil is suited to pasture, especially for early-season grazing. It is well suited to deep-rooted legumes as part of the seeding mixture. Plowing across the slope and leaving strips of sod help to control runoff and erosion. Periodic renovation to reestablish seeding, additions of lime and fertilizer, prevention of overgrazing, use of proper stocking rates, rotation of pastures, and yearly mowing to help control weeds and brush are the major pasture management needs.

This soil is suited to woodland. Logging roads and skid trails placed on the contour where possible help to reduce runoff and erosion.

The main limitations of this soil for nonfarm uses are the slow permeability of the substratum and slope. The seasonal high water table in early spring is a limitation for some uses. Capability subclass IVe.

LoB—Lordstown channery silt loam, 3 to 8 percent slopes. This gently sloping, well drained soil is on hilltops and ridges at the highest elevations in the county.

Typically, the surface layer is dark grayish brown channery silt loam 6 inches thick. The subsoil is friable, channery silt loam 18 inches thick. It is yellowish brown in the upper 6 inches and brownish yellow in the lower 12 inches. The substratum is pale brown very channery silt loam 6 inches thick. Fine-grained sandstone bedrock is at a depth of 30 inches.

Included with this soil in mapping are small areas of somewhat poorly drained Tuller soils in slight depressions and along drainageways. Also included are a few spots of Arnot soils that have bedrock at a depth of less than 20 inches and small areas of deeper Bath soils.

The depth to bedrock in this soil is 20 to 40 inches. Permeability is moderate in the subsoil and substratum. The rooting depth is determined by the depth to bedrock. Available water capacity is moderate to low. Runoff is moderate. Organic matter content is low. In unlimed areas the surface layer and subsoil are commonly very strongly acid to medium acid.

This soil has good to fair potential for farming. Many areas are idle or in woodland.

This soil is suited to cultivated crops that tolerate a short growing season. Tillage and cultivation are limited in places by small stone fragments in the surface layer. The soil tends to be droughty, and crops that mature early in the year are more dependable. Frequent applications of lime and fertilizer, minimum tillage, use of cover crops, incorporating crop residue into the soil, contour tillage, and mulching are needed to improve tilth, conserve moisture, and control the erosion hazard.

This soil is suited to pasture, particularly for early-spring grazing. Plant growth is very slow by midsummer, and care must be taken to prevent overgrazing in that period. Proper stocking rates, pasture rotation, weed and brush control, and adequate applications of lime and fertilizer are the chief pasture management needs.

This soil is suited to woodland. Machine planting of tree seedlings is practical on large areas of this soil.

This soil is limited for many nonfarm uses by the moderate depth to bedrock. Capability subclass IIe.

LoC—Lordstown channery silt loam, 8 to 15 percent slopes. This sloping, well drained soil is on upper shoulder slopes of hilltops and ridgetops at the highest elevations in the county.

Typically, the surface layer is very friable, dark grayish brown channery silt loam 4 inches thick. The subsoil is friable, yellowish brown and brownish yellow channery silt loam 20 inches thick. The substratum is friable, pale brown very channery silt loam 6 inches thick. Massive, fine-grained sandstone bedrock is at a depth of 30 inches.

Included with this soil in mapping are small areas of somewhat poorly drained Tuller soils along smaller drainageways. Also included are areas of Bath soils that have bedrock at a depth of more than 40 inches and a few shallow areas of Arnot soils.

Bedrock is at a depth of 20 to 40 inches in this soil. Permeability is moderate in the subsoil and substratum. The rooting depth is determined by the depth to bedrock. Available water capacity is moderate to low. Runoff is moderate to rapid. Organic matter content is low. In unlimed areas the surface layer and subsoil are commonly very strongly acid to medium acid.

This soil has fair potential for farming. Some areas are used for hay and pasture and for row crops in support of dairy operations. Most of the acreage is in woodland.

This soil is suited to crops that tolerate a short growing season. Tillage and cultivation are slightly limited in places by small stone fragments in the surface layer. This soil is usually droughty by midsummer, and crops that mature early in the year are more dependable. Erosion is severe if the soil is cultivated and not protected. Frequent applications of lime and fertilizer are needed. Minimum tillage, use of cover crops, incorporating crop residue into the soil, stripcropping, using diversions and contour tillage, and mulching help to improve tilth, conserve moisture, and control runoff.

This soil is suited to early-season pasture. Droughtiness makes plant growth sparse by midsummer, and care must be taken to prevent overgrazing in that period. Proper stocking rates, pasture rotation, weed and brush control, and adequate applications of lime and fertilizer are the chief management needs.

This soil is suited to woodland. Machine planting of tree seedlings is practical on large areas.

This soil is limited for many nonfarm uses by the moderate depth to bedrock and slope. Many areas overlooking Seneca Lake or the larger valleys have esthetic value. Capability subclass IIIe.

LoD—Lordstown channery silt loam, 15 to 25 percent slopes. This moderately steep, well drained soil is on side slopes of valley walls that receive runoff from adjacent higher soils.

Typically, the surface layer is dark grayish brown channery silt loam 2 inches thick. The subsoil is friable channery silt loam 20 inches thick. It is yellowish brown in the upper part and brownish yellow in the lower part. The substratum is pale brown very channery silt loam 4 inches thick. Fine-grained sandstone bedrock is at a depth of 26 inches.

Included with this soil in mapping are pockets of Bath soils where the depth to bedrock is more than 40 inches. Also included are small areas of Arnot soils where the depth to bedrock is less than 20 inches and a few areas of moderately deep soils with a fine textured subsoil.

The depth to bedrock in this soil is 20 to 40 inches. Permeability is moderate in the subsoil and substratum. The rooting depth is determined by the depth to bedrock. Available water capacity is moderate to low. Runoff is rapid. Organic matter content is low. In unlimed areas the surface layer and subsoil are commonly very strongly acid to medium acid.

This soil has poor potential for farming. It is used mostly for pasture, hay, and woodland.

This soil is poorly suited to farming because of the hazard of erosion and slope, which limits the use of machinery. Crops on this soil have a short growing season. In places, tillage operations are difficult because of included areas of shallow soils and small stone fragments in the surface layer. The soil is usually droughty by midsummer. Minimum tillage, use of cover crops, incorporating crop residue into the soil, using diversions and contour tillage, and mulching help to improve tilth, conserve moisture, and control runoff and erosion.

This soil is suited to early-season pasture. Plant growth is sparse by midsummer because of droughtiness. Care must be taken to prevent overgrazing in midsummer, because overgrazing increases the hazard of erosion and competition from weeds. Proper stocking rates, pasture rotation, weed and brush control, and adequate applications of lime and fertilizer are the main management needs; slope limits yearly mowing and application of lime and fertilizer in places.

This soil is suited to woodland. Machine planting is limited by slope.

This soil is limited for many nonfarm uses by the moderate depth to bedrock and by slope. Many areas overlooking Seneca Lake and large valleys have esthetic value. Capability subclass IVe.

LTE—Lordstown-Arnot complex, steep. This complex consists of steep, moderately deep, well drained Lordstown soils and steep, shallow, well drained Arnot soils. The soils are in long, narrow areas on upper valley walls. In most areas, bedrock forms a series of wide steps that are covered with soil material to form a smooth slope. A thin covering of Arnot soils is at the edge of each bedrock step, and the moderately deep soil between the steps is mainly Lordstown soils. Slope ranges from 25 to 35 percent. The Lordstown soils make up about 45 percent of this complex, the Arnot soils about 40 percent, and included soils about 15 percent.

These soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Lordstown soils is dark grayish brown channery silt loam 2 inches thick. The subsoil is friable, channery silt loam 20 inches thick. It is yellowish brown in the upper part and brownish yellow in the lower part. The substratum is pale brown very channery silt loam 2 inches thick. Fine-grained sandstone bedrock is at a depth of 24 inches.

Typically, the surface layer of the Arnot soils is dark gray channery silt loam 2 inches thick. The subsoil is 13 inches thick. It is strong brown channery silt loam in the upper 3 inches and yellowish brown very channery silt loam in the lower 10 inches. Sandstone bedrock is at a depth of 15 inches.

Included with these soils in mapping are areas of Bath soils where bedrock is at a depth of more than 40 inches. Also included are areas of soils that have bedrock at a depth of less than 10 inches and a few areas of rock outcrop.

The Lordstown soils have bedrock at a depth of 20 to 40 inches, and the Arnot soils at a depth of 10 to 20 inches. The rooting depth is determined by the depth to bedrock. Available water capacity is generally low in the soils. Permeability is moderate in both soils. Runoff is rapid. Organic matter content is low. In unlimed areas the surface layer and subsoil are very strongly acid to medium acid.

This complex has poor potential for farming and fair potential for pasture. Most areas are in woodland, and the soils are suited to this use.

These soils are not suited to cultivated crops. Slopes are too steep for farm machinery. Droughtiness and small stone fragments in the surface layer are other major limitations for farming. Erosion is a hazard if the surface is not protected by a plant cover.

These soils are suited to long-term pasture, but a plant cover needs to be maintained and grazing controlled to protect the soils from erosion. These soils are droughty. Reseeding and applying lime and fertilizer are difficult because of the steep slopes.

These soils are limited for most nonfarm uses by the shallow to moderate depth to bedrock and by slope. Capability subclass VIIe.

LTF—Lordstown-Arnot complex, very steep. This complex consists of very steep, moderately deep, well drained Lordstown soils and very steep, shallow, well drained Arnot soils. The soils are in broad, long areas along valley walls below the crests of hilltops and ridges. In most areas, bedrock forms a series of wide steps that are covered with soil material to form a smooth slope. A thin covering of Arnot soils is at the edge of each bedrock step, and the deeper soil between the steps is mainly Lordstown soils. Slope ranges from 35 to 70 percent. This complex is about 45 percent Lordstown soils, 40 percent Arnot soils, and 15 percent included soils. These soils are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Lordstown soils is dark grayish brown channery silt loam 2 inches thick. The subsoil is friable, channery silt loam 18 inches thick. It is yellowish brown in the upper part and brownish yellow in the lower part. The substratum is pale brown very channery silt loam 5 inches thick. Fine-grained sandstone bedrock is at a depth of 23 inches.

Typically, the surface layer of the Arnot soils is dark gray channery silt loam 2 inches thick. The subsoil is 12 inches thick. It is strong brown channery silt loam in the upper 3 inches and yellowish brown very channery silt loam in the lower 9 inches. Sandstone bedrock is at a depth of 14 inches.

Included with these soils in mapping are areas of Bath soils where bedrock is at a depth of more than 40 inches. Also included are areas of rock outcrop.

The Lordstown soils have bedrock at a depth of 20 to 40 inches, and the Arnot soils at a depth of 10 to 20 inches. The rooting depth is determined by the depth to bedrock. Permeability is moderate in both soils. Available water capacity is generally low. Runoff is very rapid. Organic matter content is low. In unlimed areas the surface layer and subsoil of both soils are very strongly acid to medium acid.

This complex has very poor potential for farming but is suited to controlled grazing. Most areas are in woodland, a use to which the soils are suited.

These soils are not suitable for crops because of very steep slopes. The soils can be used for controlled grazing, but protection from overgrazing is needed. The hazard of erosion is very severe in areas that have a sparse plant cover. Pastures are of poor quality because of droughtiness and the extreme difficulty of reseeding. The very steep slopes prevent use of most farm machinery for applying fertilizers and reseeding.

These soils are too steep for most urban uses. Some areas have potential for recreation. Most areas are better suited to use for natural open areas and wildlife habitat. Capability subclass VIIs.

Ma—Madalin silt loam. This deep, poorly drained and very poorly drained soil is on broad flats or along narrow drainageways in the basins of former glacial lakes. This soil is nearly level, and water ponds on the soil or runs off the soil very slowly. The areas receive large amounts of runoff from surrounding higher soils. Slope ranges from 0 to 3 percent.

Typically, the surface layer is very dark gray heavy silt loam 8 inches thick. The subsoil is 20 inches thick. The upper 2 inches of the subsoil is mottled, friable, dark gray light silty clay loam; the next 7 inches is mottled, firm, gray silty clay loam; and the lower 11 inches is mottled, firm, dark gray silty clay. The substratum extends to a depth of 60 inches or more. It is firm, dark

gray silty clay to a depth of 45 inches and brown and gray silty clay loam at a depth of more than 45 inches.

Included with this soil in mapping are small areas of slightly better drained Rhinebeck soils on rises and benches. Also included are small areas of Canandaigua soils, areas of soils where the subsoil is underlain by loamy glacial till, and small areas of soils that have a mucky surface layer.

This soil has a high water table at or near the soil surface for prolonged periods. Water is often ponded on the surface early in spring and in other excessively wet periods. Permeability is slow in the subsoil and slow or very slow in the substratum. The rooting depth is mainly confined to the upper part of the subsoil and is restricted by the prolonged high water table and the firm, clayey subsoil. Available water capacity is high. Runoff is intermittently ponded to very slow. Organic matter content is high in the surface layer. In unlimed areas the surface layer is medium acid to neutral.

Most areas of this soil are idle or support water-tolerant shrubs and trees. The cleared areas are used for low-grade pasture and grasses. This soil has poor to fair potential for farming and urban uses; it has better potential for wildlife habitat, ponds, and natural open areas.

This soil is suited to cultivated crops if it is drained and protected from ponding; undrained areas are too wet for crops. A combination of surface and tile drainage is needed on this soil. Because of the slow permeability, drains need to be close to each other. The main limitation for drainage is a lack of adequate outlets. If the soil is cultivated when wet, hard clods or crusts form at the surface; if the soil is cultivated when dry, seed germination and crop growth are poor. Minimum tillage, using cover crops, and incorporating crop residue into the soil help to maintain the organic matter content and tilth.

This soil is suited to pasture. Undrained areas cannot be grazed in spring because of the likely damage to the surface layer. Overgrazing and compaction of the surface layer cause a loss of desired plant species and ponding on the surface layer. Partial drainage, proper stocking rates, pasture rotation, yearly mowing to help control brush and weeds, and restricted grazing when the soil is wet are the major pasture management needs.

This soil is suited to water-tolerant trees such as red maple and eastern hemlock. The use of logging equipment is restricted during excessively wet periods. Planting of tree seedlings should be delayed until the water table recedes.

The main limitations for most nonfarm uses of this soil are the high water table and the slowly permeable subsoil. Some areas are suitable for wetland wildlife habitat. Capability subclass IVw.

MrB—Mardin channery silt loam, 3 to 8 percent slopes. This deep, moderately well drained, gently sloping soil is in convex areas on uplands. The areas receive runoff from adjacent soils.

Typically, the surface layer is dark grayish brown channery silt loam 8 inches thick. The subsoil is 43 inches thick. The upper 10 inches of the subsoil is yellowish brown, friable channery silt loam and light olive brown channery loam; the middle 3 inches is mottled, light brownish gray channery silt loam; the lower 30 inches is a very firm fragipan of olive brown gravelly loam. The substratum is very firm, olive brown very gravelly loam to a depth of more than 60 inches.

Included with this soil in mapping are small areas of somewhat poorly drained Volusia soils in slight depressions and along drainageways. Also included are small areas of better drained Bath soils on slight rises and knolls, areas of Schuyler soils, and a few areas of soils that have bedrock within 40 inches of the surface.

In spring and other excessively wet periods, a seasonal high water table is perched above the fragipan in this soil. Depth to the fragipan ranges from 14 to 26 inches. Permeability is moderate above the fragipan and slow and very slow in the fragipan and substratum. Roots are mostly confined to the zone above the fragipan. Available water capacity is moderate to low. Runoff is moderate. Organic matter content is low to medium. In unlimed areas the surface layer and upper part of the subsoil are extremely acid to slightly acid.

This soil has good potential for farming. Cultivated areas are used for small grains, corn, and hay. Most of the acreage of the soil is cultivated or in small woodlots.

This soil is suited to cultivated crops commonly grown in the area. The surface layer contains many flat stone fragments that hinder tillage and harvesting operations but that do not prevent cultivation. Large applications of lime are needed to establish and grow legumes. This soil is not suited to continuous cultivation. Contour tillage, stripcropping, use of cover crops, and using diversions to break long slopes help to control runoff and erosion. Drainage of wetter included soils by random tile drains allows early planting and more uniform field management. Minimum tillage, cover crops, incorporating crop residue into the soil, and mulching are needed to increase water infiltration during the growing season and to maintain tilth.

This soil is suited to pasture. Prevention of overgrazing and restriction of grazing when the soil is wet are the main pasture management concerns. The soil compacts if grazed when wet. Overgrazing and compaction of the surface layer restrict plant growth and increase runoff. Measures are needed to increase infiltration, mainly during the growing season. Adequate applications of lime and fertilizer, proper stocking rates, pasture rotation, and yearly mowing to help control brush and weeds are the main management needs.

This soil is suited to woodland. Machine planting of tree seedings is feasible in open areas.

The main limitations for nonfarm uses of this soil are the temporary seasonal high water table and the slow or

very slow permeability of the fragipan and substratum. Capability subclass IIw.

MrC—Mardin channery silt loam, 8 to 15 percent slopes. This deep, moderately well drained, sloping soil is in convex or long, smooth areas that receive runoff from higher adjacent soils.

Typically, the surface layer is dark grayish brown channery silt loam 5 inches thick. The subsoil is 44 inches thick. The upper 10 inches of the subsoil is yellowish brown, friable channery silt loam and light olive brown channery loam; the middle 3 inches is mottled, light brownish gray channery silt loam; the lower 31 inches is a very firm fragipan of olive brown gravelly loam. The substratum is very firm, olive brown very gravelly loam to a depth of more than 60 inches.

Included with this soil in mapping are small areas of somewhat poorly drained Volusia soils along drainageways. Also included are areas of Schuyler soils in the southwestern part of the county, better drained Bath soils, and soils that have bedrock at a depth of less than 40 inches.

A seasonal high water table is perched above the fragipan of this soil in the spring and other excessively wet periods. Depth to the fragipan ranges from 14 to 26 inches. Permeability is moderate above the fragipan and slow or very slow in the fragipan and substratum. The rooting depth is mostly confined to the zone above the fragipan. Available water capacity is moderate to low. Organic matter content is low to medium. Runoff is moderate to rapid. In unlimed areas the surface layer and upper part of the subsoil are extremely acid to slightly acid.

This soil has fair potential for farming. Most of the acreage is in pasture, hay, or woodland. Cultivated areas are used for small grains or corn.

This soil is suited to general row crops if erosion and runoff are controlled. The surface layer contains many flat stone fragments that hinder tillage and harvesting equipment, and the moisture content is inadequate for plants during dry periods. Contour tillage, stripcropping, use of cover crops, and keeping tillage to a minimum reduce erosion, conserve moisture, and maintain tilth. Diversions are needed to help break up long slopes and divert runoff from other areas. Areas where conservation practices cannot be applied are better suited to deep-rooted legumes. Large applications of lime and fertilizer are needed to maintain legume stands and increase plant growth.

This soil is suited to pasture. Overgrazing reduces plant growth, and grazing when the soil is wet compacts the surface layer. Both result in increased runoff and erosion. Applications of lime and fertilizer are required to assure good growth of legumes and other grass mixtures. Measures that increase infiltration, particularly during the dry summer months, are needed. Proper stocking rates, pasture rotation, yearly mowing to control weeds and brush, and restricted grazing when the soil is wet are the chief management needs.

This soil is suited to woodland. Placing logging roads on the contour where possible helps to control runoff and erosion.

The main limitations for most nonfarm uses of this soil are the seasonal high water table, the slow or very slow permeability of the fragipan, and slope. Capability subclass IIIe.

MrD—Mardin channery silt loam, 15 to 25 percent slopes. This deep, moderately well drained, moderately steep soil is in narrow, oblong areas on side slopes of a dissected plateau. The areas receive runoff from higher adjacent soils.

Typically, the surface layer is dark grayish brown channery silt loam 4 inches thick. The subsoil is 42 inches thick. The upper 10 inches of the subsoil is yellowish brown, friable channery silt loam and light olive brown channery loam; the middle 3 inches is mottled, light brownish gray channery silt loam; the lower 29 inches is a very firm fragipan of olive brown channery silt loam. The substratum is very firm, olive brown very gravelly loam to a depth of more than 60 inches.

Included with this soil in mapping are small areas of somewhat poorly drained Volusia soils along drainageways and at the base of slopes where seepage water comes to the surface. Also included are areas of finer textured Schuyler soils in the southwestern part of the county and small areas of severely eroded soils.

In spring a seasonal high water table is perched above the fragipan of this soil. The fragipan is at a depth of 14 to 26 inches. Permeability is moderate above the fragipan and slow or very slow in the fragipan and substratum. The rooting depth is restricted to the zone above the fragipan. Runoff is rapid. Available water capacity is moderate to low. Organic matter content is low to medium. In unlimed areas the surface layer and upper part of the subsoil are extremely acid to slightly acid.

This soil has fair to poor potential for farming. It is used for hay, pasture, and woodland.

This soil is limited for cultivated crops by slope, rapid runoff, and the hazard of erosion. The use of farm machinery is difficult and hazardous. The soil is not suited to frequent cultivation. Minimum tillage, use of cover crops, and diversions that break up long slopes and divert excess runoff are needed to control erosion and increase water infiltration during the growing season. If slopes permit, contour tillage and stripcropping are suitable for this soil. Difficulty in tilling this soil and the hazard of erosion make long-term sod crops more practical than other crops. Large amounts of lime and fertilizer are needed to maintain good plant growth.

This soil is suited to pasture. The natural fertility is low; therefore, lime and fertilizer are necessary to maintain productivity. Plowing across the slope and leaving strips of sod help to control erosion and increase infiltration

during the reseeding process. Prevention of overgrazing, proper stocking rates, pasture rotation, restricted grazing when the soil is wet, and yearly mowing to help control weeds and brush are the major pasture management requirements.

This soil is suited to woodland. Placing logging roads and skid trails on the contour where possible helps to reduce the erosion hazard.

This soil is limited for most nonfarm uses by the slow or very slow permeability of the fragipan and substratum, the moderately steep slopes, and seasonal wetness. Capability subclass IVe.

OCF—Ochrepts-Orthents complex, very steep. This complex consists of deep, somewhat excessively drained, unconsolidated soil material in areas dissected by deep, steep-sided streams. In many areas this material is very thick, as much as 8 to 10 feet, but it is as thin as 4 feet where the streams have cut into bedrock. Slopes are commonly near 100 percent but range from 35 to 100 percent. The soil has a tendency to slip or slump downslope, especially where the stream undercuts the soil deposit. The Ochrepts and Orthents make up about equal parts of this unit and are so intermingled that it was not practical to map them separately. A few small areas in this unit have rock outcrop ledges and spots where the soil material is less than 4 feet thick.

These soils have undergone very little development and vary from place to place in the texture and types of layers in the soil. The soils in this complex have little or no potential for farming or other uses. Capability subclass VIIIs.

OdA—Odessa silt loam, 0 to 3 percent slopes. This deep, somewhat poorly drained, nearly level soil is in areas of former glacial lakes. The areas receive runoff from higher adjacent soils.

Typically, the surface layer is very dark grayish brown silt loam 9 inches thick. The subsurface layer is mottled, friable, brown silt loam 3 inches thick. The upper 4 inches of the subsoil is mottled, firm, reddish brown silty clay loam. The lower 12 inches of the subsoil is mottled, firm, dark reddish gray silty clay. The substratum is firm, dark reddish gray and dark grayish brown silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter Madalin soils along drainageways. Also included are spots of better drained Schoharie soils on slight rises and knolls and small areas of Collamer soils.

A seasonal high water table is perched in the upper part of the subsoil of this soil in the spring and other excessively wet periods. Permeability is slow or very slow in the subsoil and very slow in the substratum. The rooting depth is restricted by the seasonal high water table and the firm, clayey subsoil. Most roots are confined to a depth of 20 inches. Available water capacity is moderate to high. Runoff is slow. Organic matter content is medium to high. In unlimed areas the surface layer is medium acid to neutral and the subsoil is medium acid to mildly alkaline.

This soil has fair potential for farming. In some areas cultivated crops such as small grains, corn, and hay are grown in support of dairy farming.

This soil is suited to cultivated crops. Unless the soil is drained, planting is delayed in the spring and the choice of crops is restricted. Removing excess water, maintaining tilth, and diverting runoff from surrounding soils are the main management concerns. Because this soil has very slow internal drainage, a system of closely spaced tile drains or a combination of surface and tile drainage is needed. This soil is somewhat sticky when wet and hard when dry. Good tilth is difficult to maintain. If the soil is worked when wet, the surface becomes cloddy and crusty. Plowing at the proper moisture content, using cover crops, incorporating crop residue into the soil, and minimum tillage help to maintain tilth.

This soil is suited to late spring pasture or summer pasture when the soil is not wet. Prevention of overgrazing and restriction of grazing when the soil is wet are the major pasture management concerns. This soil compacts if grazed during excessivly wet periods. Undrained areas are better suited to forage crops, such as birdsfoot trefoil, which tolerate wetness. Proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are the chief management needs.

This soil is suited to woodland. The use of heavy equipment during excessively wet periods causes compaction.

This soil is limited for many nonfarm uses by the seasonal high water table, the slow or very slow permeability of the subsoil, and the clayey subsoil. Capability subclass IIIw.

OdB—Odessa silt loam, 3 to 8 percent slopes. This deep, somewhat poorly drained, gently sloping soil is in slightly convex areas in former glacial lake plains. The areas receive runoff from higher adjacent soils.

Typically, the surface layer is very dark grayish brown silt loam 8 inches thick. The subsurface layer is friable, brown silt loam 4 inches thick. The subsoil is 16 inches thick. The upper 4 inches of the subsoil is mottled, firm, reddish brown silty clay loam; the lower 12 inches is mottled, firm, dark reddish gray silty clay. The substratum is firm, dark reddish gray and dark grayish brown silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are spots of wetter soils in slight depressions and along drainageways. Also included are areas of better drained Schoharie soils on slight rises and knolls, small areas of better drained Collamer soils, and areas of eroded soils.

In spring and other excessively wet periods, the water table in this soil is perched in the upper part of the subsoil. Permeability is slow or very slow in the subsoil and very slow in the substratum. The rooting depth is

restricted by the seasonal high water table and the firm, clayey subsoil. Most roots extend to a depth of 20 inches. Available water capacity is moderate to high. Runoff is slow. Organic matter content is medium to high. In unlimed areas the surface layer is medium acid to neutral and the subsoil is medium acid to mildly alkaline.

This soil has fair potential for farming. Cultivated crops such as small grains, corn, and hay are grown in some areas. Many areas are used for pasture and woodland.

This soil is suited to most crops grown in the area. Unless the soil is drained, wetness delays spring planting and limits the choice of crops. This hazard of erosion is moderate if the soil is cultivated and not protected. Because this soil has slow internal drainage, drains must be closely spaced. Generally, some combination of open drains and tile drains is suitable. Interceptor drains help to control runoff from other areas. In some places random drainage of included wet spots with tile is needed to make management of fields more uniform. Practices that control erosion and wetness include contour tillage, stripcropping, and using diversions and cover crops. If this soil is worked when wet, the surface layer becomes cloddy and crusty. Plowing at the proper moisture content, incorporating crop residue into the soil, and minimum tillage help to maintain tilth.

This soil is suited to late spring pasture or summer pasture. Undrained areas are better suited to forage crops, such as birdsfoot trefoil, which tolerate some wetness. Prevention of overgrazing and restriction of grazing when the soil is wet are the major management concerns. This soil compacts if grazed when wet. Proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are the main management needs.

This soil is suited to woodland. The use of heavy equipment is restricted during excessively wet periods. Placing logging trails on the contour where possible helps to control erosion.

This soil is limited for many nonfarm uses mainly by the seasonal high water table and the slow or very slow permeability of the subsoil. The clayey subsoil is a limitation for some uses. Capability subclass IIIw.

Pa—Palms muck. This deep, very poorly drained, nearly level soil is in small, undrained closed depressions throughout the county. The areas commonly border areas of deeper muck deposits. Slope is mostly less than 2 percent but ranges to as much as 3 percent.

Typically, the top layer is black, well decomposed organic material 21 inches thick. The underlying material is light gray light silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of deep Carlisle muck. Also included are small areas of soils where the organic layer is less than 16 inches deep.

This soil has a water table at or near the surface much of the time. The soil is subject to frequent flooding and ponding. Permeability is moderate or moderately rapid in the organic layer and moderate or moderately slow in the underlying material. The rooting depth is determined by the depth to the water table but is mainly 10 inches. Available water capacity is high. Runoff is very slow to occasionally ponded. Organic matter content is very high. In unlimed areas the organic layer is strongly acid to neutral.

This soil has poor potential for farming. The soil supports water-tolerant grasses, reeds, sedges, and brush. It has fair potential for wetland wildlife habitat.

Undrained areas of this soil are too wet for farming. Many areas are adjacent to lakes or ponds and are very difficult to drain. Before estimating the farming potential of the soil, onsite investigation is needed to determine the depth of organic material and feasibility of drainage.

This soil is suited to water-tolerant trees such as red maple and eastern hemlock. Most trees establish themselves on windthrow mounds. Wetness makes planting of tree seedlings generally unfeasible.

The main limitations of this soil for nonfarm uses are the prolonged high water table and frequent flooding. Some sites can be developed for wetland wildlife habitat. Capability subclass VIw.

Ph—Philo silt loam. This deep, moderately well drained, nearly level soil is on flood plains. Slope ranges from 0 to 3 percent.

Typically, the surface layer is dark grayish brown silt loam 10 inches thick. The subsoil is 25 inches thick. The upper 14 inches of the subsoil is brown silt loam that is mottled in the lower part; the middle 7 inches is mottled, firm, brown gravelly silt loam; the lower 4 inches is firm, grayish brown gravelly loam. The substratum is friable, grayish brown very gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter Atkins soils in remnant drainageways, depressions, and slackwater areas. Also included are areas of well drained soils on slight rises and spots of soils with a gravelly surface layer.

In the spring and during wet periods, this soil has a seasonal high water table in the lower part of the subsoil. Flooding sometimes occurs for brief periods during spring and other excessively wet periods. Permeability is moderate to moderately slow in the subsoil and moderately rapid to rapid in the substratum. Depth of rooting is restricted by the water table and is mainly 2 feet. Available water capacity is moderate to high. Runoff is slow. Organic matter content is high. In unlimed areas the surface layer and subsoil are strongly acid to medium acid.

This soil has good potential for farming. Cultivated areas are used for corn, small grains, and hay. Some areas are pastured.

This soil is well suited to crops. Flooding and wetness in early spring are the main limitations. Drainage of included low wet spots by land smoothing and tile drainage is suitable, but drainage outlets are difficult to establish in places. Streambank protection and channel improvement are needed in places to protect the soil from flood damage.

This soil is suited to late-spring grazing or summer grazing. Prevention of overgrazing and restriction of grazing when the soil is wet are the major concerns. This soil compacts if pastured when wet. Seeding with varieties that can tolerate short periods of wetness, use of proper stocking rates, rotation of pastures, and yearly mowing to control weeds and brush are the main management requirements.

This soil is suited to woodland. The use of heavy equipment is restricted during excessively wet periods.

The main limitations for most nonfarm uses of this soil are the temporary seasonal high water table and periodic flooding. Capability subclass IIw.

Pt—Pits, gravel. This unit consists of open excavations used for mining sand and gravel. These excavations range from 4 to 30 feet in depth and from a few acres to 75 acres. The sides are generally nearly vertical, and the bottoms are nearly level.

These areas have little farming potential. Most of the areas are in a sparse cover of native vegetation. Several have potential for community development. Capability subclass not assigned.

Rh—Red Hook gravelly silt loam. This deep, somewhat poorly drained, nearly level soil is in low lying areas near streams and in depressional areas on outwash terraces. Some areas of this soil receive runoff from adjacent soils.

Typically, the surface layer is very dark grayish brown gravelly silt loam 7 inches thick. The upper part of subsoil is mottled, friable, pale brown gravelly loam 7 inches thick. The lower part of subsoil is mottled, friable, grayish brown gravelly sandy loam 12 inches thick. The substratum is grayish brown very gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Castile soils on slight rises and very poorly drained Halsey soils in low lying depressions. Also included are small areas of Atkins soils on flood plains.

This soil has a seasonal high water table in the upper part of the subsoil in spring and other excessively wet periods. Permeability is moderate in the subsoil and moderate to moderately rapid in the substratum. The rooting depth depends on the depth to the water table but is mainly 20 inches. Available water capacity is low to moderate. Runoff is slow. Organic matter content is medium. In unlimed areas the surface layer and subsoil are strongly acid to slightly acid.

This soil has fair potential for farming. Cleared areas are used for corn, small grains, hay, or pasture. Many undrained areas are pastured, idle, or wooded.

If drained, this soil is suited to most crops commonly grown in the area. Undrained areas are better suited to hay or pasture plants, such as birdsfoot trefoil and timothy, which can tolerate spring wetness. Seasonal wetness and ponding in a few areas after heavy rains are the main limitations. Tile and open-ditch drainage are suitable for this soil, but in many places adequate outlets are hard to establish. Runoff from higher adjacent soils needs to be diverted. Minimum tillage, incorporating crop residue into the soil, using cover crops, and tillage at the proper moisture content help to maintain tilth and improve organic matter content.

This soil is suited to summer pasture. Prevention of overgrazing and restriction of grazing when the soil is wet are the major management concerns. Proper stocking rates, pasture rotation, and yearly mowing to control weeds and brush are the major management requirements.

This soil is suited to woodland. Tree seedling mortality is reduced if planting is delayed to allow the water table to recede in late spring. The use of heavy equipment is restricted during excessively wet periods.

The main limitation of this soil for most nonfarm uses is the seasonal high water table. In some areas, rare flooding is a hazard. Capability subclass IIIw.

RnA—Rhinebeck gravelly silt loam, 0 to 3 percent slopes. This deep, somewhat poorly drained, nearly level soil is in the basins of old glacial lakes. The areas receive runoff from the surrounding soils. Slope ranges from 0 to 3 percent.

Typically, the surface layer is very dark grayish brown gravelly silt loam 9 inches thick. The subsurface layer is mottled, firm, grayish brown silty clay loam. The subsoil is 28 inches thick. The upper 19 inches of the subsoil is mottled, firm, brown silty clay; the lower 9 inches is firm, mottled, brown silty clay loam. The substratum is brown heavy silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of poorly drained and very poorly drained Madalin soils along drainageways. Also included are small areas of better drained Collamer soils on knolls and small areas of soils that have a surface layer of silt loam or silty clay loam.

A seasonal high water table is perched in the upper part of the subsoil of this soil in spring and other excessively wet periods. Water is ponded on some areas for short periods. Permeability is slow in the subsoil and substratum. The rooting depth is restricted by the seasonal high water table and the firm, clayey subsoil and is mainly 20 inches. Available water capacity is moderate to high. Runoff is slow. Organic matter content is medium to high. In unlimed areas the surface layer and subsoil are medium acid to neutral.

This soil has fair potential for farming. Cultivated crops such as small grains, corn, and hay are grown in support of dairy operations.

Drainage is generally needed for cultivated crops on this soil. Undrained areas are limited to short-term crops, hay, and pasture. Spring planting is delayed and harvesting in the fall is difficult in undrained areas. Crops in depressions are damaged during prolonged wet periods. Areas where the clayey subsoil is exposed are subject to crusting and ponding. A system of closely spaced tile drains or a combination of surface and tile drainage is needed. Diverting runoff from surrounding areas is a needed practice in this soil. Plowing at the proper moisture content, using cover crops, incorporating crop residue into the soil, and minimum tillage help to maintain tilth and increase organic matter content.

This soil is suited to late-spring pasture or summer pasture. Undrained areas are best suited to water-tolerant forage crops such as birdsfoot trefoil and timothy. Prevention of overgrazing and restriction of grazing when the soil is wet are the major management concerns. This soil compacts if grazed during excessively wet periods. Proper stocking rates, pasture rotation, and adequate weed and brush control are the chief management needs.

This soil is suited to woodland. Use of heavy equipment during excessively wet periods compacts the surface and subsurface layers.

This soil is limited for many nonfarm uses mainly by the seasonal high water table and the slowly permeable subsoil. Gravel in the surface layer is a limitation for some uses. Capability subclass IIIw.

RnB—Rhinebeck gravelly silt loam, 3 to 8 percent slopes. This deep, somewhat poorly drained, gently sloping soil is in the basins of old glacial lakes. The areas receive runoff from higher adjacent soils. Slope ranges from 3 to 8 percent.

Typically, the surface layer is very dark grayish brown gravelly silt loam 6 inches thick. The subsurface layer is mottled, firm, grayish brown silty clay loam 8 inches thick. The subsoil is 28 inches thick. The upper 19 inches of the subsoil is mottled, firm, brown silty clay; the lower 9 inches is mottled, firm, brown silty clay loam. The substratum is brown heavy silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of poorly drained and very poorly drained Madalin soils in slight depressions and along drainageways. Also included are spots of better drained Hudson soils on slight rises and knolls and areas of soils with a surface layer of silty clay loam or silt loam.

In spring and other excessively wet periods, the water table in this soil is perched in the upper part of the subsoil. Permeability is slow in the subsoil and substratum. The rooting depth is restricted by the water table and the firm, clayey subsoil, and it is mainly 20 inches. Runoff is slow. Organic matter content is medium to high. In unlimed areas the surface layer and subsoil are medium acid to neutral.

This soil has fair potential for farming. Cultivated crops such as small grains, corn, and hay are grown. Many areas are used for pasture and woodland.

This soil is suitable for crops commonly grown in the area. Wetness is the main limitation. Unless this soil is drained, wetness delays planting and limits the choice of crops. The hazard of erosion is moderate if the soil is cultivated and not protected. Crops in wet pockets are damaged during prolonged wet periods. In places where the clayey subsoil is exposed, the surface layer is subject to crusting and ponding. Response to tile drains is variable, and a combination of surface and tile drainage is needed. In some places random drainage of wet spots with tile drains is suitable; in other areas interceptor drains are needed to divert runoff from adjacent soils. Practices that control erosion include contour tillage, stripcropping, and using cover crops. Plowing within the proper moisture content, incorporating crop residue into the soil, and minimum tillage help to maintain tilth and increase organic matter content.

This soil is suited to late-spring pasture or summer pasture. Undrained areas are best suited to forage crops, such as birdsfoot trefoil and timothy, which tolerate wetness. Prevention of overgrazing and restriction of grazing when the soil is wet are the major management concerns. This soil compacts if grazed during excessively wet periods. Proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are the chief management needs.

This soil is suited to woodland. Use of heavy logging equipment is restricted during excessively wet periods.

This soil is limited for many nonfarm uses mainly by the seasonal high water table and the slowly permeable subsoil. Gravel in the surface layer limits the soil for some uses. Capability subclass IIIw.

ROF—Rock outcrop-Arnot complex, very steep. This complex consists of rock ledges and very steep, well drained, shallow Arnot soils on nearly perpendicular walls and gorges. The height of the side walls, or depth of most gorges, ranges from 50 feet to more than 200 feet. Slope ranges from 35 to 70 percent. Rock outcrop makes up 50 percent of the unit, Arnot soils 40 percent, and included soils 10 percent. The Rock outcrop and Arnot soils are in such an intricate pattern that it was not practical to map them separately.

Typically, the surface layer of the Arnot soils is dark grayish brown channery silt loam or channery loam 2 inches thick. The subsoil is 11 inches thick. The upper part of the subsoil is friable, strong brown channery silt loam, and the lower part is friable, yellowish brown very channery silt loam. Sandstone bedrock is at a depth of 13 inches.

Included with this soil in mapping are small areas of soils where bedrock is within 10 inches of the surface. Also included are a few areas of Lordstown soils that have bedrock at a depth of 20 to 40 inches and areas that have accumulations of soil and rock fragments at the base of rock outcrop ledges.

The Arnot soil has bedrock at a depth of 10 to 20 inches. The rooting depth is determined by the depth to bedrock, which varies from 0 to 20 inches in this complex. Runoff is rapid. Permeability is moderate in the soil material. Available water capacity and organic matter content are low. In unlimed areas the surface layer and subsoil of the Arnot soils are very strongly acid to medium acid.

This complex has no potential for farming or urban uses. Woodland, recreation, and wildlife habitat are the major potential uses of the complex. All areas are in natural vegetation.

The gorges in this complex have esthetic value. Scattered stands of timber are on parts of the complex, but steepness makes it impossible to manage the stand (fig. 7). Capability subclass VIIIs.

ScB3—Schoharie silty clay loam, 3 to 8 percent slopes, severely eroded. This deep, moderately well drained to well drained, gently sloping or undulating soil in on glacial lake plains. This soil receives runoff from higher adjacent soils.

Typically, the surface layer is dark grayish brown silty clay loam 6 inches thick. The subsoil is mottled, firm, reddish brown silty clay 29 inches thick. The substratum is firm, reddish brown silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat poorly drained Odessa soils in slight depressions and along drainageways. Also included are small areas of Collamer and Dunkirk soils, moderately deep Schoharie Variant soils in some areas near bedrock escarpments, soils in some concave areas that have a surface layer of silt loam, and areas of soils that are not eroded.

In spring and other excessively wet periods, this soil has a seasonal high water table in the lower part of the subsoil. Permeability is slow or very slow in the subsoil and substratum. Most roots are confined to a depth of 2 feet by the clayey subsoil and the seasonal high water table. Available water capacity is moderate. Runoff is medium. Organic matter content is low. In unlimed areas the surface layer is medium acid to neutral. The upper part of the subsoil is neutral, and the lower part is mildly alkaline.

This soil has fair potential for farming. Cultivated crops such as corn and small grains are grown in some areas. The soil is used for grapes and other fruit crops. Some cleared areas are used for hay or pasture, and some areas are idle or wooded.

This soil is suited to most crops commonly grown in the county, but it requires careful management. The main limitations are the high clay content of the surface layer and the severe hazard of erosion. The surface layer is sticky when wet and hard when dry, and the soil is susceptible to continued erosion if not protected by plant cover. Cultivating and planting when the soil is at the proper moisture content assures germination. Additions of organic matter help to improve tilth and increase available water capacity. In some places random drainage of included wet spots with tile drains is required. Diversion terraces control runoff and help to break up long slopes. Diversion terraces and contour tillage, contour stripcropping, minimum tillage, and incorporating crop residue into the soil reduce the erosion hazard and help maintain tilth. Plowing, tillage, and general traffic need to be restricted if the soil is wet.

This soil is suited to late-spring pasture. Prevention of overgrazing and restriction of grazing when the soil is wet are the major management concerns. This soil compacts if grazed when wet. A plant cover is needed to prevent further erosion. Proper stocking rates, rotation of pastures, and yearly mowing to help control weeds and brush are main management needs.

This soil is suited to woodland. Use of heavy equipment is restricted during excessively wet periods.

The main limitations of this soil for most nonfarm uses are the slow and very slow permeability of the subsoil, instability of the clayey material, and seasonal wetness. Care should be taken to protect this soil from erosion during construction periods. Many areas of the soil near Seneca Lake have esthetic value. Capability subclass IIIe.

ScC3—Schoharie silty clay loam, 8 to 15 percent slopes, severely eroded. This deep, moderately well drained to well drained, sloping or rolling soil is in dissected areas of glacial lake plains. Gullies are prominent in many areas. The soil receives runoff from higher adjacent soils.

Typically, the surface layer is dark grayish brown silty clay loam 4 inches thick. The subsoil is mottled, firm, reddish brown silty clay 29 inches thick. The substratum is firm, reddish brown silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat poorly drained Odessa soils along drainageways. Also included are areas of moderately deep Schoharie Variant soils adjacent to bedrock escarpments, spots of Collamer and Dunkirk soils, and small areas of uneroded soils.

In spring and other excessively wet periods, this soil has a seasonal water table in the lower part of the subsoil. Permeability is slow or very slow in the subsoil and substratum. The rooting depth is mainly 2 feet and is restricted by the clayey subsoil and the seasonal high water table. Available water capacity is moderate. Runoff

is rapid. Organic matter content is low. In unlimed areas the surface layer is medium acid to neutral. The subsoil is neutral in the upper part and mildly alkaline in the lower part.

This soil has fair to poor potential for farming. Crops such as corn, small grains, and hay are grown in a few areas. Other cleared areas are used for pasture or are idle, and some areas are used for grapes and other fruit crops.

This soil is limited for most cultivated crops by erosion and the high clay content in the surface layer. The surface layer is sticky when wet and hard when dry. Sod crops are needed in the cropping system to protect the soil from further erosion. Cultivation and planting when the soil is at the proper moisture content assure germination. This soil clods easily if worked when too wet. Tilth is difficult to maintain. Minimum tillage, cover crops, incorporating crop residue into the soil, and tillage at the proper moisture content help to increase organic matter content and improve tilth. Contour tillage, contour stripcropping, and using diversions help to reduce runoff and control erosion. The operation of machinery is limited in some areas by rills and gullies.

This soil is suited to late-spring pasture. The soil compacts if grazed during excessively wet periods. Overgrazing and compaction of the surface layer restrict plant growth and increase runoff and erosion. Maintenance of a plant cover, proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are the main management needs.

This soil is suited to woodland. The use of heavy equipment is restricted during excessively wet periods. Placing logging roads and skid trails on the contour helps control erosion.

The main limitations of this soil for most nonfarm uses are the slow or very slow permeability of the subsoil, slope, instability of the clayey material, and the seasonal high water table. Many areas of this soil have esthetic qualities. Capability subclass IVe.

ScD3—Schoharie silty clay loam, 15 to 25 percent slopes, severely eroded. This deep, moderately well drained to well drained, moderately steep soil is in small, narrow belts in dissected areas of the lake plains near Seneca Lake. The soil receives runoff from higher adjacent soils.

Typically, the surface layer is dark grayish brown silty clay loam 3 inches thick. The subsoil is mottled, firm, reddish brown silty clay 29 inches thick. The substratum is firm, reddish brown silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are spots of Dunkirk soils. Also included are small areas of Schoharie Variant soils where bedrock is within 40 inches of the surface and areas of soils that have short, steep and very steep slopes.

In spring and other excessively wet periods, this soil has a seasonal high water table in the lower part of the subsoil for very brief periods. Permeability is slow or very slow in the subsoil and substratum. The rooting depth is mainly 2 feet. Available water capacity is moderate. Runoff is rapid or very rapid. Organic matter content is low. In unlimed areas the surface layer is medium acid to neutral. The subsoil is neutral in the upper part and mildly alkaline in the lower part.

This soil has poor potential for farming. Most cleared areas are used for pasture or are idle. The remaining acreage is wooded.

This soil is poorly suited to cultivated crops. Slope and the hazard of erosion are the main limitations. Areas where machinery can be safely operated are suitable for hay, and deep-rooted legumes such as alfalfa and birdsfoot trefoil are well suited to this soil.

This soil is suited to permanent summer pasture. Compaction is a concern if the soil is grazed during wet periods. Reseeding by renovation, incorporating plant residue into the soil, and topdressing open, well sodded areas with fertilizer are suitable pasture management practices. Grazed areas need a plant cover to prevent further erosion and deterioration of tilth. Proper stocking rates, pasture rotation, restricted grazing during excessively wet periods, and yearly mowing to control weeds and brush are major management needs.

This soil is suited to woodland. Placing logging roads and skid trails on the contour helps to control erosion. The surface layer is sticky and slippery when wet, and the use of heavy logging equipment is restricted.

The main limitations of this soil for most nonfarm uses are the slow or very slow permeability of the subsoil, moderately steep slopes, and instability of the clayey material. Many areas overlooking Seneca Lake have esthetic value. Capability subclass VIe.

ShC3—Schoharie Variant silty clay loam, 8 to 15 percent slopes, severely eroded. This moderately deep, moderately well drained to well drained, sloping soil is in narrow belts on dissected lake plains. The areas receive runoff from higher adjacent soils.

Typically, the surface layer is dark grayish brown silty clay loam 6 inches thick. The subsoil is 18 inches thick. The upper 12 inches of the subsoil is firm, reddish brown silty clay loam; the lower 6 inches is mottled, firm, reddish brown heavy silty clay loam. Hard sandstone bedrock is at a depth of 24 inches.

Included with this soil in mapping are small areas of wetter soils along drainageways. Also included are areas of deeper Schoharie soils between gullies and near the top of slopes and a few areas of uneroded soils.

In spring and other excessively wet periods, this soil has a seasonal high water table in the lower part of the subsoil. Bedrock is at a depth of 20 to 40 inches. Permeability is slow or very slow in the subsoil. The root depth is mainly 2 feet. Available water capacity is moderate to

low. Runoff is medium to rapid. Organic matter content is low. In unlimed areas the surface layer and subsoil are medium acid to neutral.

This soil has fair to poor potential for farming. A few areas are used for small grains. Some areas are in hay or pasture, are wooded or idle, and are used for orchard crops.

This soil is poorly suited to most cultivated crops. A severe hazard of erosion and the high clay content of the surface layer are the main limitations. The soil clods if worked when wet, and tilth is difficult to maintain. Cultivation and planting when the soil is at the proper moisture content assure seed germination and reduce clodding. The soil needs a protective plant cover. Diversion terraces help to control runoff. Diversion terraces and stripcropping, minimum tillage, and incorporation of crop residue into the soil help to reduce the erosion hazard and improve tilth. Sod-forming crops are needed in the cropping system to control erosion.

This soil is suited to late-spring pasture and summer pasture. It compacts if grazed during excessively wet periods. Overgrazing and compaction of the surface layer restrict plant growth and increase runoff and erosion. Maintenance of plant cover, proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are the main management needs.

This soil is suited to woodland. Placing logging roads and skid trails on the contour help to control erosion. The use of heavy equipment during excessively wet periods causes compaction.

The main limitations of this soil for nonfarm uses are the moderate depth to bedrock, the slow or very slow permeability of the subsoil, and slope. Capability subclass IVe.

ShD3—Schoharie Variant silty clay loam, 15 to 25 percent slopes, severely eroded. This moderately deep, moderately well drained to well drained, moderately steep soil is in narrow belts on a dissected lake plain. The soil receives runoff from higher adjacent soils.

Typically, the surface layer is dark grayish brown silty clay loam 4 inches thick. The subsoil is firm, reddish brown silty clay loam 18 inches thick. The lower part of the subsoil is mottled. Hard sandstone bedrock is at a depth of 22 inches.

Included with this soil in mapping are areas of Schoharie soils that have bedrock at a depth of more than 40 inches. Also included are soils with short, steep and very steep slopes; areas where gullies are so eroded that the bedrock is exposed; and areas of soils where bedrock is within 20 inches of the surface.

In spring and other excessively wet periods, this soil has a seasonal high water table above the bedrock for brief periods. Bedrock is at a depth of 20 to 40 inches. Permeability is slow or very slow in the subsoil. The rooting depth is mainly 2 feet or is restricted by bedrock. Available water capacity is moderate to low. Runoff is rapid or very rapid. Organic matter content is low. In unlimed areas the surface layer and subsoil are medium acid to neutral.

This soil has poor potential for farming. It is used mainly for pasture or woodland. A few areas are used for grapes and fruit trees.

This soil is poorly suited to cultivated crops. The hazard of erosion and slope are the main limitations. The soil is suited to hay in areas where machinery can be safely operated, but slope and the gullies that formed from erosion make the operation of equipment difficult in many areas. This soil needs a permanent plant cover to prevent further erosion.

This soil is suited to permanent pasture. It can be grazed in late spring and during the summer. Reseeding by renovation and returning plant residue to the soil are suitable management practices. Open, well sodded areas can be topdressed with fertilizer. Maintenance of plant cover, restricted grazing during wet periods, proper stocking rates, rotation of pastures, and yearly mowing help control brush and weeds are the main management needs.

This soil is suited to woodland. Placing logging roads and skid trails on the contour and avoiding clearcutting help to reduce the erosion hazard.

The main limitations of this soil for nonfarm uses are the moderate depth to bedrock, the slow or very slow permeability of the subsoil, and moderately steep slopes. Some areas overlooking Seneca Lake have esthetic value. Capability subclass VIe.

SyC—Schuyler silt loam, 8 to 15 percent slopes. This deep, moderately well drained, sloping soil is on hilltops that receive little or no runoff and on upper side slopes that receive runoff from higher adjacent slopes.

Typically, the surface layer is dark brown silt loam 9 inches thick. The subsoil is 29 inches thick. The upper 13 inches of the subsoil is mottled, friable, olive brown and light olive brown silt loam; the next 8 inches is mottled, firm, olive channery silt loam; and the lower 8 inches is mottled, firm, gray very channery silt loam. The substratum is gray very channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter Fremont soils along drainageways and on lower toe slopes. Also included are small areas of moderately deep, finer textured Hornell soils that have shale bedrock within 40 inches of the surface and areas of soils with a surface layer of channery silt loam.

This soil has a seasonal high water table in spring and during excessively wet periods. The water table is perched above the substratum. Permeability is moderate or moderately slow in the subsoil and slow in the substratum. In spring the rooting depth is somewhat restricted by the seasonal high water table. Available water capacity is moderate to high. Organic matter content is medium to low. Runoff is medium to rapid. In unlimed

areas the surface layer and subsoil are extremely acid to medium acid.

This soil has fair potential for farming. Cultivated areas are used for small grains, corn, and hay or are used for pasture.

This soil is suited to general row crops commonly grown in the county, but careful management is needed to control runoff and erosion and maintain tilth. The use of large tillage and harvesting equipment is limited by slope. Because of rapid runoff, droughtiness is a concern during dry periods. Contour tillage, stripcropping, and diversions that intercept runoff can be used to help control erosion and increase water infiltration during the summer. Incorporating crop residue into the soil, minimum tillage, cultivating at the proper moisture content, and use of cover crops help to maintain tilth. Using sod crops in the cropping system and heavy application of lime and fertilizer are suitable management practices.

This soil is suited to late-spring grazing. Overgrazing and compaction are the major concerns of management. Maintenance of a sod cover to control erosion, proper stocking rates, pasture rotation, restricted grazing during wet periods, and yearly mowing to help control brush and weeds are the main management needs.

This soil is suited to woodland. The use of heavy equipment is restricted during excessively wet periods. Placing logging roads and skid trails on the contour where possible reduces gullying.

The main limitations for most nonfarm uses of this soil are the slow permeability of the substratum, seasonal wetness, and slope. Capability subclass IIIe.

SyD—Schuyler silt loam, 15 to 25 percent slopes. This deep, moderately well drained, moderately steep soil is in narrow strips on the side slopes of hills. The soil receives runoff from higher adjacent soils.

Typically, the surface layer is dark brown silt loam 6 inches thick. The subsoil is 30 inches thick. The upper 14 inches is mottled, friable, olive brown and light olive brown silt loam; the next 8 inches is mottled, firm, olive channery silt loam; and the lower 8 inches is mottled, firm, gray very channery heavy silt loam. The substratum is gray very channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter Fremont soils along drainageways. Also included are small areas of finer textured Hornell soils that have shale bedrock within 40 inches of the surface, a few areas of soils that have a weak fragipan in the lower part of the subsoil, and areas of soils with a surface layer of channery silt loam.

A seasonal high water table is in the subsoil of this soil in early spring and during excessively wet periods. Permeability is moderate or moderately slow in the subsoil and slow in the substratum. In spring the rooting depth is 2 feet. Available water capacity is high to moderate. Organic matter content is medium to low. Runoff is rapid. In unlimed areas the surface layer and subsoil are extremely acid to medium acid.

This soil has poor potential for farming. Most cleared areas are used for hay or pasture.

This soil is limited for cultivated crops by moderately steep slopes, rapid runoff, and a severe erosion hazard. The operation of farm equipment is difficult and hazardous because of the steep slopes. If this soil is cultivated, a protective plant cover is needed for as long as possible. Management practices such as minimum tillage, use of cover crops, and using diversions to divert runoff are suitable for controlling erosion. If slopes permit, contour tillage and stripcropping are also suitable practices. Crops respond well to heavy applications of lime and fertilizer.

This soil is suited to pasture. The natural fertility and lime content are low; therefore, periodic plowing to reestablish the stands and incorporate lime and fertilizer is necessary to maintain productivity. Plowing across the slope and leaving strips of sod help to control runoff and erosion. Prevention of overgrazing, proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are the major pasture management requirements.

This soil is suited to woodland. Placing logging roads and skid trails on the contour where possible prevents gullying.

This soil is limited for many nonfarm uses by the slowly permeable substratum, moderately steep slopes, and seasonal high water table. Capability subclass IVe.

SyE—Schuyler silt loam, 25 to 35 percent slopes. This deep, moderately well drained, steep soil is in narrow strips on the side slopes of hills and valleys. The areas receive runoff from higher adjacent soils.

Typically, the surface layer is dark brown silt loam 3 inches thick. The subsoil is 27 inches thick. The upper 10 inches of the subsoil is friable, mottled, olive brown and light olive brown silt loam; the middle 9 inches is mottled, firm, olive channery heavy silt loam; and the lower 8 inches is mottled, firm, gray very channery silt loam. The substratum is gray very channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of soils with a surface layer of channery silt loam. Also included are small areas of soils that have a subsoil of silty clay and a few areas of soils that have a weak fragipan in the lower part of the subsoil.

A seasonal high water table is in the subsoil of this soil for brief periods in early spring. Permeability is moderate or moderately slow in the subsoil and slow in the substratum. The rooting depth is mostly 2 feet, but some roots extend to a depth of more than 2 feet during midsummer. Available water capacity is moderate to high. Organic matter content is medium to low. Runoff is rapid. In unlimed areas the surface layer and subsoil are extremely acid to medium acid.

This soil has poor potential for farming. Many areas are wooded, and some areas are idle or in pasture.

This soil is not suited to cultivated crops. Steep slopes and a severe erosion hazard are the main limitations. The slope is too steep for safe use of farm machinery.

This soil is suited to permanent pasture, but vegetative cover needs to be maintained and grazing controlled to protect the soil from erosion. Large applications of lime and fertilizer are needed, but applying fertilizer and reseeding are limited by the steep slopes. This soil tends to be droughty because of the rapid rate of runoff.

This soil is suited to woodland. On disturbed areas such as logging roads and skid trails, the erosion hazard is severe. Harvesting timber is limited by the steep slopes.

This soil is limited for many nonfarm uses by the slowly permeable substratum and steep slopes. Capability subclass VIe.

Te—Teel silt loam. This deep, moderately well drained to somewhat poorly drained, nearly level soil is on flood plains of the larger meandering creeks in the county. Slope ranges from 0 to 3 percent.

Typically, the surface layer is dark grayish brown silt loam 10 inches thick. The upper part of the subsoil is friable, dark brown silt loam 6 inches thick. The lower part of the subsoil is friable, brown silt loam 16 inches thick and is mottled in the lower part. Next is an older, buried soil that is 12 inches thick. It is friable, very dark grayish brown silt loam in the upper part and mottled, very dark brown silt loam in the lower part. The substratum is olive gray loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of poorly drained and very poorly drained Wayland soils in slight depressions and along remnant drainageways. Also included are areas of soils on slight rises or berms that are better drained than this Teel soil.

This soil has a seasonal high water table in the subsoil in the spring and other wet periods. The water table is influenced by the level of the adjacent stream. Flooding is common in the spring in some years. Permeability is moderate in the subsoil and substratum. In spring, roots are restricted by the water table, but later in the growing season the rooting depth extends to 30 inches or more. Available water capacity is high. Runoff is slow. Organic matter content is high. In unlimed areas the surface layer and subsoil are medium acid to neutral.

This soil has good potential for farming. Cultivated areas are used for small grains, hay, and corn and other vegetables. Many areas are in pasture.

This soil is suited to cultivated crops. Periodic flooding and seasonal wetness are the main limitations to use, and if drainage is needed, outlets are often difficult to establish. Lowering the adjacent stream channel generally improves drainage. In places, land shaping is needed to improve surface drainage. This soil is suitable for nearly continuous row cropping, especially where the soil is moderately well drained. Dikes to control flooding, streambank protection, and channel improvement are needed in some places.

This soil is suited to late-spring grazing and summer grazing. Prevention of overgrazing and restriction of grazing when the soil is wet are the major pasture management concerns. This soil compacts if pastured when wet. Seeding with a mixture of water-tolerant varieties, using proper stocking rates and pasture rotation, and yearly mowing to control weeds and brush are the main management requirements.

This soil is suited to woodland. The use of heavy equipment is restricted during excessively wet periods.

The main limitations for most nonfarm uses of this soil are the seasonal high water table and periodic flooding. Some areas are a good source of topsoil. Capability subclass IIw.

TuB—Tuller channery silt loam, 3 to 8 percent slopes. This shallow, somewhat poorly drained to poorly drained, gently sloping soil is in areas that receive runoff and subsurface seepage from higher adjacent areas.

Typically, the surface layer is dark grayish brown channery silt loam 7 inches thick. The subsoil is mottled, friable, grayish brown channery silt loam and very channery silt loam 11 inches thick. Fine-grained sandstone bedrock is at a depth of 18 inches.

Included with this soil in mapping are areas of better drained Arnot soils on knolls. Also included are spots of soils that are of deeper or shallower to bedrock than this Tuller soil.

This soil has a seasonal high water table in the subsoil during spring and other wet periods. Bedrock is at a depth of 10 to 20 inches. Permeability is moderately slow or slow in the subsoil. Available water capacity is low. Runoff is moderate. The rooting depth is confined to the depth to bedrock. Organic matter content is medium to high in the surface layer. In unlimed areas the surface layer ranges from strongly acid to very strongly acid.

This soil has poor potential for farming. Most of the cleared areas are used for long-term hay or pasture. Many areas are idle land that is slowly reverting to woodland.

Undrained areas of this soil are not suited to cultivated crops. Drainage outlets and tile installations are extremely difficult to establish because of the shallow depth to bedrock. With adequate drainage, this soil is suited to some crops grown in the area. Using diversions, sod waterways, and contour tillage helps to control erosion and wetness. Interceptor drains are suitable in some areas for diverting runoff from surrounding soils. Small stone fragments in the surface layer limit tillage and harvesting. Minimum tillage, cover crops, and incorporating crop residue into the soil help to improve tilth and maintain organic matter content. Droughtiness is a concern in midsummer.

This soil is suited to pasture and hay. Prevention of overgrazing and restriction of grazing when the soil is wet or droughty are the major concerns of pasture management. The low available water capacity of the soil causes sparse stands by midsummer. Proper stocking rates, pasture rotation, weed and brush control, and adequate applications of lime and fertilizer are the chief management needs.

This soil is suitable for woodland. Wetness and small stone fragments in the surface layer interfere with machine planting of trees.

This soil is limited for many nonfarm uses by the seasonal high water table, slow or moderately slow permeability of the subsoil, and shallow depth to bedrock. Capability subclass IVw.

TuC—Tuller channery silt loam, 8 to 15 percent slopes. This shallow, somewhat poorly drained to poorly drained, sloping soil is on lower side slopes that receive runoff and subsurface seepage from higher adjacent soils.

Typically, the surface layer is dark grayish brown channery silt loam 5 inches thick. The subsoil is 10 inches thick. The upper part of the subsoil is mottled, friable, grayish brown channery silt loam; the lower part is mottled, firm, grayish brown very channery silt loam. Fine-grained sandstone bedrock is at a depth of 15 inches.

Included with this soil in mapping are small, slightly higher areas of better drained Arnot and Lordstown soils. Also included are areas of soils that are deeper or shallower to bedrock than this Tuller soil and a few areas of rock outcrop.

A seasonal high water table is in the subsoil of this soil during spring and other prolonged wet periods. Bedrock is at a depth of 10 to 20 inches. Permeability is moderately slow or slow in the subsoil. Available water capacity is low. Runoff is moderate to rapid. The rooting depth is confined to the depth to bedrock. Organic matter content is medium to high. In unlimed areas the surface layer ranges from strongly acid to very strongly acid.

This soil has poor farming potential. Most of the cleared areas are used for long-term pasture. Woodlots are common, and areas of idle land are slowly reverting back to woodland.

This soil is limited for crops by the shallow depth to bedrock and the difficulty in establishing adequate drainage. If the soil is used for cultivated crops, it needs to be drained, adequately limed and fertilized, and protected from erosion. Small stone fragments in the surface layer interfere with cultivation. In some areas wetness in spring can be reduced by diverting runoff from adjacent soils. Diverisons, open ditches, contour tillage, and stripcropping help to control erosion and wetness. Minimum tillage, use of cover crops, and incorporating crop residue into the soil are needed to maintain tilth and increase organic matter content. In most years droughtiness is a concern in midsummer.

This soil is better suited to pasture or hay than to cultivated crops. It is not suited to early-season pasture because of wetness. Prevention of overgrazing and restriction of grazing when the soil is wet or droughty are the major concerns of pasture management. The low available water capacity of the soil makes stands sparse by midsummer. Proper stocking rates, pasture rotation, weed and brush control, and adequate applications of lime and fertilizer are the chief management needs.

This soil is suitable for woodland. Wetness and small stone fragments in the surface layer interfere with machine planting of trees. Placing logging roads and skid trails on the contour helps control erosion.

This soil is limited for most nonfarm uses by slope, shallow depth to bedrock, seasonal wetness, and moderately slow or slow permeability in the subsoil. Capability subclass IVw.

UD—Udorthents, smoothed. This unit consists of areas that have been altered by grading for housing developments, industrial sites, and other construction purposes. Soil material is generally excavated from these areas and stockpiled for final grading and topdressing. Some areas are filled with soil and rock material trucked from other sites, and the material is leveled. This soil material shows little or no development, and texture and drainage vary considerably from one area to another.

These areas have little potential for farming. Most areas require onsite investigation to determine the feasibility of proposed uses. Capability subclass not assigned.

VaB—Valois gravelly silt loam, 3 to 8 percent slopes. This deep, well drained, gently sloping soil is on knolls and small undulating hills. The areas receive runoff from higher adjacent soils.

Typically, the surface layer is dark brown gravelly silt loam 8 inches thick. The subsoil is 40 inches thick. In sequence from the top, it is 8 inches of very friable, dark yellowish brown gravelly silt loam; 13 inches of friable, yellowish brown gravelly loam; 8 inches of friable, yellowish brown gravelly sandy loam; and 11 inches of friable, brown very gravelly sandy loam. The substratum is brown very gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter Mardin and Volusia soils along drainageways. Also included are spots of Howard soils and soils with a nongravelly surface layer.

The seasonal high water table in this soil is generally at a depth of more than 3 feet. Permeability is moderate in the surface layer and subsoil and moderate to moderately rapid in the substratum. The rooting depth is mainly 3 feet. Available water capacity is moderate. Runoff is moderate to slow. Organic matter content is low. In un-

limed areas the surface layer is very strongly acid or strongly acid.

This soil has good potential for farming. Cultivated areas are used for dry beans, corn, small grains, and alfalfa. Areas near Seneca Lake are primarily used for grapes. This soil has good potential for residential development.

This soil is well suited to all crops commonly grown in the county, especially to deep-rooted perennial crops and specialized fruits and vegetables. Lime is needed for most crops, especially legumes, and crops respond well to liberal applications of fertilizer. Erosion is a hazard if the soil is intensively cultivated and not protected by plant cover. Incorporating crop residue into the soil, minimum tillage, and cover crops help to maintain tilth and reduce erosion. Contour tillage and stripcropping also help to control erosion and conserve water during the growing season, but contour farming is limited by slope in some areas. Tile drainage of wetter included soils helps to make field management more efficient. Gravel in the surface layer hinders some tillage operations.

This soil is suited to pasture, especially to early-season grazing. During the dry summer months it tends to be droughty and plant growth is restricted. Care must be taken to prevent overgrazing during this period. Deep-rooted legumes are well suited to this soil, but applications of lime and fertilizer are required to maintain stands and assure good growth. Proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are the major management needs.

This soil is suited to woodland. Open areas are well suited to machine planting of seedlings.

This soil has few limitations for nonfarm uses. Gravel in the surface layer is a concern for some uses. Many areas are suitable for homesites. Capability subclass IIe.

VaC—Valois gravelly silt loam, 8 to 15 percent slopes. This sloping, deep, well drained soil is on lower valley sides and low, rolling hills. The landscape is commonly a series of knolls and small hills that slope in several directions. Some areas receive runoff from higher adjacent soils.

Typically, the surface layer of this soil is dark brown gravelly silt loam 6 inches thick. The subsoil is 39 inches thick. In sequence from the top, it is 9 inches of very friable, dark yellowish brown gravelly silt loam; 13 inches of friable, yellowish brown gravelly loam; 8 inches of yellowish brown gravelly sandy loam; and 9 inches of friable, brown very gravelly sandy loam. The substratum is friable, brown very gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Howard soils. Also included are spots of Mardin and Bath soils which have a dense fragipan, areas of finer textured Lansing soils, and areas of soils with a nongravelly surface layer.

The seasonal high water table in this soil is generally at a depth of more than 3 feet. Permeability is moderate in the surface layer and subsoil and moderate to moderately rapid in the substratum. The rooting depth is mainly 3 feet. Available water capacity is moderate. Runoff is moderate to rapid. Organic matter content is low. In unlimed areas the surface layer is very strongly acid or strongly acid.

This soil has fair potential for farming. Cultivated areas are used for corn, small grains, and hay. Areas near Seneca Lake are primarily used for grapes. This soil has good potential for residential development, and it is suited to woodland.

This soil is suited to most cultivated crops grown in the area. It is well suited to small fruit trees and forage crops that require good drainage and deep rooting. Intensively cultivated areas are subject to erosion. The use of tillage and harvesting equipment is slightly limited by slope and gravel in the surface layer. Areas with long slopes that can be contoured or stripcropped can be used more intensively than areas with short slopes. On short, complex slopes where contour farming is not practical, the use of sod crops is suitable. Measures that help increase infiltration and reduce erosion include minimum tillage, returning crop residue to the soil, and using winter cover crops. Applications of lime and fertilizer are required to maintain plant growth.

This soil is suited to early-season grazing. Prevention of overgrazing is the major concern of pasture management, especially during the dry summer months. Deep-rooted legumes are well suited to this soil, but liberal applications of lime and fertilizer are required to maintain stands and growth. Furrowing increases infiltration, particularly during the summer months. Proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are major management needs.

The main limitations for many nonfarm uses of this soil are slope and gravel in the surface layer. Capability subclass IIIe.

VaD—Valois gravelly silt loam, 15 to 25 percent slopes. This deep, well drained, moderately steep soil is on lower valley side slopes and hilly areas near valley bottoms. Some areas receive runoff from higher adjacent soils.

Typically, the surface layer is dark brown gravelly silt loam 4 inches thick. The subsoil is 38 inches thick. In sequence from the top, it is 8 inches of very friable, dark yellowish brown gravelly silt loam; 13 inches of friable, yellowish brown gravelly loam; 8 inches of friable, yellowish brown gravelly sandy loam; and 9 inches of brown very gravelly sandy loam. The substratum is brown very gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are spots of wetter Volusia and Mardin soils in depressions and hillside seep spots. Also included are spots of Howard soils with a

loose, gravelly substratum and small areas of Bath soils which have a dense fragipan.

In early spring the seasonal high water table in this soil is generally at a depth of more than 3 feet. Permeability is moderate in the surface layer and subsoil and moderate to moderately rapid in the substratum. Plant roots are not restricted, but the rooting depth is mainly 3 feet. Available water capacity is moderate. Runoff is rapid. Organic matter content is low. In unlimed areas the surface layer is very strongly acid or strongly acid.

This soil has fair to poor potential for farming. Cleared areas are used for small grains, hay, or pasture. Areas near Seneca Lake are primarily used for grapes.

The less sloping areas of this soil are suitable for cultivated crops, but most areas are poorly suited to farming. The moderately steep slopes make the operation of machinery difficult and hazardous. The hazard of erosion is severe if the soil is cultivated and not protected by plant cover. Because this soil tends to be droughty, deep-rooted legumes are needed in any hay seeding. Minimum tillage, cover crops, return of crop residue to the soil, and diversions help to conserve moisture and reduce erosion. If shape of the slope permits, contour tillage and stripcropping are suitable for controlling erosion. Liberal applications of lime and fertilizer are needed to maintain plant growth.

This soil is suited to pasture, especially for early-season grazing. Prevention of overgrazing during dry summer months is the major concern of pasture management. Deep-rooted legumes are suited to this soil, but applications of lime and fertilizer are required to maintain stands and assure growth. If plowing is necessary to reestablish cover, plowing across the slope and leaving strips of sod help to control runoff. Proper stocking rates, pasture rotation, and yearly mowing to control weeds and brush are major management needs.

This soil is suited to woodland. Machine planting of seedlings is difficult because of moderately steep slopes.

The main limitation of this soil for most nonfarm uses is slope. Gravel in the surface layer also limits the soil for some uses. Capability subclass IVe.

VEE—Valois soils, steep. These deep, well drained, steep soils are on lower side walls of valleys and on irregularly sloping hills near the edge of valley floors. Slope ranges from 25 to 35 percent. These areas commonly receive runoff from higher adjacent soils.

Typically, the surface layer of these soils is variable in texture and thickness. It is loam, silt loam, or fine sandy loam and is gravelly in places. It ranges to as much as several inches thick. The subsoil is about 35 inches thick. In sequence from the top, it is 7 inches of very friable, dark yellowish brown gravelly silt loam; 10 inches of friable, yellowish brown gravelly loam; 8 inches of friable, yellowish brown gravelly sandy loam; and 10 inches of friable, brown very gravelly sandy loam. The substratum is brown very gravelly sandy loam to a depth of 60 inches or more.

Included with these soils in mapping are areas of soils that are more sandy and contain more small stone fragments in the surface layer than these Valois soils. Also included are small areas of Bath soils which have a dense fragipan and a few areas of Volusia soils in seep spots.

In early spring these soils have a seasonal high water table at a depth of more than 3 feet. Permeability is moderate in the surface layer and subsoil and moderately rapid or moderate in the substratum. Plant roots are not restricted, but the rooting depth is mainly 3 feet. Available water capacity is moderate. Runoff is rapid to very rapid. Organic matter content is low. In unlimed areas the surface layer is very strongly acid or strongly acid.

These soils have poor potential for farming. Cleared areas are used for long-term hay, for permanent pasture, or are idle. Most areas are wooded.

These soils are not suited to cultivated crops. Steep slopes and erosion are the main limitations. Equipment operation is very hazardous.

These soils are better suited to permanent sod which can be managed for pasture. In areas where pasture management is practical, deep-rooted legumes are suitable in the seeding mixture. Lime and fertilizer are needed to maintain stands and assure growth, but application is difficult. The soils are droughty. Protection from overgrazing and maintaining adequate plant cover are the main management needs.

These soils are suited to woodland. Avoiding clearcutting reduces the hazard of erosion, and placing logging roads across the slope prevents gullying.

The main limitation of this soil for most nonfarm uses is slope. Capability subclass VIe.

VHF—Valois and Howard soils, very steep. This unit consists of very steep, deep, well drained Valois soils and deep, well drained to somewhat excessively drained Howard soils. The areas of the unit consist of either Valois soils or Howard soils, or both. The soils are on the sides of lower valley walls. Slope ranges from 35 to 60 percent.

Typically, the surface layer of the Valois soils is variable in texture and thickness. It is commonly dark brown gravelly silt loam 3 inches thick. The upper layer of the subsoil is very friable, dark yellowish brown gravelly silt loam 7 inches thick; the middle layer is friable, yellowish brown gravelly loam 15 inches thick; and the lower layer is friable, brown very gravelly sandy loam 9 inches thick. The substratum is brown very gravelly sandy loam to a depth of 60 inches or more.

Typically, the surface layer of the Howard soils is variable in texture and thickness. It is commonly dark brown gravelly loam 4 inches thick. The subsurface layer is friable, pale brown gravelly loam 6 inches thick. The

upper part of the subsoil is friable, brown very gravelly loam 12 inches thick; the lower part is firm, dark brown very gravelly silt loam 9 inches thick. The substratum is dark yellowish brown, stratified sand and gravel to a depth of 60 inches or more.

Included with these soils in mapping are small areas of soils that are more sandy than these Valois or Howard soils. Also included are Bath soils which have a dense fragipan and small areas of soils underlain by silty or clayey deposits.

The seasonal high water table in this unit is generally at a depth of more than 3 feet. Permeability is moderate in the subsoil of the Valois soils and moderate or moderately rapid in the subsoil of the Howard soils. Plant roots are not restricted, but the rooting depth is mainly 3 feet. Available water capacity is moderate in the Valois soils and moderate to low in the Howard soils. Runoff is rapid to very rapid. Organic matter content is low. In unlimed areas the surface layer is very strongly acid to strongly acid in the Valois soils and medium acid to neutral in the Howard soils.

These soils have very poor potential for farming. Most areas are wooded.

This unit is too steep for most uses other than woodland and recreation. Farm equipment cannot be operated safely, and the hazard of erosion is very severe. A protective vegetative cover is needed at all times to control erosion. Pasture improvement is very difficult.

These soils are suited to woodland. They are too steep to allow feasible planting of tree seedlings by machine.

In urban areas this unit is suited to use as natural open areas. Capability subclass VIIe.

VoA—Volusia channery silt loam, 0 to 3 percent slopes. This deep, somewhat poorly drained, nearly level soil commonly is on hilltops. Some lower areas of this soil receive runoff from higher adjacent soils.

Typically, the surface layer is dark grayish brown channery silt loam 9 inches thick. The subsoil is mottled, friable, pale brown channery silt loam 3 inches thick. The next layer is light grayish brown channery silt loam 2 inches thick. This is underlain by a very firm fragipan of mottled, dark grayish brown channery silt loam 34 inches thick. The substratum is firm, dark grayish brown channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter Chippewa soils in slight depressions and along drainageways. Also included are areas of Fremont soils, Erie soils, and soils where bedrock is within 40 inches of the surface.

This soil has a seasonal high water table perched above the fragipan in the spring and other excessively wet periods. The water moves laterally across the top of the fragipan and can be observed seeping from exposures such as roadcuts. Depth to the fragipan ranges from 10 to 16 inches. Permeability above the fragipan is moderate and in the fragipan is slow or very slow. The rooting depth is confined mainly to the zone above the fragipan. Available water capacity is low to moderate. Runoff is slow. Organic matter content is medium to high in the surface layer. In unlimed areas the surface layer and upper part of the subsoil are very strongly acid to slightly acid.

This soil has fair potential for farming. Cultivated areas are used for small grains, corn for silage, or hay. Many areas are in pasture. The remaining areas are idle or in woodland, and a large portion of the idle land is being planted to conifer plantations.

Undrained areas of this soil are limited to short-season crops or crops that can withstand seasonal wetness. With drainage, this soil is suited to many crops grown in the area. Some areas can be improved by diverting runoff from adjacent higher soils. In other areas a more complete drainage system, including some combination of open-ditch and tile drainage, is required. A patterned drainage system is generally not feasible because the slow internal drainage requires very close spacing of drains to be effective. Some fields can be partially improved by tile drainage of included wet spots. Tillage at the proper moisture content, fall plowing, using cover crops and minimum tillage, and incorporating crop residue into the soil are practices that help to maintain tilth and increase organic matter content. Liberal applications of lime and fertilizer are needed on this soil. Small stone fragments in the surface layer limit some tillage and harvesting operations.

This soil is suited to summer pasture. Prevention of overgrazing and restriction of grazing when the soil is wet are the major pasture management concerns. This soil compacts if grazed during excessively wet periods. Proper stocking rates, pasture rotation, yearly mowing to help control brush and weeds, and topdressing with lime and fertilizer are needed for pasture management.

This soil is suited to woodland. The use of heavy equipment during excessively wet periods severely compacts the surface layer.

This soil is limited for most nonfarm uses by the seasonal high water table and the very slow or slow permeability of the fragipan and substratum. Small stone fragments in the surface layer limit some uses. Many areas are excellent sites for dugout ponds. Capability subclass IIIw.

VoB—Volusia channery silt loam, 3 to 8 percent slopes. This deep, somewhat poorly drained, gently sloping soil is on concave uplands that receive little runoff and on lower toe slopes that receive large amounts of runoff from adjacent soils.

Typically, the surface layer is dark grayish brown channery silt loam 6 inches thick. The subsoil is mottled, friable, pale brown channery silt loam 4 inches thick. The next layer is mottled, firm, light grayish brown channery silt loam 3 inches thick. This is underlain by a very firm

fragipan of mottled, dark grayish brown channery silt loam 35 inches thick. The substratum is firm, dark grayish brown channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of wetter Chippewa soils in slight depressions and along drainageways. Also included are small areas of better drained Mardin soils on slight rises and convex knolls, areas of finer textured Fremont soils, and a few small areas of soils that have bedrock within 40 inches of the surface.

In the spring and other excessively wet periods, a seasonal high water table is perched above the fragipan. The water moves laterally on top of the fragipan and can be observed seeping from exposures such as roadcuts. Depth to the fragipan ranges from 10 to 16 inches. Permeability is moderate above the fragipan and slow or very slow in the fragipan. The rooting depth is restricted to the zone above the fragipan. Available water capacity is low to moderate. Runoff is moderate. Organic matter content is medium to high in the surface layer. In unlimed areas the surface layer and upper part of the subsoil are very strongly acid to slightly acid.

This soil has fair potential for farming. Cultivated areas are used for small grains, corn for silage, or hay. Some areas are in pasture, and some are idle or in woodland. Most of the idle land is reverting to woodland or is being planted to conifer plantations (fig. 8).

If this soil is used for cultivated crops, it needs to be heavily limed and fertilized, effectively drained, and protected from erosion. With drainage, it is suited to many crops commonly grown in the area, but plant growth is limited during long dry periods. Response to tile drainage is limited. Drains generally need to be closely spaced. Many areas can be improved by interceptor drains that divert excess runoff from adjacent higher soils. Random drains for the included wetter soils allow more uniform management of some fields. Measures that help to control erosion are contour tillage, using diversions, stripcropping, minimum tillage, and using cover crops. These practices plus plowing at the proper moisture content, returning crop residue to the soil, and using sod crops in the cropping system help to maintain tilth, increase organic matter content, and conserve moisture. Small stone fragments in the surface layer limit some tillage operations.

This soil is suited to summer pasture. Prevention of overgrazing and restriction of grazing when the soil is wet are the major pasture management concerns. This soil compacts if grazed during excessively wet periods. Overgrazing and compaction of the surface layer restrict plant growth and increase runoff. Proper stocking rates, pasture rotation, yearly mowing to help control weeds, and applications of lime and fertilizer are major management needs.

This soil is suited to woodland. Machine planting of tree seedlings is practical in open areas of this soil. The use of heavy logging equipment is restricted during excessively wet periods.

This soil is limited for many nonfarm uses by the seasonal high water table and the very slow or slow permeability of the fragipan and substratum. Small stone fragments in the surface layer limit some uses. Some areas are good sites for diked ponds. Capability subclass IIIw.

VoC—Volusia channery silt loam, 8 to 15 percent slopes. This deep, somewhat poorly drained, sloping soil is on lower hillsides and toe slopes that receive runoff from higher adjacent soils.

Typically, the surface layer is grayish brown channery silt loam 4 inches thick. The subsoil is mottled, friable, pale brown channery silt loam 5 inches thick. The next layer is mottled, firm, light grayish brown channery silt loam 3 inches thick. This is underlain by a very firm fragipan of mottled, dark grayish brown channery silt loam 36 inches thick. The substratum is dark grayish brown channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Chippewa soils where seepage water comes to the surface. Also included are small areas of moderately well drained soils on ridges, small areas of Fremont soils on toe slopes, and spots of soils that have bedrock within 40 inches of the surface.

In the spring and other excessively wet periods, a seasonal high water table is perched above the fragipan of this soil. The water commonly moves downslope across the top of the fragipan. Depth to the fragipan ranges from 10 to 16 inches. Permeability is moderate above the fragipan and very slow or slow in the fragipan. The rooting depth is confined to the zone above the fragipan. Available water capacity is low to moderate. Runoff is rapid. Organic matter content is medium to high in the surface layer. In unlimed areas the surface layer and upper part of the subsoil are very strongly acid to slightly acid.

This soil has fair to poor potential for farming. Most areas are idle or are farmed at a low level of intensity. Some large areas are wooded.

This soil is limited for cultivated crops by runoff and erosion. Plant growth is limited by a lack of moisture during long dry periods in midsummer. Many areas of this soil are better suited to hay than to row crops. Wetness delays spring planting, and undrained areas need short-term crops or water-tolerant crops. Measures that help to control erosion are contour tillage, using diversions to break up long slopes, stripcropping, using sod crops in the cropping system, minimum tillage, establishing sod waterways, and using cover crops. Wetness can be controlled by diverting runoff from adjacent soils and by using tile drains for random drainage of wet pockets and as interceptor drains to divert subsurface seepage. Minimum tillage, tillage at proper moisture

level, using cover crops, and incorporating crop residue into the soil help to maintain tilth, conserve moisture, and increase organic matter content. Crops need liberal amounts of lime and fertilizer. Small stone fragments in the surface layer limit some tillage operations.

This soil is suited to summer pasture. Prevention of overgrazing and restriction of grazing when the soil is wet are the major pasture management concerns. Grazing when the soil is wet compacts the surface layer, and overgrazing reduces plant growth. Both cause increased runoff and erosion. Growth of plants in some areas is limited during dry periods. Topdressing with lime and fertilizer, proper stocking rates, pasture rotation, and yearly mowing to help control weeds are the main management needs.

This soil is suited to northern hardwoods. Placing logging roads and skid trails on the contour reduces gullying.

This soil is limited for most nonfarm uses by the seasonal high water table, very slowly or slowly permeable fragipan and substratum, and slope. Small stone fragments in the surface layer limit some uses. Capability subclass IIIe.

VoD—Volusia channery silt loam, 15 to 25 percent slopes. This deep, somewhat poorly drained, moderately steep soil is on concave lower valley walls and hillsides that receive runoff from higher adjacent soils.

Typically, the surface layer is grayish brown channery silt loam 3 inches thick. The subsoil is mottled, friable, pale brown channery silt loam 5 inches thick. The next layer is mottled, firm, light grayish brown channery silt loam 3 inches thick. This is underlain by a very firm fragipan of mottled, dark grayish brown channery silt loam 35 inches thick. The substratum is dark grayish brown channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small wet pockets of Chippewa soils where seepage water comes to the surface. These areas are indicated on the map by a spot symbol. Also included are small areas of finer textured Fremont soils and better drained Mardin soils.

In the spring and other excessively wet periods, this soil has a seasonal high water table perched above the fragipan. The water moves laterally across the top of the fragipan. Depth to the fragipan ranges from 10 to 16 inches. Permeability is moderate above the fragipan and very slow or slow in the fragipan. The rooting depth is confined to the zone above the fragipan. Available water capacity is low to moderate. Runoff is rapid. Organic matter content is medium in the surface layer. In unlimed areas the surface layer is strongly acid to slightly acid.

This soil has poor potential for farming. Most cleared areas are used for hay or pasture or are idle. Many areas are forested.

This soil is poorly suited to cultivated crops. The hazard of erosion and seasonal wetness are the main limitations. The soil is not suited to frequent cultivation; it requires practices such as diverting runoff, contour tillage, minimum tillage, use of cover crops, incorporating crop residue into the soil, and tillage at the proper moisture content to maintain tilth, increase organic matter content, and control runoff and erosion. The operation of farm machinery is limited by slope and small stone fragments in the surface layer. Large amounts of lime and fertilizer are needed on this soil to maintain plant growth.

This soil is suited to pasture, but it must be adequately limed and fertilized, and periodic tillage to reestablish the forage seeding and to incorporate lime and fertilizer is necessary. Plowing across the slope and leaving strips of sod help to control erosion. Controlled grazing, proper stocking rates, pasture rotation, restricted grazing during wet periods, and yearly mowing to help control brush and weeds are major pasture management requirements.

This soil is suited to woodland. Placing logging roads and skid trails on the contour help control erosion. The use of equipment is restricted during excessively wet periods.

This soil is limited for many nonfarm uses by the seasonal high water table, very slow or slow permeability of the fragipan, and slope. Capability subclass IVe.

Wk—Wallkill silt loam. This deep, very poorly drained, nearly level soil is in areas on flood plains. Slope ranges from 0 to 3 percent but is mostly less than 2 percent.

Typically, the surface layer of this soil is very dark grayish brown silt loam 5 inches thick. The subsoil is mottled, dark gray silt loam 11 inches thick. The next layer is mottled, black silt loam 2 inches thick. This is underlain by black, well decomposed organic material 20 inches thick. The substratum is very dark gray silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Wayland soils that are not underlain with organic material.

The water table in this soil is at or near the surface much of the year. The level of the water table is controlled by the adjacent streams and nearby Seneca Lake. This soil is subject to periodic flooding. Permeability is moderate in the subsoil and moderately rapid to rapid in the organic material. The rooting depth is determined by the depth to the water table but is mainly restricted to the upper part of the subsoil. Available water capacity is high. Runoff is slow to occasionally ponded. Organic matter content is high. In unlimed areas the surface layer and subsoil are slightly acid to neutral.

This soil has poor potential for farming. It has better potential for wetland wildlife habitat and natural open areas. Most areas of the soil support water-tolerant grasses and shrubs.

Undrained areas of this soil are too wet for cultivated crops or hay. If wetness is controlled, the soil is well suited to intensive cropping, but suitable outlets general-

ly are not available for drainage. Flooding on this soil is most frequent during the growing season.

This soil is suitable for midsummer grazing. Prevention of overgrazing and restriction of grazing when the soil is wet are the major pasture management concerns. This soil is suited to grass species that tolerate wetness and periods of flooding. Plowing, preparing seedbeds, and seeding need to be done during dry periods in midsummer, when the water table is at the lowest depth. Proper stocking rates, pasture rotation, and yearly mowing to help control brush are major management needs.

This soil is suited to water-tolerant trees such as red maple, eastern hemlock, and white spruce. The use of heavy equipment is restricted during excessively wet periods. Seedling mortality is reduced in places if planting is delayed to allow the water table to recede.

The main limitations of this soil for nonfarm uses are prolonged wetness and frequent flooding. The unstable organic layer is a limitation for uses such as sites for roads. During dry periods, this soil is a potential source for topsoil. Capability subclass IVw.

Wy—Wayland silt loam. This deep, poorly drained and very poorly drained, nearly level soil is on low-lying flood plains of major streams and in old oxbows and slackwater areas at the outer edge of higher flood plains. Slope ranges from 0 to 3 percent but is mostly less than 2 percent.

Typically, the surface layer of this soil is very dark grayish brown silt loam 6 inches thick. The upper part of the subsoil is mottled, friable, dark gray heavy silt loam 7 inches thick. The lower part of the subsoil is mottled, friable, dark grayish brown, light silty clay loam 7 inches thick. The substratum is firm, gray silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of better drained Teel soils on slightly higher rises and benches. Also included are small areas of Wallkill soils and a few small areas of soils with a mucky surface layer.

This soil has a water table at or near the surface for prolonged periods during the year. The soil is subject to frequent flooding. Permeability is slow in the subsoil and substratum. The rooting depth is determined by the depth to the water table and is mainly 10 to 15 inches. Available water capacity is high. Runoff is slow to occasionally ponded. Organic matter content is high. In unlimed areas the surface layer and subsoil are medium acid to mildly alkaline.

This soil has poor potential for farming. It has better potential for wetland wildlife habitat and natural open areas. Most areas support water-tolerant grasses and shrubs. Some cleared areas are used for pasture, and a few areas are drained and used for general row crops and hay.

Undrained areas of this soil are too wet for cultivated crops. This soil is well suited to cultivated crops if it is properly drained and protected from flooding, but suitable drainage outlets generally are not available. Surface drainage by shallow ditches permits the growth of some short-season crops. Because this soil is in the lowest areas along streams, it is subject to flooding during the growing season. Consequently, flood protection measures are required in drained areas that are intensively cropped.

This soil is suited to midsummer grazing. Prevention of overgrazing and restriction of grazing when the soil is wet are the major pasture management concerns. The soil is suited to forage crops that tolerate periods of flooding and wetness. Plowing, preparing seedbeds, and seeding need to be done during the dry periods of the summer, when the water table is at its iowest depth. Proper stocking rates, pasture rotation, and yearly mowing to help control weeds and brush are major management needs.

This soil is suited to water-tolerant trees such as red maple, eastern hemlock, and white spruce. The use of heavy equipment is restricted during excessively wet periods. Tree seedling mortality is reduced if planting is delayed until midsummer.

This soil is limited for nonfarm uses by prolonged wetness and frequent flooding. Some areas are good sites for wetland wildlife habitat or for ponds. Capability subclass IVw.

Use and management of the soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil. It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic tank disposal systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops and pasture, woodland, as sites for buildings, highways and other transportation systems, sanitary facilities, and parks and other recreation facilities, and for wildlife habitat. From the data presented, the potential of each soil for specified land uses can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be

avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand and gravel, roadfill, and topsoil. Other information indicates the presence of bedrock, wetness, or very firm soil layers that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and pasture

Joseph Dell, regional crop specialist, Cooperative Extension Service; and John T. Wildeman, district conservationist, Soil Conservation Service, assisted in preparing this section.

The major management concerns in the use of the soils for crops and pasture are described in this section. In addition, the crops or pasture plants best suited to the soil, including some not commonly grown in the survey area, are discussed; the system of land capability classification used by the Soil Conservation Service is explained; the estimated yields of the main crops and hay plants are presented for each soil; and a productivity rating is assigned to each soil.

This section provides information about the overall agricultural potential of the survey area and about the management practices that are needed. The information is useful to equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Soil maps for detailed planning." Planners of management systems for individual fields or farms should also consider the detailed information given in the description of each soil.

Erosion is a major concern on about one-third of the cropland in Schuyler County, according to the 1967 New York State Inventory of Soil and Water Conservation needs (*8*). The hazard of erosion is related to the slope of the land, rainfall, and the amount and type of plant cover.

Most soils that have slopes of more than 3 percent require some measures to control water erosion. Soils that have a high content of silt and few stone fragments, such as Dunkirk, Collamer, and Schoharie soils, are the most susceptible to erosion.

The loss of soil through erosion causes a loss of nutrients and water, gullies on hillsides, deterioration of tilth, detrimental sedimentation downslope, and pollution of streams and reservoirs. Soil productivity is generally reduced if the soil surface is lost, and increasing amounts of material from the subsoil are incorporated into the plow layer. This is especially true of soils with a fine textured subsoil, such as Rhinebeck and Schoharie soils, and soils with a compact subsoil that restricts the depth of rooting, such as Mardin and Erie soils. Erosion also reduces the productivity of soils that tend to be droughty, such as Chenango soils, because of a loss of organic matter. Soils that are shallow or moderately deep to bedrock, for example, Arnot, Tuller, and Lordstown soils, are permanently damaged by erosion.

Erosion control practices provide protective cover, reduce runoff, and increase infiltration. Minimum tillage, no-till farming, use of cover crops, leaving crop residue on the surface, and using cropping systems with a high proportion of sod-forming crops are suitable management practices on soils with short, irregular slopes, such as rolling Howard soils. Contour farming, stripcropping, terracing, and using diversions are practices better suited to soils with smooth, long, uniform slopes, such as sloping Bath, Conesus, Lansing, and Aurora soils, (fig. 9).

Wind erosion is a concern on cleared areas of organic Carlisle and Palms soils. It is of particular concern if the soil surface is dry. Using windbreaks, regulating the water table, and providing irrigation are effective in reducing wind erosion.

The effectiveness of a particular combination of erosion control practices differs from one soil to another, and different combinations can be equally effective on the same soil.

Drainage is a major management need on about half of the acreage used for crops and pasture in the survey area. Some soils are so wet that the production of crops common to the area is generally not possible without the installation of extensive drainage systems. Poorly drained and very poorly drained Atkins, Canandaigua, Carlisle, Chippewa, Halsey, Madalin, Palms, Tuller, Wallkill, and Wayland soils are examples of soils that need drainage.

Seasonal wetness interferes with early planting, growth, and harvesting of most crops on somewhat poorly drained soils. In this category are the Angola, Appleton, Burdett, Erie, Fremont, Hornell, Odessa, Red Hook, Rhinebeck, and Volusia soils. Crops grown on these soils respond well to drainage.

Some areas of well drained and moderately well drained soils, such as Bath, Valois, Conesus, and Mardin soils, contain small areas of wetter soils that require random subsurface drainage to make management of fields more uniform.

The design of drainage systems varies with the type of soil. A combination of surface drainage and subsurface

drainage is needed in most areas of poorly drained and very poorly drained soils. Establishing drainage outlets in these soils is often difficult. Surface drainage can include open ditches, grassed waterways, land smoothing, and bedding systems; subsurface drainage mainly consists of tile or plastic drains.

Drains must be more closely spaced in soils with slow to very slow permeability than they are in more permeable soils. Subsurface drainage is slow in such soils as Erie, Fremont, Madalin, Odessa, Rhinebeck, and Volusia soils. These soils may also require surface drainage. Soils with moderate to rapid permeability, such as Red Hook and Halsey soils, respond well to subsurface drainage if adequate outlets are available. Some wet, sloping soils respond well to interceptor drains that divert surface runoff and subsurface seepage away from the area. Sloping Volusia, Fremont, and Erie soils are examples of these kinds of soils.

Available water capacity. Some soils in the county tend to be droughty. Sandy and gravelly soils, soils with restricting layers, and soils that are shallow or moderately deep to bedrock tend to have a relatively low capacity to store moisture. Gravelly Chenango soils, Volusia soils, which have a fragipan, and shallow Arnot soils, for example, have relatively low available water capacity. Maintaining or increasing organic matter content and improving tilth help increase the water holding capacity of these droughty soils. The use of green manure crops, crop residue, and animal wastes helps to build up organic matter content and improve tilth.

Tilth affects the emergence of seedlings, the infiltration of water into the soil, and the ease of cultivation. Soils with good tilth generally have granular structure and are porous.

Excessive tillage tends to reduce organic matter content and breaks down tilth. Some soils that are deep, well drained or excessively drained, and coarse textured or moderately coarse textured, such as Chenango and Howard soils, can be tilled with little concern for damaging tilth. However, wetter and finer textured soils, for example, Schoharie, Rhinebeck, and Odessa soils, must be tilled at the proper moisture content to prevent deterioration of tilth. Plowing or cultivating when these kinds of soils are wet causes puddles, and results in surface crusts and clods when the soil dries. Cultivation at proper moisture content; inclusion of sod crops, green manure crops, and cover crops in the crop rotation; return of crop residue to the soil; and additions of animal manure help keep the soil granular, porous, and in good tilth.

Fertility. All of the soils in the county need lime or fertilizer for optimum crop production, and most need both. The amount needed depends on the natural content of lime and plant nutrients in the soil, on the needs of the particular crop, and on the level of yield desired.

Organic matter content is important in assessing soil fertility. The average organic matter content is about 3.5 percent in the surface layer of the soils in Schuyler County. Poorly drained and very poorly drained soils, such as Madalin and Wayland soils, generally have an organic matter content somewhat higher than average.

Nitrogen in the organic matter is in complex organic forms and is unusable by plants until the organic matter is slowly decomposed by soil micro-organisms. Nitrogen fertilizer is needed to supplement the nitrogen made available from the soil organic matter. The use of green manure crops and sod crops and the return of crop residue to the soil help to build up organic matter and improve the natural nitrogen content.

Nitrogen can be lost either through leaching from rapidly permeable soils, such as Chenango soils, or by denitrification on the wetter and less permeable soils, such as Fremont soils. Small amounts of nitrogen applied at planting time and as a side dressing while the crop is growing help to maintain the proper content.

Coarse textured soils such as Arnot soils tend to be very low in natural phosphorus. The additions of appropriate amounts of phosphate in the form of commercial fertilizers generally help to increase the content of phosphorus.

Most of the soils of Schuyler County are low to medium in potassium supplying capacity. Rhinebeck and Schoharie soils have a clayey subsoil and are somewhat higher in potassium content but still require additional potassium fertilizer.

Special crops. In 1969, 1,711 acres of orchards and vineyards were in Schuyler County. The commonly grown orchard crops are cherries, peaches, prunes, apples, and pears. Soils well suited to orchards are deep and well drained, are free of impervious layers that restrict root development, have moderate to high available water capacity, and are medium acid to neutral. Howard, Valois, and Lansing soils are examples of soils well suited to fruit crops.

The production of grapes is limited to areas near Seneca Lake. Soils with long slopes that grade toward the lake have good air drainage and a longer growing season because of the warming influence of the lake. Because grapes are more tolerant of drainage extremes than most fruit crops, they can be grown on a wide variety of soils, but vineyard longevity and ease of management are generally more common on well drained or moderately well drained, loamy soils.

In 1969 about 200 acres in Schuyler County were used commercially for sweet corn, Irish potatoes, cabbage, tomatoes, squash, and strawberries and melons. Deep soils, such as Teel, Philo, and Lansing soils, that have good natural drainage and moderate to high available water capacity and that do not have impervious layers are especially well suited to such vegetable crops.

The latest information on erosion control practices; on the drainage, tilth, fertility, and available water capacity of the soils; and on growing special crops and field crops

can be obtained from the local offices of the Cooperative Extension Service and the Soil Conservation Service.

Soil productivity rating

Table 5 rates the arable soils in Schuyler County according to their potential for hay and silage corn, which typically are the major crops on dairy farms in New York State. Soils in the county that are not suited to such crops are not rated. The highest ratings are assigned to the most productive soils, with 100 representing the soil that has the best production potential.

In rating the soils, it is assumed that suitable varieties are planted; proper amounts of lime and fertilizer are applied; weeds, insects, and diseases are controlled; the soil is adequately drained; good tilth is maintained; field operations are timely; and erosion control practices such as stipcropping are used where needed.

The ratings indicate the relative yields of silage corn and hay given as total digestible nutrients (TDN) in tons per acre per year. The method used in making the ratings is described in Cornell Agronomy Mimeo 77-19 (*4*). The yield figures in table 6, "Yields per acre of crops and pasture," were used to calculate the ratings. However, the productivity rating for a particular soil cannot be directly compared to the yield data given in table 6, because such yield data indicate soil potential during a single growing season, but the productivity rating in table 5 gives the potential of a soil for an entire intensive crop rotation period.

The productivity ratings are for individual map units and do not take into account the size of the unit or how the soils adjacent to the unit are used.

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. Absence of an estimated yield indicates that the crop is not suited to or not commonly grown on the soil.

The estimated yields were based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from nearby counties were also considered.

The yields were estimated assuming that the latest soil and crop management practices were used. Hay and pasture yields were estimated for the most productive varieties of grasses and legumes suited to the climate and the soil. A few farmers may be obtaining average yields higher than those shown in table 6.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, barnyard manure, and green-manure crops; harvesting crops with the smallest possible loss; and timeliness of all fieldwork.

The estimated yields reflect the productive capacity of the soils for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not included because the acreage of these crops is small. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the management concerns and productivity of the soils for these crops.

Capability classes and subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forest trees, or for engineering purposes.

In the capability system, all kinds of soil are grouped at two levels: capability class and subclass. These levels are defined in the following paragraphs. A survey area may not have soils of all classes.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and landforms have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class; they are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is indicated in table 7. All soils in the survey area except those named at a level higher than the series are included. Some of the soils that are well suited to crops and pasture may be in low-intensity use, for example, soils in capability classes I and II. Data in this table can be used to determine the farming potential of such soils.

The capability subclass is identified in the description of each soil map unit in the section "Soil maps for detailed planning."

Woodland management and productivity

Table 8 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Mapping unit symbols for soils suitable for wood crops are listed, and the ordination (woodland suitability) symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w* indicates excessive water in or on the soil; *d*, restricted root depth; and *r*, steep slopes. The letter *o* indicates insignificant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the following order: w, d, and r.

In table 8 the soils are also rated for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of major soil limitations.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if some measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or equipment; *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree that the soil affects expected mortality of planted tree seedlings. Plant competition is not considered in the ratings. Seedlings from good planting stock that are properly planted during a period of sufficient rainfall are rated. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Considered in the ratings of *windthrow hazard* are characteristics of the soil that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that trees in wooded areas are not expected to be blown down by commonly occurring winds; *moderate*, that some trees are blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in 50 years and applies to fully stocked, even-aged, unmanaged stands. Site index is listed for trees that woodland managers generally favor for wood crop production. The trees are the most important species in regard to growth rate, quality, value, and marketability (fig. 10). The site index is also given for tree species that commonly occur on the soil, regardless of potential value or growth.

Trees to plant are those that are suitable for commercial wood production and that are suited to the soils.

Engineering

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this information are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers and ranchers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to (1) select potential residential, commercial, industrial, and recreational uses; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 9 shows, for each kind of soil, the degree and kind of limitations for building site development; table 10, for sanitary facilities; and table 12, for water management. Table 11 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

Some of the terms used in this soil survey have a special meaning in soil science. Many of these terms are defined in the Glossary.

Building site development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets are indicated in table 9. A *slight* limitation indicates that soil properties generally are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are made for pipelines, sewerlines, communications and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil layers below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given, and the presence of very firm or

extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 9 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Depth to bedrock, slope, and large stones in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious hazard.

Local roads and streets referred to in table 9 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The classifications of the soil and the soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, depth to hard rock or very compact layers, and content of large stones affect stability and ease of excavation.

Lawns and landscaping require soils that are suitable for the establishment and maintenance of turf for lawns and ornamental trees and shrubs for landscaping. The best soils are firm after rains, are not dusty when dry, and absorb water readily and hold sufficient moisture for plant growth. The surface layer should be free of stones. If shaping is required, the soils should be thick enough over bedrock or hardpan to allow for necessary grading. In rating the soils, the availability of water for sprinkling is assumed.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 10 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Soil suitability is rated by the terms *good*, *fair*, or *poor*, which, respectively, mean about the same as the terms *slight*, *moderate*, and *severe*.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Stones, boulders, and shallowness to bedrock interfere with installation. Excessive slope can cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

In some soils, loose sand and gravel or fractured bedrock is less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the effluent, and ground water in the area may be contaminated.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Soils that are very high in content of organic matter and those that have cobbles, stones, or boulders are not suitable. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon

floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soil material affect the performance of embankments.

Sanitary landfill is a method of disposing of solid waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil material. Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have a loamy or silty texture, have moderate to slow permeability, are deep to a seasonal water table, and are not subject to flooding. Clayey soils are likely to be sticky and difficult to spread. Sandy or gravelly soils generally have rapid permeability, which might allow noxious liquids to contaminate ground water. Soil wetness can be a limitation, because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

Ease of excavation affects the suitability of a soil for the trench type of landfill. A suitable soil is deep to bedrock and free of large stones and boulders. If the seasonal water table is high, water will seep into trenches.

Unless otherwise stated, the limitations in table 10 apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry periods. Soils that are loamy or silty and free of stones or boulders are better than other soils. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 11 by ratings of good, fair, or poor. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the surface and a depth of 5 to 6 feet. It is assumed that soil layers will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 15 provide specific information about the nature of each layer. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, low potential frost action, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor*.

Sand and *gravel* are used in great quantities in many kinds of construction. The ratings in table 11 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 15.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in

preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slope, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils and very firm clayey soils; soils with suitable layers less than 8 inches thick; soils having large amounts of gravel, stones, or soluble salt; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 12 the soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Large stones and organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

Aquifer-fed excavated ponds are bodies of water made by excavating a pit or dugout into a ground-water aquifer. Excluded are ponds that are fed by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Ratings in table 12 are for ponds that are properly designed, located, and constructed. Soil properties and site features that affect aquifer-fed ponds are depth to a permanent water table, permeability of the aquifer, quality of the water, and ease of excavation.

Drainage of soil is affected by such soil properties as permeability; texture; depth to bedrock, hardpan, or other layers that affect the rate of water movement; depth to the water table; slope; stability of ditchbanks; susceptibility to flooding; salinity and alkalinity; and availability of outlets for drainage.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock, hardpan, or other unfavorable material; large stones; permeability; ease of establishing vegetation; and resistance to water erosion, soil blowing, soil slipping, and piping.

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect the use of soils for waterways are slope, permeability, erodibility, wetness, and suitability for permanent vegetation.

Recreation

Recreational facilities in the county include Watkins Glen State Park, the Sugar Hill forest area, the Connecticut Hill Game Management Area, Warren Clute Memorial Park in the village of Watkins Glen, and several town parks. Golf courses and boating, swimming, fishing, and hiking areas in the county provide opportunities for recreation.

The soils of the survey area are rated in table 13 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations

are minor and easily overcome. *Moderate* means that the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 13 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 10, and interpretations for dwellings without basements and for local roads and streets, given in table 9.

Camp areas require such site preparation as shaping and leveling for tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing camping sites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for use as picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that will increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones or boulders, is firm after rains, and is not dusty when dry. If shaping is required to obtain a uniform grade, the depth of the soil over bedrock or hardpan should be enough to allow necessary grading.

Paths and trails for walking, horseback riding, bicycling, and other uses should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once during the annual period of use. They should have moderate slopes and have few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They should have a surface that is free of stones and boulders and have moderate slopes. Suitability of the soil for traps, tees, or greens was not considered in rating the soils. Irrigation is an assumed management practice.

Wildlife habitat

By Robert E. Myers, wildlife biologist, Soil Conservation Service.

The valleys in the county that are intensively farmed with grain crops provide habitat for a small population of ringnecked pheasants. The rolling and sloping land adjacent to the valleys consists of forestland, brush, and idle fields interspersed with farms, all of which provide habitat for cottontail rabbits, white-tailed deer, ruffed grouse, and gray squirrels.

The steep hillsides generally contain the most extensive forests. Wild turkeys inhabit the mature hardwood forests in the southern portion of the county, and the small shrubbed and wooded wetland and the brushy idle fields are suitable for woodcock.

A few open wetlands are used by waterfowl and marsh birds. Songbirds are common throughout the county, and the greatest diversity of these is in the mixed land-use areas.

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, is inadequate, or is inaccessible, wildlife either are scarce or do not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 14, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning for parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even

impossible to create, improve, or maintain on soils having such a rating.

The elements of wildlife habitat are briefly described in the following paragraphs.

Grain and seed crops are seed-producing annuals used by wildlife. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Major soil properties that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations.

Hardwood trees and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Major soil properties that affect growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Soil properties that have a major effect on the growth of coniferous plants are depth of the root zone, available water capacity, and wetness.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife (fig. 11). They can be naturally wet areas, or they can be created by dams or levees or by water-control structures in marshes or streams. Major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Openland habitat consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants.

Woodland habitat consists of areas of hardwoods or conifers, or a mixture of both, and associated grasses, legumes, and wild herbaceous plants.

Wetland habitat consists of open, marshy or swampy, shallow water areas where water-tolerant plants grow.

Soil properties

Edward A. Fernau, senior soil engineer, New York State Department of Transportation, Soil Mechanics Bureau, assisted in the preparation of this section.

Extensive data about soil properties are summarized on the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present data about pertinent soil and water features, engineering test data, and data obtained from physical and chemical laboratory analyses of soils.

Engineering properties

Table 15 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 15 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil series and morphology."

Texture is described in table 15 in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified soil classification system (Unified) (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*1*).

The *Unified* system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested in the survey area, with group index numbers in parentheses, is given in table 18. The estimated classification, without group index numbers, is given in table 15. Also in table 15 the percentage, by weight, of rock fragments more than 3 inches in diameter is estimated for each major horizon. These estimates are determined mainly by observing volume percentage in the field and then converting that, by formula, to weight percentage.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Range in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

In some surveys, the estimates are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount across classification boundaries (1 or 2 percent), the classification in the marginal zone is omitted.

Physical and chemical properties

Table 16 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many

field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Soil and water features

Table 17 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used, to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rains or after snow melts is not considered flooding, nor is water in swamps and marshes. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not construction of basements is feasible and to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 5 to 6 feet or less. For many soils, the limited depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and on other observations during the mapping of the soils. The kind of bedrock and its hardness as related to ease of excavation is also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200-horsepower tractor, but hard bedrock generally requires blasting.

Potential frost action refers to the likelihood of damage to pavements and other structures by frost heaving and low soil strength after thawing. Frost action results from the movement of soil moisture into the freezing temperature zone in the soil, which causes ice lenses to form. Soil texture, temperature, moisture content, porosity, permeability, and content of organic matter are the most important soil properties that affect frost action. It is assumed that the soil is not covered by insulating vegetation or snow and is not artificially drained. Silty and clayey soils that have a high water table in winter are most susceptible to frost action. Well drained very gravelly or sandy soils are the least susceptible.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Engineering test data

The results of analyses of engineering properties of several typical soils of the survey area are given in table 18.

The data presented are for soil samples that were collected from carefully selected sites. The soil profiles sampled are typical of the series discussed in the section "Soil series and morphology." The soil samples were analyzed by the New York State Department of Transportation, Soil Mechanics Bureau.

The methods used in obtaining the data are listed by code in the next paragraph. Most of the codes, in parentheses, refer to the methods assigned by the American Association of State Highway and Transportation Officials. The codes for shrinkage and Unified classification are those assigned by the American Society for Testing and Materials.

The methods and codes are AASHTO classification (M-145-49); Unified classification (D-2487-66T); mechanical analysis (T88-57); liquid limit (T89-60); plasticity index (T90-56); moisture-density, method C (T99-57), shrinkage (D-427).

Engineering properties of geologic deposits

This section discusses the engineering characteristics of the various unconsolidated geologic deposits in Schuyler County and their relation to soils.

The types of geologic deposits in Schuyler County are glacial till, outwash, ice contact, lacustrine, alluvial, and organic. The engineering significance of each geologic deposit is influenced to a great extent by its mode of deposition, which in turn determines the texture of the material and the internal structure. Other influences are the position of the deposits on the landscape and the position of the water table. In Schuyler County the geologic deposits are divided into the following categories: deep till deposits; shallow-to-rock deposits; stratified, coarse-grained deposits; stratified, fine-grained deposits; and organic deposits.

Deep till deposits

Deep till deposits are unstratified, highly variable mixtures that range in size from rock fragments to clay. This material was scoured and transported from nearby sources by glacial ice and deposited as ground moraine. Bedrock is generally at a depth of more than 5 feet, but in some small areas the depth to rock is less than 5 feet and some areas have rock outcrops. The individual rock and mineral fragments in the soil generally reflect the kind of bedrock in the immediate area.

Soils formed in mixed deep till deposits are those of the Alden, Appleton, Bath, Burdett, Chippewa, Conesus, Erie, Fremont, Lansing, Mardin, Schuyler, Valois, and Volusia series. The Valois series represents morainic till deposits and contains more water-worked material than is generally found in deep till deposits.

The soils formed in deep till deposits are the most dense and compact of the unconsolidated deposits of the county. Most of the tills have been subjected to the compactive weight of overriding ice. Deep till soils range from nearly level to steep, with most ranging from gently sloping to sloping. Many landscapes are such that cut and fill earthwork is involved in most construction. The soils usually provide stable, relatively incompressible foundations for engineering works. Fill material from these deposits, when properly compacted, commonly provides stable embankments. Steep cut slopes often are subject to surface sloughing and erosion.

Shallow-to-rock deposits

Shallow-to-rock deposits are unstratified mixtures of glacial till or fine-grained material deposited or formed as a thin veneer over bedrock. The soil is generally 2 to 5 feet thick, and rock outcrops are common in some areas. The landforms and topography are generally controlled by bedrock.

Soils formed over fine-grained sandstone are of the Angola, Lordstown, and Tuller series. The Aurora and Hornell soils formed over shale. The Arnot and Schoharie Variant soils formed over sandstone. The Schoharie Variant soils formed in lacustrine fine-grained material, and the other soils formed in glacial till.

Soils formed in shallow-to-rock deposits of glacial till generally have adequate foundation strength for light structures, but the fine-grained material has less strength and is compressible. The topography may be such that cut and fill earthwork would be necesary for extensive engineering works. In general, the shale bedrock is softer and more deeply weathered than the sandstone. Fill material is limited in quantity because of the shallow depth to bedrock.

Stratified, coarse-grained deposits

This group consists of materials dominated by gravel and sand sorted by glacial meltwater into layered deposits. The deposits occupy such geologic landforms as outwash plains and terraces; alluvial fans; ice-contact kames, eskers, and kame moraines; and the coarser textured portions of deltas. The strata within these deposits are well sorted or poorly sorted and have particle sizes ranging from cobbles to silt. The deposits are usually loose and porous.

The Castile, Chenango, Halsey, Howard, and Red Hook soils formed in gravelly deposits of outwash, ice-contact material, and deltas. Castile and Chenango soils also are on alluvial fan deposits. The Atkins and Philo soils formed in alluvium over sand and gravel.

Coarse-grained deposits generally have relatively high strength. Because of their loose and porous nature, most of these deposits are not highly erodible but are subject to settlement when vibrated. The Atkins and Philo soils are susceptible to flooding.

These deposits of gravel and sand have many uses as construction material. Depending on gradation, soundness, and plasticity, they may be used for such purposes as:

1. Fill material for highway embankments;
2. Fill material for parking areas and developments;
3. Fill material to decrease stress on underlying soils so construction operations may progress;
4. Subbase for pavements;
5. Wearing surfaces for driveways, parking lots, and some roads;
6. Material for highway shoulders;
7. Free draining backfill for structures and pipes;
8. Outside shells of dams;
9. Slope protection blankets to drain and help stabilize wet cut slopes;
10. Sources of sand and gravel for general use.

Stratified, fine-grained deposits

Deposits in this category consist of lacustrine, fine-grained sediment transported by glacial meltwater and deposited in quiet glacial lakes and ponds. Some are flood-plain soils on more recent slack-water deposits. The soils generally have distinct layers or laminations of silt- and clay-sized particles. Although these deposits are mostly silt, there is generally enough clay to make them plastic and sticky.

Soils formed in deep, lake-laid silt and clay deposits are those of the Hudson, Madalin, Odessa, Rhinebeck, and Schoharie series. The Canandaigua, Collamer, and Dunkirk soils formed in deep silty areas of deltas. Fluvaquents-Udifluvents complex, frequently flooded; Teel soils; and Wayland soils formed in alluvial material on flood plains.

Because of their fine texture and high moisture content, these deposits have relatively low strength. They are usually highly compressible, and settlement may occur over long periods. The soils with a high silt content are less compressible but are highly erodible and frost susceptible, and they are prone to flooding.

The fine-grained deposits, especially those such as Canandaigua soils, which are flat, wet, and subject to ponding, are difficult to use for engineering works. Sites for embankments and heavy structures or buildings on soils formed in these finer sediments must be investigated for strength and settlement characteristics and for the effects of ground water.

Organic deposits

Organic deposits are for the most part an accumulation of plant remains. In places they include a minimal amount of mineral soil. They occur in very poorly drained depressions and bogs which are covered with water during parts of the year.

Carlisle and Palms soils are deep organic soils. Aquepts and Saprists, ponded, (freshwater marsh) are inundated areas. Wallkill soils have a thin veneer of mineral soil over organic matter. The soils in organic deposits are unsuitable for foundations because they are wet, weak, and highly compressible. Generally the organic material should be removed and replaced with suitable backfill. Filling over organic deposits causes long-term settlement.

Soil series and morphology

In this section, each soil series recognized in the survey area is described in detail. The descriptions are arranged in alphabetic order by series name.

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil that is typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*9*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series in this survey area. Phases, or map units, of each soil series are described in the section "Soil maps for detailed planning."

Alden series

The Alden series consists of deep, very poorly drained, nearly level soils on uplands. The soils formed in glacial till derived from local sandstone and shale.

The Alden soils are associated on the landscape with well drained Lansing soils, moderately well drained Conesus soils, and somewhat poorly drained Appleton soils. In upland areas Alden soils are near and similar to Chippewa soils but do not have the dense fragipan of those soils. Alden soils are coarser textured than the similarly drained Madalin soils and are not as silty as the poorly drained and very poorly drained Canandaigua soils.

Typical pedon of Alden silt loam, in the town of Hector, 1/4 mile west of New York route 228 and 400 feet north of Culver Road, in a pasture:

Ap—0 to 8 inches, black (10YR 2/1) silt loam; moderate medium granular structure; friable; many roots; less than 2 percent coarse fragments; neutral; abrupt smooth boundary.

B21g—8 to 14 inches, light brownish gray (2.5Y 6/2) silt loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; common roots; 5 percent coarse fragments; neutral; clear smooth boundary.

B22g—14 to 30 inches, grayish brown (2.5Y 5/2) light silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few roots between ped faces; 10 percent coarse fragments; light brownish gray (2.5Y 6/2) ped coats; some patchy clay films on peds; neutral; clear smooth boundary.

IICg—30 to 50 inches, grayish brown (10YR 5/2) gravelly heavy loam; massive; firm; 20 percent coarse fragments; neutral.

The solum thickness ranges from 24 to 36 inches, and depth to carbonates is more than 40 inches. Depth to bedrock is more than 60 inches. Coarse fragments of mainly gravel or channers make up 0 to 10 percent, by volume, of the solum and 10 to 35 percent of the substratum. Reaction in the surface layer and subsoil is slightly acid or neutral, and the substratum is neutral to moderately alkaline.

The Ap horizon has hue of 10YR, or hue is neutral. Value is 2 or 3, and chroma is 0 or 1. The Ap horizon ranges from very fine sandy loam to silt loam. Structure is granular or subangular blocky.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 0 through 2. It is very fine sandy loam, silt loam, or light silty clay loam. Mottles are few to many and distinct or prominent. Structure is weak or moderate, fine or medium subangular blocky, or the horizon is massive. Consistence is friable or firm.

The C horizon has hue, value, and chroma similar to those of the B horizon. It ranges from loam to heavy loam and their gravelly analogs. It is platy or massive.

Angola series

The Angola series consists of moderately deep, somewhat poorly drained, nearly level to sloping soils on uplands. The soils formed in glacial till derived mainly from sandstone and shale.

The Angola soils are in a drainage sequence with moderately well drained Aurora soils. They are associated on the landscape with Appleton and Burdett soils, which formed in similar glacial till deposits but are shallower to bedrock.

Typical pedon of Angola silt loam, 0 to 3 percent slopes, in the town of Dix, 1.2 miles west of Meads Hill Road, 300 feet north of County Route 16, in a pasture:

Ap—0 to 8 inches, dark grayish brown (10YR 4/2) silt loam; moderate fine and medium granular structure; friable; many roots; 10 percent coarse fragments; neutral; abrupt smooth boundary.

A2—8 to 14 inches, grayish brown (2.5Y 5/2) channery silt loam; few medium distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; common roots; many fine and common medium pores; 15 percent coarse fragments; neutral; clear wavy boundary.

B21—14 to 18 inches, olive gray (5Y 5/2) channery heavy silt loam; common medium and coarse prominent yellowish brown (10YR 5/6) and common medium distinct light gray (10YR 6/1) mottles; moderate medium subangular blocky structure; firm; few roots; many fine and common medium pores; thin patchy clay films in pores; 30 percent coarse fragments; neutral; clear wavy boundary.

B22t—18 to 27 inches, olive brown (2.5Y 4/4) channery light silty clay loam; many medium distinct olive gray (5Y 4/2) and few fine distinct yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky

structure; firm; few roots; many fine and common medium pores; continuous olive gray (5Y 5/2) clay films on ped faces and clay linings in pores; 25 percent coarse fragments; neutral; abrupt smooth boundary.

IIR—27 inches, gray (5Y 5/1) fine grained sandstone.

The solum thickness and depth to bedrock range from 20 to 40 inches. Coarse fragments dominantly of soft shale or fine grained sandstone make up 5 percent, by volume, of the surface layer to 35 percent of the lower part of the profile. Reaction ranges from slightly acid to neutral in the surface layer and medium acid to mildly alkaline in the subsoil.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. It is silt loam or silty clay loam.

The A2 horizon has hue of 10YR through 5Y, value of 4 or 5, and chroma of 2 through 4. The fine-earth texture is heavy silt loam or light silty clay loam. High-chroma mottles are few to many and distinct. Structure is fine or medium subangular blocky. Consistence is friable or firm.

The B horizon has hue of 10YR through 5Y, value of 4 or 5, and chroma of 2 through 4. The fine-earth texture is silt loam or light silty clay loam. High-chroma mottles are few to many. Structure is fine or medium subangular blocky. Consistence is friable or firm.

The C horizon, where present, has hue, value, chroma, and texture similar to those of the B horizon. Structure is weak platy, or the material is massive.

Appleton series

The Appleton series consists of deep, somewhat poorly drained, nearly level to gently sloping soils on till plains. The soils formed in glacial till derived from limestone, gray shale, and fine-grained sandstone.

The Appleton soils are in a drainage sequence with well drained Lansing soils, moderately well drained Conesus soils, and very poorly drained Alden soils. Appleton soils do not have the fragipan that is in Volusia and Erie soils. Appleton soils are similar to Burdett soils but do not have the silty mantle of those soils and are coarser textured in the lower part of the subsoil.

Typical pedon of Appleton silt loam, 3 to 8 percent slopes, in the town of Reading, 500 feet west of County Route 18, 100 feet north of Irelandville Road, in a cultivated field:

Ap—0 to 8 inches, very dark grayish brown (10YR 3/2) silt loam; moderate fine and medium granular structure; friable; many roots; many fine pores; 10 percent coarse fragments; neutral; abrupt smooth boundary.

A2—8 to 11 inches, light brownish gray (2.5Y 6/2) gravelly silt loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common roots; common medium and fine pores; 15 percent coarse fragments; slightly acid; clear wavy boundary.

B21—11 to 17 inches, dark grayish brown (10YR 4/2) gravelly silt loam; common medium distinct yellowish brown (10YR 5/6) and light gray (10YR 7/2) mottles; firm; moderate medium subangular blocky structure; few roots; common medium and fine pores; few thin patchy clay films in pores; 20 percent coarse fragments; slightly acid; clear wavy boundary.

B22t—17 to 30 inches, dark brown (10YR 4/3) gravelly loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; very few roots; common medium and large pores; 30 percent coarse fragments; dark grayish brown (10YR 4/2) clay films on ped faces and in pores; neutral; clear wavy boundary.

B3—30 to 34 inches, dark brown (10YR 4/3) gravelly loam; common medium distinct yellowish brown (10YR 5/6) and light gray (10YR 7/2) mottles; weak medium subangular blocky structure; firm; 30 percent coarse fragments; calcareous; mildly alkaline; clear wavy boundary.

C—34 to 60 inches, dark grayish brown (10YR 4/2) gravelly loam; common medium distinct (10YR 5/6) mottles; firm; massive; 30 percent coarse fragments; calcareous; moderately alkaline.

The solum thickness ranges from 20 to 36 inches, and depth to carbonates is 18 to 32 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up from as little as 5 percent, by volume, of the surface layer to as much as 35 percent of the lower part of the subsoil and the substratum. Reaction ranges from medium acid to neutral in the surface layer, from medium acid to mildly alkaline in the subsoil, and from mildly alkaline to moderately alkaline in the substratum.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2. It ranges from silt loam to fine sandy loam.

The A2 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 or 3. It is loam or silt loam.

The B horizon has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 2 or 3. It is loam, sandy clay loam, or silt loam and their gravelly analogs. Low- and high-chroma mottles are common to many. Structure is weak or moderate, fine or medium subangular blocky. Consistence is friable or firm.

The C horizon has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 2 through 4. It is fine sandy loam, silt loam, or loam and their gravelly analogues. Structure is platy, or the material is massive.

Aquepts

Aquepts in Schuyler County consist of deep, very poorly drained, mineral soils that have a cambic B hori-

zon. These soils are ponded with shallow water throughout much of the year and are commonly called fresh water marsh. The soils formed in sandy, silty, clayey, and loamy deposits of glaciofluvial and glaciolacustrine origin, of glacial till, and of local alluvial origin. These soils are in low areas or depressions adjacent to manmade or natural bodies of water. Slope is dominantly less than 1 percent. Aquepts are mapped in an undifferentiated group with Saprists.

Aquepts commonly are near Wayland, Wallkill, Madalin, Alden, and Halsey soils on slightly higher areas where ponding or flooding occurs for brief periods in the spring.

Because of the variability of Aquepts, a typical pedon is not provided. Aquepts have a solum 10 to 30 inches thick, and depth to bedrock is more than 5 feet. The coarse fragment content ranges from 0 to 50 percent, by volume. These soils are very strongly acid to medium acid in the upper part of the solum, very strongly acid to neutral in the lower part of the solum, and strongly acid to moderately alkaline in the substratum.

The A horizon dominantly has hue of 7.5YR to 2.5Y, value of 2 through 4, and chroma of 1 or 2. It ranges from mucky silty clay loam to loamy sand and their gravelly analogs. The A horizon is 1 to 15 inches thick. Some areas have an organic surface layer as much as 16 inches thick.

The B horizon dominantly has hue of 5YR to 2.5Y or is neutral and has value of 3 through 7 and chroma of 0 through 2. Mottles are common. The B horizon ranges from silty clay to loamy sand and their gravelly or very gravelly analogs. It is 4 to 20 inches thick.

The C horizon has hue, value, chroma, and texture similar to those of the B horizon.

Arnot series

The Arnot series consists of shallow, well drained to moderately well drained, gently sloping to very steep soils on uplands. The soils formed in thin glacial till deposits derived from sandstone and siltstone.

The Arnot soils are associated on the landscape with somewhat poorly drained to poorly drained Tuller soils and moderately deep Lordstown soils. Arnot soils occupy landforms similar to those of deep, well drained Bath soils and deep, moderately well drained Mardin soils but do not have the dense fragipan characteristic of those soils.

Typical pedon of Arnot channery silt loam, 8 to 15 percent slopes, in the town of Tyrone, 1/8 mile north of Altay Road, 50 feet west of Preemption Road, in a forested area:

A1—0 to 2 inches, dark gray (10YR 4/1) channery silt loam; moderate fine granular structure; very friable, many roots; 20 percent coarse fragments; very strongly acid; clear smooth boundary.

A2—2 to 5 inches, light grayish brown (10YR 6/2) channery silt loam; moderate fine granular structure; very friable; many roots; 20 percent coarse fragments; very strongly acid; clear smooth boundary.

B21—5 to 8 inches, strong brown (7.5YR 5/6) channery silt loam; moderate fine subangular blocky structure; friable; common fine roots; many pores; 25 percent coarse fragments; very strongly acid; clear wavy boundary.

B22—8 to 19 inches, yellowish brown (10YR 5/4) very channery silt loam; moderate fine subangular blocky structure; friable; common roots; many fine pores, 45 percent coarse fragments; very strongly acid; abrupt smooth boundary.

R—19 inches, grayish brown (2.5Y 5/2) thin-bedded fine grained sandstone bedrock.

The solum thickness and depth to bedrock range from 10 to 20 inches. Coarse fragments dominantly of sandstone and siltstone make up 20 to 35 percent, by volume, of the surface layer and 25 to 50 of the subsoil and generally increase with depth. Reaction ranges from very strongly acid to medium acid in the surface layer and subsoil.

The Ap or A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 1 through 3. The A2 horizon, where present, has hue of 10YR through 7.5YR, value of 6 or 7, and chroma of 2 or 3. These horizons are channery silt loam or channery loam.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 4 through 6. The fine-earth texture is silt loam or loam. Few to common, distinct mottles are in some profiles. Structure ranges from weak, fine to moderate, medium subangular blocky to weak thin platy. Consistence is friable or firm.

Some profiles have a thin C horizon with a high percentage of rock fragments. Silt loam or loam material is in the voids, and high-chroma mottles are above bedrock.

The bedrock is massive or fractured, interbedded sandstone, siltstone, and shale.

Atkins series

The Atkins series consists of deep, poorly drained, nearly level soils on flood plains. The soils formed in recent alluvium underlain by gravel at a depth of 20 to 40 inches.

The Atkins soils are in a drainage sequence with moderately well drained Philo soils. Atkins soils are on landscape positions similar to those of poorly drained and very poorly drained Wayland soils but are underlain by gravelly deposits at a shallower depth than the Wayland soils. Atkins soils are similar to Wallkill soils but do not have underlying organic deposits.

Typical pedon of Atkins silt loam, in the Town of Orange, 1/2 mile south of Switzer Hill Road, 200 feet west of County Route 16, in a pasture:

A1—0 to 4 inches, dark grayish brown (10YR 4/2) silt loam; moderate fine and medium granular structure; friable; many roots; 2 percent coarse fragments; strongly acid; clear smooth boundary.

B21—4 to 12 inches, dark grayish brown (2.5Y 4/2) silt loam; common medium distinct gray (10YR 6/1) and common fine distinct brown (7.5YR 4/4) mottles; moderate fine subangular blocky structure; friable; common roots; very strongly acid; clear smooth boundary.

B22—12 to 18 inches, olive gray (5Y 5/2) silt loam; common fine distinct brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; friable; few roots; strongly acid; clear wavy boundary.

B23—18 to 27 inches, gray (5Y 5/1) heavy silt loam; common fine distinct brown (7.5YR 5/4) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; few roots; strongly acid; clear wavy boundary.

IIC—27 to 60 inches, gray (5Y 5/1) very gravelly loam; common fine distinct brown (7.5YR 5/4) mottles; massive to stratified; friable to loose; thin discontinuous gray silt line at a depth of 45 to 50 inches; 50 percent coarse fragments; strongly acid.

The solum thickness and depth to gravel deposits range from 25 to 40 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up 0 to 5 percent of the solum and 35 to 60 percent of the substratum. Reaction ranges from very strongly acid to strongly acid in the surface layer and subsoil and from very strongly acid to medium acid in the substratum.

The Ap or A1 horizon has hue of 10YR, value of 3 through 5, and chroma of 1 or 2. It is silt loam or silty clay loam.

The B horizon has hue of 7.5YR through 5Y, value of 4 through 6, and chroma of 1 or 2. It is silt loam, very fine sandy loam, light silty clay loam, and sandy loam. Structure is weak or moderate, fine to coarse subangular blocky or prismatic. Consistence is friable to firm.

The C horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 1 through 3. The fine-earth texture is silt loam, loam, or sandy loam. The horizon is massive or stratified, friable, or loose.

Aurora series

The Aurora series consists of moderately deep, moderately well drained, gently sloping to moderately steep soils on uplands. The soils formed in thin glacial till derived from sandstone, siltstone, and shale. Aurora soils are on bedrock-controlled landforms and are 20 to 40 inches deep over bedrock.

The Aurora soils are in a drainage sequence with somewhat poorly drained Angola soils. Aurora soils are in the same general upland areas as deeper, well drained Lansing soils and moderately well drained Conesus soils. Aurora soils have a finer textured subsoil than Lordstown soils.

Typical pedon of Aurora channery silt loam, 8 to 15 percent slopes, in the Town of Catherine, 1/2 mile west of Perth Road, 3/4 mile south of County Route 14, in a spruce plantation:

Ap—0 to 6 inches, dark grayish brown (10YR 4/2) channery silt loam; weak fine and medium granular structure; friable; many fine roots; 15 percent coarse fragments; strongly acid; abrupt smooth boundary.

A2—6 to 12 inches, brown (10YR 5/3) silt loam; weak medium subangular blocky structure; friable; common roots; common medium and large pores; 10 percent coarse fragments; strongly acid; clear wavy boundary.

B&A—12 to 14 inches, light olive brown (2.5Y 5/4) light silty clay loam; moderate medium subangular blocky structure; firm; common roots; common medium and large pores; brown (10YR 5/3) and light gray (10YR 7/2) dry ped coatings 1 to 2 millimeters thick; 5 percent coarse fragments; medium acid; clear wavy boundary.

B22t—14 to 17 inches, light olive brown (2.5Y 5/4) light silty clay loam; moderate medium subangular blocky structure; firm; few roots; common medium and large pores with clay linings; continuous clay coatings on ped faces and in pores; 5 percent weathered fine shale fragments; medium acid; clear wavy boundary.

B23t—17 to 23 inches, dark yellowish brown (10YR 4/4) shaly silty clay loam; common medium distinct gray (10YR 6/1) and yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; very few roots; common medium and large pores lined with clay; continuous clay films on peds, thinner than in B22t horizon; 20 percent weathered fine shale fragments; slightly acid; abrupt smooth boundary.

R—23 inches, dark gray (10YR 5/1) thin-bedded shale.

The solum thickness ranges from 20 to 40 inches and generally corresponds with the depth to bedrock. The content of coarse fragments, dominantly of sandstone in the surface layer and weathered shale in the subsoil and substratum, ranges from 5 to 30 percent by volume, and normally increases with depth. Reaction ranges from strongly acid to neutral in the A horizon and medium acid to neutral in the B and C horizons.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 through 3. It is silt loam or loam and their channery analogs.

The A2 horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 to 3. The fine-earth texture is silt loam or silty clay loam.

The B horizon has hue of 7.5YR through 5Y, value of 3 through 5, and chroma of 3 or 4. Mottles are few to common and faint or distinct and have value of 3 through 6 and chroma of 1 through 6. The fine-earth texture is silt loam or silty clay loam. Structure is weak or moderate, medium or coarse subangular blocky.

The C horizon, where present, has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 2 through 4. The fine-earth texture is silt loam or silty clay loam.

Bath series

The Bath series consists of deep, well drained, gently sloping to steep soils on uplands. The soils formed in glacial till derived from sandstone, siltstone, and shale.

The Bath soils are in a drainage sequence with moderately well drained Mardin soils, somewhat poorly drained Volusia soils, and poorly drained and very poorly drained Chippewa soils. Bath soils formed in parent material similar to that in which moderately deep Lordstown soils formed and occupy landscape positions similar to those of the Valois soils. Bath soils have a fragipan which Valois and Lordstown soils do not have.

Typical pedon of Bath channery silt loam, 8 to 15 percent slopes, in the Town of Orange, 100 feet south of Sugar Hill Road, 20 feet east of Grandview Road, in a wooded area:

O1—1 to 1/2 inch, undecomposed leaf litter.

O2—1/2 inch to 0, very dark grayish brown (10YR 3/2) decomposed organic matter.

A1—0 to 1 inch, very dark gray (10YR 3/1) channery silt loam; moderate fine granular structure; friable; many roots; 20 percent coarse fragments; strongly acid; abrupt wavy boundary.

A2—1 to 2 inches, pinkish gray (7.5YR 7/2) channery silt loam; moderate fine granular structure; friable; many roots; 20 percent coarse fragments; strongly acid; clear smooth boundary.

B21—2 to 11 inches, yellowish brown (10YR 5/6) channery loam; weak medium subangular blocky structure; friable; many roots; 20 percent coarse fragments; strongly acid; clear wavy boundary.

B22—11 to 22 inches, yellowish brown (10YR 5/6) channery loam; moderate medium subangular blocky structure; friable; common roots; 30 percent coarse fragments; strongly acid; clear wavy boundary.

A'2—22 to 27 inches, pale brown (10YR 6/3) channery silt loam; massive; common roots; firm; 20 percent coarse fragments; medium acid; clear wavy boundary.

IIB'x—27 to 52 inches, brown (10YR 5/3) gravelly loam; few fine distinct yellowish brown (10YR 5/6) mottles; very coarse prismatic structure parting to moderate medium subangular blocky; very firm; brittle; 30 percent coarse fragments; common fine pores; pale brown (10YR 6/3) prism faces bordered by yellowish brown (10YR 5/6) material; very thin clay films in some pores; medium acid; clear wavy boundary.

IIC—52 to 60 inches, brown (10YR 4/3) gravelly loam; weak medium platy structure; firm; 30 percent coarse fragments; common fine pores; slightly acid.

The solum thickness ranges from 40 to 60 inches. Depth to the fragipan ranges from 26 to 40 inches. Depth to bedrock is more than 6 feet. Coarse fragments make up 2 to 35 percent, by volume, of the surface layer, 15 to 35 of the subsoil, and 15 to 60 percent of the fragipan and substratum. Reaction ranges from very strongly acid to medium acid above the fragipan, from strongly acid to slightly acid in the fragipan, and from strongly acid to neutral in the substratum.

The Ap or A1 horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 1 through 3. It is mainly channery silt loam or channery loam, but some pedons have an A1 horizon of silt loam.

The A2 horizon has hue of 7.5YR or 10YR, value of 5 through 7, and chroma of 1 or 2. It is mainly channery silt loam or channery loam.

The B2 horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 4 through 6. The fine-earth texture is loam or silt loam. Structure is weak to moderate, fine or medium subangular blocky. Consistence is very friable or friable.

The A'2 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 or 3. It is loam or silt loam. Structure is weak platy, or the material is massive. Mottles, where present, range to common, medium distinct.

The B'x horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 3 through 5. The fine-earth texture is silt loam, sandy loam or loam. Mottles range from few to common and faint to distinct and have chroma of 2 through 8. Structure ranges from platy to subangular blocky, or the material is massive within prisms. Consistence is very firm or firm.

The C horizon is similar to the B'x horizon in hue, value, chroma, and texture. Structure is platy, or the material is massive.

Burdett series

The Burdett series consists of deep, somewhat poorly drained, gently sloping to moderately steep soils on till plains. The soils formed in two separate glacial till deposits strongly influenced by shale.

Burdett soils are on landscapes similar to those occupied by Angola, Appleton, and Erie soils, none of which has the silty mantle that is in Burdett soils. The Burdett soils are deeper than the Angola soils, have a finer textured Bt horizon than the Appleton soils, and do not have the fragipan of the Erie soils.

Typical pedon of Burdett silt loam, 3 to 8 percent slopes, in the Town of Reading, 1 mile south of County Route 23, 100 feet west of Cross Road, in a cultivated field:

Ap—0 to 8 inches, dark grayish brown (10YR 4/2) silt loam; moderate medium and fine granular structure; friable; many roots; 10 percent coarse fragments; neutral; abrupt smooth boundary.

B2—8 to 14 inches, light olive brown (2.5Y 5/4) silt loam; common medium distinct light brownish gray (2.5Y 6/2) and brownish yellow (10YR 6/6) mottles; moderate medium and fine subangular blocky structure; friable; common roots; 10 percent coarse fragments; neutral; clear smooth boundary.

A2—14 to 19 inches, grayish brown (2.5Y 5/2) heavy silt loam; many coarse prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable; common roots; 10 percent coarse fragments; light olive gray (5Y 6/2) ped coats; neutral; clear wavy boundary.

IIB2t—19 to 32 inches, dark grayish brown (2.5Y 4/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium and fine subangular blocky structure; firm, slightly plastic, slightly sticky; few roots; 10 percent coarse fragments; light gray to gray (5Y 6/1) clay films on ped faces and pores; neutral; clear wavy boundary.

IIC—32 to 64 inches, grayish brown (2.5Y 5/2) shaly heavy silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; massive; firm, slightly plastic, slightly sticky; 20 percent coarse fragments; light gray (10YR 6/1) lime streaks; calcareous; mildly alkaline.

The solum thickness ranges from 30 to 45 inches. Depth to carbonates ranges from 30 to 72 inches. Depth to bedrock is more than 60 inches. Coarse fragments, mainly slate or siltstone, make up 5 to 15 percent, by volume, of the surface layer and upper part of the subsoil and 10 to 30 percent of the lower part of the subsoil and the substratum. Reaction ranges from strongly acid to neutral in the upper part of the subsoil, slightly acid to neutral in the lower part of the subsoil, and slightly acid to moderately alkaline in the substratum.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam or very fine sandy loam.

The B horizon has hue of 10YR through 2.5Y, value of 5 or 6, and chroma of 2 through 4. It is very fine sandy loam or silt loam. Structure is weak or moderate, fine or medium subangular blocky. Consistence is very friable or friable.

The A2 horizon has hue of 10YR through 2.5Y, value of 5 or 6, and chroma of 2 or 3. It is dominantly silt loam or very fine sandy loam. Mottles are common or many, medium or coarse, and faint to prominent. Structure is weak or moderate, fine or medium subangular blocky. Consistence is very friable or friable.

The IIB2t horizon has hue of 10YR through 5Y, value of 4 or 5, and chroma of 2 through 4. The fine-earth texture ranges from heavy loam to silty clay loam. Structure is weak or moderate, fine or medium subangular blocky. Consistence is firm or very firm.

The IIC horizon has hue of 10YR through 5Y, value of 4 or 5, and chroma of 2 through 4. It is loam, silt loam, or silty clay loam. It has weak or moderate, thin to thick platy structure, or the material is massive. Consistence is firm or very firm.

Canandaigua series

The Canandaigua series consists of deep, poorly drained and very poorly drained, nearly level soils in low valley areas and in small depressions in uplands. The soils formed in lacustrine deposits of silt, very fine sand, and clay.

The Canandaigua soils are in a drainage sequence with well drained Dunkirk soils and moderately well drained Collamer soils. In upland areas Canandaigua soils occupy positions similar to those of the Chippewa soils, but Canandaigua soils do not have the dense fragipan of those soils. At lower elevations, Canandaigua soils, Alden soils, and Madalin soils are in similar positions. Canandaigua soils are coarser textured than the Madalin soils, and they do not have the coarse fragments typical of the Alden soils.

Typical pedon of Canandaigua silt loam, in the Town of Reading, 500 yards east of Preemption Road, 100 feet south of Ray Roberts Road, in an idle field:

Ap—0 to 9 inches, very dark gray (10YR 3/1) silt loam; moderate fine and medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

B21g—9 to 15 inches, dark gray (10YR 4/1) silt loam; few fine faint yellowish brown (10YR 5/6-5/8) stains; moderate thick platy structure parting to weak very fine and fine subangular blocky; friable; common fine roots; neutral; clear smooth boundary.

B22g—15 to 20 inches, dark gray (10YR 4/1) silty clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; firm; few fine roots; common fine pores; thin patchy grayish brown (10YR 5/2) clay coats on some ped faces; neutral; clear smooth boundary.

B23g—20 to 38 inches, grayish brown (10YR 5/2) silty clay loam; many medium and coarse distinct yellowish brown (10YR 5/6) mottles; moderate medium coarse subangular blocky structure; firm; few fine roots; thin patchy grayish brown (10YR 5/2) clay coats on some ped faces; neutral; clear wavy boundary.

C1g—38 to 50 inches, gray (10YR 6/1) silty clay loam; many fine distinct yellowish brown (10YR 5/4) mottles; massive; firm; neutral; abrupt smooth boundary.
IIC2g—50 to 54 inches, dark grayish brown (10YR 4/2) fine sand; loose; single grained; calcareous; mildly alkaline.

The solum thickness ranges from 20 to 40 inches. Depth to carbonates ranges from 20 to 60 inches. Depth to bedrock is more than 60 inches. The content of coarse fragments generally is less than 3 percent throughout the soil. Reaction ranges from slightly acid to neutral in the surface layer and subsoil and from neutral to moderately alkaline in the substratum.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is silt loam, mucky silt loam, or very fine sandy loam.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 1 or 2. It is silt loam or silty clay loam and very fine sandy loam. Mottles are common to many, are distinct or prominent, and have a higher chroma than the matrix of the B horizon. Structure is weak or moderate, fine to coarse subangular blocky or platy. Consistence is friable or firm.

The C horizon has hue, value, and chroma similar to that of the B horizon. The C horizon is extremely variable in texture and includes silty clay loam, very fine sandy loam, and silt loam and common lenses of fine sand, silt, and clay. Consistence ranges from loose to firm.

Carlisle series

The Carlisle series consists of deep, very poorly drained, nearly level soils. The soils formed in herbaceous organic deposits more than 51 inches thick.

Carlisle muck is on landscapes similar to those of Palms, Halsey, and Wallkill soils. Carlisle muck is deeper to contrasting deposits than Palms muck, which is underlain by mineral soil at a depth of 16 to 50 inches. Carlisle muck has a thicker organic layer than gravelly Halsey soils and does not have the alluvium cap over muck that is characteristic of the Wallkill soils.

Typical pedon of Carlisle muck, in the Town of Catharine, 300 feet north from Cayuta Lake and Lockheid Inn, 30 feet west of access road, in a wooded area:

Oa1—0 to 23 inches, black (N 2/0) rubbed muck (sapric material), black (5YR 2/1) broken; 10 percent fiber, less than 1 percent rubbed; weak fine subangular blocky structure; nonsticky, slightly plastic; common roots; pH 6.4 in water; clear smooth boundary.
Oa2—23 to 57 inches, very dark gray (10YR 3/1) broken and pressed muck (sapric material) black (10YR 2/1) rubbed; 50 percent fiber, 10 percent rubbed; massive; nonsticky, slightly plastic; pH 6.8 in water; clear smooth boundary.
Oa3—57 to 100 inches, black (5YR 2/1) broken and rubbed muck (sapric material); 50 percent fiber, 10 percent rubbed; massive; nonsticky, slightly plastic; pH 7.0 in water; abrupt smooth boundary.
Oa4—100 to 115 inches, dark grayish brown (10YR 4/2) broken muck (sapric material), very dark grayish brown (10YR 3/2) rubbed and pressed; 50 percent fiber, 3 percent rubbed; massive, nonsticky, slightly plastic; pH 7.0 in water.

Depth to the underlying mineral soil is more than 51 inches. Depth to bedrock is more than 60 inches. The content of coarse fragments, consisting of woody fragments, ranges from 0 to 20 percent. The reaction of the organic deposit ranges from medium acid to neutral.

The organic layers have hue of 10YR through 5YR, value of 2 through 4, and chroma of 0 through 2. The structure is weak or medium, fine granular or subangular blocky, or the material is massive.

Castile series

The Castile series consists of deep, moderately well drained, nearly level soils on glacial outwash plains. The soils formed in water-sorted, gravelly and sandy material derived mainly from shale, sandstone, and siltstone.

The Castile soils are in a drainage sequence with well drained and somewhat excessively drained Chenango soils, somewhat poorly drained Red Hook soils, and very poorly drained Halsey soils. The coarse fragments in Castile soils are smaller, rounded gravel, in contrast to the larger, flatter channery fragments in the Chenango soils. Castile and Philo soils occupy similar settings, but the Castile soils have more coarse fragments throughout the profile.

Typical pedon of Castile gravelly silt loam, in the Town of Orange, 1/2 mile south of Wolverton Road, 900 feet west of New York Route 226, in a cultivated field:

Ap—0 to 11 inches, dark brown (10YR 4/3) gravelly silt loam; moderate medium granular structure; very friable; many fine roots; 30 percent coarse fragments; many pores; strongly acid; abrupt smooth boundary.
B21—11 to 22 inches, brown (10YR 5/3) very gravelly loam; weak medium subangular blocky structure; friable; common fine roots; 40 percent coarse fragments; many pores; strongly acid; clear wavy boundary.
B22—22 to 27 inches, yellowish brown (10YR 5/4) very gravelly loam; common medium distinct grayish brown (10YR 5/2) and few fine distinct strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable; few fine roots; 40 percent coarse fragments; many pores; strongly acid; clear wavy boundary.
B3—27 to 35 inches, brown (10YR 4/3) very gravelly loam; weak medium subangular blocky structure; fri-

able; few roots; 40 percent coarse fragments; many medium pores with thin clay films; medium acid; clear wavy boundary.

C1—35 to 42 inches, dark grayish brown (10YR 4/2) very gravelly loam; massive; friable; few roots; 40 percent coarse fragments; slightly acid; abrupt wavy boundary.

C2—42 to 50 inches, dark grayish brown (10YR 4/2) very gravelly sandy loam; single grained; loose; 40 percent coarse fragments; neutral.

The solum thickness ranges from 30 to 40 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up 15 to 35 percent of surface layer, 20 to 50 percent of the subsoil, and 35 to 65 percent of the substratum. Reaction ranges from very strongly acid to medium acid in the surface layer and subsoil and from strongly acid to neutral in the substratum.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is gravelly silt loam or gravelly loam.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 2 through 4. It is sandy loam to silt loam and their gravelly or very gravelly analogs. Mottles are few or common, fine or medium, and distinct. Structure is fine to coarse subangular blocky. Consistence ranges from very friable to firm.

The C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. It ranges from very gravelly sandy loam or loam to stratified sand and gravel. Consistence is friable or loose.

Chenango series

The Chenango series consists of deep, well drained to somewhat excessively drained, nearly level to gently sloping soils on glacial outwash plains. The soils formed on outwash terraces in the larger valleys and on alluvial fans where post-glacial side streams enter major valleys.

The Chenango soils are in a drainage sequence with moderately well drained Castile soils, somewhat poorly drained Red Hook soils, and very poorly drained Halsey soils. Chenango soils are similar to the Howard soils on nearby gravelly terraces, eskers, and kames. Chenango soils do not have the clay accumulation typical in the subsoil of the Howard soils and are less alkaline.

Typical pedon of Chenango gravelly silt loam, 0 to 3 percent slopes, in the Town of Dix, 700 feet north of County Route 20, 100 feet east of New York 414, in a cultivated field:

Ap—0 to 9 inches, very dark grayish brown (10YR 3/2) gravelly silt loam; moderate fine granular structure; very friable; many roots; 20 percent coarse fragments of rounded shale and sandstone; strongly acid; abrupt smooth boundary.

B21—9 to 22 inches, strong brown (7.5YR 5/6) gravelly silt loam; weak very fine subangular blocky structure; friable; common roots; few fine pores; 30 percent coarse fragments; strongly acid; gradual wavy boudary.

B22—22 to 37 inches, strong brown (7.5YR 5/6) very gravelly loam; weak fine subangular blocky structure; friable; few fine roots; 50 percent coarse fragments; strongly acid; gradual wavy boundary.

IIC—37 to 50 inches, very dark grayish brown (10YR 3/2) very gravelly sand; single grained; loose; 50 percent coarse fragments; few roots; strongly acid.

The solum thickness ranges from 24 to 40 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up 10 to 35 percent of the surface layer, 20 to 60 percent of the subsoil, and 30 to 70 percent of the substratum. Reaction ranges from very strongly acid to strongly acid in the surface layer, very strongly acid to medium acid in the subsoil, and strongly acid to slightly acid in the substratum.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam to sandy loam and their gravelly or channery analogs.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 3 through 6. It is fine sandy loam, loam, or silt loam with channery, gravelly, or very gravelly analogs. The B horizon has weak granular or subangular blocky structure. Consistence is very friable or friable.

The C horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 2 through 4. It is very gravelly loamy sand, very gravelly sand, gravelly loamy fine sand, or stratified sand and gravel.

Chippewa series

The Chippewa series consists of deep, poorly drained and very poorly drained, nearly level soils on uplands. The soils formed in glacial till derived mainly from local sandstone, siltstone, and shale.

The Chippewa soils are in a drainage sequence with well drained Bath soils, moderately well drained Mardin soils, and somewhat poorly drained Volusia soils. Chippewa soils occupy topographic positions similar to those of the Alden, Madalin, and Canandaigua soils. Chippewa soils are coarser textured than the Madalin and Canandaigua soils, and they have a distinct fragipan that is not in the Alden soils.

Typical pedon of Chippewa silt loam, in the Town of Reading, 200 feet east of Cross Road, 50 feet north of Altay Road, in a reforested area:

Ap—0 to 9 inches, very dark grayish brown (10YR 3/2) silt loam; moderate fine granular structure; friable; many fine roots; 10 percent coarse fragments; medium acid; abrupt smooth boundary.

A2g—9 to 15 inches, light brownish gray (2.5Y 6/2) channery silt loam; common medium prominent

strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; common roots; few pores; 15 percent coarse fragments; slightly acid; clear wavy boundary.

Bxg—15 to 42 inches, grayish brown (2.5Y 5/2) channery silt loam; common medium prominent strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) mottles; strong very coarse prismatic structure becoming wider in lower part; very firm and brittle; common pores; 20 percent coarse fragments; neutral; clear wavy boundary.

Cg—42 to 60 inches, dark gray (5Y 4/1) gravelly loam; common medium distinct dark reddish brown (5YR 3/3) mottles; massive; firm, slightly sticky; 20 percent coarse fragments; mildly alkaline.

The solum thickness ranges from 36 to 50 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up 0 to 15 percent of the surface layer, 15 to 30 percent of the subsurface layer, and 20 to 40 percent of the fragipan and substratum. Reaction ranges from very strongly acid to slightly acid above the fragipan, strongly acid to neutral in the fragipan, and medium acid to moderately alkaline in the substratum.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The A2 horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 or 2. The fine-earth texture is loam, very fine sandy loam, or silt loam. Consistence is friable or firm.

The Bx horizon has hue of 10YR through 5Y, value of 3 through 6, and chroma of 1 or 2. The fine-earth texture is loam, silt loam, or light silty clay loam. Structure is prismatic parting to very weak or moderate subangular blocky, or the material within the prisms is massive. Consistence is firm or very firm and brittle.

The C horizon has hue of 10YR through 5Y, value of 4 or 5, and chroma of 1 or 2. The fine-earth texture is loam or silt loam. Consistence is firm or very firm.

Collamer series

The Collamer series consists of deep, moderately well drained, nearly level to gently sloping soils on glacial lake plains. The soils formed in silty, lake-laid deposits.

The Collamer soils are in a drainage sequence with well drained Dunkirk soils and poorly drained and very poorly drained Canandaigua soils. Collamer soils occupy topographic positions similar to those of the Hudson, Rhinebeck, Schoharie, and Odessa soils. The subsoil in the Collamer soils is coarser textured than that in the Hudson, Rhinebeck, Schoharie, or Odessa soils.

Typical pedon of Collamer silt loam, 3 to 8 percent slopes, in the Town of Reading, 1/4 mile west of New York 14, 100 feet north of Chase Road, in a cultivated field:

Ap—0 to 10 inches, dark grayish brown (10YR 4/2) silt loam; moderate coarse granular structure; friable; many fine roots; 2 percent coarse fragments; neutral; abrupt smooth boundary.

B&A—10 to 16 inches, brown (10YR 4/3) silt loam; moderate fine and medium subangular blocky structure; friable; brown (10YR 5/3) light gray (10YR 7/2) dry coats on 75 percent of ped faces; few fine faint brown (7.5YR 5/4) mottles; common roots; slightly acid; clear wavy boundary.

B2t—16 to 27 inches, brown (7.5YR 4/4) light silty clay loam; common medium distinct yellowish red (5YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium angular blocky; firm; reddish brown (5YR 4/3) clay coats, continuous on primary faces, 50 to 70 percent on secondary faces and in pores; few roots on ped faces; medium acid; clear wavy boundary.

B3—27 to 38 inches, brown (10YR 4/3) heavy silt loam; common medium distinct strong brown (7.5YR 5/6) and light brownish gray (10YR 6/2) mottles in lower half; weak medium subangular blocky structure; friable; reddish brown (5YR 4/3) patchy clay flow on faces and in pores; few roots; neutral; clear wavy boundary.

C—38 to 50 inches, brown (10YR 4/3) stratified very fine sand and silt; common medium distinct brown (7.5YR 5/6) and light brownish gray (10YR 6/2) mottles; friable; calcareous; moderately alkaline.

The solum thickness ranges from 24 to 40 inches. Depth to bedrock is more than 60 inches. Depth to carbonates is 20 to 60 inches. The content of coarse fragments is 0 to less than 3 percent throughout the soil. Reaction ranges from strongly acid to neutral in the surface layer, medium acid to mildly alkaline in the subsoil, and slightly acid to moderately alkaline in the substratum.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3.

The B&A horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 3 or 4. It is silt loam to fine sandy loam. Structure is weak or moderate, fine or medium subangular blocky. Consistence is friable or firm.

The B horizon has hue of 5YR through 2.5Y, value of 4 or 5, and chroma of 3 or 4. It is heavy silt loam or light silty clay loam. Mottles are few to many and faint to distinct. Structure is weak or moderate, fine or medium, subangular blocky. Consistence is friable to firm.

The C horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 2 or 3. It is mainly stratified very fine sand and silt but commonly has thin strata of very fine sandy loam or silty clay loam.

Conesus series

The Conesus series consists of deep, moderately well drained, nearly level to sloping soils on till plains. The soils formed in glacial till derived mainly from limestone. These soils are a taxadjunct in the survey area because they have distinct mottles in the B&A horizon. This difference does not affect use and management.

The Conesus soils are in a drainage sequence with well drained Lansing soils, somewhat poorly drained Appleton soils, and very poorly drained Alden soils. Conesus soils are near Aurora and Mardin soils. Conesus soils do not have the dense fragipan characteristic of Mardin soils and are deeper to bedrock than Aurora soils.

Typical pedon of Conesus silt loam, 3 to 8 percent slopes, in the Town of Catharine, 1/4 mile north of New York 224, 50 feet west of County Route 10, in a hayfield:

Ap—0 to 7 inches, dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; many roots; 10 percent coarse fragments; neutral; abrupt smooth boundary.

B&A—7 to 16 inches, brown (10YR 4/3) silt loam; common medium distinct strong brown (7.5YR 5/6) mottles in lower part; moderate medium subangular blocky structure; friable; common roots; common pores; pale brown (10YR 6/3) and very pale brown (10YR 7/3) dry ped coats 2 to 3 millimeters thick; 10 percent coarse fragments; thin clay films line pores; medium acid; clear wavy boundary.

B21t—16 to 32 inches, brown (10YR 4/3) heavy silt loam; few medium distinct yellowish brown (10YR 5/6) mottles; moderate medium and coarse subangular blocky structure; firm; common roots; 10 percent coarse fragments; continuous brown (10YR 5/3) clay films on ped faces; neutral; gradual wavy boundary.

B22t—32 to 41 inches, brown (10YR 4/3) silt loam; weak medium subangular blocky structure; firm; few roots; 10 percent coarse fragments; thin clay films in pores and lining ped faces; neutral; clear wavy boundary.

C1—41 to 45 inches, brown (10YR 4/3) silt loam; massive; firm; few roots; 10 percent coarse fragments; calcareous; mildly alkaline; abrupt wavy boundary.

C2—45 to 56 inches, yellowish brown (10YR 5/4) silt loam; thin lenses of very fine sand; massive; friable; less than 2 percent coarse fragments; calcareous; moderately alkaline; clear wavy boundary.

IIC3—56 to 77 inches, brown (10YR 4/3) gravelly silt loam; massive; firm; 20 percent coarse fragments; calcareous; moderately alkaline.

The solum thickness ranges from 30 to 45 inches. Depth to bedrock is more than 60 inches. Depth to carbonates is 30 to 50 inches. Coarse fragments make up 5 to 15 percent of the surface layer, 5 to 30 percent of the subsoil and upper part of the substratum, and 15 to 40 percent of the lower part of the substratum. Reaction ranges from strongly acid to neutral in the solum and from mildly alkaline to moderately alkaline in the substratum.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam or loam.

The A2 horizon, where present, has hue of 10YR through 2.5Y, value of 5 or 6, and chroma of 2 or 3. It is loam or silt loam.

The B horizon has hue of 10YR through 5Y, value of 4 or 5, and chroma of 3 or 4. The fine-earth texture is loam, silt loam, or silty clay loam. Mottles are few to many and faint or distinct. Structure is weak or moderate, fine or medium subangular blocky. Consistence is friable or firm.

The C horizon has hue of 10YR through 2.5Y, value of 4 through 6, and chroma of 2 or 3. The fine-earth texture is loam or silt loam. Structure is platy, or the material is massive. Consistence is firm or very firm except for friable lenses.

Dunkirk series

The Dunkirk series consists of deep, well drained, gently sloping to steep soils on glacial lake plains. The soils formed in silty, lake-laid sediments.

The Dunkirk soils are in a drainage sequence with moderately well drained Collamer soils and poorly drained and very poorly drained Canandaigua soils. The Dunkirk, Hudson, and Schoharie soils occupy similar settings, but Dunkirk soils have a coarser textured subsoil than Hudson or Schoharie soils.

Typical pedon of Dunkirk silt loam, 3 to 8 percent slopes, in the Town of Montour, 1/2 mile northwest of Mitchell Hollow Road, 200 feet northeast of County Route 14, in a cultivated field:

Ap—0 to 9 inches, brown (10YR 4/3) silt loam; weak fine granular structure; friable; common roots; 3 percent coarse fragments; slightly acid; abrupt smooth boundary.

A2—9 to 14 inches, brown (10YR 5/3) silt loam; moderate coarse subangular blocky structure; friable; few roots; few large and many medium pores; slightly acid; clear wavy boundary.

B&A—14 to 20 inches, yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; few roots; common medium pores; grayish brown (10YR 5/2) ped coats; patchy thin clay films in lower part; neutral; clear wavy boundary.

B21t—20 to 32 inches, yellowish brown (10YR 5/4) light silty clay loam; moderate medium subangular blocky structure; friable; few roots; many fine and medium

pores; nearly continuous clay films on ped faces; slightly acid; clear wavy boundary.

B22t—32 to 44 inches, brown (10YR 4/3) light silty clay loam; moderate coarse subangular blocky structure; firm; very few roots; common fine and medium pores; continuous thin clay films on peds; slightly acid; abrupt wavy boundary.

C—44 to 64 inches, dark grayish brown (10YR 4/2) silt loam; varved; firm; oxide stains along varves; mildly alkaline; calcareous.

The solum thickness ranges from 20 to 45 inches. Free carbonates are at a depth of 23 to 45 inches. Depth to bedrock is more than 60 inches. The content of coarse fragments ranges from 0 to less than 5 percent throughout the soil. Reaction ranges from strongly acid to neutral in the surface layer, medium acid to mildly alkaline in the subsoil, and slightly acid to moderately alkaline in the substratum.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. It is silt loam or very fine sandy loam.

The A2 horizon has hue of 10YR or 2.5YR, value of 5 or 6, and chroma of 2 or 3. It is silt loam, loam, or fine sandy loam. Structure is weak or moderate, fine or medium subangular blocky. Consistence is very friable or friable.

The B horizon has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 2 through 4. It is silt loam, very fine sandy loam, or silty clay loam. Structure is weak to strong, fine to coarse subangular blocky. Consistence is friable or firm.

The C horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 2 through 4. It ranges from very fine sand to silt loam with thin strata of silty clay loam in some profiles.

Erie series

The Erie series consists of deep, somewhat poorly drained, nearly level to sloping soils on upland till plains. The soils formed in glacial till derived mainly from siltstone and sandstone and some shale and limestone.

Erie soils are in a drainage sequence with poorly drained and very poorly drained Chippewa soils. Erie, Volusia, Burdett, and Appleton soils occupy similar topographic positions. Erie soils have a fragipan that is not in the Burdett and Appleton soils, and they are coarser textured above the fragipan than the Volusia soils.

Typical pedon of Erie silt loam, 3 to 8 percent slopes, in the Town of Hector, 1/2 mile east of Bishop Corner Road, 50 feet south of County Route 1, in a reforested area:

A1—0 to 3 inches, dark brown (10YR 4/3) silt loam; moderate fine and medium granular structure; very friable; many fine roots; 10 percent coarse fragments; medium acid; clear smooth boundary.

B2—3 to 9 inches, yellowish brown (10YR 5/4) silt loam; weak fine and medium subangular blocky structure; friable; common roots; 10 percent coarse fragments; strongly acid; clear smooth boundary.

A'2—9 to 15 inches, light brownish gray (10YR 6/2) channery silt loam; common medium distinct yellowish brown (10YR 5/8) and faint light gray to gray (10YR 6/1) mottles; weak medium platy structure; friable; common medium and fine roots; 15 percent coarse fragments; medium acid; abrupt wavy boundary.

B'x1t—15 to 29 inches, dark grayish brown (10YR 4/2) channery heavy loam; common medium distinct yellowish brown (10YR 5/6) and light gray to gray (10YR 6/1) mottles; weak thick platy structure within 10-inch wide prisms; firm, brittle; fine and medium roots in faces; 20 percent coarse fragments; grayish brown (2.5Y 5/2) clay films in most pores; thin discontinuous clay films on ped faces; slightly acid; gradual clear boundary.

B'x2t—29 to 45 inches, dark grayish brown (2.5Y 4/2) and olive brown (2.5Y 4/4) channery light silty clay loam; few fine distinct yellowish brown (10YR 5/4) mottles; very coarse prismatic structure; firm, brittle; 20 percent coarse fragments; grayish brown (2.5Y 5/2) clay films in most pores; thin continuous clay films on prism faces; gray (5Y 5/1) coats in prism faces; yellowish brown (10YR 5/4) mottles between faces; neutral; clear wavy boundary.

C—45 to 55 inches, olive brown (2.5Y 4/4) channery silt loam; massive; firm; 25 percent coarse fragments; calcareous; mildly alkaline.

The solum thickness ranges from 36 to 60 inches. Depth to carbonates is 40 to 65 inches, depth to bedrock is more than 60 inches, and depth to the fragipan is 10 to 16 inches. Coarse fragments make up 10 to 35 percent of the upper part of the subsoil and 20 to 50 percent of the lower part of the subsoil and the substratum. Reaction ranges from strongly acid to medium acid in the surface layer, from strongly acid to neutral in the subsoil, and from medium acid to moderately alkaline in the substratum.

The A1 or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam to fine sandy loam.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 2 through 4. The fine-earth texture is fine sandy loam, loam, or silt loam. Structure is weak or moderate, fine or medium subangular blocky. Consistence is friable or firm.

The A'2 horizon, where present, has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 or 3. The fine-earth texture is fine sandy loam, loam, or silt loam. Struc-

ture is weak or moderate, fine or medium, subangular blocky or platy. Consistence is friable or firm.

The Bxt horizon has hue of 10YR through 5Y, value of 3 through 5, and chroma of 2 through 4. The fine-earth texture is loam, silt loam, or silty clay loam. Structure is weak to moderate, subangular blocky or platy, or the material is massive within very coarse prisms. Consistence is firm or very firm.

The C horizon has hue, value, chroma, and texture similar to those of the Bx horizon. Structure is platy or the material is massive. Consistence is firm or very firm.

Fluvaquents

Fluvaquents in Schuyler County consist of deep, somewhat poorly drained to very poorly drained soils formed in recent alluvial deposits. These soils show little or no profile development. They are adjacent to secondary streams and are subject to frequent flooding. Slope ranges from 0 to 5 percent but is dominantly less than 3 percent.

Fluvaquents are mapped with Udifluvents. They are near Wayland and Teel soils in positions where the adjacent stream commonly shifts the soil deposits from place to place by scouring, cutting, and lateral erosion.

Because of the variability of Fluvaquents, a typical pedon is not provided. The solum of these soils consists of an A horizon 1 to 5 inches thick. Depth to bedrock is more than 5 feet. The content of coarse fragments, including gravel, cobblestones, and flagstones, is 0 to 70 percent, by volume. These soils are very strongly acid to mildly alkaline. Organic matter content decreases irregularly with depth.

The A horizon dominantly has hue of 5YR through 2.5Y, value of 2 or 3, and chroma of 0 through 2. It ranges from loamy sand to silty clay loam and their gravelly or very gravelly analogs. In some areas the surface is stony.

The C horizon has hue of 5YR through 5Y or is neutral, has value of 3 through 6, and has chroma of 0 through 2. It ranges from loamy sand to silty clay and their gravelly, cobbly, or very gravelly analogs. Mottles are in some pedons. Consistence of the C horizon is friable to loose.

Fremont series

The Fremont series consists of deep, somewhat poorly drained, nearly level to sloping soils on uplands. The soils formed in glacial till deposits derived from silty shale, siltstone, and sandstone.

The Fremont soils are in a drainage sequence with moderately well drained Schuyler soils. Fremont soils are similar to the Erie, Burdett, Volusia, and Hornell soils. They do not have the fragipan of the Erie and Volusia soils, do not have the clay accumulation in the subsoil of the Burdett soils, and are coarser textured than and do not have the shale bedrock within a depth of 40 inches that is characteristic of the Hornell soils.

Typical pedon of Fremont silt loam, 3 to 8 percent slopes, in the Town of Orange, 1/2 mile west of Switzer Hill Road, 50 feet northeast of Groundry Hill Road, in a conifer plantation:

Ap—0 to 5 inches, dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; many roots; 10 percent coarse fragments; neutral (limed); abrupt smooth boundary.

B21—5 to 13 inches, light yellowish brown (2.5Y 6/4) silt loam; common medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; moderate medium and fine subangular blocky structure; friable; common roots; 5 percent coarse fragments; medium acid; clear wavy boundary.

B22g—13 to 26 inches, grayish brown (2.5Y 5/2) light silty clay loam; many coarse distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure parting to fine subangular blocky; firm, plastic, sticky; few roots; 10 percent coarse fragments; light gray to gray (5Y 6/1) ped faces, thin discontinuous clay films on some ped faces; strongly acid; clear wavy boundary.

B23—26 to 31 inches, light olive brown (2.5Y 5/4) light silty clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm, plastic, sticky; few roots; 10 percent coarse fragments; light gray to gray (5Y 6/1) and olive gray (5Y 5/2) ped faces; strongly acid; clear wavy boundary.

IIC—31 to 60 inches, olive (5Y 4/3) very channery silt loam, pale olive (5Y 6/3) when rubbed; few medium distinct light gray to gray (5Y 6/1) mottles; weak medium platy structure; firm; few roots in upper part; 45 percent coarse fragments; medium acid in upper part, neutral at a depth of 60 inches.

The solum thickness ranges from 24 to 40 inches. Depth to bedrock is more than 40 inches. Coarse fragments make up 0 to 15 percent of the surface layer, 5 to 25 percent of the subsoil, and 15 to 50 percent of the substratum. Reaction ranges from medium acid to very strongly acid in the surface layer and subsoil and from medium acid to neutral in the substratum, unless the soil is limed.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. It is silt loam or silty clay loam.

The B horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 2 through 4. The fine-earth texture is silt loam or silty clay loam. Mottles are common or many, medium or coarse, and distinct. Structure is weak or moderate, fine or medium, subangular blocky or prismatic. Consistence is friable or firm.

The C horizon has hue, value, chroma, and texture similar to those of the B horizon. Very channery or very

shaly analogs are common. The material is massive, or it has platy structure with some rock structure evident.

Halsey series

The Halsey series consists of deep, very poorly drained, nearly level soils on glacial outwash terraces. The soils formed in water-sorted, gravelly and sandy deposits derived mainly from shale, sandstone, and siltstone.

The Halsey soils are in a drainage sequence with well drained and somewhat excessively drained Chenango soils, moderately well drained Castile soils, and somewhat poorly drained Red Hook soils. Halsey, Alden, and Canandaigua soils occupy similar positions on the landscape, but Halsey soils contain more coarse fragments throughout the profile than Alden or Canandaigua soils.

Typical pedon of Halsey mucky silt loam, in the Town of Dix, 200 yards south of Hornby Road, 700 feet east of County Route 19, in a pasture:

Ap—0 to 10 inches, black (10YR 2/1) mucky silt loam; moderate fine and medium granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

B21g—10 to 14 inches, greenish gray (5BG 5/1) gravelly loam; few fine prominent strong brown (7.5YR 5/8) mottles; weak medium platy structure; friable; few fine roots; 15 percent coarse fragments; slightly acid; abrupt wavy boundary.

B22g—14 to 25 inches, dark grayish brown (2.5Y 5/2) gravelly loam; many medium distinct strong brown (7.5YR 5/6) mottles; massive; friable; very few roots; 30 percent coarse fragments; slightly acid; abrupt wavy boundary.

IICg—25 to 51 inches, gray (10YR 5/1) very gravelly loamy sand; grayish brown (2.5Y 5/2) silt coats; massive; nonplastic, nonsticky; 60 percent coarse fragments; neutral.

The solum thickness ranges from 20 to 30 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up 2 to 10 percent, by volume, of the surface layer, 0 to 35 percent of the subsoil, and 20 to 65 percent of the substratum. Reaction ranges from medium acid to neutral throughout the surface layer and subsoil. The soil generally is less acid with depth. The substratum is neutral to mildly alkaline.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is mucky silt loam to fine sandy loam.

The B horizon has hue of 10YR through 5Y and 5BG, value of 5 or 6, and chroma of 2 or less. The fine-earth texture is loam to fine sandy loam. Structure is weak or moderate platy, or the material is massive. Consistence is friable or firm. Mottles are common or many and medium or coarse.

The C horizon has hue of 10YR through 2.5Y, value of 5 or 6, and chroma of 2 or less. It is mainly loamy sand or sand and their gravelly or very gravelly analogs or consists of stratified, loose or firm gravel and sand.

Hornell series

The Hornell series consists of moderately deep, somewhat poorly drained, gently sloping to moderately steep soils on uplands. The soils formed in glacial till derived mainly from soft gray shale and small amounts of sandstone and siltstone. These soils are on bedrock-controlled landforms and are 20 to 40 inches deep over bedrock.

Hornell soils are similar to Fremont and Schuyler soils but are shallower and have a finer textured subsoil than either of those soils. The Hornell soils are in the same general upland areas as the deeper Bath and Mardin soils. Hornell soils have a finer textured subsoil than and do not have the fragipan of Bath and Mardin soils.

Typical pedon of Hornell channery silt loam, 3 to 8 percent slopes, in the Town of Catharine, 2 1/4 miles north of County Route 7, 25 feet east of Upper Footes Hill Road, in an idle field:

Ap—0 to 6 inches, dark grayish brown (10YR 4/2) channery silt loam; moderate medium and fine granular structure; friable; many roots; 20 percent coarse fragments; medium acid; abrupt smooth boundary.

A2—6 to 8 inches, pale brown (10YR 6/3) silt loam; moderate medium subangular blocky structure; friable; common roots; 10 percent coarse fragments; medium acid; clear wavy boundary.

B21—8 to 14 inches, yellowish brown (10YR 5/4) silty clay loam; many coarse prominent strong brown (7.5YR 5/8) and light gray to gray (10YR 6/1) mottles; strong medium blocky structure; firm; common roots; 10 percent coarse fragments; light yellowish brown (2.5Y 6/4) ped faces; thin discontinuous clay films; medium acid; clear wavy boundary.

B22—14 to 28 inches, light olive brown (2.5Y 5/4) silty clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few roots; 12 percent coarse fragments; yellowish red (5YR 5/8) shale fragments; light gray to gray (10YR 6/1) ped faces; strongly acid; abrupt wavy boundary.

C—28 to 39 inches, olive (5Y 4/3) shaly silty clay loam; spots of material from B22 horizon; 30 percent coarse fragments; very strongly acid; abrupt wavy boundary.

IIR—39 inches, dark grayish brown (2.5Y 4/2) shale bedrock.

The solum thickness ranges from 20 to 36 inches. Depth to bedrock ranges from 20 to 40 inches. Coarse

fragments, dominantly sandstone in the surface layer and weathered shale in the subsoil and substratum, make up 5 to 35 percent of the subsoil and 15 to 35 percent of the substratum. Reaction ranges from very strongly acid to medium acid throughout, unless the soil is limed.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2. It is channery silt loam or channery silty clay loam.

The A2 horizon, where present, has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4. It is silt loam or silty clay loam.

The B horizon has hue of 10YR through 5Y, value of 4 or 5, and chroma of 3 or 4. The fine-earth texture is silty clay loam, clay, or silty clay. Structure is moderate or strong, medium or coarse, subangular blocky or angular blocky.

The C horizon has hue of 10YR through 5Y, value of 4 or 5, and chroma of 2 or 3. The fine-earth texture is silty clay loam, clay, or silty clay.

Howard series

The Howard series consists of deep, well drained to somewhat excessively drained, nearly level to steep soils on glacial outwash plains, kames, and eskers. The soils formed in gravelly and sandy outwash deposits derived from sandstone, siltstone, and some limestone and shale.

The Howard soils are in a drainage sequence with moderately well drained Castile soils, somewhat poorly drained Red Hook soils, and very poorly drained Halsey soils. Howard soils are similar to the Chenango soils on gravelly stream terraces, but they have more clay in the subsoil and are more alkaline than the Chenango soils.

Typical pedon of Howard gravelly loam, 3 to 8 percent slopes, in the Town of Catharine, 1/4 mile south of Cayutaville Road, 50 feet east Swamp Road, in a cultivated field:

Ap—0 to 8 inches, dark brown (10YR 4/3) gravelly loam; moderate fine granular structure; very friable; many fine and medium roots; 30 percent coarse fragments of rounded shale and sandstone pebbles; neutral (limed); abrupt smooth boundary.

A2—8 to 15 inches, pale brown (10YR 6/3) gravelly loam; weak medium subangular blocky structure; friable; common roots; 30 percent coarse fragments of rounded pebbles; medium acid; gradual irregular boundary.

B&A—15 to 28 inches, brown (10YR 5/3) very gravelly loam; moderate fine subangular blocky structure; friable; common roots; common fine pores with thin clay linings; pale brown (10YR 6/3) ped coatings 2 to 3 millimeters thick surrounding peds; 35 percent coarse fragments; medium acid; gradual irregular boundary.

B2t—28 to 36 inches, dark brown (10YR 4/3) very gravelly silt loam; moderate medium subangular blocky structure; firm; few roots; common fine pores; many sand grains have clay bridges, and pebbles have silt and clay coats on upper sides; 55 percent coarse fragments; slightly acid; gradual irregular boundary.

C—36 to 54 inches, dark yellowish brown (10YR 4/4) stratified sand and gravel; single grained; loose; calcareous; mildly alkaline.

The solum thickness and depth to carbonates range from 30 to 60 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up 30 to 60 percent, by volume, of the subsoil and 45 to 65 percent of the substratum. Reaction ranges from medium acid to neutral in the surface layer and subsoil and from mildly alkaline to moderately alkaline in the substratum.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It ranges from gravelly silt loam to gravelly sandy loam.

The A2 horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 2 or 3. The fine-earth texture ranges from sandy loam to silt loam.

The B horizon has hue of 10YR through 5YR, value of 3 through 5, and chroma of 3 or 4. The fine-earth texture ranges from sandy loam to silt loam in the upper part of the subsoil and from sandy loam and silt loam to sandy clay loam in the lower part of the subsoil. Structure is weak or moderate, fine or medium, subangular blocky. Consistence ranges from very friable to firm.

The C horizon has hue, value, and chroma similar to those of the B horizon. The C horizon is mainly stratified sand and gravel. Thin lenses of gravel-free silt and sand are common at a depth of 5 feet or more.

Hudson series

The Hudson series consists of deep, moderately well drained, gently sloping to steep soils on glacial lake plains. The soils formed in glacial lake sediments high in silt and clay content.

The Hudson soils are in a drainage sequence with somewhat poorly drained Rhinebeck soils and poorly drained and very poorly drained Madalin soils. The Hudson, Dunkirk, and Schoharie soils occupy similar topographic positions. The Hudson soils are finer textured than the Dunkirk soils, and they do not have the red color typical of Schoharie soils.

Typical pedon of Hudson gravelly silt loam, 3 to 8 percent slopes, in the Town of Catharine, 1/8 mile southeast of the junction of New York Routes 228 and 224, 250 feet north of New York Route 224, in a cultivated field:

Ap—0 to 8 inches, dark brown (10YR 4/3) gravelly silt loam; moderate fine granular structure; friable; many

fine roots; 15 percent coarse fragments; neutral; abrupt smooth boundary.

A2—8 to 18 inches, brown (10YR 5/3) gravelly silt loam; moderate fine subangular blocky structure; friable; many roots; few medium pores; 15 percent coarse fragments; slightly acid; clear wavy boundary.

B&A—18 to 24 inches, dark brown (7.5YR 4/2) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots along structural planes; common medium and fine pores with distinct clay linings; peds have coats of grayish brown (10YR 5/2) material; 2 percent coarse fragments; neutral; gradual wavy boundary.

B2t—24 to 40 inches, dark brown (7.5YR 4/2) silty clay; common medium distinct light yellowish brown (10YR 6/4) mottles; strong coarse angular blocky structure; very firm; few roots; fine and medium pores with weak clay linings; neutral; gradual irregular boundary.

C—40 to 60 inches, dark brown (10YR 4/3) silty clay; massive in varves; very firm; few medium pores with weak to indistinct clay linings; many small lime concretions; calcareous; moderately alkaline.

The solum thickness ranges from 24 to 40 inches. Carbonates are at a depth of 26 to 50 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up 0 to 25 percent, by volume, of the surface and subsurface layers and 0 to less than 5 percent of the subsoil and substratum. Reaction of the surface layer and subsoil is medium acid to neutral, and the substratum is neutral to moderately alkaline.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is silt loam or silty clay loam and their gravelly analogs.

The A2 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 or 3. It is silt loam or silty clay loam and their gravelly analogs. Structure is weak or moderate, fine or medium subangular blocky. Consistence is friable or firm.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 2 through 4. It is silty clay or silty clay loam. Structure is moderate or strong, medium or coarse, angular blocky or subangular blocky. Consistence is firm or very firm.

The C horizon has hue, value, and chroma similar to those of the B horizon. The C horizon ranges from clay to silt loam. The material is massive or varved, and consistence is firm or very firm.

The matrix colors with a chroma of 2 are inherited from parent material and are not evidence of an aquic moisture regime or of wetness sufficient to change the classification of the soil.

Lansing series

The Lansing series consists of deep, well drained, gently sloping to moderately steep soils on till plains. The soils formed in glacial till derived from limestone, gray shale, and fine-grained sandstone.

The Lansing soils are in a drainage sequence with moderately well drained Conesus soils, somewhat poorly drained Appleton soils, and very poorly drained Alden soils. Lansing soils are associated on the landscape with Aurora and Mardin soils. Lansing soils do not have the dense fragipan of Mardin soils, and they are deeper to bedrock than Aurora soils.

Typical pedon of Lansing gravelly silt loam, 3 to 8 percent slopes, in the Town of Hector, 100 feet east of Lewis Road, 20 feet south of Town Line Road, in a cultivated field:

Ap—0 to 7 inches, dark grayish brown (10YR 4/2) gravelly silt loam; moderate fine and medium granular structure; friable; many fine roots; 15 percent coarse fragments; slightly acid; abrupt smooth boundary.

A2—7 to 11 inches, brown (7.5YR 5/4) silt loam; moderate fine and medium granular structure; very friable; many fine roots; 10 percent coarse fragments; neutral; gradual smooth boundary.

A&B—11 to 17 inches, pale brown (10YR 6/3) gravelly silt loam surrounding irregularly shaped bodies of brown (10YR 4/3) gravelly silt loam 1 to 5 inches across; thin clay films in pores; weak fine subangular blocky structure; friable; common roots; 20 percent coarse fragments; neutral; gradual wavy boundary.

B&A—17 to 25 inches, brown (10YR 4/3) gravelly silt loam; moderate medium subangular blocky structure; friable; pale brown (10YR 6/3) silt coats 1 to 3 millimeters thick surrounding peds; thin clay films in pores; few roots; 20 percent coarse fragments; neutral; gradual wavy boundary.

Bt—25 to 38 inches, brown (10YR 4/3) gravelly silt loam; moderate medium subangular blocky structure; firm; brown (10YR 5/3) clay films on ped faces and in pores; few roots; 20 percent coarse fragments; neutral; clear smooth boundary.

C—38 to 50 inches, dark grayish brown (2.5Y 4/2) gravelly loam; weak medium platy structure; firm; 20 percent coarse fragments; calcareous; moderately alkaline.

The solum thickness ranges from 32 to 48 inches. Depth to bedrock is more than 60 inches. Depth to carbonates ranges from 30 to 50 inches. Coarse fragments make up 15 to 35 percent, by volume, of the surface layer, 5 to 35 percent of the subsoil, and 20 to 50 percent of the substratum. Reaction ranges from strongly acid to slightly acid in the surface layer, strongly acid to neutral in the subsoil, and mildly alkaline to moderately alkaline in the substratum.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam to very fine sandy loam and their gravelly analogs.

The A2 and A&B horizons have hue of 10YR, value of 5 or 6, and chroma of 3 or 4. The fine-earth texture is loam, silt loam, or light silty clay loam. Structure is weak to strong, fine to medium, subangular blocky or granular. Consistence is friable or firm.

The B horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 3 or 4. It is loam to light silty clay loam and their gravelly analogs. Consistence is friable or firm.

The C horizon has hue of 10YR through 5Y, value of 4 or 5, and chroma of 2. The fine-earth texture is loam or silt loam. Consistence is firm or very firm.

Lordstown series

The Lordstown series consists of moderately deep, well drained, gently sloping to very steep soils on uplands. The soils formed in glacial till dominated by sandstone. These soils are on bedrock-controlled landforms and are 20 to 40 inches deep over bedrock.

The Lordstown soils are commonly associated on the landscape with Bath, Arnot, and Tuller soils that formed in similar material. Lordstown soils are deeper to bedrock than Arnot or Tuller soils. Lordstown soils are shallower to bedrock than and do not have the fragipan of Bath soils.

Typical pedon of Lordstown channery silt loam, 8 to 15 percent slopes, in the Town of Orange, 1/2 mile south of Randall Road, 10 feet west of Groundry Hill Road, in a forested area:

A1—0 to 4 inches, dark grayish brown (10YR 4/2) channery silt loam; moderate medium granular structure; very friable; many roots; 15 percent coarse fragments; slightly acid; abrupt smooth boundary.

B21—4 to 12 inches, yellowish brown (10YR 5/4) channery silt loam; weak fine subangular blocky structure; very friable; common roots; 30 percent coarse fragments; strongly acid; clear wavy boundary.

B22—12 to 24 inches, brownish yellow (10YR 6/6) channery silt loam; weak medium subangular blocky structure; friable; common roots; 30 percent coarse fragments; strongly acid; clear smooth boundary.

C—24 to 30 inches, pale brown (10YR 6/3) very channery silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few roots; 55 percent coarse fragments; strongly acid; abrupt smooth boundary.

IIR—30 inches, fine grained sandstone bedrock.

The solum thickness and depth to bedrock range from 20 to 40 inches. Coarse fragments, dominantly of sandstone, make up 15 to 35 percent, by volume, of the solum and 20 to 60 percent of the substratum. Reaction ranges from medium acid to very strongly acid throughout the soil.

The Ap and A1 horizons have hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Both horizons are silt loam or loam and their channery analogs.

The B horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 3 through 6. The fine-earth texture is loam or silt loam. Structure is weak or moderate, fine or medium subangular blocky. Consistence is very friable or friable.

The C horizon, where present, has hue of 10YR through 2.5Y, value of 4 through 6, and chroma of 2 or 3. The fine-earth texture is loam, silt loam, or fine sandy loam.

The IIR layer consists of massive, thick beds of siltstone or sandstone interbedded with shale.

Madalin series

The Madalin series consists of deep, poorly drained and very poorly drained, nearly level soils on glacial lake plains. The soils formed in clayey sediments that were deposited in glacial lakes.

The Madalin soils are in a drainage sequence with moderately well drained Hudson soils and somewhat poorly drained Rhinebeck soils. Madalin, Canandaigua, Alden, and Halsey soils occupy similar topographic positions. Madalin soils have a finer textured subsoil than the Canandaigua and Alden soils, and they do not have the gravel content of Halsey soils.

Typical pedon of Madalin silt loam, in the town of Catharine, 1/4 mile west of County Route 10, 1,000 feet north of New York Route 224, in an idle field:

Ap—0 to 8 inches, very dark gray (10YR 3/1) heavy silt loam; fine medium granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

B1g—8 to 10 inches, dark gray (5Y 4/1) light silty clay loam; common medium distinct brown (7.5YR 5/4) mottles; moderate medium subangular blocky structure; firm; common roots; slightly acid; gradual irregular boundary.

B21g—10 to 17 inches, gray (10YR 5/1) silty clay loam; many medium distinct brown (7.5YR 5/4) mottles; moderate medium and fine subangular blocky structure; firm; few roots; neutral; clear wavy boundary.

B22tg—17 to 28 inches, dark gray (10YR 4/1) silty clay; many medium and coarse distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; gray (10YR 5/1) clay films on ped faces and in larger pores; neutral; clear wavy boundary.

C1—28 to 45 inches, dark gray (10YR 4/1) silty clay; many medium and coarse distinct yellowish brown (10YR 5/6) mottles; massive; firm; light gray (10YR 7/1) lime streaks; calcareous, mildly alkaline; clear wavy boundary.

IIC2—45 to 50 inches, brown (10YR 4/3) and gray (10YR 5/1) silty clay loam; firm; massive; 10 percent coarse fragments; calcareous; moderately alkaline.

The solum thickness and depth to carbonates range from 24 to 40 inches. Depth to bedrock is more than 60 inches. The content of coarse fragments is 0 to 2 percent at a depth of less than 40 inches and 0 to 10 percent at a depth of more than 40 inches. Reaction mainly ranges from medium acid to neutral in the surface layer and subsoil, but in some pedons it is mildly alkaline in the lower part of the subsoil. The substratum is mildly alkaline to moderately alkaline.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is silt loam or light silty clay loam.

The B horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 2 or less. It is silty clay loam, silty clay, or clay. Mottles are common or many and medium and distinct. Structure is moderate or strong, fine to coarse angular blocky or subangular blocky. Consistence is firm or very firm when the soil is moist; it is sticky and plastic or very plastic when the soil is wet.

The C horizon is similar to the B horizon in color, but in some pedons the chroma is 1 through 3. Texture of the C horizon is generally similar to that of the B horizon, or it consists of varved silt and clay.

Mardin series

The Mardin series consists of deep, moderately well drained, gently sloping to moderately steep soils on uplands. The soils formed in firm glacial till derived from siltstone, sandstone, and brittle shale.

The Mardin soils are in a drainage sequence with well drained Bath soils, somewhat poorly drained Volusia soils, and poorly drained and very poorly drained Chippewa soils. The Mardin, Lordstown, and Schuyler soils occupy similar topographic positions. The Mardin soils are deeper than the Lordstown soils, and they have a dense fragipan which is not in the Schuyler soils.

Typical pedon of Mardin channery silt loam, 3 to 8 percent slopes, in the Town of Hector, 1/2 mile north of Covert Road, 100 feet west of County Route 4, in a cultivated field:

Ap—0 to 8 inches, dark grayish brown (10YR 4/2) channery silt loam; moderate medium granular structure; friable; many roots; 20 percent coarse fragments; slightly acid; abrupt smooth boundary.

B21—8 to 15 inches, yellowish brown (10YR 5/4) channery silt loam; weak medium subangular blocky structure; friable; common roots; 30 percent coarse fragments; slightly acid; clear wavy boundary.

B22—15 to 18 inches, light olive brown (2.5Y 5/4) channery loam; common medium distinct yellowish brown (10YR 5/6) and light gray to gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; common roots; 30 percent coarse fragments; slightly acid; clear wavy boundary.

A'2—18 to 21 inches, light brownish gray (2.5Y 6/2) channery silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few roots; 30 percent coarse fragments; medium acid; clear wavy boundary.

B'x—21 to 51 inches, olive brown (2.5Y 4/4) gravelly loam; very coarse prismatic structure parting to moderate medium subangular blocky; very firm, brittle; 30 percent coarse fragments; light gray (N 7/0) prism faces outlined with strong brown (7.5YR 5/8); clay linings in some pores; very thin patchy clay films on some ped faces; slightly acid; diffuse wavy boundary.

C—51 to 69 inches, olive brown (2.5Y 4/4) very gravelly loam; massive; very firm; few prism faces; 35 percent coarse fragments; neutral.

The solum thickness ranges from 40 to 60 inches. Carbonates are at a depth of more than 55 inches. Depth to the fragipan ranges from 14 to 26 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up 15 to 35 percent of the soil above the fragipan and 20 to 45 percent of the fragipan and substratum. Reaction ranges from extremely acid to slightly acid above the fragipan, from strongly acid to neutral in the fragipan, and from strongly acid to moderately alkaline in the substratum.

The Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 2 or 3. It is channery or flaggy silt loam or loam.

The B2 horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 3 through 6. The fine-earth texture is loam or silt loam. Structure is weak or moderate, fine or medium, subangular blocky. Consistence is very friable or friable.

The A'2 horizon, where present, has hue of 10YR through 5Y, value of 5 or 6, and chroma of 2 or 3. The fine-earth texture is loam or silt loam. Structure is platy or subangular blocky, or the soil is massive. Consistence is friable or firm.

The Bx horizon has hue of 10YR through 5Y, value of 3 through 5, and chroma of 2 through 4. The fine-earth texture is loam or silt loam. Structure is weak to strong prismatic or subangular blocky, or the material is massive. Consistence is firm or very firm.

The C horizon is similar to the Bx horizon in color and texture. Structure is platy, or the material is massive. Consistence is firm or very firm.

Ochrepts

Ochrepts in Schuyler County consist of deep, moderately well drained to somewhat excessively drained soils that have a cambic horizon. The soils formed in sandy,

silty, clayey, and loamy deposits of glaciofluvial, glaciolacustrine, and glacial till material. These soils are in areas that have been deeply dissected by an incised stream. In many of these areas the unconsolidated geologic material is extremely thick. Slope is generally near 100 percent but ranges from 35 to 100 percent. The soil material has a high tendency to slip or slump downslope, especially where the stream undercuts the deposit.

Ochrepts are mapped in a complex with Orthents. They are commonly near Bath, Mardin, Chenango, Schuyler, and Valois soils.

Because of the variability of Ochrepts, a typical pedon is not provided. Ochrepts have a solum that ranges from 15 to 40 inches thick, and the depth to bedrock is more than 4 feet. The coarse fragment content ranges from 0 to 50 percent, by volume. The soils are extremely acid to medium acid.

The A horizon dominantly has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 2 through 4. It ranges from silty clay loam to loamy sand and is 4 to 16 inches thick.

The B horizon dominantly has hue of 5YR through 5Y, value of 4 through 6, and chroma of 3 through 6. It ranges from silty clay loam to loamy sand and their gravelly or very gravelly analogs. The B horizon ranges from 10 inches to more than 40 inches thick.

The C horizon has colors and texture similar to those of the B horizon.

Odessa series

The Odessa series consists of deep, somewhat poorly drained, nearly level to gently sloping soils on glacial lake plains. The soils formed in reddish lacustrine deposits high in silt and clay content.

The Odessa soils are in a drainage sequence with moderately well drained and well drained Schoharie soils. The Odessa, Rhinebeck, Burdett, and Appleton soils are similar in drainage and occupy similar topographic positions. The Odessa soils are finer textured than the Burdett and Appleton soils, and they have redder matrix colors than the Rhinebeck soils.

Typical pedon of Odessa silt loam, 3 to 8 percent slopes, in the Town of Reading, 1/2 mile south of County Route 23, 50 feet west of County Route 28, in an idle field:

Ap—0 to 8 inches, very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; friable; 2 percent coarse fragments; many fine roots; slightly acid; abrupt smooth boundary.

A2—8 to 12 inches, brown (7.5YR 5/2) silt loam; weak medium subangular blocky structure; friable; common roots; medium acid; clear smooth boundary.

B21t—12 to 16 inches, reddish brown (5YR 4/3) heavy silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; reddish gray (5YR 5/2) clay films on ped faces and lining pores; few roots; slightly acid; gradual wavy boundary.

B22t—16 to 28 inches, dark reddish gray (5YR 4/2) silty clay; common medium distinct strong brown (7.5YR 5/6) mottles; strong medium subangular blocky structure; firm; thick continuous reddish gray (5YR 5/2) clay films on ped faces and lining pores; few roots; neutral; clear wavy boundary.

C1—28 to 36 inches, dark reddish gray (5YR 4/2) heavy silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak thick platy structure; firm; gray (7.5YR 6/1) lime streaks; calcareous; mildly alkaline; clear wavy boundary.

C2—36 to 50 inches, dark grayish brown (10YR 4/2) silty clay loam; massive; firm; 2 percent coarse fragments; calcareous; moderately alkaline.

The solum thickness and depth to carbonates range from 20 to 40 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up 0 to 3 percent, by volume, of the profile. Reaction ranges from medium acid to neutral in the surface layer, medium acid to mildly alkaline in the subsoil, and mildly alkaline to moderately alkaline in the substratum.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam, silty clay loam, or loam.

The A2 horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 2. It is silt loam, loam, or silty clay loam. Structure is fine or medium subangular blocky. Consistence is friable or firm.

The B horizon has hue of 10R through 5YR, value of 3 through 5, and chroma of 2 through 4. It is silty clay loam, silty clay, or clay. Structure is moderate or strong, medium or coarse, angular or subangular blocky.

The C horizon has hue of 10R through 10YR, value of 3 through 5, and chroma of 2 through 4. It is silty clay loam, silty clay, or stratified clay and silt. The structure is platy, or the material is massive.

Orthents

Orthents in Schuyler County consist of deep, moderately well drained to excessively drained soils that have little or no evidence of development of pedogenic horizons. The soils formed in glaciofluvial, glaciolacustrine, and glacial till material on recent erosional surfaces. These soils are in areas that have been deeply dissected by an incised stream. The soil material has a high tendency to slip or slump downslope, the process being speeded up where the stream undercuts the deposit. Slopes are generally near 100 percent but range from 35 to 100 percent.

Orthents are mapped with Ochrepts. They are commonly near Bath, Mardin, Chenango, Schuyler, and

Valois soils but in positions where the soils are in a complex pattern and not intensively used.

Because of the variability of Orthents, a typical pedon is not provided. Orthents have a solum that ranges from 0 to 10 inches thick, and the depth to bedrock is more than 4 feet. Coarse fragment content ranges from 0 to 50 percent, by volume. The soils are extremely acid to medium acid.

The A horizon dominantly has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 2 through 4. It ranges from silty clay loam to loamy sand and their gravelly analogs. It is 0 to 10 inches thick.

The B horizon dominantly has hue of 5YR through 5Y, value of 4 through 6, and chroma of 3 through 6. It ranges from silty clay loam to loamy sand and their gravelly or very gravelly analogs. The B horizon ranges from 0 to 8 inches thick.

The C horizon has hue, value, chroma, and texture similar to those of the B horizon.

Palms series

The Palms series consists of deep, very poorly drained, nearly level soils. The soils formed in deposits of organic material 16 to 50 inches thick over loamy mineral deposits.

Palms soils are on landscape positions similar to those of Halsey, Wallkill, and Alden soils. The Palms soils have a thicker organic layer than the Halsey soils. The Alden soils have a mineral surface layer, and Palms soils do not have the alluvium cap over muck that is characteristic of the Wallkill soils.

Typical pedon of Palms muck, in the Town of Catharine, 1/4 mile west of County Road 6, and 400 feet north of Swamp Road, in a wooded area:

Oa1—0 to 10 inches, black (N 2/0) broken muck (sapric material), very dark gray (10YR 3/1) when rubbed, very dark brown (10YR 2/2) when pressed; 10 percent fiber unrubbed, less than 1 percent rubbed; massive; nonsticky, slightly plastic; neutral; clear smooth boundary.

Oa2—10 to 21 inches, black (10YR 2/1) broken muck (sapric material), dark reddish brown (5YR 2/2) when pressed, black (5YR 2/1) when rubbed; 20 percent fiber unrubbed, less than 3 percent rubbed; massive; nonsticky, slightly plastic; neutral; abrupt smooth boundary.

IIC—21 to 50 inches, light gray (10YR 6/1) light silty clay loam; massive; slightly sticky, slightly plastic; calcareous; moderately alkaline.

Depth to the underlying mineral soil ranges from 16 to 50 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up less than 15 percent of the mineral soil substratum. Reaction ranges from strongly acid to neutral in the organic deposits, and from slightly acid to moderately alkaline in the underlying mineral soil.

The organic layers have hue of 7.5YR through 5YR, or hue is neutral, value of 2 or 3, and chroma of 2 or less.

The IIC horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 or 2. It is loam to silty clay loam.

Philo series

The Philo series consists of deep, moderately well drained, nearly level soils on flood plains. The soils formed in recent silty alluvium underlain by gravelly deposits at a depth of 20 to 40 inches.

Philo soils are in a drainage sequence with poorly drained Atkins soils. They are similar to Teel soils, which are on flood plains, but are underlain by gravelly deposits at a shallower depth than the Teel soils. Philo soils are better drained than Wayland soils, which are also on flood plains.

Typical pedon of Philo silt loam, in the Town of Orange, 600 feet downstream on Meads Creek from Coon Hollow Road, 500 feet east of County Route 16, in a pasture:

A1—0 to 10 inches, dark grayish brown (10YR 4/2) silt loam; strong medium granular structure; very friable; many fine roots; strongly acid; gradual smooth boundary.

B21—10 to 17 inches, brown (10YR 4/3) silt loam; moderate fine and very fine subangular blocky structure; friable; common fine and medium roots; strongly acid; clear smooth boundary.

B22—17 to 24 inches, brown (10YR 4/3) silt loam; common fine faint grayish brown (10YR 5/2) and brown (7.5YR 5/4) mottles; moderate medium subangular blocky structure; friable; few roots; very strongly acid; clear wavy boundary.

B23—24 to 31 inches, brown (10YR 4/3) gravelly silt loam; common fine faint grayish brown (10YR 5/2) and brown (7.5YR 5/4) mottles; weak fine and medium subangular blocky structure; firm; few roots; 15 percent coarse fragments; very strongly acid; clear wavy boundary.

B3—31 to 35 inches, grayish brown (2.5Y 5/2) gravelly loam; common medium distinct brown (7.5YR 5/4) mottles; weak medium subangular blocky structure; firm; few roots; 20 percent coarse fragments; strongly acid; clear wavy boundary.

IIC2—35 to 50 inches, grayish brown (2.5Y 5/2) very gravelly loam mottled with various shades of gray and brown; weakly stratified; friable to loose; 50 percent coarse fragments; strongly acid.

The solum thickness ranges from 20 to 40 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up 0 to 10 percent, by volume, of the profile

to a depth of 20 inches and 15 to 55 percent of the profile at a depth of greater than 20 inches. Reaction ranges from very strongly acid to medium acid throughout the soil.

The Ap or A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam or loam.

The B horizon has hue of 7.5YR or 10YR with some subhorizons of 2.5Y, value of 4 through 6, and chroma of 3 through 5. The fine-earth texture is silt loam or loam. Structure is weak or moderate, very fine to medium, subangular blocky. Consistence is friable or firm.

The C horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 1 or 2. The fine-earth texture is loam or silt loam. Structure is weakly stratified, or the material is massive. Consistence is friable or firm.

Red Hook series

The Red Hook series consists of deep, somewhat poorly drained, nearly level soils on glacial outwash plains. The soils formed in water-sorted sand and gravel deposits derived mainly from shale, sandstone, and siltstone.

The Red Hook soils are in a drainage sequence that includes well drained to somewhat excessively drained Chenango soils, moderately well drained Castile soils, and very poorly drained Halsey soils. Red Hook, Atkins, and Halsey soils formed in similar materials. Red Hook soils are commonly near wetter Halsey soils on terraces and Atkins soils that formed in silty alluvial deposits underlain by gravel.

Typical pedon of Red Hook gravelly silt loam, in the Town of Catharine, 1/4 mile north of Grant Road, 300 feet west of County Route 10, in a pasture:

Ap—0 to 9 inches, very dark grayish brown (10YR 3/2) gravelly silt loam; moderate fine and medium granular structure; friable; many roots; 15 percent coarse fragments; medium acid; abrupt smooth boundary.

B21—9 to 16 inches, pale brown (10YR 6/3) gravelly loam; common medium distinct yellowish brown (10YR 5/4) and common medium faint light brownish gray (10YR 6/2) mottles; weak fine and medium subangular blocky structure; friable; few roots; 20 percent coarse fragments; strongly acid; clear smooth boundary.

B22—16 to 28 inches, grayish brown (10YR 5/2) gravelly sandy loam; common fine distinct brown (7.5YR 5/4) mottles; weak medium subangular blocky structure; friable; 20 percent coarse fragments; strongly acid; clear smooth boundary.

IIC—28 to 50 inches, grayish brown (10YR 5/2) very gravelly sandy loam; massive; loose; 50 percent coarse fragments; thin discontinuous gravelly clay loam lens at a depth of 32 inches; slightly acid.

The solum thickness ranges from 20 to 40 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up 10 to 55 percent of the solum and 25 to 65 percent of the substratum. Reaction ranges from strongly acid to slightly acid in the surface layer and subsoil and from medium acid to neutral in the substratum.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is gravelly silt loam to gravelly fine sandy loam.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 1 through 3. The fine-earth texture is loam, silt loam, or sandy laom. Structure is weak, fine or medium, subangular blocky. Consistence is very friable or friable.

The C horizon has hue, value, and chroma similar to those of the B horizon. It ranges from sandy loam to silt loam in the fine-earth fraction or consists of stratified sand and silt. Consistence is friable or loose.

Rhinebeck series

The Rhinebeck series consists of deep, somewhat poorly drained, nearly level to gently sloping soils on glacial lake plains. The soils formed in glacial lake sediments high in silt and clay content.

The Rhinebeck soils are in a drainage sequence which includes moderately well drained and well drained Hudson soils and poorly drained and very poorly drained Madalin soils. The Rhinebeck, Odessa, Madalin, and Canandaigua soils are in old glacial lake beds. Rhinebeck soils are gray, and Odessa soils are red. Rhinebeck soils are better drained than the clayey Madalin soils or the silty Canandaigua soils.

Typical pedon of Rhinebeck gravelly silt loam, 3 to 8 percent slopes, in the Town of Catharine, 3/4 mile south of N. Y. 224, 50 feet east of Pertl Road, in a cultivated field:

Ap—0 to 6 inches, very dark grayish brown (10YR 3/2) gravelly silt loam; moderate medium and fine granular structure; friable; many roots; 15 percent coarse fragments; neutral; abrupt smooth boundary.

A2—6 to 14 inches, grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; common roots; 10 percent coarse fragments; slightly acid; clear wavy boundary.

B2t—14 to 33 inches, brown (10YR 4/3) silty clay; common medium distinct strong brown (7.5YR 5/6) mottles; strong medium subangular blocky structure; firm; few roots; dark grayish brown (10YR 4/2) ped faces; thick patchy clay films on ped faces and in pores; 2 percent coarse fragments; neutral; clear smooth boundary.

B3—33 to 42 inches, brown (10YR 4/3) silty clay loam; common medium distinct yellowish brown (10YR 5/

6) mottles; moderate medium subangular blocky structure; firm; dark grayish brown (10YR 4/2) ped faces; thick clay films in pores; neutral; clear smooth boundary.

C—42 to 54 inches, brown (10YR 4/3) heavy silt loam; massive; friable; calcareous; moderately alkaline.

The solum thickness and depth to carbonates range from 20 to 48 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up 15 to 25 percent of the surface layer, 0 to 10 percent of the subsurface layer, and 0 to less than 3 percent of the subsoil and substratum. Reaction in the surface layer and subsoil is medium acid to neutral, and in the substratum it is mildly alkaline or moderately alkaline.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is gravelly silt loam or gravelly silty clay loam.

The A2 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. It is silty clay loam or silty clay. Structure is weak to strong, fine or medium, subangular blocky. Consistence is friable or firm.

The B horizon has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 2 or 3. It is silty clay loam or silty clay. Structure is moderate or strong, medium or coarse, subangular blocky. Consistence is firm or very firm.

The C horizon has hue, value, and chroma similar to those of the B horizon. The C horizon is heavy silt loam, silty clay loam, or silty clay. The material is varved silt and very fine sand.

Saprists

Saprists in Schuyler County consist of deep, very poorly drained organic soils. The soils formed in deposits of well decomposed herbaceous and woody plant remnants. Areas of these soils are commonly termed fresh water marsh. They are ponded with shallow water throughout much of the year. The soils are generally level and are in low areas and depressions adjacent to lakes. Slope ranges from 0 to 1 percent.

Saprists are mapped with Aquepts. Some areas contain both of these soils, while other areas are mainly one or the other. Saprists commonly are near Carlisle, Palms, Canandaigua, and Wallkill soils on slightly higher areas where ponding and flooding are brief.

Because of the variability of Saprists, a typical pedon is not provided. Saprists have organic deposits 16 to 80 inches thick over mineral soil deposits. Bedrock is at a depth of more than 5 feet. Woody fragments make up 0 to 20 percent of the organic layers. These soils are very strongly acid to neutral in the organic portion and strongly acid to moderately alkaline in the mineral soil substratum.

The O layer dominantly has hue of 5YR through 10YR, value of 2 or 3, and chroma of 0 through 2. It is mainly well decomposed sapric material.

The mineral C horizon is neutral or has hue of 5YR through 2.5Y, value of 1 through 6, and chroma of 0 through 4. It is loamy sand to silty clay and their gravelly or very gravelly analogs.

Schoharie series

The Schoharie series consists of deep, moderately well drained to well drained, gently sloping to moderately steep soils on glacial lake plains. The soils formed in reddish lacustrine deposits of silt and clay.

The Schoharie soils are in a drainage sequence that includes somewhat poorly drained Odessa soils. The Schoharie, Dunkirk, Collamer, Hudson, and Schoharie Variant soils occupy similar geographic locations along Seneca Lake. The Schoharie soils have a finer textured subsoil than the silty Dunkirk and Collamer soils. Schoharie soils formed in reddish, clayey lake sediments, in contrast to the gray clays of the Hudson soils. Schoharie soils are deep to bedrock, but the Schoharie Variant soils have bedrock at a depth of 20 to 40 inches.

Typical pedon of Schoharie silty clay loam, 8 to 15 percent slopes, severely eroded, in the Town of Montour, 100 feet north of Cotton Hanlon Road, 0.7 mile east of Hayes Road, in a hay field:

Ap—0 to 4 inches, dark grayish brown (10YR 4/2) silty clay loam; moderate medium granular structure; friable; many roots; neutral; abrupt smooth boundary.

B21t—4 to 16 inches, reddish brown (5YR 4/3) silty clay; few medium distinct yellowish brown (10YR 5/6) mottles; strong medium angular blocky structure; firm, plastic, sticky; common roots; continuous brown (7.5YR 5/3) clay films on ped faces; neutral; clear wavy boundary.

B22t—16 to 33 inches, reddish brown (5YR 4/3) silty clay; strong coarse angular blocky structure; firm, plastic, sticky; few roots; continuous brown (7.5YR 4/3) clay films on ped faces; lime streaks; mildly alkaline; clear wavy boundary.

C—33 to 60 inches, reddish brown (5YR 5/3) silty clay loam; light gray (2.5Y 7/2) silt lenses; massive parting to coarse angular blocky structure; firm, plastic, sticky; few roots in upper part; less than 2 percent coarse fragments; calcareous; moderately alkaline.

The solum thickness ranges from 20 to 40 inches. Depth to carbonates ranges from 16 to 40 inches. Coarse fragments make up 0 to 3 percent of the solum. Reaction ranges from medium acid to neutral in the surface layer and from medium acid to mildly alkaline in the subsoil. The substratum is mildly alkaline or moderately alkaline.

The Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 2 or 3. It is silty clay loam, silt loam, or loam.

The B horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 3 or 4. It is heavy silty clay loam, silty clay, or clay. Structure is moderate or strong, medium or coarse, subangular or angular blocky.

The C horizon has hue, value, chroma, and texture similar to those of the B horizon.

Schoharie Variant

The Schoharie Variant consists of moderately deep, moderately well drained to well drained, sloping or moderately steep soils on glacial lake plains. The soils formed in lacustrine deposits of silt and clay. These soils are on bedrock-controlled landforms and are 20 to 40 inches deep over bedrock.

Schoharie Variant soils are on landscapes similar to those occupied by Aurora, Lordstown, and Schoharie soils. Schoharie Variant soils are finer textured than the moderately deep Aurora and Lordstown soils. Schoharie Variant soils and Schoharie soils formed in similar lacustrine deposits, but Schoharie Variant soils are shallower to bedrock.

Typical pedon of Schoharie Variant silty clay loam, 8 to 15 percent slopes, severely eroded, in the Town of Montour, 1/4 mile west of County Route 8, 50 feet south of Cass Road, in a cultivated field:

Ap—0 to 6 inches, dark grayish brown (10YR 4/2) silty clay loam; moderate fine subangular blocky structure; friable; many fine roots; 3 percent coarse fragments; neutral; abrupt smooth boundary.

B21t—6 to 18 inches, reddish brown (5YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; common fine roots; many fine pores; clay films on ped faces; neutral; gradual wavy boundary.

B22t—18 to 24 inches, reddish brown (5YR 4/4) heavy silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few roots; many fine pores; continuous clay films on ped faces; neutral; abrupt wavy boundary.

R—24 inches, hard sandstone bedrock with secondary lime deposits on surface.

The solum thickness and depth to bedrock range from 20 to 40 inches. Coarse fragments make up 0 to 3 percent of the solum. Reaction ranges from medium acid to neutral in the surface layer and subsoil.

The Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 2 or 3.

The B horizon has hue of 10YR through 5YR, value of 4 or 5, and chroma of 3 or 4. It is silty clay loam, silty clay, or clay. Structure is moderate or strong, fine to coarse, subangular blocky.

The bedrock consists of hard sandstone, siltstone, or shale.

Schuyler series

The Schuyler series consists of deep, moderately well drained, sloping to steep soils on uplands. The soils formed in glacial till derived from silty shale, siltstone, and sandstone.

The Schuyler soils are in a drainage sequence that includes somewhat poorly drained Fremont soils. Schuyler, Bath, Hornell, and Lordstown soils occupy similar topographic positions. Schuyler soils are finer textured than Bath soils, and they do not have the dense fragipan characteristic of the Bath soils. Schuyler soils are deep, in contrast to Hornell and Lordstown soils, which have bedrock at a depth of less than 40 inches.

Typical pedon of Schuyler silt loam, 8 to 15 percent slopes, in the Town of Orange, 1/4 mile east of Yawger Road, 50 feet north of Groundry Hill Road, in second-growth woodland:

Ap—0 to 9 inches, dark brown (10YR 4/3) silt loam; strong medium granular structure; friable; many roots; 10 percent coarse fragments; strongly acid; clear smooth boundary.

B21—9 to 14 inches, olive brown (2.5Y 4/4) silt loam; moderate fine subangular blocky structure; friable; many roots; 5 percent coarse fragments; very strongly acid; clear smooth boundary.

B22—14 to 22 inches, light olive brown (2.5Y 5/4) silt loam; common medium distinct yellowish brown (10YR 5/4) and light brownish gray (10YR 6/2) mottles; moderate fine subangular blocky structure; friable; common roots; 10 percent coarse fragments; strongly acid; clear wavy boundary.

B23—22 to 30 inches, olive (5Y 5/3) channery heavy silt loam; common coarse prominent strong brown (7.5YR 5/8) and common coarse faint light olive gray (5Y 6/2) mottles; moderate medium subangular blocky structure; firm few roots; 30 percent coarse fragments; strongly acid; clear smooth boundary.

B3—30 to 38 inches, gray (5Y 5/1) very channery heavy silt loam; few medium prominent strong brown (7.5YR 5/8) mottles; very weak coarse granular structure; firm; few roots; 45 percent coarse fragments; strongly acid; clear wavy boundary.

C—38 to 50 inches, gray (5Y 5/1) very channery silt loam; common medium prominent strong brown (7.5YR 5/6) mottles; massive; firm; 55 percent coarse fragments; strongly acid.

The solum thickness ranges from 20 to 48 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up 5 to 15 percent, by volume, of the surface layer, 5 to 50 percent of the subsoil, and 10 to

60 percent of the substratum. Reaction ranges from extremely acid to medium acid throughout the soil.

The Ap horizon has hue of 10YR or 2.5Y, value of 2 through 5, and chroma of 1 through 3. It is silt loam, loam, or fine sandy loam.

The B horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 3 through 5. The fine-earth texture is silt loam, loam, or light silty clay loam. Structure is weak or moderate, fine or medium, subangular blocky. Consistence ranges from very friable to firm.

The C horizon has hue of 10YR through 5Y, value of 3 through 5, and chroma of 1 through 4. The fine-earth texture is silt loam, loam, or silty clay loam.

Teel series

The Teel series consists of deep, moderately well drained to somewhat poorly drained, nearly level soils on flood plains. The soils formed in silty alluvial deposits.

Teel soils are in a drainage sequence that includes poorly drained and very poorly drained Wayland soils. Teel soils are on landscape positions similar to those of Atkins and Philo soils. Teel soils do not have the gravelly substratum characteristic of the Atkins and Philo soils. Teel soils are also near well drained to somewhat excessively drained, channery Chenango soils on adjacent alluvial fans.

Typical pedon of Teel silt loam, in the Town of Montour, 1,000 feet north of the junction of NY 14 and old Catharine Creek bridge, in a cultivated field:

Ap—0 to 10 inches, dark grayish brown (10YR 4/2) silt loam; moderate medium subangular blocky structure; upper part compacted by machinery, more granular in lower part; friable; common roots; neutral; abrupt smooth boundary.

B21—10 to 16 inches, dark brown (10YR 3/3) silt loam; weak thick platy structure parting to weak fine subangular blocky; friable; many pores; common roots; neutral; clear smooth boundary.

B22—16 to 22 inches, brown (10YR 4/3) silt loam; moderate coarse prismatic structure parting to weak medium subangular blocky; friable; dark grayish brown (10YR 4/2) ped coats; common pores; neutral; clear smooth boundary.

B23—22 to 32 inches, brown (10YR 4/3) silt loam; few medium distinct brown (7.5YR 5/4) and grayish brown (10YR 5/2) mottles; weak fine and medium subangular blocky structure; very friable; neutral; clear smooth boundary.

A11b—32 to 38 inches, very dark grayish brown (10YR 3/2) silt loam; massive; friable; neutral; clear smooth boundary.

A12b—38 to 44 inches, very dark brown (10YR 2/2) silt loam; common medium distinct brown (7.5YR 4/4) mottles; massive; friable; high organic matter content; neutral; clear smooth boundary.

C—44 to 50 inches, olive gray (5Y 4/2) loam; common fine faint brown (7.5YR 4/4) mottles; massive; friable; neutral.

The solum thickness ranges from 24 to 45 inches. Depth to bedrock is more than 60 inches. Coarse fragments generally make up less than 3 percent, by volume, of the solum and 0 to 20 percent of the profile at a depth of more than 40 inches. Reaction is medium acid to neutral in the surface layer and subsoil and neutral to mildly alkaline in the substratum.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2. The horizon is silt loam or very fine sandy loam.

The B horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 through 4. It is silt loam and very fine sandy loam. Structure is weak or moderate, fine to coarse, subangular blocky to prismatic. Consistence is friable or very friable.

The C horizon has hue of 10YR through 5Y, value of 3 or 4, and chroma of 2 or 3. The fine-earth texture is silt loam to fine sandy loam. The material is massive or has platy structure. Consistence is friable or firm.

Tuller series

The Tuller series consists of shallow, somewhat poorly drained to poorly drained, gently sloping to sloping soils on uplands. The soils formed in thin-mantled glacial till derived from acid sandstone and siltstone. The soils are on bedrock-controlled landforms and are 10 to 20 inches deep over bedrock.

Tuller soils are in a drainage sequence which includes well drained and moderately well drained Arnot soils. Tuller soils are on the same upland areas as the Chippewa, Erie, and Volusia soils. Tuller soils are shallow to bedrock and do not have the dense fragipan characteristic in the Chippewa, Erie, and Volusia soils.

Typical pedon of Tuller channery silt loam, 3 to 8 percent slopes, in the Town of Tyrone, 1/4 mile west of Preemption Road, 100 feet north of Beach Road, in a pasture:

Ap—0 to 7 inches, dark grayish brown (10YR 4/2) channery silt loam; moderate fine granular structure; very friable; many fine roots; 20 percent coarse fragments; strongly acid; abrupt smooth boundary.

B21—7 to 12 inches, grayish brown (2.5Y 5/2) channery silt loam; common fine faint light brownish gray (10YR 6/2) and distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; many fine roots; few pores; 35 percent coarse fragments; strongly acid; clear wavy boundary.

B22—12 to 18 inches, grayish brown (10YR 5/2) very channery silt loam; many medium distinct yellowish brown (10YR 5/4 and 5/6) mottles; moderate medium subangular blocky structure; firm; few roots;

common pores with thin clay linings; 40 percent coarse fragments; strongly acid; abrupt smooth boundary.

IIR—18 inches, massive thin bedded fine grained sandstone.

The solum thickness and depth to bedrock range from 10 to 20 inches. Coarse fragments of dominantly sandstone and siltstone make up 20 to 35 percent, by volume, of the soil. Reaction ranges from very strongly acid to strongly acid in the surface layer and very strongly acid to medium acid in the subsoil.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2. It is channery silt loam or channery loam.

The B horizon has hue of 7.5YR through 5Y, value of 4 or 5, and chroma of 2 or 3. The fine-earth texture is commonly loam or silt loam. High- and low-chroma mottles are few to many and faint or distinct. Structure is weak or moderate, fine or medium, subangular blocky. Consistence is friable or firm.

The underlying bedrock is massive sandstone or interbedded sandstone, siltstone, and shale.

Udifluvents

Udifluvents in Schuyler County consist of deep, moderately well drained soils that formed in recent alluvial deposits. The soils show little or no soil profile development. They are adjacent to secondary streams and are subject to frequent flooding. Slope ranges from 0 to 5 percent but is dominantly less than 3 percent.

Udifluvents are mapped with Fluvaquents. They are near Wayland and Teel soils but are in positions where the adjacent stream, through scouring, cutting, and lateral erosion, commonly shifts the soil deposits from place to place.

Because of the variability of Udifluvents, a typical pedon is not provided. The solum of these soils consists of the A horizon 1 to 5 inches thick. Depth to bedrock is greater than 5 feet. Coarse fragments, including gravel, cobblestones, and flagstones, make up 0 to 70 percent, by volume, of some subhorizons. These soils are very strongly acid to mildly alkaline. Organic matter content decreases irregularly with depth.

The A horizon dominantly has hue of 5YR through 2.5Y, value of 3 or 4, and chroma of 2 or 3. The texture is quite variable, ranging from loamy sand to silt loam and their gravelly or very gravelly analogs. In some areas the surface is stony.

The C horizon has hue of 5YR through 2.5Y, value of 3 through 6, and chroma of 2 through 4. Some pedons are mottled. The C horizon ranges from loamy sand to silt loam and their gravelly, cobbly, or very gravelly analogs. Consistence is friable to loose.

Udorthents

Udorthents in Schuyler County consist of deep, moderately well drained to excessively drained soils that have little or no evidence of development of pedogenic horizons. They occur in areas that have been altered by grading operations for housing developments, industrial sites, and other nonfarm uses. Slope ranges from 0 to 8 percent but is dominantly less than 3 percent.

Udorthents are in areas near urban development. They are on flood plains near Wayland and Teel soils and Aquepts and Saprists. In some areas they are commonly near Chenango soils that occupy slightly higher areas.

Because of the variability of Udorthents, a typical pedon is not provided. They have a solum that ranges from 0 to 10 inches thick, and depth to bedrock is more than 5 feet. Coarse fragment content ranges from 0 to 65 percent in individual subhorizons. The soils are strongly acid to slightly acid.

The A horizon dominantly has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 1 through 4. It ranges from loamy sand to silt loam and their gravelly or very gravelly analogs.

The C horizon has hue of 5YR through 2.5Y, value of 3 through 6, and chroma 3 or 4. It ranges from loamy sand to silty clay and their gravelly or very gravelly analogs.

Valois series

The Valois series consists of deep, well drained, gently sloping to very steep soils on uplands. The soils formed in glacial till derived from sandstone, siltstone, and shale.

Valois soils are associated with Bath soils in morainic areas. Valois soils do not have the fragipan or firm basal till substratum of Bath soils. Valois and Howard soils occupy similar kinds of landscapes, but Valois soils are more acid and are finer textured in the substratum than the Howard soils. Valois soils are commonly near wetter Mardin and Volusia soils that are at lower elevations.

Typical pedon of Valois gravelly silt loam, 8 to 15 percent slopes, in the Town of Tyrone, 1/2 mile north of County Route 23, 50 feet east of County Route 25, in a wooded area:

Ap—0 to 6 inches, dark brown (10YR 4/3) gravelly silt loam; moderate fine granular structure; very friable; many fine roots; 20 percent coarse fragments; strongly acid; abrupt smooth boundary.

B21—6 to 15 inches, dark yellowish brown (10YR 4/4) gravelly silt loam; weak fine and medium subangular blocky structure; very friable; many fine roots; many pores; 20 percent coarse fragments; very strongly acid; clear wavy boundary.

B22—15 to 28 inches, yellowish brown (10YR 5/4) gravelly loam; weak fine and medium subangular blocky structure; friable; common fine roots; many pores;

25 percent coarse fragments; very strongly acid; clear wavy boundary.

B23—28 to 36 inches, yellowish brown (10YR 5/4) gravelly sandy loam; weak fine and medium subangular blocky structure; friable; few fine and medium roots; many pores; 30 percent coarse fragments; strongly acid; clear wavy boundary.

B3—36 to 45 inches, brown (10YR 4/3) very gravelly sandy loam; weak medium subangular blocky structure; friable; few fine roots; common medium pores; 35 percent coarse fragments; strongly acid; clear wavy boundary.

C—45 to 60 inches, brown (10YR 5/3) very gravelly sandy loam; massive; friable; few fine roots in upper part; 45 percent coarse fragments; strongly acid.

The solum thickness ranges from 30 to 60 inches. Depth to bedrock is more than 60 inches. Coarse fragments make up 15 to 35 percent, by volume, of the soil to a depth of 40 inches and 20 to 60 percent at a depth of more than 40 inches. Reaction is very strongly or strongly acid in the surface layer, very strongly acid to medium acid in the subsoil, and strongly acid to neutral in the substratum.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam, loam, or fine sandy loam with gravelly analogs.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 3 through 6. The fine-earth texture ranges from sandy loam to silt loam. Structure is weak or moderate, fine or medium, subangular blocky. Consistence is friable or very friable.

The C horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 2 through 6. The fine-earth texture ranges from sandy loam to loam. Thin lenses of stratified material are common.

Volusia series

The Volusia series consists of deep, somewhat poorly drained, nearly level to moderately steep soils on uplands. The soils formed in firm glacial till derived from siltstone, sandstone, and brittle shale.

Volusia soils are in a drainage sequence that includes moderately well drained Mardin soils and poorly drained Chippewa soils. Volusia, Fremont, Appleton, and Erie soils occupy similar topographic positions. Volusia soils have a fragipan that is not in Fremont or Appleton soils. Volusia soils are finer textured above the fragipan than the Erie soils.

Typical pedon of Volusia channery silt loam, 3 to 8 percent slopes, in the Town of Hector, 1/4 mile north of Covert Road, 100 yards west County Route 4, in a cultivated field:

Ap—0 to 6 inches, grayish brown (10YR 5/2) channery silt loam; moderate fine granular structure; friable; many fine roots; 20 percent coarse fragments; slightly acid; abrupt smooth boundary.

B2—6 to 10 inches, pale brown (10YR 6/3) channery silt loam; few fine faint yellowish brown (10YR 5/6) and light grayish brown (10YR 6/2) mottles; weak fine subangular blocky structure; friable; common roots; few pores; 20 percent coarse fragments; strongly acid; clear wavy boundary.

A'2—10 to 13 inches, light grayish brown (10YR 6/2) channery silt loam; many medium distinct yellowish brown (10YR 5/4) mottles; weak fine prismatic structure parting to weak medium subangular blocky; firm; few pores; 20 percent coarse fragments; strongly acid; clear wavy boundary.

B'x1—13 to 38 inches, dark grayish brown (2.5Y 4/2) channery silt loam; common fine faint light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; strong very coarse prismatic structure parting to weak coarse subangular blocky; very firm, brittle; 20 percent coarse fragments; few pores; medium acid; diffuse wavy boundary.

B'x2—38 to 48 inches, dark grayish brown (2.5Y 4/2) channery silt loam; common medium distinct yellowish brown (10YR 5/4) mottles; very coarse prismatic structure; very firm, brittle; 20 percent coarse fragments; slightly acid; clear wavy boundary.

C—48 to 60 inches, dark grayish brown (2.5Y 4/2) channery silt loam; massive; firm; 30 percent coarse fragments; neutral.

The solum thickness ranges from 40 to 72 inches. Depth to bedrock is more than 60 inches. Depth to the fragipan ranges from 10 to 16 inches. Coarse fragments make up 15 to 35 percent, by volume, of the upper part of the solum and 15 to 50 percent of the fragipan and substratum. Reaction ranges from very strongly acid to slightly acid above the fragipan, from strongly acid to neutral in the fragipan, and from medium acid to mildly alkaline in the substratum.

The Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 2 or 3. It is channery silt loam or channery loam.

The B horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 or 3. The fine-earth texture is loam or silt loam. Structure is weak or moderate, fine or medium, subangular blocky. Consistence is very friable or friable.

The A'2 horizon, where present, has hue of 10YR through 5Y, value of 5 or 6, and chroma of 2 or 3. The fine-earth texture is loam or silt loam. Structure is weak or moderate, fine or medium, subangular blocky, prismatic or platy. Consistence is friable or firm.

The Bx horizon has hue of 10YR through 5Y, value of 4 or 5, and chroma of 2 through 4. The fine-earth texture is loam or silt loam. Structure is subangular blocky or prismatic, or the material is massive. Consistence is firm to extremely firm.

The C horizon has hue, value, chroma, and texture similar to those of the Bx horizon. Structure is platy, or the material is massive. Consistence is firm or very firm.

Wallkill series

The Wallkill series consists of deep, very poorly drained, nearly level soils on flood plains. The soils formed in alluvium overlying organic material.

Wallkill soils are associated with Wayland and Teel soils on flood plains. Wallkill soils have organic material at a depth of 16 to 40 inches, which is not in the Wayland or Teel soils. Wallkill and Palms soils occupy similar positions on the landscape, but Palms soils do not have the mineral soil alluvial deposits over the organic material.

Typical pedon of Wallkill silt loam, in the Town of Montour, 500 feet west of Rock Cabin Road, and 100 feet north of Airport Road, in an idle field:

Ap—0 to 5 inches, very dark grayish brown (2.5Y 3/2) silt loam; few medium faint dark brown (10YR 3/3) mottles; weak coarse granular structure; friable; slightly sticky; many fine roots; neutral; clear smooth boundary.

B2g—5 to 16 inches, dark gray (5Y 4/1) silt loam; common fine distinct reddish brown (5YR 4/3) root mottles; weak coarse prismatic structure parting to moderate fine subangular blocky; slightly sticky; few to common roots; neutral; clear smooth boundary.

A1b—16 to 18 inches, black (10YR 2/1) silt loam; common fine distinct reddish brown (5YR 4/3) and dark gray (5Y 4/1) mottles; weak fine subangular blocky structure; slightly sticky; few roots and fibers; neutral; high in organic matter; abrupt smooth boundary.

IIOa—18 to 38 inches, black (N 2/0) muck (sapric material); 40 percent fiber, 10 percent fiber when rubbed; massive; friable; herbaceous fibers; 10 percent reddish brown mineral soil particles; neutral; abrupt smooth boundary.

IIIC—38 to 50 inches, very dark gray (5Y 3/1) silt loam; massive; slightly sticky; high in organic matter content; neutral.

The mineral soil ranges from 16 to 40 inches in thickness. Coarse fragments make up 0 to 15 percent, by volume, of the mineral soil. The underlying organic matter is at least 20 inches thick. Reaction is slightly acid or neutral in the surface layer and subsoil and medium acid to mildly alkaline in the organic layers.

The Ap horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2. It is silt loam, loam, or fine sandy loam.

The B horizon has hue of 7.5YR through 5Y, value of 4 or 5, and chroma of 1 or 2. It is loam or silt loam. Structure is weak or moderate, prismatic, or subangular blocky.

The underlying organic layers are sapric material and of woody or herbaceous plant origin.

The C horizon has hue, value, chroma, and texture similar to those of the B horizon.

Wayland series

The Wayland series consists of deep, poorly drained and very poorly drained, nearly level soils on flood plains. The soils formed in recent silty alluvial deposits.

The Wayland soils are in a drainage sequence that includes moderately well drained to somewhat poorly drained Teel soils. Wayland, Atkins, and Wallkill soils occupy similar positions on the landscape. Wayland soils do not have the underlying gravel deposits characteristic of Atkins soils. Wayland soils are silty to a depth of at least 36 inches, and Wallkill soils have 16 to 40 inches of alluvium over organic material.

Typical pedon of Wayland silt loam, in the Town of Cayuta, 1/4 mile east of N.Y. 13, 100 feet north of N.Y. 224, in a pasture:

A1—0 to 6 inches, very dark grayish brown (2.5Y 3/2) silt loam; fine root mottles; weak fine granular structure; friable; many fine roots; slightly acid; clear smooth boundary.

B21g—6 to 13 inches, dark gray (5Y 4/1) heavy silt loam; common fine distinct dark brown (10YR 3/3) mottles; weak fine and medium subangular blocky structure; friable; few fine roots; slightly acid; clear smooth boundary.

B22g—13 to 20 inches, dark grayish brown (2.5Y 4/2) light silty clay loam; common fine distinct dark reddish brown (5YR 3/3) mottles; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; friable; gray (5Y 5/1) ped coats; medium acid; clear smooth boundary.

Cg—20 to 50 inches, gray (5Y 6/1) silty clay loam; common medium prominent strong brown (7.5YR 5/6) mottles, many mottles at a depth of 32 inches; massive; firm, sticky; medium acid.

The silty deposits over coarser or finer textured deposits range from 36 inches to more than 50 inches in thickness. Depth to bedrock is more than 60 inches. Coarse fragments make up 0 to 3 percent, by volume, of the profile. Reaction ranges from medium acid to mildly alkaline throughout the soil.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 3 or less, and chroma of 2 or less. The horizon is silt loam or silty clay loam.

The Bg horizon has hue of 10YR through 5Y, value of 3 through 5, and chroma of 1 or 2. It is silt loam or silty clay loam. Structure is weak or moderate, fine to coarse, subangular blocky or prismatic.

The C horizon has hue, value, chroma, and texture similar to those of the Bg horizon.

Formation of the soils

This section describes the factors of soil formation and relates them to the formation of soils in the survey area. The section also describes the processes involved in the development of soil horizons.

Factors of soil formation

Soil is the product of the interaction among five major soil-forming factors: parent material, topography, plant and animal life, climate, and time. The relative importance of each factor varies from place to place. In some places one or two factors dominate and thus determine most of the properties of the soil.

In the following pages, the major factors of soil formation are described in relation to their effects on the soils in Schuyler County.

Parent material

Parent material is the unconsolidated earthy mass from which soils are formed. It determines the mineralogical composition of the soil and contributes largely to the chemical composition. It also influences to a great extent the rate at which soil-forming processes take place and the color of the soil. Most of the soils in Schuyler County formed in different types of deposits resulting from glaciation. Glacial till is the most extensive source of parent material; other less extensive parent materials in the county are glaciolacustrine sediments and glaciofluvial (outwash) deposits. Some soils are forming in more recent deposits of stream alluvium and in accumulations of organic material.

Table 19 shows the relationship between the different types of parent material in the county and the position and drainage of the soils.

Soils formed from glacial till deposits have a wide range of characteristics. Soils formed in deep glacial till deposits, such as Mardin, Volusia, and Chippewa soils, commonly have a firm fragipan and substratum. In places the till mantle is moderately deep or shallow over bedrock. Soils such as the Lordstown and Arnot soils formed in these areas. In Schuyler County the bedrock formation mostly consists of acid, interbedded sandstone, siltstone, and shale; thus most of the till has a high component of rock fragments and soil material derived from these formations. However, the glacial till in the northern part of the county has some limestone influence. The till is calcareous in this area and is the parent material for Lansing and Conesus soils.

During the melting of glacial ice, enormous quantities of water ran off and carried and sorted the soil and rock debris. This outwash material was redeposited in layers of sand and gravel as outwash plains, kames, eskers, and deltas. Examples of soils formed in this material are Howard and Chenango soils.

Most of the larger valleys at one time contained glacial lakes, where glacial meltwater was trapped between generally higher elevations to the south and the receding glacier on the north. The bulk of the stone-free sediment deposited in the lake waters was clayey and is the material in which soils such as the Schoharie and Hudson series formed. Where the deposits were more silty, such soils as Dunkirk and Collamer soils formed.

In more recent times, overflowing streams have deposited fresh, dark, alluvial material in the valleys. Soils formed in this material are generally quite silty and show little development. Teel and Wayland soils are examples of soils in these deposits. Soils that formed from organic deposits occupying low areas are called muck. Carlisle and Palms muck soils formed in the partly decomposed remains of trees and other plant remnants. Some of these organic pockets in the main valleys have a cover of alluvium. Wallkill soils formed in these areas.

Topography

The shape of the land surface, the slope, and the position of the land surface in relation to the water table have influenced the formation of soils in the county. Soils formed in convex-sloping areas that accumulate little runoff, or where the rate of runoff is moderate or rapid, generally are well drained and have a bright-colored, unmottled subsoil. These soils are generally leached to a greater depth than the low-lying wetter soils in the same general area. In less sloping areas, where runoff is slower, the soils generally exhibit some evidence of wetness, such as mottling in the subsoil. In level areas or in slight depressions where the water table is at or near the surface for long periods, the soils show evidence of wetness to a marked degree. They have a dark-colored, thick organic surface layer and a strongly mottled or grayish subsoil. Some soils are wet because of a high water table or because they occupy a position on the landscape where water accumulates and is perched on impervious layers in the soil.

Climate

Climate, particularly temperature and precipitation, determines to a large degree the weathering of the soils and affects growth and kind of vegetation and the leaching and translocation of weathered materials.

Schuyler County has a humid, temperate climate which tends to promote the development of moderately weathered, leached soils. Although the average temperature is slightly higher near Seneca Lake and on south-facing slopes, variability of the climate is not great enough to cause major differences among soils within the county. For more detailed information on climate, see the section "General nature of the county."

Plant and animal life

The living organisms that affect soil formation include plants, animals, bacteria, and fungi. Vegetation is generally responsible for the amount of organic matter and nutrients in the soil and the color of the surface layer. Earthworms and burrowing animals help keep the soil porous and more permeable to air and water. Their waste products cause aggregations of soil particles and improve soil structure. Bacteria and fungi decompose the vegetation, thus releasing nutrients for plant use.

In Schuyler County, the native forests, consisting of northern hardwoods and pines, have influenced soil formation. Rooting depth is shallow in many of the soils, causing wind treethrow and keeping much of the soil material churned up. Man has also influenced changes that occur in soils through clearing of the forests and cultivation of the land. He has added nutrients through fertilizers, mixed some soil horizons by plowing, and accelerated erosion in many areas.

Time

Time is a passive soil-forming factor. The degree of profile development reflects the age of a soil, and it reflects the influence of other factors. In geological terms, the deposits from which the soils in Schuyler County formed are relatively young. Most of the material was left after the last glacier melted 10,000 to 15,000 years ago. All the soils have not reached the same stage of development, however, because other soil-forming factors influence the rate and kind of development.

An immature soil is one in which distinct layers have yet to form. The Teel and Philo soils are examples of immature soils. They are forming in alluvial sediments on flood plains and receive periodic depositions of fresh alluvium.

Processes of soil horizon development

In Schuyler County the processes involved in the formation of soil horizons include the accumulation of organic matter, the leaching of soluble salts and minerals, the translocation of silicate clay minerals, the reduction and transfer of iron, and the formation of dense or compact layers in the subsoil.

The accumulation of organic matter is a slow process that takes place as plant residue decomposes. This process darkens the surface layer and helps to form the A1 horizon. The surface layer of the soils of Schuyler County is about 3.5 percent organic matter.

For soils to develop a distinct subsoil, some of the lime and other soluble salts must be leached before other soil processes such as translocation of clay minerals can take place. Many factors affect leaching, including the kinds of salts originally present, the rate and depth of percolation, and the texture of the soil.

The amount of clay minerals in a soil is inherent in the parent material, but clay content varies from one soil horizon to another. The translocation of silicate clay minerals involves the eluviation of clay particles downward from the A horizon and their redeposition in the B horizon as clay films on ped faces, as linings along pores and root channels, and as coatings on some coarse fragments. In some soils an A2 horizon has formed by considerable eluviation of clay minerals to the B horizon. The Lansing soil is an example of a soil that has a higher clay content in the B horizon than in the A horizon because of translocation.

The reduction and transfer of iron compounds occurs mainly in the wetter, more poorly drained soils. This process is known as gleying. In the poorly drained to very poorly drained soils, such as the Chippewa and Madalin soils, the grayish subsoil and underlying material indicate reduction and the removal and transfer of iron in solution. In the moderately well drained to somewhat poorly drained soils, yellowish brown and reddish brown mottles indicate the segregation of iron.

Many of the soils in Schuyler County have developed a distinct fragipan in the subsoil. The fragipan is very firm and brittle when moist and is very hard when dry. Studies indicate that swelling and shrinking take place in alternating wet and dry periods, which may account for the dense packing of soil particles, the low pore space, and the gross polygonal pattern of vertical cracks in most fragipans (*5*). Clay, silica, and oxides of aluminum are the most likely cementing agents causing brittleness and hardness. The Erie, Mardin, and Volusia soils are examples of soils in Schuyler County that have a well expressed fragipan.

Several well drained and moderately well drained soils in the county have strong brown, yellowish brown, or reddish brown subsoils. These colors are mainly caused by thin coatings of iron oxides on sand and silt particles. However, in soils such as the Schoharie soils the color is inherited from the reddish parent material in which the soil has developed. A bright-colored subsoil with iron oxide coatings is commonly termed a "color" B horizon. This type of horizon normally has subangular blocky structure but contains little or no clay translocated from the overlying surface layer.

Classification of the soils

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to "Soil taxonomy" (*6*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those

that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 20, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Inceptisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquepts (*Aqu*, meaning water, plus *ept*, from Inceptisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Haplaquepts (*Hapl*, meaning simple horizons, plus *aquept*, the suborder of Inceptisols that have an aquic moisture regime).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that is thought to typify the great group. An example is Lithic Haplaquepts. Lithic indicates that bedrock is closer to the soil surface than is typical for the great group.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is loamy-skeletal, mixed, acid, mesic Lithic Haplaquepts.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as—

	Inches
Very low	02.4
Low	2.4-3.2
Moderate	3.2-5.2
High	05.2

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having base exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to frequent flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Broad-base terrace. A ridge-type terrace built to control erosion by diverting runoff along the contour at a nonscouring velocity. The terrace is 10 to 20 inches high and 15 to 30 feet wide and has gently sloping sides, a rounded crown, and a dish-shaped channel along the upper side. It may be nearly level or have a grade toward one or both ends.

Calcareous soil. A soil containing enough calcium carbonate (commonly with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid. A soil having measurable amounts of calcium carbonate or magnesium carbonate.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Channery soil. A soil, that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Coarse fragments. Mineral or rock particles up to 3 inches (2 millimeters to 7.5 centimeters) in diameter.

Coarse textured (light textured) soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the bases of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures is difficult.

Complex, soil. A mapping unit of two or more kinds of soil occurring in such an intricate pattern that they cannot be shown separately on a soil map at the selected scale of mapping and publication.

Compressible. Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is 40 or 80 inches (1 or 2 meters).

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave. Unstable walls of cuts made by earth-moving equipment. The soil sloughs easily.

Delta. An alluvial deposit, commonly triangular in shape, formed largely beneath water and deposited at the mouth of a river or stream.

Depth to rock. Bedrock at a depth that adversely affects the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Drainage, surface. Runoff, or surface flow of water, from an area.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime. Excess carbonates. Excessive carbonates, or lime, restrict the growth of some plants.

Fast intake. The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Fine textured (heavy textured) soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; *November-May*, for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forage. Plant material used as feed by domestic animals. Forage can be grazed or cut for hay.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action. Freezing and thawing of soil moisture. Frost action can damage structures and plant roots.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also the assorted and unassorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by melt water as it flows from glacial ice.

Glacial till (geology). Unassorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes by water originating mainly from the melting of glacial ice. Many are interbedded or laminated.

Gleyed soil. A soil having one or more neutral gray horizons as a result of waterlogging and lack of oxygen. The term "gleyed" also designates gray horizons and horizons having yellow and gray mottles as a result of intermittent waterlogging.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material from 15 to 50 percent, by volume, rounded or angular rock fragments, not

prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green manure (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table, which is the upper limit of saturation.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hummocky. Refers to a landscape of hillocks, separated by low sags, having sharply rounded tops and steep sides. Hummocky relief resembles rolling or undulating relief, but the tops of ridges are narrower and the sides are shorter and less even.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered, but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The accumulation of material in a soil horizon through the deposition of suspended material, such as clay or organic matter, removed from horizons above. The B horizon is commonly an illuvial horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing

crops or in orchards so that it flows in only one direction.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Kettle (geology). A depression in the ground surface formed by the melting of an ice block buried in glacial drift.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain. An area dominated by low-lying relief that formed at the bottom of a glacial lake during part of the glacial period.

Large stones. Rock fragments 10 inches (25 centimeters) or more across. Large stones adversely affect the specified use.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. Inadequate strength for supporting loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is greater than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous areas. Areas that have little or no natural soil, are too nearly inaccessible for orderly examination, or cannot otherwise be feasibly classified.

Moderately coarse textured (moderately light textured) soil. Sandy loam and fine sandy loam.

Moderately fine textured (moderately heavy textured) soil. Clay loam, sandy clay loam, and silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material mixed with mineral soil material. The content of organic matter is more than 20 percent.

Narrow-base terrace. A terrace no more than 4 to 8 feet wide at the base. A narrow-base terrace is similar to a broad-base terrace, except for the width of the ridge and channel.

Neutral soil. A soil having a pH value between 6.6 and 7.3.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Outwash, glacial. Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by water that originated mainly from the melting of glacial ice. Glacial outwash is commonly in valleys on landforms known as valley trains, outwash terraces, eskers, kame terraces, kames, outwash fans, or deltas.

Outwash plain. A land form of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil. A pan impedes the movement of water and the growth of roots. The word "pan" is commonly combined with other words that more explicitly indicate the nature of the layer; for example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for example, may be divided into phases on the bases of differences in slope, stoniness, thickness, or some other characteristic that affects management. These differences are too small to justify separate series.

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Piping. Moving water forms subsurface tunnels or pipelike cavities in the soil.

Pitting. Formation of pits as a result of the melting of ground ice after the removal of plant cover.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Poorly graded. Refers to soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets. Surface or subsurface drainage outlets difficult or expensive to install.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock. Soil scientists regard as soil only the part of the regolith that is modified by organisms and other soil-building forces. Most engineers describe the whole regolith, even to a great depth, as "soil."

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulates over disintegrating rock.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth. Shallow root zone. The soil is shallow over a layer that greatly restricts roots. See Root zone.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from

clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in a landscape where limestone has been locally dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Slow intake. The slow movement of water into the soil.

Slow refill. The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones. Rock fragments 3 to 10 inches (7.5 to 25 centimeters) in diameter. Small stones adversely affect the specified use.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *very coarse sand* (2.0 millimeters to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.005 to 0.002 millimeter); and *clay* (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Stone line. A concentration of coarse fragments in soils that generally marks an old weathering surface. In a cross section, the line may be one fragment or more thick. The line generally overlies material that weathered in place and marks the top of a paleosol. It is ordinarily overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil, or partly worked into the soil, to provide protection from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitaion is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use or management.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer. Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Trace elements. The chemical elements in soils, in only extremely small amounts, essential to plant growth. Examples are zinc, cobalt, manganese, copper, and iron.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Unstable fill. Risk of caving or sloughing in banks of fill material.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial melt water. In nonglaciated regions, alluvium deposited by heavily loaded streams emerging from hills or mountains and spreading sediments onto the lowland as a series of adjacent alluvial fans.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but the limited geographic soil area does not justify creation of a new series.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within 1 year; specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.
Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.
Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.
Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to a soil or soil material consisting of particles well distributed over a wide range in size or diameter. Such a soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

ILLUSTRATIONS

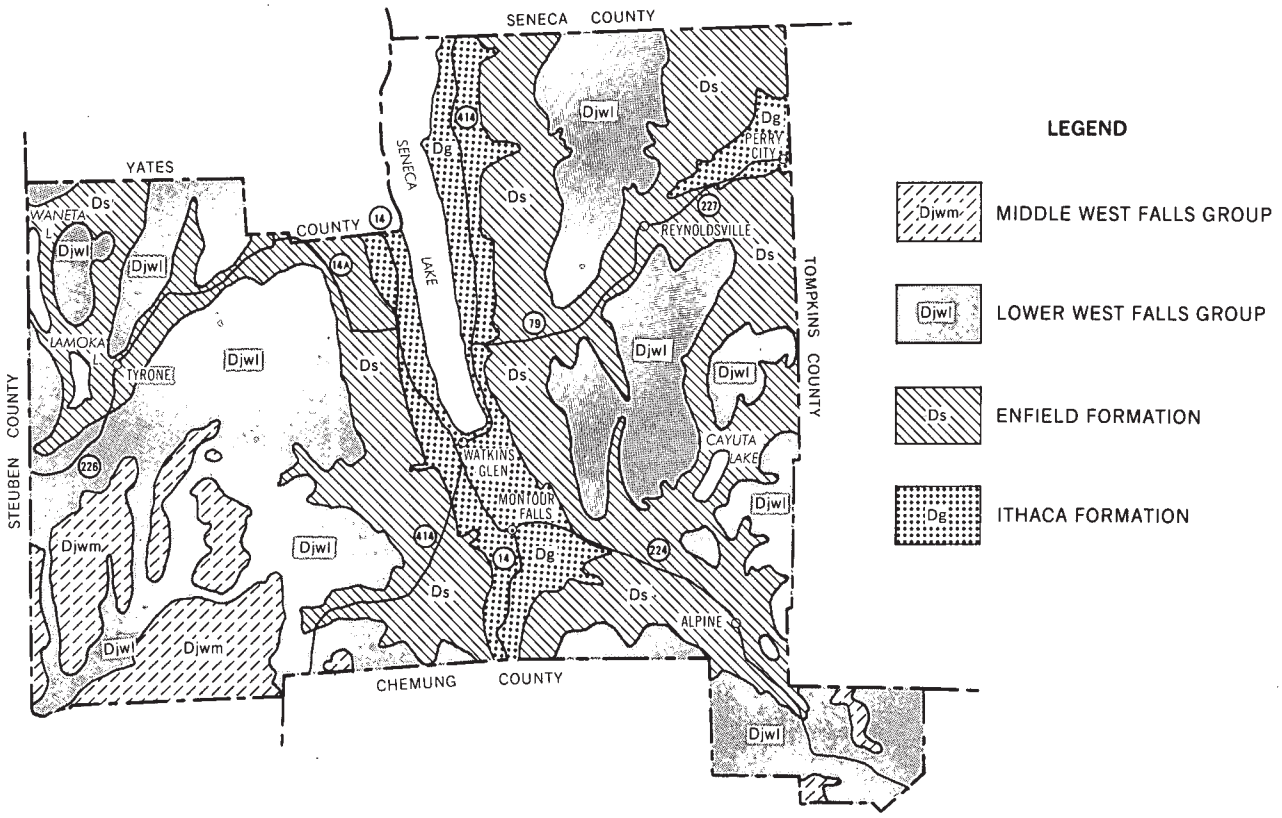

Figure 1.—Bedrock geology map of Schuyler County.

Figure 2.—An area of the Volusia-Mardin unit used for improved pasture.

Figure 3.—A typical area of the Schoharie-Hudson-Rhinebeck unit.

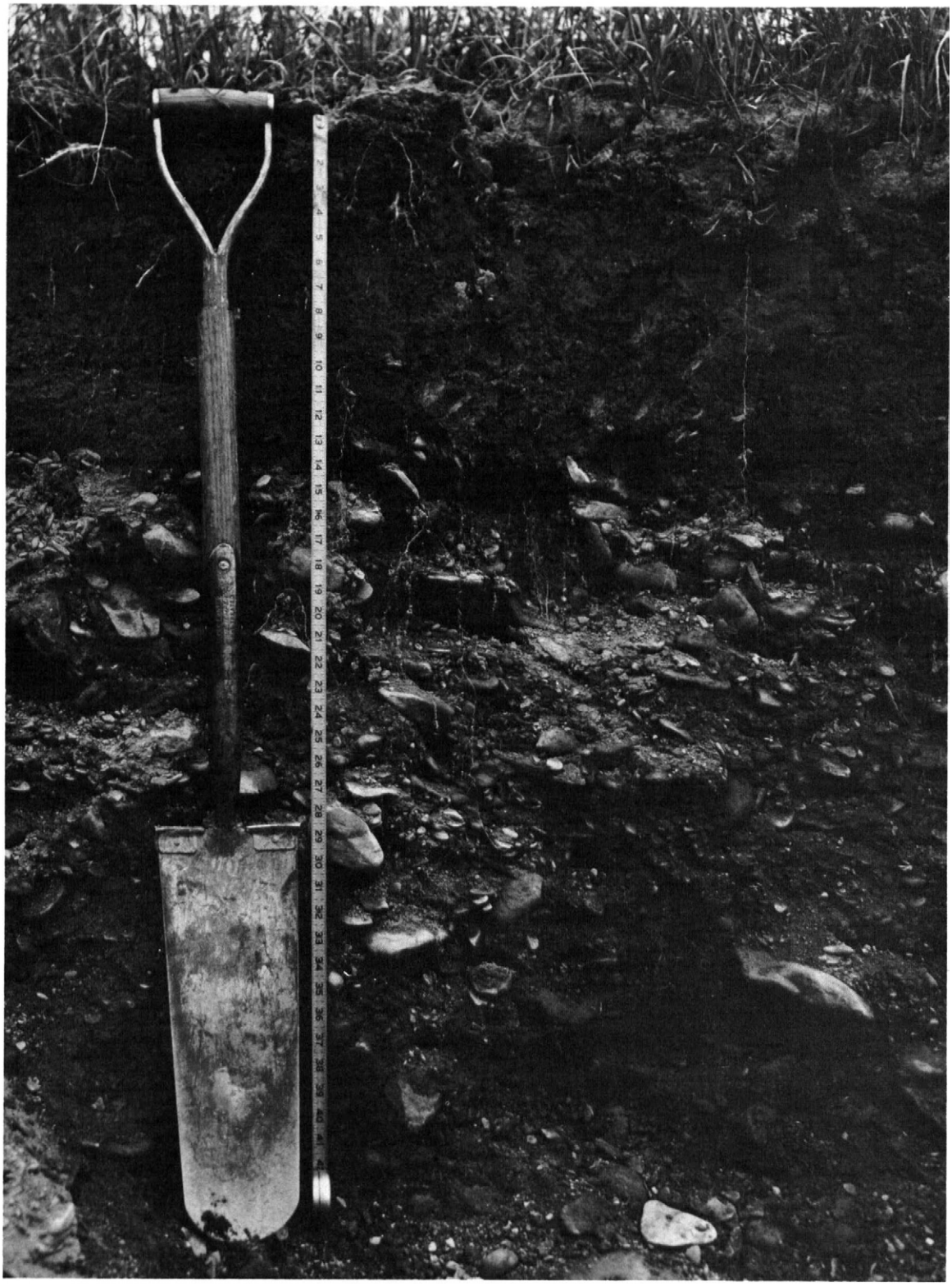

Figure 4.—A typical profile of Chenango silt loam, 0 to 3 percent slopes. The increments on the marker are in inches.

Figure 5.—Snap beans on an area of Chenango gravelly silt loam, 0 to 3 percent slopes. The stone fragments on the soil interfere with tillage.

Figure 6.—A mud slide on Dunkirk silt loam, 8 to 15 percent slopes.

Figure 7.—A wooded area of Rock outcrop-Arnot complex, very steep.

Figure 8.—An area of Volusia channery silt loam, 3 to 8 percent slopes, used for Christmas trees.

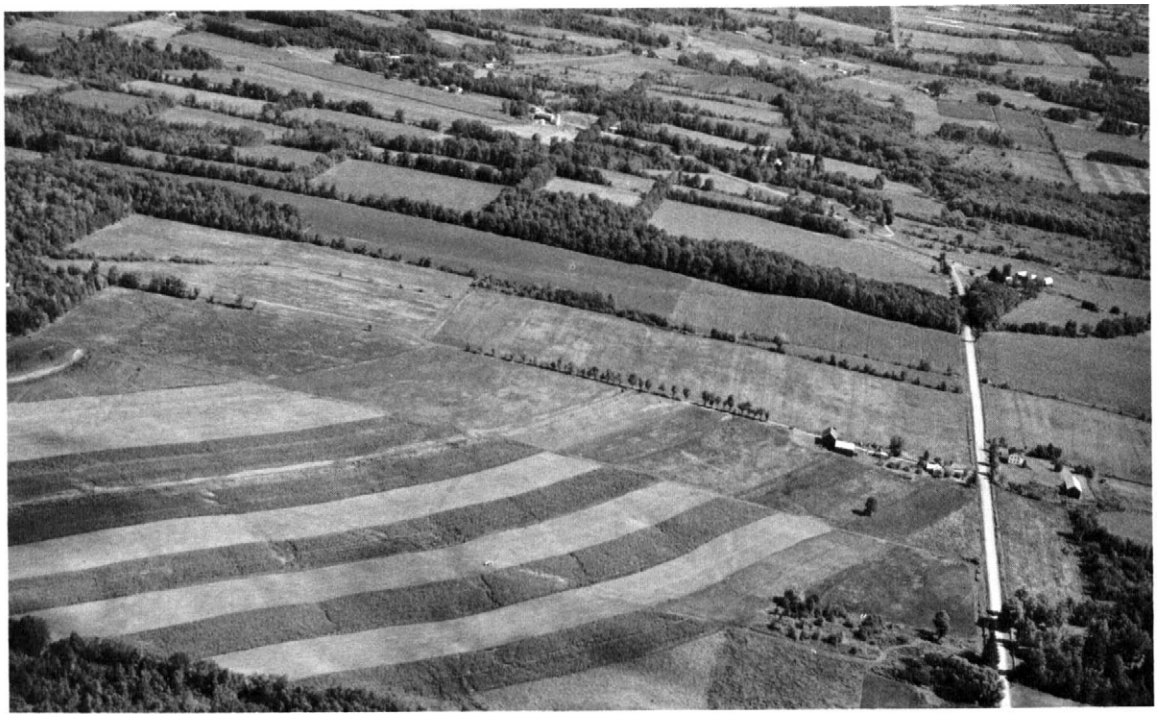

Figure 9.—Stripcropping on an area of Lansing gravelly silt loam, 8 to 15 percent slopes.

Figure 10.—An improved stand of sugar maple on Mardin channery silt loam, 3 to 8 percent slopes.

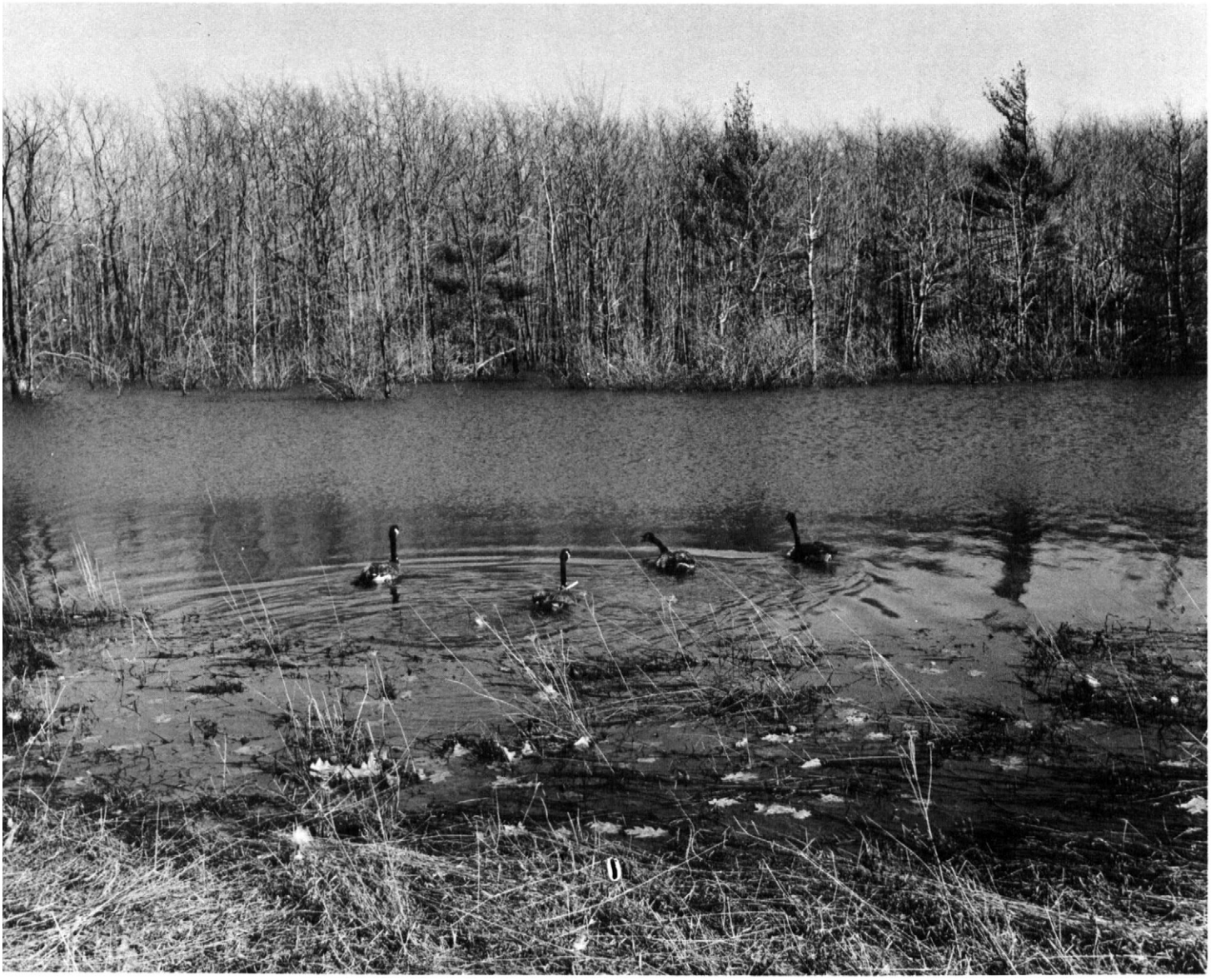

Figure 11.—This pond is in an area of very poorly drained Alden silt loam.

TABLES

TABLE 1.--TEMPERATURE AND PRECIPITATION DATA

Month	Temperature[1]						Precipitation[1]				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[2]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	31.0	14.2	22.6	59	-16	7	1.88	1.28	2.41	6	16.3
February	32.3	14.0	23.2	57	-15	0	2.17	1.08	3.05	5	15.9
March	40.6	23.4	32.0	70	-2	31	2.48	1.55	3.31	7	13.0
April	55.0	34.7	44.9	84	17	83	2.84	1.98	3.63	8	4.2
May	66.0	42.9	54.5	88	26	450	3.20	2.12	4.17	8	.2
June	76.0	53.1	64.6	92	34	738	3.75	2.15	5.05	7	.0
July	80.6	57.2	68.9	93	42	896	3.37	1.87	4.58	7	.0
August	78.8	55.3	67.1	93	37	840	3.18	2.05	4.20	6	.0
September	71.9	49.1	60.5	91	29	615	3.03	1.96	3.99	6	.0
October	60.9	39.3	50.1	84	21	324	2.77	1.24	4.01	7	.5
November	47.0	31.4	39.3	70	9	74	3.17	1.83	4.25	7	6.5
December	35.1	20.6	27.9	61	-9	19	2.59	1.45	3.52	6	14.5
Year	56.3	36.3	46.3	95	-19	4,177	34.43	30.21	38.50	80	71.1

[1]Recorded in the period 1951-74 at Ithaca, N.Y.

[2]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

Probability	Temperature[1]		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 28	May 18	May 30
2 years in 10 later than--	April 22	May 13	May 25
5 years in 10 later than--	April 13	May 2	May 17
First freezing temperature in fall:			
1 year in 10 earlier than--	October 14	September 27	September 10
2 years in 10 earlier than--	October 21	October 4	September 16
5 years in 10 earlier than--	November 3	October 17	September 28

[1]Recorded in the period 1951-74 at Ithaca, N.Y.

TABLE 3.--GROWING SEASON LENGTH

Probability	Daily minimum temperature during growing season[1]		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	177	138	108
8 years in 10	187	148	117
5 years in 10	204	168	133
2 years in 10	222	188	150
1 year in 10	231	198	158

[1]Recorded in the period 1951-74 at Ithaca, N.Y.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
Ad	Alden silt loam	927	0.4
AnA	Angola silt loam, 0 to 3 percent slopes	290	0.1
AnB	Angola silt loam, 3 to 8 percent slopes	1,409	0.7
AnC	Angola silt loam, 8 to 15 percent slopes	554	0.3
ApA	Appleton silt loam, 0 to 3 percent slopes	2,041	1.0
ApB	Appleton silt loam, 3 to 8 percent slopes	2,580	1.2
AQ	Aquepts and Saprists, ponded	620	0.3
ArB	Arnot channery silt loam, 3 to 8 percent slopes	745	0.4
ArC	Arnot channery silt loam, 8 to 15 percent slopes	542	0.3
At	Atkins silt loam	786	0.4
AuB	Aurora channery silt loam, 3 to 8 percent slopes	579	0.3
AuC	Aurora channery silt loam, 8 to 15 percent slopes	459	0.2
AuD	Aurora channery silt loam, 15 to 25 percent slopes	440	0.2
BaB	Bath channery silt loam, 3 to 8 percent slopes	397	0.2
BaC	Bath channery silt loam, 8 to 15 percent slopes	1,098	0.5
BaD	Bath channery silt loam, 15 to 25 percent slopes	3,000	1.4
BHE	Bath soils, steep	2,179	1.0
BuB	Burdett silt loam, 3 to 8 percent slopes	2,547	1.2
BuC	Burdett silt loam, 8 to 15 percent slopes	646	0.3
BuD	Burdett silt loam, 15 to 25 percent slopes	124	0.1
Ca	Canandaigua silt loam	363	0.2
Cc	Carlisle muck	651	0.3
Ce	Castile gravelly silt loam	2,387	1.1
ChA	Chenango silt loam, 0 to 3 percent slopes	211	0.1
CnA	Chenango gravelly silt loam, 0 to 3 percent slopes	1,446	0.7
CnB	Chenango gravelly silt loam, 3 to 8 percent slopes	1,085	0.5
CoB	Chenango channery silt loam, fan, 0 to 8 percent slopes	3,305	1.6
Cp	Chippewa silt loam	2,152	1.0
CrA	Collamer silt loam, 0 to 3 percent slopes	410	0.2
CrB	Collamer silt loam, 3 to 8 percent slopes	391	0.2
CsA	Conesus silt loam, 0 to 3 percent slopes	358	0.2
CsB	Conesus silt loam, 3 to 8 percent slopes	5,832	2.8
CsC	Conesus silt loam, 8 to 15 percent slopes	727	0.3
DkB	Dunkirk silt loam, 3 to 8 percent slopes	329	0.2
DkC	Dunkirk silt loam, 8 to 15 percent slopes	152	0.1
DUE3	Dunkirk and Hudson soils, steep, severely eroded	1,085	0.5
ErA	Erie silt loam, 0 to 3 percent slopes	1,921	0.9
ErB	Erie silt loam, 3 to 8 percent slopes	8,691	4.1
ErC	Erie silt loam, 8 to 15 percent slopes	780	0.4
FF	Fluvaquents-Udifluvents complex, frequently flooded	1,627	0.8
FrA	Fremont silt loam, 0 to 3 percent slopes	524	0.2
FrB	Fremont silt loam, 3 to 8 percent slopes	3,428	1.6
FrC	Fremont silt loam, 8 to 15 percent slopes	4,276	2.0
Ha	Halsey mucky silt loam	965	0.5
HnB	Hornell channery silt loam, 3 to 8 percent slopes	149	0.1
HnC	Hornell channery silt loam, 8 to 15 percent slopes	633	0.3
HnD	Hornell channery silt loam, 15 to 25 percent slopes	599	0.3
HrA	Howard gravelly loam, 0 to 3 percent slopes	829	0.4
HrB	Howard gravelly loam, 3 to 8 percent slopes	3,367	1.6
HrC	Howard gravelly loam, 8 to 15 percent slopes	2,055	1.0
HrCK	Howard gravelly loam, rolling	1,656	0.8
HSD	Howard soils, moderately steep	999	0.5
HSE	Howard soils, steep	269	0.1
HuB	Hudson gravelly silt loam, 3 to 8 percent slopes	1,202	0.6
HuC	Hudson gravelly silt loam, 8 to 15 percent slopes	634	0.3
LnB	Lansing gravelly silt loam, 3 to 8 percent slopes	1,881	0.9
LnC	Lansing gravelly silt loam, 8 to 15 percent slopes	2,151	1.0
LnD	Lansing gravelly silt loam, 15 to 25 percent slopes	336	0.2
LoB	Lordstown channery silt loam, 3 to 8 percent slopes	2,275	1.1
LoC	Lordstown channery silt loam, 8 to 15 percent slopes	4,597	2.2
LoD	Lordstown channery silt loam, 15 to 25 percent slopes	3,447	1.6
LTE	Lordstown-Arnot complex, steep	5,434	2.6
LTF	Lordstown-Arnot complex, very steep	4,796	2.3
Ma	Madalin silt loam	754	0.4
MrB	Mardin channery silt loam, 3 to 8 percent slopes	14,311	6.8
MrC	Mardin channery silt loam, 8 to 15 percent slopes	15,474	7.3
MrD	Mardin channery silt loam, 15 to 25 percent slopes	6,299	3.0
OCF	Ochrepts-Orthents complex, very steep	1,179	0.6
OdA	Odessa silt loam, 0 to 3 percent slopes	150	0.1
OdB	Odessa silt loam, 3 to 8 percent slopes	632	0.3
Pa	Palms muck	338	0.2
Ph	Philo silt loam	866	0.4

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
Pt	Pits, gravel	168	0.1
Rh	Red Hook gravelly silt loam	875	0.4
RnA	Rhinebeck gravelly silt loam, 0 to 3 percent slopes	520	0.2
RnB	Rhinebeck gravelly silt loam, 3 to 8 percent slopes	899	0.4
ROF	Rock outcrop-Arnot complex, very steep	900	0.4
ScB3	Schoharie silty clay loam, 3 to 8 percent slopes, severely erode	1,094	0.5
ScC3	Schoharie silty clay loam, 8 to 15 percent slopes, severely eroded	2,135	1.0
ScD3	Schoharie silty clay loam, 15 to 25 percent slopes, severely eroded	128	0.1
ShC3	Schoharie Variant silty clay loam, 8 to 15 percent slopes, severely eroded	330	0.2
ShD3	Schoharie Variant silty clay loam, 15 to 25 percent slopes, severely eroded	593	0.3
SyC	Schuyler silt loam, 8 to 15 percent slopes	1,419	0.7
SyD	Schuyler silt loam, 15 to 25 percent slopes	2,226	1.1
SyE	Schuyler silt loam, 25 to 35 percent slopes	862	0.4
Te	Teel silt loam	1,407	0.7
TuB	Tuller channery silt loam, 3 to 8 percent slopes	553	0.3
TuC	Tuller channery silt loam, 8 to 15 percent slopes	361	0.2
UD	Udorthents, smoothed	212	0.1
VaB	Valois gravelly silt loam, 3 to 8 percent slopes	4,908	2.3
VaC	Valois gravelly silt loam, 8 to 15 percent slopes	7,225	3.4
VaD	Valois gravelly silt loam, 15 to 25 percent slopes	3,168	1.5
VEE	Valois soils, steep	1,402	0.7
VHF	Valois and Howard soils, very steep	1,660	0.8
VoA	Volusia channery silt loam, 0 to 3 percent slopes	1,577	0.7
VoB	Volusia channery silt loam, 3 to 8 percent slopes	20,363	9.6
VoC	Volusia channery silt loam, 8 to 15 percent slopes	11,302	5.3
VoD	Volusia channery silt loam, 15 to 25 percent slopes	1,061	0.5
Wk	Wallkill silt loam	239	0.1
Wy	Wayland silt loam	1,494	0.7
	Water	388	0.2
	Total	211,840	100.0

TABLE 5.--SOIL PRODUCTIVITY RATINGS

[Soils not listed are generally unsuitable for farming]

Map symbol	Soil	Rating
Ad	Alden silt loam	55
AnA	Angola silt loam, 0 to 3 percent slopes	58
AnB	Angola silt loam, 3 to 8 percent slopes	61
AnC	Angola silt loam, 8 to 15 percent slopes	54
ApA	Appleton silt loam, 0 to 3 percent slopes	82
ApB	Appleton silt loam, 3 to 8 percent slopes	82
ArB	Arnot channery silt loam, 3 to 8 percent slopes	55
ArC	Arnot channery silt loam, 8 to 15 percent slopes	35
At	Atkins silt loam	73
AuB	Aurora channery silt loam, 3 to 8 percent slopes	67
AuC	Aurora channery silt loam, 8 to 15 percent slopes	66
AuD	Aurora channery silt loam, 15 to 25 percent slopes	54
BaB	Bath channery silt loam, 3 to 8 percent slopes	82
BaC	Bath channery silt loam, 8 to 15 percent slopes	80
BaD	Bath channery silt loam, 15 to 25 percent slopes	54
BuB	Burdett silt loam, 3 to 8 percent slopes	67
BuC	Burdett silt loam, 8 to 15 percent slopes	54
BuD	Burdett silt loam, 15 to 25 percent slopes	41
Ca	Canandaigua silt loam	61
Ce	Castile gravelly silt loam	90
ChA	Chenango silt loam, 0 to 3 percent slopes	100
CnA	Chenango gravelly silt loam, 0 to 3 percent slopes	88
CnB	Chenango gravelly silt loam, 3 to 8 percent slopes	88
CoB	Chenango channery silt loam, fan, 0 to 8 percent slopes	88
Cp	Chippewa silt loam	34
CrA	Collamer silt loam, 0 to 3 percent slopes	88
CrB	Collamer silt loam, 3 to 8 percent slopes	88
CsA	Conesus silt loam, 0 to 3 percent slopes	91
CsB	Conesus silt loam, 3 to 8 percent slopes	91
CsC	Conesus silt loam, 8 to 15 percent slopes	77
DkB	Dunkirk silt loam, 3 to 8 percent slopes	95
ErA	Erie silt loam, 0 to 3 percent slopes	61
ErB	Erie silt loam, 3 to 8 percent slopes	61
ErC	Erie silt loam, 8 to 15 percent slopes	48
FrA	Fremont silt loam, 0 to 3 percent slopes	55
FrB	Fremont silt loam, 3 to 8 percent slopes	55
FrC	Fremont silt loam, 8 to 15 percent slopes	41
Ha	Halsey mucky silt loam	34
HnB	Hornell channery silt loam, 3 to 8 percent slopes	63
HnC	Hornell channery silt loam, 8 to 15 percent slopes	43
HnD	Hornell channery silt loam, 15 to 25 percent slopes	34
HrA	Howard gravelly loam, 0 to 3 percent slopes	97
HrB	Howard gravelly loam, 3 to 8 percent slopes	97
HrC	Howard gravelly loam, 8 to 15 percent slopes	83
HrCK	Howard gravelly loam, rolling	82
HSD	Howard soils, moderately steep	61
HuB	Hudson gravelly silt loam, 3 to 8 percent slopes	88
HuC	Hudson gravelly silt loam, 8 to 15 percent slopes	68
LnB	Lansing gravelly silt loam, 3 to 8 percent slopes	97
LnC	Lansing gravelly silt loam, 8 to 15 percent slopes	86
LnD	Lansing gravelly silt loam, 15 to 25 percent slopes	61
LoB	Lordstown channery silt loam, 3 to 8 percent slopes	71
LoC	Lordstown channery silt loam, 8 to 15 percent slopes	60
LoD	Lordstown channery silt loam, 15 to 25 percent slopes	34
Ma	Madalin silt loam	27
MrB	Mardin channery silt loam, 3 to 8 percent slopes	73
MrC	Mardin channery silt loam, 8 to 15 percent slopes	71
MrD	Mardin channery silt loam, 15 to 25 percent slopes	34
OdA	Odessa silt loam, 0 to 3 percent slopes	64
OdB	Odessa silt loam, 3 to 8 percent slopes	64
Ph	Philo silt loam	94

TABLE 5.--SOIL PRODUCTIVITY RATINGS--Continued

Map symbol	Soil	Rating
Rh	Red Hook gravelly silt loam	73
RnA	Rhinebeck gravelly silt loam, 0 to 3 percent slopes	67
RnB	Rhinebeck gravelly silt loam, 3 to 8 percent slopes	67
ScB3	Schoharie silty clay loam, 3 to 8 percent slopes, severely eroded	68
ScC3	Schoharie silty clay loam, 8 to 15 percent slopes, severely eroded	53
ScD3	Schoharie silty clay loam, 15 to 25 percent slopes, severely eroded	34
ShC3	Schoharie Variant silty clay loam, 8 to 15 percent slopes, severely eroded	53
ShD3	Schoharie Variant silty clay loam, 15 to 25 percent slopes, severely eroded	34
SyC	Schuyler silt loam, 8 to 15 percent slopes	60
SyD	Schuyler silt loam, 15 to 25 percent slopes	34
Te	Teel silt loam	88
TuB	Tuller channery silt loam, 3 to 8 percent slopes	50
TuC	Tuller channery silt loam, 8 to 15 percent slopes	41
VaB	Valois gravelly silt loam, 3 to 8 percent slopes	95
VaC	Valois gravelly silt loam, 8 to 15 percent slopes	87
VaD	Valois gravelly silt loam, 15 to 25 percent slopes	54
VoA	Volusia channery silt loam, 0 to 3 percent slopes	55
VoB	Volusia channery silt loam, 3 to 8 percent slopes	55
VoC	Volusia channery silt loam, 8 to 15 percent slopes	46
VoD	Volusia channery silt loam, 15 to 25 percent slopes	27
Wk	Wallkill silt loam	69
Wy	Wayland silt loam	69

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. The estimates were made in 1978. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Corn	Corn silage	Oats	Wheat	Dry beans	Alfalfa hay	Trefoil-grass hay
	Bu	Ton	Bu	Bu	Bu	Ton	Ton
Ad---------- Alden	---	14	---	---	---	---	2.5
AnA---------- Angola	70	14	65	40	---	---	3.0
AnB---------- Angola	80	15	65	40	---	---	3.0
AnC---------- Angola	75	15	60	30	---	---	3.0
ApA---------- Appleton	100	20	70	50	30	4.0	3.5
ApB---------- Appleton	100	20	75	50	30	4.0	3.5
AQ*---------- Aquepts and Saprists	---	---	---	---	---	---	---
ArB---------- Arnot	70	14	60	---	---	2.5	2.5
ArC---------- Arnot	60	12	50	---	---	2.0	2.0
At---------- Atkins	100	18	70	---	30	---	3.5
AuB---------- Aurora	85	17	75	50	25	4.5	3.5
AuC---------- Aurora	80	16	70	45	25	4.5	3.0
AuD---------- Aurora	---	---	---	---	---	4.0	3.0
BaB---------- Bath	95	19	80	45	35	4.5	3.5
BaC---------- Bath	90	18	75	40	---	4.5	3.5
BaD---------- Bath	---	---	---	---	---	4.0	3.0
BHE---------- Bath	---	---	---	---	---	---	---
BuB---------- Burdett	85	16	65	50	30	3.5	3.5
BuC---------- Burdett	75	15	60	45	25	3.5	3.5
BuD---------- Burdett	---	---	---	---	---	---	3.0
Ca---------- Canandaigua	90	17	65	40	30	---	3.0

See footnote at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Oats	Wheat	Dry beans	Alfalfa hay	Trefoil-grass hay
	Bu	Ton	Bu	Bu	Bu	Ton	Ton
Cc---------- Carlisle	---	---	---	---	---	---	---
Ce---------- Castile	105	21	85	55	35	5.0	3.5
ChA---------- Chenango	125	23	90	60	35	5.5	3.0
CnA, CnB---------- Chenango	100	20	80	50	30	5.0	3.0
CoB---------- Chenango	100	20	80	50	30	5.0	3.0
Cp---------- Chippewa	---	---	---	---	---	---	2.5
CrA---------- Collamer	110	20	90	60	35	5.0	3.5
CrB---------- Collamer	110	20	90	60	35	5.0	3.5
CsA---------- Conesus	110	21	90	60	35	5.0	3.5
CsB---------- Conesus	110	21	90	60	35	5.0	3.5
CsC---------- Conesus	100	20	85	55	30	4.5	3.0
DkB---------- Dunkirk	115	21	95	60	35	5.5	3.5
DkC---------- Dunkirk	110	20	90	55	30	5.0	3.5
DUE3---------- Dunkirk and Hudson	---	---	---	---	---	---	---
ErA---------- Erie	80	15	65	35	---	3.0	3.0
ErB---------- Erie	80	15	65	35	---	3.0	3.0
ErC---------- Erie	70	14	60	30	---	3.0	2.5
FF*---------- Fluvaquents-Udifluvents	---	---	---	---	---	---	---
FrA---------- Fremont	70	14	60	30	---	---	2.5
FrB---------- Fremont	70	14	60	30	---	---	2.5
FrC---------- Fremont	65	13	55	25	---	---	2.5
Ha---------- Halsey	---	---	---	---	---	---	2.5
HnB---------- Hornell	85	17	65	35	---	---	2.5
HnC---------- Hornell	75	15	65	35	---	---	2.5

See footnote at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Oats	Wheat	Dry beans	Alfalfa hay	Trefoil-grass hay
	Bu	Ton	Bu	Bu	Bu	Ton	Ton
HnD---------- Hornell	---	---	---	---	---	---	2.5
HrA, HrB---------- Howard	110	22	80	60	35	5.5	3.0
HrC, HrCK---------- Howard	90	18	75	55	30	5.0	3.0
HSD---------- Howard	---	---	---	---	---	4.5	2.5
HSE---------- Howard	---	---	---	---	---	---	---
HuB---------- Hudson	100	20	80	45	---	5.0	3.5
HuC---------- Hudson	90	18	70	40	---	4.5	3.5
LnB---------- Lansing	120	22	95	60	35	5.5	3.5
LnC---------- Lansing	110	20	90	55	30	5.5	3.5
LnD---------- Lansing	---	---	---	---	---	4.5	3.0
LoB---------- Lordstown	80	16	75	45	---	4.0	3.0
LoC---------- Lordstown	75	15	70	40	---	4.0	3.0
LoD---------- Lordstown	---	---	---	---	---	---	2.5
LTE---------- Lordstown-Arnot	---	---	---	---	---	---	---
LTF---------- Lordstown-Arnot	---	---	---	---	---	---	---
Ma---------- Madalin	---	---	---	---	---	---	2.0
MrB---------- Mardin	85	17	70	40	---	4.0	3.0
MrC---------- Mardin	80	16	65	40	---	4.0	3.0
MrD---------- Mardin	80	---	---	---	---	---	2.5
OCF---------- Ochrepts-Orthents	---	---	---	---	---	---	---
OdA---------- Odessa	85	16	60	35	---	3.0	3.0
OdB---------- Odessa	85	16	60	35	---	3.0	3.0
Pa---------- Palms	---	---	---	---	---	---	---
Ph---------- Philo	120	22	90	60	35	5.0	3.5

See footnote at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Oats	Wheat	Dry beans	Alfalfa hay	Trefoil-grass hay
	Bu	Ton	Bu	Bu	Bu	Ton	Ton
Pt* Pits, gravel	---	---	---	---	---	---	---
Rh Red Hook	90	18	65	40	30	3.5	3.5
RnA Rhinebeck	90	17	65	40	---	3.0	3.0
RnB Rhinebeck	90	17	65	40	---	3.0	3.0
ROF Rock outcrop-Arnot	---	---	---	---	---	---	---
ScB3 Schoharie	70	15	65	40	---	4.0	3.0
ScC3 Schoharie	75	14	60	35	---	3.5	3.0
ScD3 Schoharie	---	---	---	---	---	---	2.5
ShC3 Schoharie Variant	70	14	60	35	---	3.5	3.0
ShD3 Schoharie Variant	---	---	---	---	---	---	2.5
SyC Schuyler	75	15	65	40	---	4.0	3.0
SyD Schuyler	---	---	---	---	---	---	2.5
SyE Schuyler	---	---	---	---	---	---	---
Te Teel	115	21	80	50	30	4.5	3.5
TuB Tuller	60	12	55	---	---	---	2.5
TuC Tuller	55	10	---	---	---	---	2.0
UD* Udorthents	---	---	---	---	---	---	---
VaB Valois	105	21	80	50	35	5.5	3.5
VaC Valois	95	19	75	50	30	5.0	3.5
VaD Valois	---	---	---	---	---	4.0	3.0
VEE Valois	---	---	---	---	---	---	---
VHF Valois and Howard	---	---	---	---	---	---	---
VoA Volusia	70	14	65	35	---	---	2.5
VoB Volusia	70	14	65	35	---	---	2.5

See footnote at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Oats	Wheat	Dry beans	Alfalfa hay	Trefoil-grass hay
	Bu	Ton	Bu	Bu	Bu	Ton	Ton
VoC---------- Volusia	65	13	60	30	---	---	2.5
VoD---------- Volusia	---	---	---	---	---	---	2.0
Wk---------- Wallkill	100	18	---	---	---	---	3.0
Wy---------- Wayland	95	18	---	---	---	---	3.0

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage.]

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	211	---	---	---
II	47,565	17,794	19,739	10,032
III	106,273	56,932	48,596	745
IV	33,300	24,706	8,594	---
V	1,627	---	1,627	---
VI	6,422	5,433	989	4,796
VII	15,054	9,358	---	5,696
VIII	620	---	620	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
Ad---------- Alden	5w	Slight	Severe	Severe	Severe	Red maple----------	50	White spruce,
						Eastern hemlock-----	45	northern white cedar.
AnA, AnB, AnC------ Angola	3w	Slight	Moderate	Moderate	Moderate	Northern red oak----	70	Eastern white pine,
						Sugar maple---------	60	Norway spruce,
						Red maple----------	60	white spruce,
						White ash----------	70	European larch.
ApA, ApB---------- Appleton	3w	Slight	Moderate	Moderate	Moderate	Northern red oak----	70	European larch,
						Sugar maple---------	60	Norway spruce,
						Red maple----------	60	white spruce,
						White ash----------	70	eastern white pine.
ArB, ArC---------- Arnot	5d	Slight	Slight	Severe	Moderate	Northern red oak----	55	Eastern white pine,
						Sugar maple---------	50	red pine,
						Eastern white pine--	55	European larch.
						White ash----------	60	
At---------- Atkins	4w	Slight	Severe	Severe	Moderate	White ash----------	60	Eastern white pine,
						Red maple----------	55	white spruce,
								Norway spruce.
AuB, AuC---------- Aurora	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Norway spruce,
						Sugar maple---------	65	white spruce,
						White ash----------	75	European larch,
						American basswood---	70	red pine.
AuD---------- Aurora	3r	Moderate	Moderate	Slight	Slight	Northern red oak----	70	Norway spruce,
						Sugar maple---------	65	white spruce,
						White ash----------	75	European larch,
						American basswood---	70	red pine.
BaB, BaC---------- Bath	3o	Slight	Slight	Slight	Slight	Northern red oak----	65	Eastern white pine,
						Black cherry--------	75	red pine,
						Sugar maple---------	70	Norway spruce,
						White ash----------	80	European larch,
								white spruce.
BaD, BHE*--------- Bath	3r	Slight	Moderate	Slight	Slight	Northern red oak----	65	Eastern white pine,
						Black cherry--------	75	red pine,
						Sugar maple---------	70	Norway spruce,
						American basswood---	70	European larch,
						White ash----------	80	White spruce.
BuB, BuC---------- Burdett	3w	Slight	Moderate	Moderate	Moderate	Northern red oak----	70	European larch,
						Sugar maple---------	60	Norway spruce,
						Red maple----------	60	white spruce,
						White ash----------	70	eastern white spruce.
BuD---------- Burdett	3w	Moderate	Moderate	Moderate	Moderate	Northern red oak----	70	European larch,
						Sugar maple---------	60	Norway spruce,
						Red maple----------	60	white spruce.
						American basswood---	70	
Ca---------- Canandaigua	4w	Slight	Severe	Severe	Severe	Red maple----------	65	Eastern white pine,
						Eastern hemlock-----	55	white spruce.
						Northern white cedar	65	
Cc---------- Carlisle	5w	Slight	Severe	Severe	Severe	Red maple----------	45	Generally unplantable.
						Eastern hemlock-----	45	
Ce---------- Castile	3o	Slight	Slight	Slight	Slight	Sugar maple---------	63	Eastern white pine,
						Northern red oak----	70	Norway spruce,
						White ash----------	75	white spruce.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
ChA, CnA, CnB-------- Chenango	2o	Slight	Slight	Slight	Slight	Sugar maple---------- Northern red oak---- American basswood--- White ash-----------	70 80 80 85	Eastern white pine, red pine, European larch, Norway spruce.
CoB---------- Chenango	2o	Slight	Slight	Slight	Slight	Sugar maple---------- Northern red oak---- American basswood--- White ash-----------	70 80 70 75	Eastern white pine, Norway spruce.
Cp---------- Chippewa	5w	Slight	Severe	Severe	Severe	Red maple---------- Eastern hemlock-----	50 45	Eastern white pine, white spruce.
CrA, CrB---------- Collamer	2o	Slight	Slight	Slight	Slight	Sugar maple---------- Black cherry-------- White ash---------- Northern red oak---- American basswood---	65 80 70 80 70	Eastern white pine, Norway spruce, white spruce, European larch.
CsA, CsB, CsC-------- Conesus	2o	Slight	Slight	Slight	Slight	Sugar maple---------- Northern red oak---- American basswood--- White ash-----------	75 80 70 80	Eastern white pine, European larch, Norway spruce, white spruce.
DkB---------- Dunkirk	2o	Slight	Slight	Slight	Slight	Sugar maple---------- American basswood--- White ash---------- Black walnut-------- Northern red oak---- Black cherry--------	70 70 80 80 80 80	Eastern white pine, Norway spruce, European larch, black walnut.
DkC---------- Dunkirk	2r	Moderate	Slight	Slight	Slight	Sugar maple---------- American basswood--- White ash---------- Black walnut-------- Northern red oak---- Black cherry--------	70 70 80 80 80 80	Eastern white pine, Norway spruce, European larch, black walnut.
DUE3*: Dunkirk----------	2r	Severe	Moderate	Slight	Slight	Sugar maple---------- American basswood--- White ash---------- Black walnut-------- Northern red oak---- Black cherry--------	70 70 80 80 80 80	Eastern white pine, Norway spruce, European larch, black walnut.
Hudson----------	2r	Severe	Moderate	Slight	Slight	Northern red oak---- Sugar maple---------- White ash---------- American basswood---	80 70 80 70	Eastern white pine, Norway spruce, white spruce, black walnut.
ErA, ErB, ErC------ Erie	3w	Slight	Moderate	Moderate	Moderate	Sugar maple---------- Northern red oak---- Red maple---------- White ash-----------	64 70 60 70	Eastern white pine, Norway spruce, European larch, white spruce.
FrA, FrB---------- Fremont	3w	Slight	Moderate	Moderate	Moderate	Sugar maple---------- Northern red oak---- White ash---------- Red maple----------	60 65 65 60	Eastern white pine, European larch, Norway spruce, white spruce.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
FrC---------- Fremont	3w	Moderate	Moderate	Moderate	Moderate	Sugar maple--------- Northern red oak---- White ash---------- Red maple----------	60 65 65 60	Eastern white pine, European larch, Norway spruce, white spruce.
Ha---------- Halsey	5w	Slight	Severe	Severe	Severe	Red maple---------- Eastern hemlock-----	55 45	Eastern white pine, white spruce.
HnB---------- Hornell	3w	Slight	Moderate	Slight	Slight	Sugar maple--------- White ash---------- Northern red oak---- Red maple----------	60 70 70 60	Eastern white pine, European larch, white spruce, Norway spruce.
HnC---------- Hornell	3w	Moderate	Moderate	Slight	Slight	Sugar maple--------- White ash---------- Northern red oak---- Red maple----------	60 70 70 60	Eastern white pine, European larch, white spruce, Norway spruce.
HnD---------- Hornell	3w	Severe	Moderate	Slight	Slight	Sugar maple--------- White ash---------- Northern red oak---- Red maple----------	60 70 70 60	Eastern white pine, European larch, white spruce, Norway spruce.
HrA, HrB, HrC, HrCK---------- Howard	2o	Slight	Slight	Slight	Slight	Sugar maple--------- Northern red oak---- American basswood--- White ash----------	70 80 80 85	Eastern white pine, European larch, red pine, Norway spruce.
HSD*, HSE*--------- Howard	2r	Moderate	Moderate	Slight	Slight	Sugar maple--------- Northern red oak---- American basswood--- White ash----------	70 80 80 85	Eastern white pine, European larch, red pine, Norway spruce.
HuB---------- Hudson	2o	Slight	Slight	Slight	Slight	Northern red oak---- Sugar maple--------- White ash---------- American basswood---	80 70 85 80	Eastern white pine, Norway spruce, white spruce, black walnut.
HuC---------- Hudson	2r	Moderate	Slight	Slight	Slight	Northern red oak---- Sugar maple--------- White ash---------- American basswood---	80 70 85 80	Eastern white pine, Norway spruce, white spruce, black walnut.
LnB, LnC---------- Lansing	2o	Slight	Slight	Slight	Slight	Sugar maple--------- Northern red oak---- White ash----------	70 80 85	Eastern white pine, red pine, Norway spruce.
LnD---------- Lansing	2r	Moderate	Moderate	Slight	Slight	Sugar maple--------- Northern red oak---- White ash----------	70 80 85	Eastern white pine, red pine, Norway spruce.
LoB, LoC---------- Lordstown	3o	Slight	Slight	Slight	Slight	Northern red oak---- Sugar maple--------- White ash----------	65 60 65	Eastern white pine, European larch, red pine, Norway spruce.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
LoD---------- Lordstown	3r	Slight	Moderate	Slight	Slight	Northern red oak---- Sugar maple--------- White ash-----------	65 60 65	Eastern white pine, European larch, red pine, Norway spruce.
LTE*: Lordstown---------	3r	Slight	Moderate	Slight	Slight	Northern red oak---- Sugar maple--------- White ash-----------	65 60 65	Eastern white pine, European larch, red pine, Norway spruce.
Arnot----------	5d	Slight	Moderate	Severe	Moderate	Northern red oak---- Sugar maple--------- Eastern white pine-- White ash-----------	55 50 55 55	Eastern white pine, red pine, European larch.
LTF*: Lordstown---------	3r	Moderate	Severe	Slight	Slight	Northern red oak---- Sugar maple--------- White ash-----------	65 60 65	Eastern white pine, European larch, red pine, Norway spruce.
Arnot----------	5d	Moderate	Severe	Severe	Moderate	Northern red oak---- Sugar maple--------- Eastern white pine-- White ash-----------	55 50 55 55	Eastern white pine, red pine, European larch.
Ma---------- Madalin	5w	Slight	Severe	Severe	Severe	Red maple---------- White ash---------- Eastern hemlock-----	50 50 45	Eastern white pine, white spruce.
MrB, MrC---------- Mardin	3o	Slight	Slight	Slight	Slight	Sugar maple--------- Northern red oak---- Black cherry-------- White ash-----------	60 63 75 70	Red pine, European larch, Norway spruce, eastern white pine.
MrD---------- Mardin	3r	Slight	Moderate	Slight	Slight	Sugar maple--------- Northern red oak---- Black cherry-------- White ash-----------	60 63 75 70	Red pine, European larch, Norway spruce, eastern white pine.
OdA, OdB---------- Odessa	3w	Slight	Moderate	Slight	Slight	Sugar maple--------- Northern red oak---- Red maple----------	65 65 65	Eastern white pine, white spruce, Norway spruce.
Pa---------- Palms	5w	Slight	Severe	Severe	Severe	Red maple---------- White ash---------- Northern white-cedar Eastern hemlock----- Black ash----------	46 50 27 45 ---	Generally unplantable.
Ph---------- Philo	2w	Slight	Moderate	Slight	Slight	Black walnut-------- Northern red oak---- Sugar maple--------- White ash-----------	80 79 70 80	Eastern white pine, Norway spruce, European larch, black walnut.
Rh---------- Red Hook	3w	Slight	Moderate	Moderate	Moderate	Red maple---------- Sugar maple--------- White ash-----------	70 70 80	Eastern white pine, Norway spruce, white spruce.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
RnA, RnB---------- Rhinebeck	3w	Slight	Moderate	Slight	Slight	Sugar maple--------- Northern red oak---- Red maple-----------	65 70 65	Eastern white pine, Norway spruce, white spruce.
ROF*: Rock outcrop.								
Arnot--------------	5d	Moderate	Severe	Severe	Moderate	Northern red oak---- Sugar maple--------- Eastern white pine-- White ash-----------	55 50 55 55	Eastern white pine, red pine, European larch.
ScB3--------------- Schoharie	2o	Slight	Slight	Slight	Slight	Northern red oak---- Sugar maple--------- American basswood--- White ash-----------	80 70 85 80	Eastern white pine, white spruce, Norway spruce, black walnut.
ScC3--------------- Schoharie	2r	Moderate	Slight	Slight	Slight	Northern red oak---- Sugar maple--------- American basswood--- White ash-----------	80 70 85 80	Eastern white pine, white spruce, Norway spruce, black walnut.
ScD3--------------- Schoharie	2r	Severe	Moderate	Slight	Slight	Northern red oak---- Sugar maple--------- American basswood--- White ash-----------	80 70 85 80	Eastern white pine, Norway spruce, white spruce, black walnut.
ShC3--------------- Schoharie Variant	2r	Moderate	Slight	Slight	Slight	Northern red oak---- Sugar maple--------- American basswood--- White ash-----------	80 70 85 80	Eastern white pine, Norway spruce, white spruce, black walnut.
ShD3--------------- Schoharie Variant	2r	Severe	Moderate	Slight	Slight	Northern red oak---- Sugar maple--------- American basswood--- White ash-----------	80 70 85 80	Eastern white pine, Norway spruce, white spruce, black walnut.
SyC---------------- Schuyler	3o	Slight	Slight	Slight	Slight	Northern red oak---- Black cherry-------- Sugar maple--------- White ash-----------	70 75 61 70	Eastern white pine, red pine, Norway spruce, European larch.
SyD, SyE----------- Schuyler	3r	Moderate	Moderate	Slight	Slight	Northern red oak---- Black cherry-------- Sugar maple--------- White ash-----------	70 75 61 70	Eastern white pine, red pine, Norway spruce, European larch.
Te----------------- Teel	2o	Slight	Slight	Slight	Slight	Sugar maple--------- White ash---------- Black walnut-------- American basswood---	70 85 80 85	Eastern white pine, Norway spruce, black walnut, European larch.
TuB, TuC----------- Tuller	5w	Slight	Severe	Severe	Severe	Red maple----------- Eastern hemlock-----	55 45	Eastern white pine, white spruce, Norway spruce.
VaB, VaC----------- Valois	3o	Slight	Slight	Slight	Slight	Sugar maple--------- Northern red oak---- American basswood--- White ash-----------	61 70 70 75	Eastern white pine, white spruce, Norway spruce, red pine, European larch.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
VaD, VEE*---------- Valois	3r	Slight	Moderate	Slight	Slight	Sugar maple--------- Northern red oak---- American basswood--- White ash----------	61 70 70 75	Eastern white pine, white spruce, Norway spruce, red pine, European larch.
VHF*: Valois----------	3r	Moderate	Severe	Slight	Slight	Sugar maple--------- Northern red oak---- White ash----------	61 70 75	Eastern white pine, white spruce, Norway spruce, red pine, European larch.
Howard----------	3r	Moderate	Severe	Slight	Slight	Sugar maple--------- Northern red oak---- White ash----------	70 80 85	Eastern white pine, European larch, red pine, Norway spruce.
VoA, VoB, VoC------ Volusia	3w	Slight	Moderate	Moderate	Moderate	Northern red oak---- Sugar maple--------- White ash---------- Red maple----------	62 64 70 65	Eastern white pine, Norway spruce, European larch, white spruce.
VoD---------- Volusia	3w	Moderate	Moderate	Moderate	Moderate	Northern red oak---- Sugar maple--------- White ash---------- Red maple----------	62 64 70 65	Eastern white pine, Norway spruce, European larch, white spruce.
Wk---------- Wallkill	4w	Slight	Severe	Severe	Severe	Eastern hemlock----- Red maple----------	45 65	White spruce.
Wy---------- Wayland	4w	Slight	Severe	Severe	Severe	Red maple---------- Eastern hemlock-----	65 45	White spruce.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ad---------- Alden	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, frost action.	Severe: wetness.
AnA, AnB---------- Angola	Severe: depth to rock, wetness.	Severe: frost action, wetness.	Severe: depth to rock, wetness.	Severe: frost action, wetness.	Severe: frost action.	Moderate: wetness.
AnC---------- Angola	Severe: depth to rock, wetness.	Severe: frost action, wetness.	Severe: depth to rock, wetness.	Severe: slope, frost action, wetness.	Severe: frost action.	Moderate: slope, wetness, depth to rock.
ApA, ApB---------- Appleton	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: frost action.	Moderate: wetness.
AQ*. Aquepts and Saprists						
ArB---------- Arnot	Severe: depth to rock, small stones.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
ArC---------- Arnot	Severe: depth to rock, small stones.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
At---------- Atkins	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness, floods.
AuB---------- Aurora	Severe: depth to rock, wetness.	Moderate: frost action, wetness.	Severe: depth to rock, wetness.	Moderate: frost action, wetness.	Moderate: frost action, depth to rock.	Moderate: depth to rock.
AuC---------- Aurora	Severe: depth to rock, wetness.	Moderate: frost action, slope.	Severe: depth to rock, wetness.	Severe: slope.	Moderate: frost action, slope.	Moderate: depth to rock, slope.
AuD---------- Aurora	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
BaB---------- Bath	Moderate: wetness, small stones.	Moderate: frost action.	Moderate: wetness.	Moderate: slope, frost action.	Moderate: frost action.	Moderate: small stones.
BaC---------- Bath	Moderate: slope, wetness, small stones.	Moderate: slope, frost action.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, small stones.
BaD, BHE*---------- Bath	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BuB---------- Burdett	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: frost action.	Moderate: wetness.
BuC---------- Burdett	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: slope, wetness, frost action.	Severe: frost action.	Moderate: slope, wetness.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BuD--- Burdett	Severe: slope, wetness.	Severe: slope, wetness, frost action.	Severe: slope, wetness.	Severe: slope, wetness, frost action.	Severe: slope, frost action.	Severe: slope.
Ca--- Canandaigua	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, frost action.	Severe: wetness.
Cc--- Carlisle	Severe: floods, wetness, excess humus.	Severe: wetness, low strength, floods.	Severe: wetness, low strength, floods.	Severe: wetness, low strength, floods.	Severe: low strength, wetness, floods.	Severe: excess humus, wetness, floods.
Ce--- Castile	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: frost action.	Moderate: small stones.
ChA--- Chenango	Severe: small stones, cutbanks cave.	Moderate: frost action.	Slight---	Moderate: frost action.	Moderate: frost action.	Slight.
CnA--- Chenango	Severe: small stones, cutbanks cave.	Moderate: frost action.	Slight---	Moderate: frost action.	Moderate: frost action.	Moderate: small stones.
CnB--- Chenango	Severe: small stones, cutbanks cave.	Moderate: frost action.	Slight---	Moderate: slope, frost action.	Moderate: frost action.	Moderate: small stones.
CoB--- Chenango	Severe: small stones, cutbanks cave.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods, frost action.	Severe: small stones.
Cp--- Chippewa	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
CrA, CrB--- Collamer	Severe: wetness.	Severe: frost action.	Severe: wetness.	Severe: frost action.	Severe: frost action.	Slight.
CsA--- Conesus	Severe: wetness.	Moderate: wetness, frost action.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: frost action.	Slight.
CsB--- Conesus	Severe: wetness.	Moderate: wetness, frost action.	Severe: wetness.	Moderate: slope, wetness, frost action.	Moderate: frost action.	Slight.
CsC--- Conesus	Severe: wetness.	Moderate: slope, wetness, frost action.	Severe: wetness.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
DkB--- Dunkirk	Slight---	Moderate: frost action.	Slight---	Moderate: frost action.	Moderate: frost action.	Slight.
DkC--- Dunkirk	Moderate: slope.	Moderate: frost action, slope.	Moderate: slope.	Severe: slope, frost action.	Severe: frost action, slope.	Moderate: slope.
DUE3*: Dunkirk---	Severe: slope.	Severe: slope, frost action.	Severe: slope.	Severe: slope, frost action.	Severe: slope, frost action.	Severe: slope.
Hudson---	Severe: slope, too clayey, wetness.	Severe: slope, low strength.	Severe: slope, wetness, low strength.	Severe: slope, low strength.	Severe: slope, low strength.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
ErA, ErB---------- Erie	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: frost action.	Moderate: wetness.
ErC---------- Erie	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: slope, wetness, frost action.	Severe: frost action.	Moderate: wetness.
FF*. Fluvaquents-Udifluvents						
FrA, FrB---------- Fremont	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: frost action.	Moderate: wetness.
FrC---------- Fremont	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: slope, wetness.	Severe: frost action.	Moderate: wetness.
Ha---------- Halsey	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, frost action.	Severe: wetness.
HnB---------- Hornell	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness, low strength.	Moderate: wetness, small stones.
HnC---------- Hornell	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: slope, wetness.	Severe: wetness, low strength.	Moderate: slope, wetness.
HnD---------- Hornell	Severe: slope, wetness, depth to rock.	Severe: slope, wetness.	Severe: slope, wetness, depth to rock.	Severe: slope, wetness.	Severe: slope, wetness, low strength.	Severe: slope.
HrA---------- Howard	Severe: small stones, cutbanks cave.	Moderate: frost action.	Slight---------	Moderate: frost action.	Moderate: frost action.	Moderate: small stones.
HrB---------- Howard	Severe: small stones, cutbanks cave.	Moderate: frost action.	Slight---------	Moderate: slope, frost action.	Moderate: frost action.	Moderate: small stones.
HrC, HrCK--------- Howard	Severe: small stones, cutbanks cave.	Moderate: slope, frost action.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, small stones.
HSD*, HSE*-------- Howard	Severe: slope, small stones, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
HuB---------- Hudson	Severe: too clayey, wetness.	Severe: low strength.	Severe: wetness, low strength.	Severe: low strength.	Severe: low strength.	Moderate: small stones.
HuC---------- Hudson	Severe: too clayey, wetness.	Severe: low strength.	Severe: wetness, low strength.	Severe: slope, low strength.	Severe: low strength.	Moderate: slope, small stones.
LnB---------- Lansing	Moderate: small stones, wetness.	Moderate: frost action.	Moderate: wetness.	Moderate: frost action, slope.	Moderate: frost action.	Moderate: small stones.
LnC---------- Lansing	Moderate: small stones, wetness.	Moderate: frost action. slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: frost action, slope.	Moderate: small stones.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
LnD---------- Lansing	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LoB---------- Lordstown	Severe: depth to rock.	Moderate: depth to rock, frost action.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.	Moderate: depth to rock, small stones.
LoC---------- Lordstown	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Moderate: slope, depth to rock, small stones.
LoD---------- Lordstown	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
LTE*, LTF*: Lordstown--------	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
Arnot----------	Severe: slope, depth to rock, small stones.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
Ma---------- Madalin	Severe: wetness, too clayey.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness.
MrB---------- Mardin	Severe: wetness.	Moderate: frost action.	Severe: wetness.	Moderate: frost action.	Moderate: frost action.	Moderate: small stones.
MrC---------- Mardin	Severe: wetness.	Moderate: frost action.	Severe: wetness.	Severe: slope.	Moderate: frost action.	Moderate: small stones.
MrD---------- Mardin	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Severe: slope.
OCF*. Ochrepts-Orthents						
OdA, OdB---------- Odessa	Severe: wetness, too clayey.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: low strength.	Moderate: wetness.
Pa---------- Palms	Severe: wetness, floods, cutbanks cave.	Severe: wetness, low strength, floods.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, excess humus.
Ph---------- Philo	Severe: floods, wetness.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Moderate: floods.	Moderate: floods.
Pt*. Pits, gravel						
Rh---------- Red Hook	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: frost action, wetness.	Moderate: wetness, small stones.
RnA, RnB---------- Rhinebeck	Severe: wetness, too clayey.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: low strength.	Moderate: wetness, small stones.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
ROF*: Rock outcrop.						
Arnot	Severe: depth to rock, small stones.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
ScB3 Schoharie	Severe: too clayey.	Severe: low strength.	Severe: wetness, low strength.	Severe: low strength.	Severe: low strength.	Moderate: too clayey.
ScC3 Schoharie	Severe: too clayey.	Severe: low strength.	Severe: wetness, low strength.	Severe: slope, low strength.	Severe: low strength.	Moderate: too clayey, slope.
ScD3 Schoharie	Severe: slope, too clayey.	Severe: slope, low strength.	Severe: slope, wetness, low strength.	Severe: slope, low strength.	Severe: slope, low strength.	Severe: slope.
ShC3 Schoharie Variant	Severe: too clayey, depth to rock.	Severe: low strength.	Severe: wetness, depth to rock.	Severe: slope, low strength.	Severe: low strength.	Moderate: too clayey, depth to rock.
ShD3 Schoharie Variant	Severe: slope, too clayey, depth to rock.	Severe: slope, low strength.	Severe: slope, wetness, depth to rock.	Severe: slope, low strength.	Severe: slope, low strength.	Severe: slope.
SyC Schuyler	Moderate: slope, wetness.	Severe: frost action.	Severe: wetness.	Severe: slope, frost action.	Severe: frost action.	Moderate: slope.
SyD, SyE Schuyler	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Te Teel	Severe: floods, wetness.	Severe: floods, frost action, wetness.	Severe: floods, wetness.	Severe: floods, frost action, wetness.	Severe: frost action, floods.	Moderate: floods.
TuB Tuller	Severe: depth to rock, wetness, small stones.	Severe: wetness, depth to rock, frost action.	Severe: wetness, depth to rock.	Severe: wetness, depth to rock, frost action.	Severe: depth to rock, wetness, frost action.	Severe: depth to rock, wetness.
TuC Tuller	Severe: depth to rock, wetness, small stones.	Severe: wetness, depth to rock, frost action.	Severe: wetness, depth to rock.	Severe: slope, wetness, depth to rock.	Severe: depth to rock, wetness, frost action.	Severe: depth to rock, wetness, small stones.
UD*. Udorthents						
VaB Valois	Moderate: small stones.	Moderate: frost action.	Slight	Moderate: slope, frost action.	Moderate: frost action.	Moderate: small stones.
VaC Valois	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
VaD, VEE* Valois	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
VHF*:						
Valois	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Howard	Severe: slope, small stones, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
VoA, VoB	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: frost action.	Moderate: small stones, wetness.
VoC	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: slope, wetness, frost action.	Severe: frost action.	Moderate: slope, small stones, wetness.
VoD	Severe: slope, wetness.	Severe: slope, wetness, frost action.	Severe: slope, wetness.	Severe: slope, wetness, frost action.	Severe: slope, frost action.	Severe: slope.
Wk	Severe: wetness, floods.	Severe: floods, wetness, low strength.	Severe: floods, wetness, low strength.	Severe: floods, wetness, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods.
Wy	Severe: wetness, floods.	Severe: floods, wetness, frost action.	Severe: floods, wetness.	Severe: floods, wetness, frost action.	Severe: wetness, floods, frost action.	Severe: wetness, floods.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ad Alden	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
AnA, AnB Angola	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock.	Severe: depth to rock, wetness.	Severe: wetness.	Fair: thin layer.
AnC Angola	Severe: depth to rock, wetness, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock, wetness.	Severe: wetness.	Fair: thin layer.
ApA Appleton	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Fair: thin layer.
ApB Appleton	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Fair: thin layer.
AQ*. Aquepts and Saprists					
ArB** Arnot	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Slight	Poor: small stones, thin layer.
ArC** Arnot	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Moderate: slope.	Poor: small stones, thin layer.
At** Atkins	Severe: floods, wetness.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Poor: wetness.
AuB Aurora	Severe: depth to rock, wetness.	Severe: depth to rock.	Severe: depth to rock, wetness.	Moderate: wetness.	Fair: thin layer, small stones.
AuC Aurora	Severe: depth to rock, wetness.	Severe: slope, depth to rock.	Severe: depth to rock, wetness.	Moderate: wetness, slope.	Fair: thin layer, slope.
AuD Aurora	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, wetness.	Severe: slope.	Poor: slope.
BaB Bath	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones.
BaC Bath	Severe: percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: slope, wetness.	Fair: slope, small stones.
BaD Bath	Severe: slope, percs slowly.	Severe: slope.	Moderate: slope, wetness.	Severe: slope.	Poor: slope.

See footnotes at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BHE* Bath	Severe: slope, percs slowly.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
BuB Burdett	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Fair: thin layer.
BuC Burdett	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Fair: slope, thin layer.
BuD Burdett	Severe: slope, wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: slope, wetness.	Poor: slope.
Ca Canandaigua	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Cc Carlisle	Severe: floods, wetness.	Severe: wetness, excess humus, seepage.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Poor: wetness, excess humus, hard to pack.
Ce** Castile	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Moderate: wetness, seepage.	Fair: small stones, thin layer.
ChA**, CnA**, CnB** Chenango	Slight	Severe: seepage, small stones.	Severe: seepage, too sandy.	Severe: seepage.	Poor: small stones.
CoB** Chenango	Moderate: floods.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones, thin layer.
Cp Chippewa	Severe: wetness, percs slowly.	Moderate: small stones.	Severe: wetness.	Severe: wetness.	Poor: wetness.
CrA Collamer	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Moderate: wetness.	Good.
CrB Collamer	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Good.
CsA, CsB Conesus	Severe: percs slowly, wetness.	Moderate: small stones, slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones.
CsC Conesus	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: small stones, slope.
DkB Dunkirk	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Good.
DkC Dunkirk	Severe: percs slowly.	Severe: slope.	Slight	Moderate: slope.	Fair: slope.

See footnotes at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
DUE3*:					
Dunkirk	Severe: slope, percs slowly.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Hudson	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: slope, too clayey, wetness.	Severe: slope.	Poor: slope, too clayey, thin layer.
ErA Erie	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Fair: small stones, thin layer.
ErB Erie	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Fair: small stones, thin layer.
ErC Erie	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Fair: small stones, slope.
FF*. Fluvaquents-Udifluvents					
FrA Fremont	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Fair: small stones, thin layer.
FrB Fremont	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Fair: thin layer.
FrC Fremont	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: wetness.	Fair: thin layer, slope.
Ha Halsey	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness.
HnB Hornell	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock.	Severe: wetness, depth to rock.	Severe: wetness.	Poor: too clayey.
HnC Hornell	Severe: depth to rock, wetness, percs slowly.	Severe: slope, depth to rock.	Severe: wetness, depth to rock.	Severe: wetness.	Poor: too clayey.
HnD Hornell	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: wetness, depth to rock.	Severe: slope, wetness.	Poor: slope, too clayey.
HrA**, HrB** Howard	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones, thin layer.
HrC**, HrCK** Howard	Moderate: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Fair: slope, small stones, thin layer.
HSD* ** Howard	Severe: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: slope, seepage.	Poor: slope.
HSE* ** Howard	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope, seepage.	Poor: slope.

See footnotes at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HuB---------- Hudson	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, thin layer.
HuC---------- Hudson	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness, too clayey.	Moderate: wetness, slope.	Poor: too clayey, thin layer.
LnB---------- Lansing	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones.
LnC---------- Lansing	Severe: percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones.
LnD---------- Lansing	Severe: slope.	Severe: slope.	Moderate: wetness.	Severe: slope.	Poor: slope.
LoB**---------- Lordstown	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Slight----------	Fair: small stones, thin layer.
LoC**---------- Lordstown	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Moderate: slope.	Fair: small stones, thin layer.
LoD**---------- Lordstown	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Poor: slope.
LTE* **, LTF* **:					
Lordstown----------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope.
Arnot----------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, small stones, thin layer.
Ma---------- Madalin	Severe: percs slowly, wetness.	Slight----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey.
MrB---------- Mardin	Severe: percs slowly.	Moderate: small stones.	Severe: wetness.	Moderate: wetness.	Fair: small stones.
MrC---------- Mardin	Severe: percs slowly.	Severe: slope.	Severe: wetness.	Moderate: slope.	Fair: small stones.
MrD---------- Mardin	Severe: slope, percs slowly.	Severe: slope.	Severe: wetness.	Severe: slope.	Poor: slope.
OCF*. Ochrepts-Orthents					
OdA---------- Odessa	Severe: percs slowly, wetness.	Slight----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey.
OdB---------- Odessa	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey.
Pa---------- Palms	Severe: wetness, floods, subsides.	Severe: wetness, seepage, floods.	Severe: wetness, floods, excess humus.	Severe: wetness, floods, seepage.	Poor: wetness, hard to pack, excess humus.

See footnotes at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ph---------- Philo	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, seepage.	Severe: floods, seepage.	Fair: thin layer.
Pt*. Pits, gravel					
Rh**---------- Red Hook	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Fair: small stones.
RnA---------- Rhinebeck	Severe: percs slowly, wetness.	Slight----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey.
RnB---------- Rhinebeck	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey.
ROF*: Rock outcrop.					
Arnot---------- Arnot	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, small stones, thin layer.
ScB3---------- Schoharie	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey.
ScC3---------- Schoharie	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey.
ScD3---------- Schoharie	Severe: slope, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Severe: slope, wetness.	Poor: slope, too clayey.
ShC3---------- Schoharie Variant	Severe: percs slowly, depth to rock, wetness.	Severe: slope, depth to rock.	Severe: wetness, too clayey, depth to rock.	Severe: wetness.	Poor: too clayey.
ShD3---------- Schoharie Variant	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: wetness, too clayey, depth to rock.	Severe: slope, wetness.	Poor: slope, too clayey.
SyC---------- Schuyler	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Moderate: slope, wetness.	Fair: slope, small stones.
SyD---------- Schuyler	Severe: slope, percs slowly.	Severe: slope.	Severe: wetness.	Severe: slope.	Poor: slope.
SyE---------- Schuyler	Severe: slope, percs slowly.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Poor: slope.
Te---------- Teel	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Good.
TuB**---------- Tuller	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: thin layer, small stones, area reclaim.

See footnotes at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
TuC**---------- Tuller	Severe: depth to rock, wetness, percs slowly.	Severe: slope, depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: thin layer, small stones, area reclaim.
UD*. Udorthents					
VaB---------- Valois	Slight----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
VaC---------- Valois	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: slope, small stones.
VaD---------- Valois	Severe: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage, slope.	Poor: slope.
VEE*---------- Valois	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
VHF*: Valois----------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Howard**----------	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope, seepage.	Poor: slope.
VoA---------- Volusia	Severe: wetness, percs slowly.	Moderate: small stones.	Severe: wetness.	Severe: wetness.	Fair: small stones, thin layer.
VoB---------- Volusia	Severe: wetness, percs slowly.	Moderate: slope, small stones.	Severe: wetness.	Severe: wetness.	Fair: small stones, thin layer.
VoC---------- Volusia	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Fair: slope, small stones.
VoD---------- Volusia	Severe: slope, wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: slope, wetness.	Poor: slope.
Wk---------- Wallkill	Severe: floods, wetness.	Severe: floods, seepage, wetness.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Poor: wetness.
Wy---------- Wayland	Severe: floods, wetness, percs slowly.	Severe: floods.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.
** Possible pollution hazard to water supplies because of rapid permeability or fractured bedrock.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ad Alden	Poor: wetness, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
AnA, AnB, AnC Angola	Poor: frost action, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: small stones, thin layer.
ApA, ApB Appleton	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: small stones.
AQ*. Aquepts and Saprists				
ArB, ArC Arnot	Poor: thin layer, area reclaim.	Unsuited: excess fines, thin layer.	Poor: excess fines, thin layer.	Poor: small stones, area reclaim.
At Atkins	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
AuB, AuC Aurora	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
AuD Aurora	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
BaB, BaC Bath	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
BaD Bath	Fair: slope, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
BHE* Bath	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
BuB Burdett	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, small stones.
BuC Burdett	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer, small stones.
BuD Burdett	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Ca Canandaigua	Poor: wetness, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Cc Carlisle	Poor: low strength, wetness.	Unsuited: excess humus.	Unsuited: excess humus.	Poor: wetness.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ce---------- Castile	Good----------	Fair: thin layer.	Good----------	Poor: small stones.
ChA---------- Chenango	Good----------	Fair: thin layer.	Good----------	Fair: thin layer.
CnA, CnB, CoB--------- Chenango	Good----------	Poor: excess fines.	Good----------	Poor: small stones.
Cp---------- Chippewa	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
CrA, CrB---------- Collamer	Poor: frost action.	Poor: excess fines.	Unsuited: excess fines.	Good.
CsA, CsB---------- Conesus	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: small stones.
CsC---------- Conesus	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
DkB---------- Dunkirk	Poor: frost action.	Poor: excess fines.	Unsuited: excess fines.	Good.
DkC---------- Dunkirk	Poor: frost action.	Poor: excess fines.	Unsuited: excess fines.	Fair: slope.
DUE3*: Dunkirk----------	Poor: slope, frost action.	Poor: excess fines.	Unsuited: excess fines.	Poor: slope.
Hudson----------	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
ErA, ErB, ErC--------- Erie	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
FF*. Fluvaquents-Udifluvents				
FrA, FrB---------- Fremont	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, small stones.
FrC---------- Fremont	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, small stones.
Ha---------- Halsey	Poor: wetness, frost action.	Fair: excess fines, thin layer.	Fair: excess fines, thin layer.	Poor: wetness.
HnB, HnC---------- Hornell	Poor: low strength, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: small stones, thin layer, too clayey.
HnD---------- Hornell	Poor: low strength, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
HrA, HrB, HrC, HrCK--- Howard	Good----------	Poor: thin layer.	Good----------	Poor: small stones.
HSD*---------- Howard	Fair: slope.	Poor: thin layer.	Good----------	Poor: slope, small stones.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
HSE* Howard	Poor: slope.	Poor: thin layer.	Good	Poor: slope, small stones.
HuB Hudson	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, small stones.
HuC Hudson	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
LnB, LnC Lansing	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
LnD Lansing	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
LoB, LoC Lordstown	Poor: thin layer.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
LoD Lordstown	Poor: thin layer.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, small stones.
LTE*, LTF*: Lordstown	Poor: slope, thin layer.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, small stones.
Arnot	Poor: slope, thin layer, area reclaim.	Unsuited: excess fines, thin layer.	Poor: excess fines, thin layer.	Poor: slope, small stones, area reclaim.
Ma Madalin	Poor: low strength, wetness, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, area reclaim.
MrB, MrC Mardin	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
MrD Mardin	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
OCF*. Ochrepts-Orthents				
OdA, OdB Odessa	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Pa Palms	Poor: wetness, low strength.	Unsuited: excess humus, excess fines.	Unsuited: excess humus, excess fines.	Poor: wetness, excess humus.
Ph Philo	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Good.
Pt*. Pits, gravel				
Rh Red Hook	Poor: frost action.	Unsuited: excess fines.	Fair: excess fines.	Poor: small stones.
RnA, RnB Rhinebeck	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
ROF*: Rock outcrop.				

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
ROF*:				
Arnot	Poor: slope, thin layer, area reclaim.	Unsuited: excess fines, thin layer.	Poor: excess fines, thin layer.	Poor: slope, small stones, area reclaim.
ScB3, ScC3 Schoharie	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, too clayey.
ScD3 Schoharie	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
ShC3 Schoharie Variant	Poor: low strength, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, too clayey.
ShD3 Schoharie Variant	Poor: low strength, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, thin layer.
SyC Schuyler	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: small stones.
SyD Schuyler	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
SyE Schuyler	Poor: slope.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope.
Te Teel	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
TuB, TuC Tuller	Poor: thin layer, frost action.	Unsuited: excess fines, thin layer.	Unsuited: excess fines, thin layer.	Poor: small stones.
UD*. Udorthents				
VaB, VaC Valois	Fair: frost action.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
VaD Valois	Fair: slope.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope.
VEE* Valois	Poor: slope.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope.
VHF*:				
Valois	Poor: slope.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope.
Howard	Poor: slope.	Poor: excess fines.	Good	Poor: slope, small stones.
VoA, VoB, VoC Volusia	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones, thin layer.
VoD Volusia	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones, thin layer.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Wk---------- Wallkill	Poor: low strength, frost action, excess humus.	Unsuited: excess fines, excess humus.	Unsuited: excess fines, excess humus.	Poor: wetness.
Wy---------- Wayland	Poor: wetness, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
Ad---------- Alden	Favorable------	Favorable------	Favorable------	Wetness, percs slowly, poor outlets.	Not needed-----	Wetness.
AnA, AnB, AnC----- Angola	Depth to rock, slope.	Thin layer, depth to rock.	Depth to rock	Depth to rock, percs slowly.	Depth to rock, wetness, slope.	Rooting depth, slope.
ApA, ApB---------- Appleton	Favorable------	Favorable------	Favorable------	Percs slowly---	Percs slowly---	Percs slowly.
AQ*. Aquepts and Saprists						
ArB, ArC---------- Arnot	Depth to rock, slope, seepage.	Thin layer, depth to rock.	Depth to rock, no water.	Not needed-----	Depth to rock, slope.	Droughty, rooting depth, slope.
At---------- Atkins	Seepage--------	Piping, seepage.	Favorable------	Floods, poor outlets.	Not needed-----	Wetness, piping.
AuB, AuC, AuD----- Aurora	Depth to rock, slope.	Thin layer, depth to rock.	Deep to water	Depth to rock, percs slowly.	Depth to rock, percs slowly.	Rooting depth, erodes easily.
BaB, BaC, BaD, BHE*---------- Bath	Slope----------	Favorable------	No water-------	Not needed-----	Slope, percs slowly.	Slope, percs slowly.
BuB, BuC, BuD----- Burdett	Favorable------	Favorable------	Slow refill----	Percs slowly---	Percs slowly, slope.	Percs slowly, slope.
Ca---------- Canandaigua	Favorable------	Piping, low strength.	Slow refill----	Poor outlets, cutbanks cave.	Not needed-----	Wetness.
Cc---------- Carlisle	Seepage, excess humus.	Excess humus, wetness.	Slow refill----	Excess humus, floods, frost action.	Not needed-----	Wetness.
Ce---------- Castile	Seepage--------	Seepage, piping.	Deep to water	Cutbanks cave	Piping---------	Favorable.
ChA, CnA, CnB----- Chenango	Seepage--------	Seepage, piping.	No water-------	Not needed-----	Piping, small stones.	Droughty.
CoB---------- Chenango	Seepage--------	Seepage--------	Deep to water	Floods---------	Piping---------	Droughty.
Cp---------- Chippewa	Favorable------	Favorable------	Favorable------	Wetness, percs slowly.	Not needed-----	Wetness, percs slowly.
CrA, CrB---------- Collamer	Favorable------	Low strength, piping, erodes easily.	Slow refill, cutbanks cave.	Cutbanks cave	Erodes easily, piping.	Erodes easily, piping.
CsA, CsB, CsC----- Conesus	Favorable------	Favorable------	Deep to water	Percs slowly---	Erodes easily	Slope, erodes easily.
DkB, DkC---------- Dunkirk	Seepage, slope.	Low strength, piping.	No water-------	Not needed-----	Slope, erodes easily.	Slope, erodes easily.
DUE3*: Dunkirk----------	Seepage, slope.	Low strength, piping.	No water-------	Not needed-----	Slope, erodes easily.	Slope, erodes easily.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
DUE3*: Hudson	Slope	Erodes easily, low strength, hard to pack.	Deep to water, slow refill.	Percs slowly, frost action, slope.	Slope, percs slowly, erodes easily.	Slope, percs slowly, erodes easily.
ErA, ErB, ErC-- Erie	Favorable	Favorable	Slow refill	Percs slowly, slope.	Percs slowly, slope.	Wetness, percs slowly, slope.
FF*. Fluvaquents-Udifluvents						
FrA, FrB, FrC-- Fremont	Favorable	Favorable	Slow refill	Percs slowly	Percs slowly	Slope, erodes easily.
Ha-- Halsey	Seepage	Seepage	Favorable	Wetness, poor outlets.	Not needed	Wetness.
HnB, HnC, HnD-- Hornell	Depth to rock, slope.	Low strength, piping.	Depth to rock, slow refill.	Percs slowly, depth to rock.	Depth to rock, erodes easily.	Erodes easily, slope.
HrA, HrB, HrC, HrCK, HSD*, HSE*- Howard	Seepage, slope.	Seepage	No water	Not needed	Slope, small stones.	Droughty, slope.
HuB, HuC-- Hudson	Slope	Erodes easily, low strength, hard to pack.	Deep to water, slow refill.	Percs slowly, frost action, slope.	Slope, percs slowly, erodes easily.	Slope, percs slowly, erodes easily.
LnB, LnC, LnD-- Lansing	Slope	Favorable	No water	Not needed	Erodes easily, slope.	Slope, erodes easily.
LoB, LoC, LoD-- Lordstown	Depth to rock, slope, seepage.	Thin layer, depth to rock.	Deep to water, depth to rock.	Not needed	Depth to rock, rooting depth, slope.	Droughty, slope, rooting depth.
LTE*, LTF*: Lordstown	Depth to rock, slope, seepage.	Thin layer, depth to rock.	Deep to water	Not needed	Depth to rock, rooting depth, slope.	Droughty, slope, rooting depth.
Arnot	Depth to rock, slope, seepage.	Thin layer, depth to rock.	Depth to rock, no water.	Not needed	Depth to rock, slope.	Droughty, rooting depth, slope.
Ma-- Madalin	Favorable	Low strength	Slow refill	Wetness, percs slowly, poor outlets.	Not needed	Wetness, percs slowly.
MrB, MrC, MrD-- Mardin	Favorable	Favorable	Deep to water	Percs slowly, slope.	Percs slowly, slope.	Percs slowly, slope.
OCF*. Ochrepts-Orthents						
OdA, OdB-- Odessa	Favorable	Low strength	Slow refill	Percs slowly	Percs slowly, erodes easily.	Wetness, percs slowly, erodes easily.
Pa-- Palms	Seepage, excess humus.	Excess humus, wetness.	Slow refill	Cutbanks cave, frost action, excess humus.	Not needed	Wetness.
Ph-- Philo	Seepage	Piping, seepage.	Deep to water, cutbanks cave.	Floods, poor outlets.	Not needed	Erodes easily, piping.
Pt*. Pits, gravel						
Rh-- Red Hook	Seepage	Seepage	Favorable	Poor outlets	Not needed	Wetness.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
RnA, RnB---------- Rhinebeck	Favorable------	Low strength, erodes easily.	Slow refill----	Percs slowly---	Percs slowly--- erodes easily.	Percs slowly, erodes easily.
ROF*: Rock outcrop.						
Arnot----------	Depth to rock, slope, seepage.	Thin layer, depth to rock.	Depth to rock, no water.	Not needed-----	Depth to rock, slope.	Droughty, rooting depth, slope.
ScB3, ScC3, ScD3-- Schoharie	Slope----------	Low strength---	Deep to water	Percs slowly, slope.	Slope, percs slowly, erodes easily.	Slope, percs slowly, erodes easily.
ShC3, ShD3-------- Schoharie Variant	Slope, depth to rock.	Low strength, depth to rock.	Deep to water, depth to rock.	Percs slowly, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, rooting depth.
SyC, SyD, SyE----- Schuyler	Slope----------	Favorable------	Deep to water	Percs slowly, slope.	Percs slowly, erodes easily.	Percs slowly, erodes easily.
Te---------- Teel	Favorable------	Piping, low strength.	Deep to water, cutbanks cave.	Floods, poor outlets.	Not needed-----	Piping, erodes easily.
TuB, TuC---------- Tuller	Depth to rock, seepage.	Thin layer, depth to rock.	Depth to rock, slow refill.	Depth to rock	Depth to rock	Rooting depth, droughty.
UD*. Udorthents						
VaB, VaC, VaD, VEE*---------- Valois	Seepage, slope.	Seepage--------	No water-------	Not needed-----	Slope----------	Slope.
VHF*: Valois----------	Seepage, slope.	Seepage--------	No water-------	Not needed-----	Slope----------	Slope.
Howard----------	Seepage, slope.	Seepage--------	No water-------	Not needed-----	Slope, small stones.	Droughty, slope.
VoA, VoB, VoC, VoD---------- Volusia	Favorable------	Favorable------	Slow refill----	Percs slowly---	Percs slowly, rooting depth.	Wetness, percs slowly, rooting depth.
Wk---------- Wallkill	Seepage--------	Low strength, unstable fill.	Subsides-------	Floods, poor outlets, frost action.	Not needed-----	Wetness.
Wy---------- Wayland	Favorable------	Piping, low strength.	Favorable------	Wetness, floods, poor outlets.	Not needed-----	Wetness, erodes easily.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ad Alden	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
AnA, AnB Angola	Moderate: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
AnC Angola	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope, wetness.	Moderate: wetness.	Moderate: slope, wetness.
ApA, ApB Appleton	Moderate: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
AQ*. Aquepts and Saprists					
ArB Arnot	Moderate: small stones.	Moderate: small stones.	Severe: depth to rock, small stones.	Moderate: small stones.	Severe: depth to rock.
ArC Arnot	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, depth to rock, small stones.	Moderate: small stones.	Severe: depth to rock.
At Atkins	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, floods.
AuB Aurora	Moderate: percs slowly.	Slight	Moderate: depth to rock, slope.	Slight	Moderate: depth to rock.
AuC Aurora	Moderate: percs slowly, slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: depth to rock, slope.
AuD Aurora	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
BaB Bath	Moderate: small stones, percs slowly.	Moderate: small stones.	Moderate: small stones, percs slowly.	Moderate: small stones.	Moderate: small stones.
BaC Bath	Moderate: slope, percs slowly.	Moderate: slope, small stones.	Severe: slope.	Moderate: small stones.	Moderate: slope, small stones.
BaD Bath	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, small stones.	Severe: slope.
BHE* Bath	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BuB Burdett	Moderate: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
BuC Burdett	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope, wetness.	Moderate: wetness.	Moderate: slope, wetness.
BuD Burdett	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Moderate: wetness, slope.	Severe: slope.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ca---------- Canandaigua	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Cc---------- Carlisle	Severe: floods, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness, floods.	Severe: wetness, excess humus.	Severe: excess humus, wetness, floods.
Ce---------- Castile	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
ChA---------- Chenango	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
CnA, CnB---------- Chenango	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
CoB---------- Chenango	Severe: floods.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Severe: small stones.
Cp---------- Chippewa	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
CrA---------- Collamer	Slight----------	Slight----------	Moderate: percs slowly.	Slight----------	Slight.
CrB---------- Collamer	Slight----------	Slight----------	Moderate: slope, percs slowly.	Slight----------	Slight.
CsA, CsB---------- Conesus	Moderate: percs slowly.	Slight----------	Moderate: percs slowly.	Slight----------	Slight.
CsC---------- Conesus	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
DkB---------- Dunkirk	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
DkC---------- Dunkirk	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
DUE3*: Dunkirk----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hudson----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
ErA, ErB---------- Erie	Moderate: wetness, percs slowly.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
ErC---------- Erie	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness.	Severe: slope, wetness.	Moderate: wetness.	Moderate: wetness.
FF*. Fluvaquents-Udifluvents					
FrA, FrB---------- Fremont	Moderate: wetness, percs slowly.	Moderate: wetness.	Severe: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
FrC---------- Fremont	Severe: wetness, slope.	Moderate: wetness, slope.	Severe: slope, wetness.	Moderate: wetness.	Moderate: wetness, slope.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ha Halsey	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
HnB Hornell	Moderate: wetness, percs slowly.	Moderate: wetness.	Severe: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
HnC Hornell	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness.	Severe: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: slope, wetness.
HnD Hornell	Severe: slope.	Severe: slope.	Severe: slope, wetness, percs slowly.	Moderate: slope, wetness.	Severe: slope.
HrA, HrB Howard	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
HrC, HrCK Howard	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, small stones.
HSD* Howard	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope.
HSE* Howard	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
HuB Hudson	Moderate: percs slowly.	Slight	Moderate: percs slowly.	Slight	Slight.
HuC Hudson	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
LnB Lansing	Slight	Slight	Moderate: small stones.	Slight	Slight.
LnC Lansing	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
LnD Lansing	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
LoB Lordstown	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: depth to rock, small stones.
LoC Lordstown	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, depth to rock, small stones.
LoD Lordstown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope.
LTE*, LTF*: Lordstown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LTE*, LTF*: Arnot	Severe: slope.	Severe: slope.	Severe: slope, depth to rock, small stones.	Severe: slope.	Severe: slope, depth to rock.
Ma: Madalin	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
MrB: Mardin	Moderate: percs slowly.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
MrC: Mardin	Moderate: slope, percs slowly.	Moderate: small stones, slope.	Severe: slope, small stones.	Moderate: small stones.	Moderate: small stones, slope.
MrD: Mardin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: small stones, slope.	Severe: slope.
OCF*. Ochrepts-Orthents					
OdA, OdB: Odessa	Moderate: percs slowly, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Pa: Palms	Severe: wetness, floods, excess humus.	Severe: wetness, excess humus.	Severe: wetness, floods, excess humus.	Severe: wetness, excess humus.	Severe: wetness, floods, excess humus.
Ph: Philo	Moderate: floods.	Moderate: floods.	Moderate: floods.	Slight	Moderate: floods.
Pt*. Pits, gravel					
Rh: Red Hook	Moderate: wetness.	Moderate: wetness.	Severe: wetness, small stones.	Moderate: wetness.	Moderate: wetness, small stones.
RnA, RnB: Rhinebeck	Moderate: wetness, percs slowly.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
ROF*: Rock outcrop.					
Arnot	Severe: slope.	Severe: slope.	Severe: slope, depth to rock, small stones.	Severe: slope.	Severe: slope, depth to rock.
ScB3: Schoharie	Moderate: percs slowly.	Moderate: too clayey.	Moderate: percs slowly.	Moderate: too clayey.	Moderate: too clayey.
ScC3: Schoharie	Moderate: percs slowly.	Moderate: slope.	Severe: slope.	Moderate: too clayey.	Moderate: too clayey.
ScD3: Schoharie	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
ShC3: Schoharie Variant	Moderate: percs slowly.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.	Moderate: too clayey, depth to rock.
ShD3: Schoharie Variant	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
SyC---------- Schuyler	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
SyD---------- Schuyler	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
SyE---------- Schuyler	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Te---------- Teel	Moderate: floods.	Moderate: floods.	Moderate: floods.	Slight---------- floods.	Moderate: floods.
TuB---------- Tuller	Severe: wetness.	Severe: wetness.	Severe: depth to rock, wetness, small stones.	Severe: wetness.	Severe: depth to rock, wetness.
TuC---------- Tuller	Severe: wetness.	Severe: wetness.	Severe: slope, depth to rock, small stones.	Severe: wetness.	Severe: depth to rock, wetness.
UD*. Udorthents					
VaB---------- Valois	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
VaC---------- Valois	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
VaD---------- Valois	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
VEE*---------- Valois	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
VHF*: Valois----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Howard----------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
VoA, VoB---------- Volusia	Moderate: wetness, small stones, percs slowly.	Moderate: wetness, small stones.	Severe: small stones, wetness.	Moderate: wetness, small stones.	Moderate: small stones, wetness.
VoC---------- Volusia	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, small stones.	Severe: slope, small stones, wetness.	Moderate: wetness, small stones.	Moderate: slope, small stones, wetness.
VoD---------- Volusia	Severe: slope.	Severe: slope.	Severe: slope, small stones, wetness.	Moderate: slope, wetness, small stones.	Severe: slope.
Wk---------- Wallkill	Severe: floods, wetness.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, floods.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Wy---------- Wayland	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, floods.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Ad---- Alden	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
AnA---- Angola	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
AnB---- Angola	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AnC---- Angola	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ApA---- Appleton	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
ApB---- Appleton	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AQ*. Aquepts and Saprists										
ArB, ArC---- Arnot	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
At---- Atkins	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
AuB---- Aurora	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AuC---- Aurora	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AuD---- Aurora	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BaB---- Bath	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BaC---- Bath	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BaD---- Bath	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BHE*---- Bath	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BuB---- Burdett	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
BuC---- Burdett	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
BuD---- Burdett	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ca---- Canandaigua	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Very poor.	Poor	Good.

See footnote at end of table.

TABLE 14.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Cc---- Carlisle	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Ce---- Castile	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
ChA, CnA, CnB---- Chenango	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CoB---- Chenango	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
Cp---- Chippewa	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
CrA---- Collamer	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
CrB---- Collamer	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CsA---- Conesus	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
CsB---- Conesus	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CsC---- Conesus	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DkB---- Dunkirk	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
DkC---- Dunkirk	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DUE3*:										
Dunkirk----	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Hudson----	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ErA---- Erie	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Fair	Poor	Fair.
ErB---- Erie	Fair	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
ErC---- Erie	Fair	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
FF*. Fluvaquents-Udifluvents										
FrA---- Fremont	Fair	Fair	Good	Good	Good	Fair	Fair	Fair	Fair	Fair.
FrB---- Fremont	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Fair	Poor.
FrC---- Fremont	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
Ha---- Halsey	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.

See footnote at end of table.

TABLE 14.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
HnB---------- Hornell	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HnC---------- Hornell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HnD---------- Hornell	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
HrA, HrB---------- Howard	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Good	Very poor.
HrC, HrCK---------- Howard	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Good	Very poor.
HSD*---------- Howard	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Good	Very poor.
HSE*---------- Howard	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Poor	Good	Very poor.
HuB---------- Hudson	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HuC---------- Hudson	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LnB---------- Lansing	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LnC---------- Lansing	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
LnD---------- Lansing	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
LoB---------- Lordstown	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LoC---------- Lordstown	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LoD---------- Lordstown	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
LTE*:										
Lordstown---------	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Arnot----------	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
LTF*:										
Lordstown---------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Arnot----------	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Ma---------- Madalin	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
MrB---------- Mardin	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
MrC---------- Mardin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.

See footnote at end of table.

TABLE 14.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
MrD---------- Mardin	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
OCF*. Ochrepts-Orthents										
OdA---------- Odessa	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
OdB---------- Odessa	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Pa---------- Palms	Poor	Poor	Poor	Poor	Poor	Good	Good	Fair	Poor	Poor.
Ph---------- Philo	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Pt*. Pits, gravel										
Rh---------- Red Hook	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
RnA---------- Rhinebeck	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
RnB---------- Rhinebeck	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ROF*: Rock outcrop.										
Arnot---------- 	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
ScB3---------- Schoharie	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ScC3---------- Schoharie	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ScD3---------- Schoharie	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ShC3---------- Schoharie Variant	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ShD3---------- Schoharie Variant	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
SyC, SyD, SyE------ Schuyler	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Te---------- Teel	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
TuB---------- Tuller	Very poor.	Poor	Poor	Poor	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.
TuC---------- Tuller	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.
UD*. Udorthents										
VaB---------- Valois	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 14.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
VaC---------- Valois	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
VaD---------- Valois	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
VEE*---------- Valois	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
VHF*:										
Valois----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Howard----------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Good	Very poor.
VoA---------- Volusia	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Fair	Poor	Fair.
VoB---------- Volusia	Fair	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
VoC---------- Volusia	Fair	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
VoD---------- Volusia	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
Wk---------- Wallkill	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Wy---------- Wayland	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ad---------- Alden	0-8	Silt loam-------	ML, OL	A-7, A-5	0	95-100	85-100	70-95	55-85	40-50	5-15
	8-30	Silt loam, silty clay loam, very fine sandy loam.	CL, CL-ML, SM-SC	A-4, A-6	0	95-100	85-100	70-95	40-85	20-35	5-15
	30-50	Gravelly loam, loam.	CL, GC, SC, CL-ML	A-2, A-4, A-6	0-5	60-95	50-90	45-90	30-65	20-35	5-15
AnA, AnB, AnC------ Angola	0-8	Silt loam-------	ML, CL, OL, CL-ML	A-4, A-5, A-6, A-7	0	100	75-100	65-100	55-95	25-45	3-20
	8-27	Silty clay loam, shaly silt loam.	GM-GC, ML, CL	A-4, A-6	0-5	60-100	55-95	45-95	35-90	15-35	3-20
	27	Weathered bedrock.	---	---	---	---	---	---	---	---	---
ApA, ApB---------- Appleton	0-8	Silt loam-------	ML, SM	A-2, A-6, A-7	0-5	85-100	80-95	55-95	30-85	35-45	10-15
	8-34	Loam, silt loam, gravelly sandy clay loam.	CL, SC, GC, CL-ML	A-2, A-4	0-5	65-95	60-95	50-90	30-85	20-30	5-10
	34-60	Loam, gravelly fine sandy loam, gravelly silt loam.	CL, SC, GC, CL-ML	A-4, A-2	0-5	65-95	60-95	40-90	25-85	20-30	5-10
AQ*. Aquepts and Saprists											
ArB, ArC---------- Arnot	0-5	Channery silt loam.	ML, GM, SM	A-4	5-10	65-85	55-80	50-80	40-70	<30	**NP-5
	5-19	Very channery silt loam, channery loam.	GM, GM-GC	A-2, A-4, A-1	10-25	30-60	25-55	20-55	15-50	<30	NP-5
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
At---------- Atkins	0-4	Silt loam-------	ML, CL	A-4, A-6	0	90-100	90-100	75-100	60-95	25-50	2-25
	4-27	Silty clay loam, loam, sandy loam.	SM, SC, ML, CL	A-2, A-4, A-6	0-5	85-100	80-100	50-100	25-85	20-50	1-25
	27-60	Stratified very gravelly silt loam to very gravelly sandy loam.	GM	A-2, A-4, A-6 A-1	0-15	40-60	30-50	20-50	10-45	20-45	1-15
AuB, AuC, AuD------ Aurora	0-6	Channery silt loam.	CL, SC, GC	A-6	0	60-80	55-75	50-75	35-65	30-40	11-20
	6-23	Silty clay loam, shaly silty clay loam, silt loam.	CL	A-6	0-5	65-100	60-90	55-95	55-90	25-35	11-20
	23	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BaB, BaC, BaD, BHE*---------- Bath	0-2	Channery silt loam.	ML, GM, SM, OL	A-2, A-4	5-15	60-95	50-95	40-85	30-80	30-40	5-10
	2-27	Channery loam, channery silt loam.	SM, GM, ML	A-2, A-4	5-10	65-95	50-90	40-85	20-80	20-35	NP-7
	27-52	Channery loam, gravelly sandy loam, very channery silt loam.	GM, GM-GC, CL-ML, SM-SC	A-1, A-2, A-4	10-15	40-90	30-85	30-85	20-75	<25	NP-6
	52-60	Flaggy loam, gravelly silt loam, very channery sandy loam.	GM-GC, CL-ML, GM, SM	A-1, A-2, A-4	10-15	40-90	25-85	20-80	10-75	<25	NP-6
BuB, BuC, BuD------ Burdett	0-8	Silt loam-------	ML	A-4, A-5, A-6, A-7	0	85-95	80-90	70-90	55-80	35-45	5-15
	8-19	Silt loam, very fine sandy loam.	ML, SM, CL, SC	A-4	0-5	85-95	80-90	70-85	40-80	20-30	2-10
	19-32	Shaly clay loam, silty clay loam, shaly loam.	CL, GM-GC, SC, CL-ML	A-4, A-6	5-10	65-85	60-80	50-75	40-65	20-30	5-15
	32-64	Shaly loam, silty clay loam, shaly silt loam.	CL, SC, GC, CL-ML	A-4, A-6	5-10	65-85	60-80	50-75	40-65	20-35	5-15
Ca---------- Canandaigua	0-9	Silt loam-------	ML, OL, MH, OH	A-4, A-5, A-6, A-7	0	95-100	95-100	90-100	85-100	35-55	5-15
	9-38	Silt loam, very fine sandy loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	70-95	20-40	5-15
	38-50	Silt loam, very fine sandy loam, silty clay loam.	ML, CL	A-4	0	95-100	95-100	90-100	70-95	20-30	3-10
Cc---------- Carlisle	0-99	Sapric material	Pt	A-8	---	---	---	---	---	---	---
Ce---------- Castile	0-11	Gravelly silt loam.	ML, GM	A-2, A-4	0-5	55-80	50-75	40-75	30-65	<30	NP-10
	11-42	Very gravelly loam, very gravelly sandy loam, gravelly silt loam.	GM, SM, ML	A-1, A-2, A-4	5-10	40-75	35-70	20-65	10-60	<30	NP-10
	42-50	Stratified sand and gravel to very gravelly loam.	GW, GP, GW-GM, GM	A-1, A-2	5-10	30-55	25-50	15-45	0-35	---	NP

See footnotes at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
ChA---------- Chenango	0-9	Silt loam-------	ML, SM, CL, SC	A-4, A-2	0-5	80-90	75-85	45-85	25-75	<30	NP-10
	9-37	Gravelly silt loam, gravelly fine sandy loam, very gravelly loam.	ML, GM, SM	A-2, A-4, A-1	5-10	35-80	30-75	25-75	15-65	<35	NP-10
	37-50	Very gravelly loamy coarse sand, very gravelly sand, gravelly loamy fine sand.	GW, GM, SM, SP	A-1	5-10	25-65	20-60	10-50	1-20	---	NP
CnA, CnB---------- Chenango	0-9	Gravelly silt loam.	ML, SM, GM	A-2, A-4, A-1	5-15	55-85	55-80	35-80	15-70	<40	NP-10
	9-37	Gravelly silt loam, gravelly fine sandy loam, very gravelly loam.	ML, GM, SM	A-2, A-4, A-1	5-10	35-80	30-75	25-75	15-65	<35	NP-10
	37-50	Very gravelly loamy coarse sand, very gravelly sand, gravelly loamy fine sand.	GW, GM, SM, SP	A-1	5-10	25-65	20-60	10-50	1-20	---	NP
CoB---------- Chenango	0-9	Channery silt loam.	ML, GM, SM	A-2, A-4, A-1	5-15	55-85	55-80	35-80	15-70	<35	NP-10
	9-37	Channery silt loam, channery loam, very gravelly fine sandy loam.	ML, GM, SM	A-2, A-4, A-1	5-20	25-75	20-70	15-70	10-65	<40	NP-10
	37-50	Very gravelly loamy coarse sand, very gravelly sand, gravelly loamy fine sand.	GW, GM, SM, SP	A-1	10-20	25-60	10-55	5-45	0-20	---	NP
Cp---------- Chippewa	0-9	Silt loam-------	ML, OL	A-7, A-5	0-5	80-100	75-100	65-95	55-85	40-50	5-15
	9-15	Channery silt loam, channery loam, channery very fine sandy loam.	GM, ML, CL-ML, SC-SM	A-4	5-10	65-85	60-85	45-85	35-75	25-35	5-10
	15-42	Channery silt loam, channery silty clay loam, very channery loam.	CL, GC, SC, CL-ML	A-2, A-4	10-15	60-80	55-70	45-70	30-65	15-25	5-10
	42-60	Channery silt loam, gravelly loam, very channery loam.	GM, ML, CL-ML, SM	A-2, A-4	10-15	60-80	55-70	45-70	30-65	25-35	5-10

See footnotes at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
CrA, CrB---------- Collamer	0-10	Silt loam-------	CL, CL-ML, SM-SC	A-4	0	95-100	90-100	80-95	65-85	20-30	5-10
	10-16	Silt loam, very fine sandy loam, fine sandy loam.	SC, CL, CL-ML, SM-SC	A-4	0	95-100	95-100	65-95	40-85	20-30	5-10
	16-38	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	75-95	20-30	5-15
	38-50	Stratified silt to very fine sand.	ML, SM	A-4	0	95-100	95-100	70-100	40-90	<15	NP-4
CsA, CsB, CsC------ Conesus	0-7	Silt loam-------	SM-SC, CL, CL-ML	A-4, A-6	0	80-100	75-95	60-90	40-85	25-35	5-15
	7-56	Gravelly silt loam, silty clay loam, gravelly loam.	CL, GC, SC, CL-ML	A-4, A-6	0-5	60-95	55-95	45-90	40-85	20-30	5-15
	56-77	Gravelly loam, gravelly silt loam, very gravelly loam.	CL, GC, SC, CL-ML	A-4, A-2, A-6	5-10	55-90	50-85	40-80	30-60	20-30	5-15
DkB, DkC---------- Dunkirk	0-9	Silt loam-------	SC, CL, CL-ML	A-4	0	95-100	90-100	75-100	45-90	20-30	5-10
	9-14	Silt loam, very fine sandy loam, fine sandy loam.	CL, SC, CL-ML, SM-SC	A-4	0	95-100	90-100	70-100	40-90	20-30	5-10
	14-44	Silt loam, silty clay loam, very fine sandy loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	90-100	60-95	20-30	5-15
	44-64	Stratified silt to very fine sand.	ML, SM	A-4	0	95-100	90-100	70-100	40-95	<15	NP-4
DUE3*:											
Dunkirk----------	0-9	Silt loam-------	SC, CL, CL-ML	A-4	0	95-100	90-100	75-100	45-90	20-30	5-10
	9-14	Silt loam, very fine sandy loam, fine sandy loam.	CL, SC, CL-ML, SM-SC	A-4	0	95-100	90-100	70-100	40-90	20-30	5-10
	14-44	Silt loam, silty clay loam, very fine sandy loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	90-100	60-95	20-30	5-15
	44-64	Stratified silt to very fine sand.	ML, SM	A-4	0	95-100	90-100	70-100	40-95	<15	NP-4
Hudson----------	0-18	Silty clay loam	ML, CL-ML	A-4, A-6, A-7	0	95-100	95-100	85-100	65-95	25-48	5-19
	18-40	Silty clay, silty clay loam.	CL, CH	A-7, A-6	0	95-100	90-100	80-100	80-100	35-65	15-35
	40-60	Silty clay, silt loam, clay.	CL, CH	A-7, A-6	0	95-100	90-100	80-100	60-100	35-65	15-35

See footnotes at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
ErA, ErB, ErC------ Erie	0-9	Silt loam-------	ML, SM	A-2, A-4	0-5	80-90	75-85	50-85	30-75	30-40	5-10
	9-15	Channery fine sandy loam, channery silt loam, channery loam.	GC, SC, CL, CL-ML	A-2, A-4, A-1	5-10	60-80	55-75	40-70	20-65	15-25	5-10
	15-45	Channery silt loam, channery silty clay loam, very channery loam.	CL, GC, SC	A-2, A-6	10-25	55-80	50-70	40-65	30-65	25-35	10-15
	45-55	Channery silt loam, channery silty clay loam, very channery loam.	CL, GC, SC	A-2, A-6	10-25	55-80	50-70	40-65	30-65	25-35	10-15
FF*. Fluvaquents-Udifluvents											
FrA, FrB, FrC------ Fremont	0-5	Silt loam-------	ML, CL, CL-ML	A-6, A-7, A-4	0-10	80-100	75-100	70-100	55-95	25-45	5-20
	5-31	Silt loam, silty clay loam, shaly silty clay loam.	CL	A-6, A-4	0-10	75-100	70-95	65-95	55-85	25-40	10-20
	31-60	Shaly silt loam, shaly silty clay loam, very channery silt loam.	CL, GC, GM, CL-ML	A-6, A-4, A-2	0-10	50-85	40-80	35-75	30-70	25-40	5-15
Ha---------- Halsey	0-10	Mucky silt loam	CL-ML, CL, OL, SM-SC	A-2, A-4	0-2	65-100	55-100	35-90	25-90	20-30	3-10
	10-25	Loam, gravelly fine sandy loam.	SM-SC, CL-ML, CL	A-2, A-4	0-2	60-100	50-100	35-90	20-85	20-30	3-10
	25-51	Gravelly sand, very gravelly loamy sand.	SP, GP, GM, SM	A-1	5-10	30-75	25-70	20-55	0-35	---	NP
HnB, HnC, HnD------ Hornell	0-6	Channery silt loam.	ML, GM, CL, SC	A-6, A-7	0	60-80	55-75	55-75	40-70	35-50	10-20
	6-28	Silty clay, shaly silty clay loam, clay.	ML, GM, SC, CH	A-6, A-7	0-5	60-95	50-90	45-90	35-85	35-55	10-30
	28-39	Shaly silty clay, very shaly silty clay loam, shaly clay.	ML, SC, GM, CH	A-6, A-7	0-5	60-80	50-75	45-75	35-70	35-55	10-30
	39	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
HrA, HrB, HrC, HrCK, HSD*, HSE*--Howard	0-8	Gravelly loam---	SM, GM, ML	A-4, A-2, A-1	0-5	55-80	50-75	30-70	15-65	25-35	5-10
	8-28	Gravelly loam, very gravelly sandy loam, gravelly silt loam.	SC, GC, GM-GC, CL-ML	A-4, A-2, A-1	0-5	45-80	40-75	25-70	10-60	15-25	5-10
	28-36	Very gravelly silt loam, very gravelly sandy clay loam, very gravelly sandy loam.	GC	A-2, A-4	5-10	40-55	35-50	20-45	10-40	30-40	10-20
	36-54	Stratified sand and gravel.	GW, GP	A-1	5-15	35-45	30-40	15-30	0-5	---	NP
HuB, HuC----------Hudson	0-18	Gravelly silt loam.	ML, GM, CL-ML, SM	A-4, A-6, A-7	0	65-90	60-85	55-85	40-80	25-48	5-19
	18-40	Silty clay, silty clay loam.	CL, CH	A-7, A-6	0	95-100	90-100	80-100	80-100	35-65	15-35
	40-60	Silty clay, silt loam, clay.	CL, CH	A-7, A-6	0	95-100	90-100	80-100	60-100	35-65	15-35
LnB, LnC, LnD------Lansing	0-7	Gravelly silt loam.	ML, GM, SM	A-4, A-2	0-5	60-75	55-70	45-65	25-60	25-45	1-15
	7-38	Silt loam, silty clay loam, gravelly loam.	ML, CL, GC, SM-SC	A-4	0-5	55-95	50-90	45-85	40-80	20-30	2-10
	38-50	Gravelly loam, gravelly silt loam, very gravelly loam.	ML, CL, GC, SM	A-4, A-2	5-10	45-80	40-70	40-65	30-60	15-25	2-10
LoB, LoC, LoD------Lordstown	0-4	Channery silt loam.	ML, GM, SM	A-4	5-10	65-85	50-75	50-75	40-65	<30	NP-4
	4-24	Channery silt loam, channery loam.	ML, GM, SM	A-4	5-10	65-85	50-75	50-75	40-65	<30	NP-4
	24-30	Very channery loam, channery silt loam, very channery fine sandy loam.	ML, GM	A-2, A-4	5-25	40-75	30-70	25-70	15-60	<30	NP-4
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LTE*, LTF*: Lordstown----------	0-4	Channery silt loam, channery loam.	ML, GM, SM	A-4	5-10	65-85	50-75	50-75	40-65	<30	NP-4
	4-24	Channery silt loam, channery loam.	ML, GM, SM	A-4	5-10	65-85	50-75	50-75	40-65	<30	NP-4
	24-30	Very channery loam, channery silt loam, very channery fine sandy loam.	ML, GM	A-2, A-4	5-25	40-75	30-70	25-70	15-60	<30	NP-4
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
LTE*, LTF*:											
Arnot	0-5	Channery silt loam, channery loam.	ML, GM, SM	A-4	5-10	60-85	55-80	45-80	40-70	<30	NP-5
	5-19	Very channery silt loam, channery loam.	GM, GM-GC	A-2, A-4, A-1	10-25	30-60	25-55	20-55	15-50	<30	NP-5
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ma	0-8	Silt loam	ML, MH	A-6, A-7	0	95-100	95-100	85-100	65-95	35-55	10-20
Madalin	8-28	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	95-100	95-100	85-100	70-95	45-65	25-35
	28-50	Silty clay, clay, silty clay loam.	CL, CL-ML	A-6, A-4	0	95-100	95-100	85-100	70-95	25-35	5-15
MrB, MrC, MrD	0-8	Channery silt loam.	GM, ML, CL, GC	A-4	5-20	65-85	60-80	50-70	35-60	25-35	5-10
Mardin	8-21	Channery silt loam, channery loam, gravelly loam.	CL, GC, CL-ML, SM-SC	A-4	5-10	60-75	55-70	45-70	35-65	15-25	5-10
	21-51	Channery loam, channery silt loam, very channery loam.	CL, GC, SC, CL-ML	A-2, A-4	10-25	55-75	50-70	40-70	30-65	20-30	5-10
	51-69	Channery loam, channery silt loam, very channery silt loam.	CL, GC, SC, CL-ML	A-2, A-4	10-25	55-75	50-70	40-70	30-65	20-30	5-10
OCF*.											
Ochrepts-Orthents											
OdA, OdB	0-12	Silt loam	CL, ML, OL	A-6, A-7	0	100	95-100	80-100	65-95	35-50	12-20
Odessa	12-28	Silty clay loam, silty clay, clay.	CL, CH, ML	A-7	0	100	95-100	90-100	80-100	40-55	15-30
	28-50	Silty clay, clay, silty clay loam.	CL, CH	A-6, A-7	0	100	95-100	90-100	80-100	30-55	15-30
Pa	0-21	Sapric material	Pt	A-8	---	---	---	---	---	---	---
Palms	21-50	Clay loam, silty clay loam, loam.	CL-ML, CL	A-4, A-6	0	85-100	80-100	70-95	50-90	25-40	5-20
Ph	0-24	Silt loam	ML, SM	A-4	0	95-100	80-100	70-90	45-80	20-40	1-10
Philo	24-50	Gravelly silt loam to very gravelly loam.	GM, SM, ML	A-2, A-4, A-1	0	40-85	35-75	30-75	20-65	20-40	1-10
Pt*.											
Pits, gravel											

See footnotes at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Rh---------- Red Hook	0-9	Gravelly silt loam.	ML, SM, GM, OL	A-1, A-2, A-4	0-5	60-80	55-75	40-75	25-65	20-30	2-4
	9-28	Silt loam, loam, very gravelly sandy loam.	ML, SM, GM, GP-GM	A-1, A-2, A-4	0-5	30-90	25-85	15-80	10-70	20-30	2-4
	28-50	Gravelly loam, gravelly silt loam, very gravelly sandy loam.	GM, SM, GP-GM	A-1, A-2, A-4	5-10	30-65	25-60	15-55	10-50	20-30	2-4
RnA, RnB---------- Rhinebeck	0-6	Gravelly silt loam.	ML, MH, CL, GC	A-6, A-7	0	70-80	65-75	60-75	45-70	30-55	10-25
	6-14	Silty clay loam, silty clay.	CH, CL	A-7	0	90-100	85-100	80-100	70-95	45-65	25-35
	14-42	Silty clay loam, silty clay.	CH, CL	A-7	0	90-100	85-100	80-100	70-95	45-65	25-35
	42-54	Stratified silt and very fine sand to silty clay.	ML, CL	A-4	0	90-100	85-100	65-100	55-95	10-30	NP-10
ROF*: Rock outcrop.											
Arnot---------- Channery silt loam.	0-5		ML, GM, SM	A-4	5-10	60-85	55-80	45-80	40-70	<30	NP-5
Very channery silt loam, channery loam.	5-19		GM, GM-GC	A-2, A-4, A-1	10-25	30-60	25-55	20-55	15-50	<30	NP-5
Unweathered bedrock.	19		---	---	---	---	---	---	---	---	---
ScB3, ScC3, ScD3--- Schoharie	0-4	Silty clay loam	ML, CL	A-6, A-7	0	100	95-100	80-100	65-95	35-50	12-20
	4-33	Silty clay, clay, silty clay loam.	CL	A-6, A-7	0	100	95-100	90-100	80-100	30-45	12-20
	33-60	Silty clay, clay, silty clay loam.	CL	A-6	0	100	95-100	90-100	80-100	20-35	12-20
ShC3, ShD3--------- Schoharie Variant	0-6	Silty clay loam	ML, CL	A-6, A-7	0	100	95-100	80-100	80-95	35-50	12-20
	6-24	Silty clay loam, silty clay, clay.	CL	A-6, A-7	0	100	95-100	90-100	80-100	30-45	12-20
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
SyC, SyD, SyE------ Schuyler	0-9	Silt loam-------	CL, SC, CL-ML, SM-SC	A-2, A-4, A-6	0-5	80-95	75-90	55-85	30-80	25-40	5-20
	9-38	Very channery loam, channery silt loam, silty clay loam.	CL-ML, CL, SC, GC	A-4, A-6	5-15	55-95	50-90	40-85	20-80	25-40	5-20
	38-50	Channery loam, channery silt loam, silty clay loam.	SC, CL, GM-GC, CL-ML	A-2, A-6	5-15	40-90	30-85	30-85	20-75	25-40	5-20

See footnotes at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Te---------- Teel	0-10	Silt loam-------	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	60-90	15-35	2-15
	10-44	Silt loam, very fine sandy loam.	ML, CL-ML, CL	A-4, A-6	0	100	95-100	80-100	50-90	15-35	2-15
	44-50	Silt loam, fine sandy loam, gravelly very fine sandy loam.	ML, SM, CL, SM-SC	A-4, A-6	0-5	75-100	70-100	50-100	30-90	<25	NP-15
TuB, TuC---------- Tuller	0-7	Channery silt loam.	ML, GM, SM	A-2, A-4	5-10	55-75	50-70	40-70	30-60	30-40	2-7
	7-18	Very channery silt loam, very channery loam.	GM, GM-GC	A-2, A-4, A-1	10-20	40-55	35-50	30-50	20-40	20-30	2-7
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
UD*. Udorthents											
VaB, VaC, VaD, VEE*---------- Valois	0-6	Gravelly silt loam.	ML, GM, SM	A-4, A-2, A-1	0-2	60-80	55-70	35-70	20-65	<25	NP-5
	6-45	Gravelly loam, gravelly silt loam, gravelly sandy loam.	GM, ML, SM	A-4, A-2, A-1	0-10	60-75	55-70	40-70	20-60	<25	NP-5
	45-60	Gravelly sandy loam, very gravelly loam.	GM, SM, GW-GM, SM-SC	A-1, A-2	0-15	40-75	30-70	15-45	10-35	<25	NP-7
VHF*: Valois----------	0-6	Gravelly silt loam.	ML, GM, SM	A-4, A-2, A-1	0-2	60-80	55-70	35-70	20-65	<25	NP-5
	6-45	Gravelly loam, gravelly silt loam, gravelly sandy loam.	GM, ML, SM	A-4, A-2, A-1	0-10	60-75	55-70	40-70	20-60	<25	NP-5
	45-60	Gravelly sandy loam, very gravelly loam.	GM, SM, GW-GM, SM-SC	A-1, A-2	0-15	40-75	30-70	15-45	10-35	<25	NP-7
Howard----------	0-8	Gravelly loam---	SM, GM, ML	A-4, A-2, A-1	0-5	55-80	50-75	30-70	15-65	25-35	5-10
	8-28	Gravelly loam, very gravelly sandy loam, gravelly silt loam.	GC, GM-GC, SC, CL-ML	A-4, A-2, A-1	0-5	45-80	40-75	25-70	10-60	15-25	5-10
	28-36	Very gravelly loam, very gravelly sandy clay loam, very gravelly sandy loam.	GC	A-2, A-4	5-10	40-55	35-50	20-45	10-40	30-40	5-20
	36-54	Stratified sand and gravel.	GW, GP, GW-GM	A-1	5-15	35-45	30-40	15-30	0-5	---	NP

See footnotes at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
VoA, VoB, VoC, VoD-- Volusia	0-6	Channery silt loam.	GM, ML, SM, OL	A-4	5-10	70-85	65-80	55-80	40-70	30-40	5-10
	6-13	Channery silt loam, very channery loam.	CL-ML, CL, GM-GC, SC	A-4	5-10	65-90	60-85	50-85	35-75	15-25	5-10
	13-60	Channery silt loam, channery loam, silty clay loam.	GM-GC, CL, SC, CL-ML	A-4	10-25	75-90	70-85	60-85	40-80	20-30	5-10
Wk---------- Wallkill	0-5	Silt loam-------	ML, SM, OL	A-5, A-7	0	95-100	90-100	70-100	40-90	40-50	5-15
	5-18	Silt loam, loam	CL, CL-ML	A-4	0	75-100	70-100	60-100	40-90	15-25	5-10
	18-38	Sapric material	Pt	A-8	0	---	---	---	---	---	---
Wy---------- Wayland	0-6	Silt loam-------	ML, OL	A-7, A-5	0	100	95-100	90-100	70-95	40-50	5-15
	6-50	Silt loam, silty clay loam.	ML, CL, CL-ML	A-6, A-4	0	100	95-100	90-100	70-95	25-40	5-15

* See description of the map unit for composition and behavior characteristics of the map unit.
** NP means nonplastic.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
Ad	0-8	0.6-2.0	0.16-0.22	6.1-7.3	Low	---	---
Alden	8-30	0.2-0.6	0.14-0.20	6.1-7.3	Low	---	
	30-50	0.2-0.6	0.08-0.15	6.6-8.4	Low	---	
AnA, AnB, AnC	0-8	0.6-2.0	0.17-0.22	6.1-7.3	Low	0.37	3-2
Angola	8-27	0.06-0.2	0.11-0.19	5.6-7.8	Low	0.28	
	27	---	---	---	---	---	
ApA, ApB	0-8	0.6-2.0	0.12-0.20	5.6-7.3	Low	0.32	3
Appleton	8-34	0.06-0.6	0.07-0.18	5.6-7.8	Low	0.37	
	34-60	0.06-0.6	0.07-0.18	7.4-8.4	Low	0.37	
AQ*. Aquepts and Saprists							
ArB, ArC	0-5	0.6-2.0	0.10-0.15	3.6-6.0	Low	0.24	2-1
Arnot	5-19	0.6-2.0	0.08-0.12	3.6-6.0	Low	0.17	
	19	---	---	---	---	---	
At	0-4	0.6-2.0	0.14-0.22	4.5-5.5	Low	---	---
Atkins	4-27	0.06-2.0	0.14-0.18	4.5-5.5	Low	---	
	27-60	2.0-20.0	0.08-0.12	4.5-6.0	Low	---	
AuB, AuC, AuD	0-6	0.6-2.0	0.16-0.21	5.6-7.3	Low	0.37	3
Aurora	6-23	0.06-0.2	0.13-0.20	5.6-7.3	Low	0.28	
	23	---	---	---	---	---	
BaB, BaC, BaD, BHE*	0-2	0.6-2.0	0.10-0.20	4.5-6.0	Low	0.24	3
Bath	2-27	0.6-2.0	0.08-0.18	4.5-6.0	Low	0.28	
	27-52	<0.2	0.01-0.06	4.5-6.5	Low	0.28	
	52-60	<0.2	0.01-0.06	5.1-7.3	Low	0.28	
BuB, BuC, BuD	0-8	0.6-2.0	0.15-0.20	5.1-7.3	Low	0.37	3-2
Burdett	8-19	0.6-2.0	0.13-0.18	5.1-7.3	Low	0.37	
	19-32	0.06-0.2	0.08-0.14	6.1-7.3	Low	0.28	
	32-64	0.06-0.2	0.08-0.14	6.1-8.4	Low	0.28	
Ca	0-9	0.6-2.0	0.20-0.35	6.1-7.3	Low	---	3
Canandaigua	9-38	0.2-0.6	0.19-0.20	6.1-7.3	Low	---	
	38-50	0.2-0.6	0.19-0.20	6.6-8.4	Low	0.49	
Cc	0-99	0.6-6.0	0.35-0.45	5.6-7.3	---	---	---
Carlisle							
Ce	0-11	0.6-2.0	0.09-0.16	4.5-6.0	Low	0.24	3
Castile	11-42	2.0-6.0	0.05-0.13	4.5-6.0	Low	0.20	
	42-50	>6.0	0.01-0.02	5.1-7.3	Low	0.17	
ChA	0-9	0.6-6.0	0.11-0.19	4.5-5.5	Low	0.37	3
Chenango	9-37	0.6-6.0	0.05-0.14	4.5-6.0	Low	0.20	
	37-50	6.0-20	0.01-0.03	5.1-6.5	Low	0.17	
CnA, CnB, CoB	0-9	0.6-6.0	0.08-0.15	4.5-5.5	Low	0.24	3
Chenango	9-37	0.6-6.0	0.05-0.14	4.5-6.0	Low	0.20	
	37-50	6.0-20	0.01-0.03	5.1-6.5	Low	0.17	
Cp	0-9	0.6-2.0	0.14-0.21	4.5-6.5	Low	0.32	3
Chippewa	9-15	0.6-2.0	0.10-0.17	4.5-6.5	Low	0.43	
	15-42	<0.2	0.01-0.02	5.1-7.3	Low	0.28	
	42-60	<0.2	0.01-0.02	5.6-8.4	Low	0.28	

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
CrA, CrB--------- Collamer	0-10 10-16 16-38 38-50	0.6-2.0 0.6-2.0 0.2-0.6 0.2-0.6	0.14-0.21 0.14-0.20 0.16-0.20 0.12-0.20	5.1-7.3 5.6-7.3 5.6-7.8 6.1-8.4	Low---------- Low---------- Low---------- Low----------	0.49 0.43 0.43 0.64	3
CsA, CsB, CsC---- Conesus	0-7 7-56 56-77	0.6-2.0 0.6-2.0 0.06-0.2	0.15-0.20 0.09-0.19 0.08-0.16	5.1-7.3 5.1-7.3 7.4-8.4	Low---------- Low---------- Low----------	0.32 0.37 0.28	3
DkB, DkC--------- Dunkirk	0-9 9-14 14-44 44-64	0.6-2.0 0.6-2.0 0.2-0.6 0.2-0.6	0.16-0.21 0.16-0.20 0.16-0.20 0.12-0.20	5.1-7.3 5.1-7.3 5.6-7.8 6.1-8.4	Low---------- Low---------- Low---------- Low----------	0.49 0.43 0.43 0.64	3
DUE3*: Dunkirk--------- Hudson---------- 	0-9 9-14 14-44 44-64 0-18 18-40 40-60	0.6-2.0 0.6-2.0 0.2-0.6 0.2-0.6 0.2-2.0 0.06-0.2 0.06-0.2	0.16-0.21 0.16-0.20 0.16-0.20 0.12-0.20 0.16-0.21 0.13-0.17 0.12-0.20	5.1-7.3 5.1-7.3 5.6-7.8 6.1-8.4 5.6-7.3 5.6-7.3 6.6-8.4	Low---------- Low---------- Low---------- Low---------- Moderate------- Moderate------- Moderate-------	0.49 0.43 0.43 0.64 0.49 0.28 0.28	3 3
ErA, ErB, ErC---- Erie	0-9 9-15 15-45 45-55	0.6-2.0 0.6-2.0 0.06-0.2 0.06-0.2	0.12-0.19 0.09-0.16 0.01-0.03 0.01-0.03	5.1-6.0 5.1-7.3 5.1-7.3 5.6-8.4	Low---------- Low---------- Low---------- Low----------	0.37 0.28 0.28 0.28	3
FF*. Fluvaquents- Udifluvents							
FrA, FrB, FrC---- Fremont	0-5 5-31 31-60	0.6-2.0 0.2-2.0 <0.2	0.17-0.21 0.12-0.19 0.11-0.16	4.5-6.0 4.5-6.0 5.6-7.3	Low---------- Low---------- Low----------	0.37 0.37 0.28	3
Ha--------------- Halsey	0-10 10-25 25-51	0.6-2.0 0.6-2.0 6.0-20	0.14-0.24 0.12-0.18 0.02-0.07	5.6-7.3 5.6-7.3 6.6-7.8	Low---------- Low---------- Low----------	0.24 0.32 ---	5
HnB, HnC, HnD---- Hornell	0-6 6-28 28-39 39	0.6-2.0 0.2-0.6 <0.06 ---	0.16-0.21 0.11-0.13 0.07-0.13 ---	4.5-6.0 4.5-6.0 4.5-6.0 ---	Low---------- Moderate------- Moderate------- ---	0.43 0.28 0.28 ---	3
HrA, HrB, HrC, HrCK, HSD*, HSE*---------- Howard	0-8 8-28 28-36 36-54	0.6-6.0 0.6-6.0 0.6-6.0 >20.	0.07-0.15 0.06-0.12 0.05-0.08 0.01-0.02	5.6-7.3 5.6-7.3 5.6-7.3 7.4-8.4	Low---------- Low---------- Low---------- Low----------	0.24 0.20 0.20 0.17	3
HuB, HuC--------- Hudson	0-18 18-40 40-60	0.2-2.0 0.06-0.2 0.06-0.2	0.16-0.21 0.13-0.17 0.12-0.20	5.6-7.3 5.6-7.3 6.6-8.4	Moderate------- Moderate------- Moderate-------	0.49 0.28 0.28	3
LnB, LnC, LnD---- Lansing	0-7 7-38 38-50	0.6-2.0 0.6-2.0 0.06-0.2	0.10-0.16 0.09-0.19 0.08-0.16	5.1-6.5 5.1-7.3 7.4-8.4	Low---------- Low---------- Low----------	0.28 0.37 0.28	3
LoB, LoC, LoD---- Lordstown	0-4 4-24 24-30 30	0.6-2.0 0.6-2.0 0.6-2.0 ---	0.11-0.17 0.10-0.16 0.05-0.14 ---	4.5-6.0 4.5-6.0 4.5-6.0 ---	Low---------- Low---------- Low---------- ---	0.24 0.28 0.28 ---	3

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
LTE*, LTF*:							
Lordstown	0-4	0.6-2.0	0.11-0.17	4.5-6.0	Low	0.20	3
	4-24	0.6-2.0	0.10-0.16	4.5-6.0	Low	0.28	
	24-30	0.6-2.0	0.05-0.14	4.5-6.0	Low	0.28	
	30	---	---	---	---	---	
Arnot	0-5	0.6-2.0	0.10-0.15	4.5-6.0	Low	0.24	2-1
	5-19	0.6-2.0	0.08-0.12	4.5-6.0	Low	0.17	
	19	---	---	---	---	---	
Ma	0-8	0.2-0.6	0.16-0.21	5.6-7.3	Moderate	---	---
Madalin	8-28	0.06-0.2	0.12-0.13	5.6-7.8	Moderate	---	
	28-50	<0.2	0.12-0.13	7.4-8.4	Moderate	---	
MrB, MrC, MrD	0-8	0.6-2.0	0.11-0.17	3.6-6.5	Low	0.24	3
Mardin	8-21	0.6-2.0	0.09-0.16	3.6-6.5	Low	0.28	
	21-51	<0.2	0.01-0.03	5.1-7.3	Low	0.28	
	51-69	<0.2	0.01-0.03	5.1-8.4	Low	0.28	
OdA, OdB	0-12	0.2-0.6	0.17-0.21	5.6-7.3	Moderate	0.49	3
Odessa	12-28	<0.2	0.12-0.17	5.6-7.8	Moderate	0.28	
	28-50	<0.06	0.12-0.14	7.4-8.4	Moderate	0.28	
OCF*. Ochrepts-Orthents							
Pa	0-21	0.6-6.0	0.35-0.45	5.1-7.3	---	---	---
Palms	21-50	0.2-2.0	0.14-0.22	6.1-8.4	Low	---	
Ph	0-24	0.2-2.0	0.12-0.20	4.5-6.0	Low	---	---
Philo	24-50	2.0-20.0	0.06-0.10	4.5-6.0	Low	---	
Pt*. Pits, gravel							
Rh	0-9	0.6-2.0	0.09-0.12	5.1-6.5	Low	0.20	3
Red Hook	9-28	0.6-2.0	0.04-0.17	5.1-6.5	Low	0.43	
	28-50	0.6-6.0	0.04-0.11	5.6-7.3	Low	0.43	
RnA, RnB	0-6	0.2-0.6	0.16-0.21	5.6-7.3	Moderate	0.37	3
Rhinebeck	6-14	0.06-0.2	0.12-0.14	5.6-7.8	Moderate	0.28	
	14-42	0.06-0.2	0.12-0.14	6.1-8.4	Moderate	0.28	
	42-54	0.06-0.2	0.12-0.15	7.4-8.4	Low	0.28	
ROF*: Rock outcrop.							
Arnot	0-5	0.6-2.0	0.10-0.15	4.5-6.0	Low	0.24	2-1
	5-19	0.6-2.0	0.08-0.12	4.5-6.0	Low	0.17	
	19	---	---	---	---	---	
ScB3, ScC3, ScD3-	0-4	0.2-0.6	0.17-0.21	5.6-7.3	Moderate	0.49	3
Schoharie	4-33	<0.2	0.12-0.17	5.6-7.8	Moderate	0.28	
	33-60	<0.2	0.12-0.14	7.4-8.4	Moderate	0.28	
ShC3, ShD3	0-6	0.2-0.6	0.17-0.21	5.6-7.3	Moderate	0.49	3
Schoharie Variant	6-24	<0.2	0.12-0.17	5.6-7.3	Moderate	0.28	
	24	---	---	---	---	---	
SyC, SyD, SyE	0-9	0.6-2.0	0.12-0.19	3.6-6.0	Low	0.37	3
Schuyler	9-38	0.2-2.0	0.11-0.18	3.6-6.0	Low	0.37	
	38-50	0.06-0.2	0.09-0.18	3.6-6.0	Low	0.28	
Te	0-10	0.6-2.0	0.18-0.21	5.6-7.3	Low	---	---
Teel	10-44	0.6-2.0	0.17-0.19	5.6-7.3	Low	---	
	44-50	0.6-2.0	0.12-0.19	6.6-7.8	Low	---	

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
TuB, TuC----------	0-7	0.6-2.0	0.09-0.15	4.5-5.5	Low----------	0.24	2-1
Tuller	7-18	0.06-0.6	0.06-0.10	4.5-6.0	Low----------	0.17	
	18	---	---	---	----------	---	
UD*.							
Udorthents							
VaB, VaC, VaD,							
VEE*----------	0-6	0.6-2.0	0.08-0.16	4.5-5.5	Low----------	0.24	3
Valois	6-45	0.6-2.0	0.07-0.14	4.5-6.0	Low----------	0.28	
	45-60	0.6-6.0	0.03-0.09	5.1-7.3	Low----------	0.20	
VHF*:							
Valois----------	0-6	0.6-2.0	0.08-0.16	4.5-5.5	Low----------	0.24	3
	6-45	0.6-2.0	0.07-0.14	4.5-6.0	Low----------	0.28	
	45-60	0.6-6.0	0.03-0.09	5.1-7.3	Low----------	0.20	
Howard----------	0-8	0.6-6.0	0.07-0.15	5.6-7.3	Low----------	0.24	3
	8-28	0.6-6.0	0.06-0.12	5.6-7.3	Low----------	0.20	
	28-36	0.6-6.0	0.05-0.08	5.6-7.3	Low----------	0.20	
	36-54	>20.	0.01-0.02	7.4-8.4	Low----------	0.17	
VoA, VoB, VoC,							
VoD----------	0-6	0.6-2.0	0.11-0.17	4.5-6.5	Low----------	0.24	3
Volusia	6-13	0.6-2.0	0.09-0.16	4.5-6.5	Low----------	0.28	
	13-60	<0.2	0.01-0.02	5.1-7.8	Low----------	0.28	
Wk----------	0-5	0.6-2.0	0.16-0.21	6.1-7.3	Low----------	---	---
Wallkill	5-18	0.6-2.0	0.15-0.20	6.1-7.3	Low----------	---	
	18-38	2.0-20	0.19-0.22	5.6-7.8	Low----------	---	
Wy----------	0-6	0.2-2.0	0.17-0.22	5.6-7.8	Low----------	---	---
Wayland	6-50	0.06-0.2	0.16-0.20	5.6-7.8	Low----------	---	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

[The definitions of "flooding" and "water table" in the Glossary explain terms such as "rare," "brief," "apparent," and "perched." The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Ad---------- Alden	D	None--------	---	---	0-0.5	Perched	Nov-Jun	>60	---	High-----	High-----	Low.
AnA, AnB, AnC----- Angola	C	None--------	---	---	0.5-1.5	Perched	Dec-May	20-40	Rippable	High-----	High-----	Low.
ApA, ApB---------- Appleton	C	None--------	---	---	0.5-1.5	Perched	Dec-May	>60	---	High-----	High-----	Low.
AQ*. Aquepts and Saprists												
ArB, ArC---------- Arnot	C/D	None--------	---	---	1.0-1.5	Perched	Mar-May	10-20	Hard	Moderate	Low------	High.
At---------- Atkins	D	Common------	Very brief	Sep-Jul	0-1.0	Apparent	Nov-Jun	>60		High-----	High-----	Moderate.
AuB, AuC, AuD----- Aurora	C	None--------	---	---	1.5-2.0	Perched	Mar-May	20-40	Rippable	Moderate	Moderate	Low.
BaB, BaC, BaD, BHE*---------- Bath	C	None--------	---	---	2.0-4.0	Perched	Jan-Mar	>60	---	Moderate	Moderate	Moderate.
BuB, BuC, BuD----- Burdett	C	None--------	---	---	0.5-1.5	Perched	Dec-May	>60	---	High-----	High-----	Low.
Ca---------- Canandaigua	D	None--------	---	---	0-1.0	Apparent	Nov-May	>60	---	High-----	High-----	Low.
Cc---------- Carlisle	A/D	Frequent----	Long------	Nov-May	0-1.0	Apparent	Sep-Jun	>60	---	High-----	High-----	Low.
Ce---------- Castile	B	None--------	---	---	1.5-2.0	Apparent	Mar-May	>60	---	Moderate	Moderate	Moderate.
ChA, CnA, CnB----- Chenango	A	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
CoB---------- Chenango	A	Rare--------	---	---	3.0-6.0	Apparent	Mar-Apr	>60	---	Moderate	Low------	Moderate.
Cp---------- Chippewa	D	None--------	---	---	0.0-0.5	Perched	Nov-May	>60	---	Moderate	High-----	Moderate.
CrA, CrB---------- Collamer	C	None--------	---	---	1.5-2.0	Perched	Mar-May	>60	---	High-----	Moderate	Low.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
CsA, CsB, CsC----- Conesus	B	None--------	---	---	1.5-2.0	Perched	Mar-May	>60	---	Moderate	Moderate	Low.
DkB, DkC---------- Dunkirk	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Low.
DUE3*: Dunkirk----------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Low.
Hudson----------	C	None--------	---	---	1.5-2.0	Perched	Mar-May	>60	---	Moderate	High-----	Low.
ErA, ErB, ErC----- Erie	C	None--------	---	---	0.5-1.5	Perched	Dec-May	>60	---	High-----	High-----	Moderate.
FF*. Fluviquents-Udifluvents												
FrA, FrB, FrC----- Fremont	C	None--------	---	---	0.5-1.5	Perched	Dec-May	>40	Rippable	High-----	High-----	High.
Ha---------- Halsey	D	None to frequent.	Brief-----	Sep-Apr	0-0.5	Apparent	Sep-Jun	>60	---	High-----	High-----	Low.
HnB, HnC, HnD----- Hornell	D	None--------	---	---	0.5-1.5	Perched	Dec-May	20-40	Rippable	Moderate	High-----	High.
HrA, HrB, HrC, HrCK, HSD*, HSE*- Howard	A	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Low.
HuB, HuC---------- Hudson	C	None--------	---	---	1.5-2.0	Perched	Mar-May	>60	---	Moderate	High-----	Low.
LnB, LnC, LnD----- Lansing	B	None--------	---	---	3.0-6.0	Perched	Mar-May	>60	---	Moderate	Low------	Moderate.
LoB, LoC, LoD----- Lordstown	C	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	Low------	High.
LTE*, LTF*: Lordstown--------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	Low------	High.
Arnot----------	C/D	None--------	---	---	1.0-1.5	Perched	Mar-May	10-20	Hard	Moderate	Low------	High.
Ma---------- Madalin	D	None--------	---	---	0-0.5	Apparent	Nov-Jun	>60	---	Moderate	High-----	Low.
MrB, MrC, MrD----- Mardin	C	None--------	---	---	1.5-2.0	Perched	Mar-May	>60	---	Moderate	Moderate	Moderate.
OdA, OdB---------- Odessa	D	None--------	---	---	0.5-1.5	Perched	Dec-May	>60	---	Moderate	High-----	Low.
OCF*. Ochrepts-Orthents												
Pa---------- Palms	A/D	Frequent----	Long------	Nov-May	0-1.0	Apparent	Nov-May	>60	---	High-----	High-----	Moderate.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Ph---------- Philo	B	Common------	Brief	Jan-May	1.5-3.0	Apparent	Jan-Apr	>60	--------	Moderate	Low------	High.
Pt*. Pits, gravel												
Rh---------- Red Hook	C	None to rare	---	---	0.5-1.5	Apparent	Dec-May	>60	---	High-----	High-----	Moderate.
RnA, RnB---------- Rhinebeck	D	None--------	---	---	0.5-1.5	Perched	Dec-May	>60	---	Moderate	High-----	Low.
ROF*: Rock outcrop.												
Arnot----------	C/D	None--------	---	---	1.0-1.5	Perched	Apr-May	10-20	Hard	Moderate	Low------	High.
ScB3, ScC3, ScD3-- Schoharie	C	None--------	---	---	1.5-3.0	Perched	Mar-May	>60	---	Moderate	High-----	Low.
ShC3, ShD3-------- Schoharie Variant	C	None--------	---	---	1.5-3.0	Perched	Mar-May	20-40	Hard	Moderate	High-----	Low.
SyC, SyD, SyE----- Schuyler	C	None--------	---	---	1.5-2.0	Perched	Mar-May	>60	---	High-----	Moderate	Moderate.
Te---------- Teel	B	Common------	Brief-----	Nov-May	0.5-2.0	Apparent	Jan-May	>60	---	High-----	Moderate	Low.
TuB, TuC---------- Tuller	D	None--------	---	---	0.5-1.0	Perched	Dec-Jun	10-20	Hard	High-----	High-----	High.
UD*. Udorthents												
VaB, VaC, VaD, VEE*---------- Valois	B	None--------	---	---	3.0-6.0	---	---	>60	---	Moderate	Low------	High.
VHF*: Valois----------	B	None--------	---	---	3.0-6.0	---	---	>60	---	Moderate	Low------	High.
Howard----------	A	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Low.
VoA, VoB, VoC, VoD---------- Volusia	C	None--------	---	---	0.5-1.5	Perched	Dec-May	>60	---	High-----	High-----	Moderate.
Wk---------- Wallkill	D	Frequent----	Long------	Nov-Jun	0-0.5	Apparent	Nov-Jun	>60	---	High-----	Moderate	Moderate.
Wy---------- Wayland	D	Frequent----	Brief to long.	Nov-Jun	0-0.5	Apparent	Nov-Jun	>60	---	High-----	High-----	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--ENGINEERING TEST DATA

[Dashes indicate data were not available]

Soil name, report number, horizon, and depth in inches	Classification		Grain size distribution										Liquid limit	Plasticity index	Moisture density		Linear shrinkage
			Larger than 3 inches	Percentage passing sieve--						Percentage smaller than--					Max. dry density	Optimum moisture	
	AASHTO	Unified		2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm				
			Pct											Pct		Lb/Ft3	Pct	Pct
Angola sil[1]: (S73NY-049-010)																	
Ap------- 0 to 8	A-5 (04)	ML	0	100	95	90	87	84	78	66	38	16	7	45	4	95	23	6.0
A2------- 8 to 18	A-4 (00)	GM-GC	10	89	70	62	56	53	48	39	23	11	7	25	4	122	12	3.0
B22t-----18 to 27	A-4 (01)	GC	15	92	80	74	69	64	57	47	31	17	12	27	9	122	12	6.0
Bath cn-sil[2]: (S73NY-049-008)																	
B21------ 2 to 11	A-4 (00)	SM	0	97	88	81	73	64	54	41	24	12	6	26	2	116	14	3.0
B22------11 to 22	A-2-4(00)	GM	0	93	82	75	66	56	46	34	23	11	6	24	2	120	12	3.0
B'x------27 to 52	A-2-4(00)	SM	5	99	87	78	67	57	46	33	19	10	5	17	1	131	9	2.0
C--------52 to 60	A-2-4(00)	SM	5	98	85	75	67	59	47	34	22	12	7	20	3	132	9	3.2
Conesus sil[3]: (S73NY-049-001)																	
Ap------- 0 to 7	A-4 (03)	ML	2	96	91	87	82	78	71	62	37	22	12	34	7	106	18	0.0
B&A------ 7 to 16	A-4 (01)	CL-ML	2	97	87	83	77	72	67	60	43	27	19	26	6	117	15	0.0
B21t-----16 to 32	A-6 (05)	CL	2	97	91	87	83	78	72	64	44	28	18	30	11	117	14	0.0
B22t-----32 to 41	A-6 (08)	CL	2	99	94	90	86	82	76	69	49	31	21	34	14	116	14	0.0
C2-------45 to 56	A-4 (02)	CL-ML	2	100	97	97	96	95	94	87	39	16	9	23	5	116	15	0.0
IIC3-----56 to 77	A-4 (01)	GM-GC	2	96	85	79	73	66	58	50	34	18	10	24	7	124	11	0.0
Fremont sil[4]: (S73NY-049-006)																	
Ap------- 0 to 5	A-4 (01)	CL-ML	0	100	99	98	92	80	64	51	24	14	7	28	6	117	13	3.6
B21------ 5 to 13	A-4 (08)	ML	0	98	93	90	88	86	83	80	54	29	20	37	10	103	18	4.4
B22g-----13 to 31	A-6 (11)	CL	0	99	96	94	90	85	79	76	61	36	25	39	15	113	16	8.0
C--------31 to 60	A-6 (02)	GC	10	92	86	80	69	57	48	44	33	23	12	32	12	126	11	7.4

See footnotes at end of table.

TABLE 18.--ENGINEERING TEST DATA--Continued

Soil name, report number, horizon, and depth in inches	Classification		Grain size distribution										Liquid limit	Plasticity index	Moisture density		Linear shrinkage
			Larger than 3 inches	Percentage passing sieve--						Percentage smaller than--					Max. dry density	Optimum moisture	
	AASHTO	Unified		2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			Lb/Ft^3	Pct	Pct
Hornell cn-sil[5]: (S73NY-049-011)			Pct											Pct				
Ap------- 0 to 6	A-5 (05)	ML	0	97	90	83	77	71	63	57	39	16	8	48	10	100	20	5.2
B21------ 8 to 14	A-6 (10)	ML	0	100	95	90	86	83	77	73	60	38	24	40	14	107	19	7.6
B22------14 to 28	A-7-6(20)	CH	0	99	93	89	86	83	77	74	65	44	29	55	26	104	21	9.0
Mardin cn-sil[6]: (S73NY-049-004)																		
Ap------- 0 to 8	A-4 (00)	GM	2	99	89	81	73	66	57	49	30	15	8	27	5	110	16	2.8
B21------ 8 to 18	A-4 (00)	SM-SC	2	96	84	77	69	59	45	37	24	13	7	23	4	123	12	3.0
B'x------21 to 51	A-4 (01)	SC	10	98	87	80	74	67	55	47	31	17	10	27	8	126	11	3.6
C--------51 to 69	A-4 (00)	SM-SC	5	96	84	79	70	61	49	41	19	9	5	24	5	126	11	3.0
Schoharie sicl[7]: (S73NY-049-005)																		
Ap------- 0 to 4	A-6 (14)	CL	0	100	100	100	100	98	98	95	62	38	27	37	14	98	23	6.6
B21t----- 4 to 16	A-7-6(20)	CL	0	100	100	100	100	99	98	96	82	56	40	42	19	103	22	9.0
B22t-----16 to 33	A-7-6(23)	CL	0	100	100	100	100	100	99	98	90	59	42	44	21	106	20	0.0
C--------33 to 60	A-6 (17)	CL	0	100	100	100	100	99	99	98	81	52	33	36	17	107	20	8.0

[1]Angola sandy loam:
Town of Dix, 1.1 mi. west of Meads Hill Rd., 300 ft. north of Co. Rt. 16.
[2]Bath channery sandy loam:
Town of Orange, 100 ft. south of Sugar Hill Rd., 200 ft. east of Grandview Rd.
[3]Conesus sandy loam:
Town of Catharine, 50 ft. west of Co. Rt. 10, 0.4 mi. south of NY-224.
[4]Fremont sandy loam:
Town of Orange, 50 ft. east of Groundry Hill Rd., 0.4 mi. west of Switzer Hill Rd.
[5]Hornell channery sandy loam:
Town of Catharine, 2.3 mi. north of Co. Rt. 7, 25 ft. east of Upper Footes Hill Rd.
[6]Mardin channery sandy loam:
Town of Hector, 0.4 mi. north of Covert Rd., 100 ft. west of Co. Rt. 4.
[7]Schoharie silty clay loam:
Town of Montour, 100 ft. north of Cotton Hanlon Rd., 0.7 mi. east of Hayes Rd.

TABLE 19.--RELATIONSHIPS OF POSITION, PARENT MATERIAL, AND DRAINAGE OF SOILS

Parent Material	Somewhat excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
	SOILS ON UPLANDS					
Deep, moderately fine textured, olive brown glacial till with 27 to 35 percent clay in the subsoil.			Schuyler	Fremont		
Deep, medium textured and moderately coarse textured, brownish glacial till with 18 to 27 percent clay in the subsoil.		Valois				
Deep, medium textured, brownish glacial till with 18 to 27 percent clay in the subsoil.		Lansing	Conesus	Appleton		
Deep, medium textured, brownish glacial till with a compact fragipan.		Bath	Mardin	Volusia	Chippewa	Chippewa
Deep, medium textured and moderately fine textured, brownish glacial till with a silt mantle.					Burdett	Alden
Moderately deep, medium textured to moderately fine textured, brownish glacial till over shale.			Aurora	Angola		
Moderately deep, fine textured, brownish glacial till over soft shale.				Hornell		
Moderately deep, medium textured, brownish glacial till over sandstone and siltstone.		Lordstown				
Shallow, medium textured, brownish glacial till over sandstone and siltstone.		Arnot	Arnot	Tuller	Tuller	
	SOILS ON LACUSTRINE PLAINS AND DELTAS					
Deep, clayey, reddish glaciolacustrine deposits		Schoharie	Schoharie	Odessa		
Deep, clayey, grayish glaciolacustrine deposits			Hudson	Rhinebeck	Madalin	Madalin
Deep, silty, brownish glaciolacustrine deposits		Dunkirk	Collamer		Canandaigua	Canandaigua
Moderately deep, clayey, reddish glaciolacustrine deposits.		Schoharie Variant	Schoharie Variant			
	SOILS ON OUTWASH PLAINS, TERRACES, AND ALLUVIAL FANS					
Medium textured to moderately coarse textured, brownish, glaciofluvial material over stratified sand and gravel.	Howard	Howard				
Moderately coarse textured, brownish, fluvial material over stratified sand and gravel.	Chenango	Chenango	Castile	Red Hook		Halsey
	SOILS ON FLOOD PLAINS					
Medium textured, brownish, mildly alkaline alluvial sediments.			Teel	Teel	Wayland	Wayland
Medium textured, brownish, acid alluvial sediments			Philo		Atkins	
Medium textured, brownish alluvial sediments over organic material.						Wallkill
	SOILS IN SWAMPS AND BOGS					
Deep organic material more than 51 inches thick						Carlisle
Moderately deep organic material, 16 to 50 inches thick, over loamy mineral soil.						Palms

TABLE 20.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series]

Soil name	Family or higher taxonomic class
Alden	Fine-loamy, mixed, nonacid, mesic Mollic Haplaquepts
Angola	Fine-loamy, mixed, mesic Aeric Ochraqualfs
Appleton	Fine-loamy, mixed, mesic Aeric Ochraqualfs
Arnot	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts
Atkins	Fine-loamy, mixed, acid, mesic Typic Fluvaquents
Aurora	Fine-loamy, mixed, mesic Glossaquic Hapludalfs
Bath	Coarse-loamy, mixed, mesic Typic Fragiochrepts
Burdett	Fine-loamy, mixed, mesic Aeric Ochraqualfs
Canandaigua	Fine-silty, mixed, nonacid, mesic Mollic Haplaquepts
Carlisle	Euic, mesic Typic Medisaprists
Castile	Loamy-skeletal, mixed, mesic Aquic Dystrochrepts
Chenango	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Chippewa	Fine-loamy, mixed, mesic Typic Fragiaquepts
Collamer	Fine-silty, mixed, mesic Glossoboric Hapludalfs
*Conesus	Fine-loamy, mixed, mesic Glossoboric Hapludalfs
Dunkirk	Fine-silty, mixed, mesic Glossoboric Hapludalfs
Erie	Coarse-loamy, mixed, mesic Aeric Fragiaqualfs
Fremont	Fine-loamy, mixed, acid, mesic Aeric Haplaquepts
Halsey	Coarse-loamy over sandy or sandy-skeletal, mixed, nonacid, mesic Mollic Haplaquepts
Hornell	Fine, illitic, acid, mesic Aeric Haplaquepts
Howard	Loamy-skeletal, mixed, mesic Glossoboric Hapludalfs
Hudson	Fine, illitic, mesic Glossaquic Hapludalfs
Lansing	Fine-loamy, mixed, mesic Glossoboric Hapludalfs
Lordstown	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Madalin	Fine, illitic, mesic Mollic Ochraqualfs
Mardin	Coarse-loamy, mixed, mesic Typic Fragiochrepts
Odessa	Fine, illitic, mesic Aeric Ochraqualfs
Palms	Loamy, mixed, euic, mesic Terric Medisaprists
Philo	Coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts
Red Hook	Coarse-loamy, mixed, nonacid, mesic Aeric Haplaquepts
Rhinebeck	Fine, illitic, mesic Aeric Ochraqualfs
Schoharie	Fine, illitic, mesic Typic Hapludalfs
Schoharie Variant	Fine, illitic, mesic Typic Hapludalfs
Schuyler	Fine-loamy, mixed, mesic Aquic Dystrochrepts
Teel	Coarse-silty, mixed, mesic Fluvaquentic Eutrochrepts
Tuller	Loamy-skeletal, mixed, acid, mesic Lithic Haplaquepts
Valois	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Volusia	Fine-loamy, mixed, mesic Aeric Fragiaquepts
Wallkill	Fine-loamy, mixed, nonacid, mesic Thapto-Histic Fluvaquents
Wayland	Fine-silty, mixed, nonacid, mesic Mollic Fluvaquents

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