



United States  
Department of  
Agriculture

Natural Resources  
Conservation  
Service

In cooperation with  
New Hampshire  
Agricultural  
Experiment Station

# Soil Survey of Grafton County Area, New Hampshire





# How to Use This Soil Survey

## General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

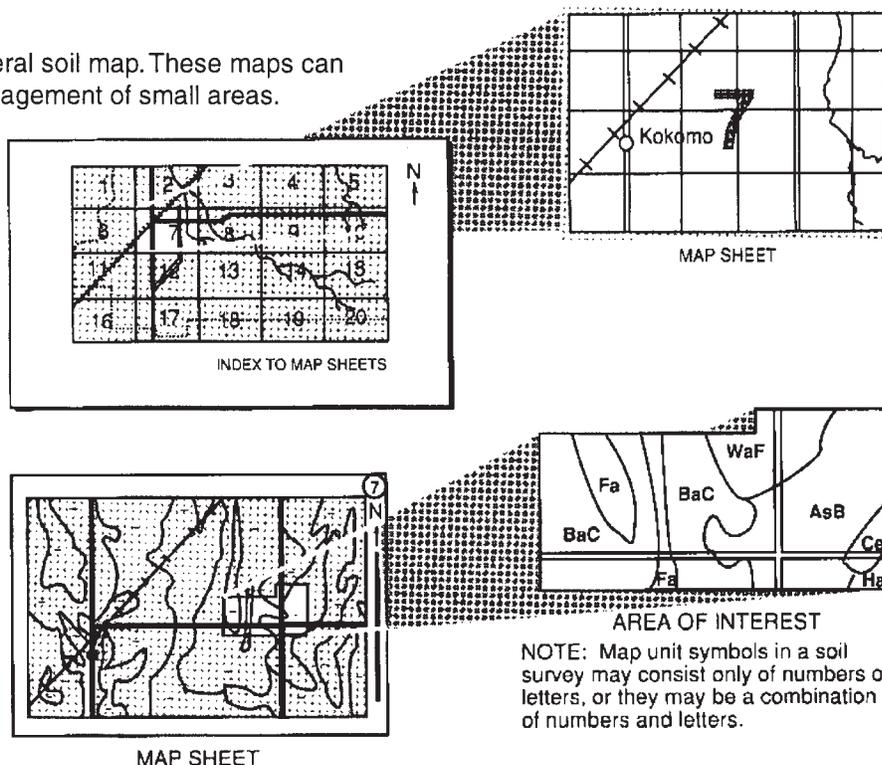
## Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



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This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1986. Soil names and descriptions were approved in 1987. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1986. This survey was made cooperatively by the Natural Resources Conservation Service and the New Hampshire Agricultural Experiment Station. The survey is part of the technical assistance furnished to the Grafton County Soil and Water Conservation District.

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**Cover: Connecticut River floodplain, terrace and adjacent uplands. The area farmed in the foreground is within the mesic soil temperature regime. The forested uplands (middle) is in the frigid soil temperature regime. The mountain tops are in the cryic soil temperature regime.**

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# Foreword

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This soil survey contains information that can be used in land-planning programs in the Grafton County Area. The survey contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as 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 soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.



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# Soil Survey of Grafton County Area, New Hampshire

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United States Department of Agriculture, Natural Resources Conservation Service  
in cooperation with the University of New Hampshire Agricultural Experiment Station

GRAFTON COUNTY is in the west-central part of New Hampshire. The western boundary of the county, formed by the Connecticut River, is the Vermont state line. The total area of the county is 1,750 square miles, or 1,120,000 acres. The part of this county covered in this survey excludes the White Mountain National Forest and has a total area of about 775,300 acres, or 1,211 square miles (fig 1.).

The soils in the county on the hills and lower parts of mountains dominantly are gently sloping to very steep and well drained to poorly drained. Stones and boulders are on the surface of most areas, except those cleared for farming.

The soils on the tops of mountains and high hills are commonly shallow to bedrock. Complex slope patterns, stones and boulders on the surface, the depth to bedrock, a high water table, and an erosion hazard are major limitations of those areas for farming and community development.

The soils in the major stream valleys are dominantly excessively drained to poorly drained and nearly level to very steep. Those soils that are nearly level to gently sloping are the major farming areas of the county.

This soil survey provides updated information to a soil survey of Grafton County published in 1939 (5) and provides maps that shows the soils in greater detail.

## General Nature of the Survey Area

This section provides general information about Grafton County and describes some of the natural and cultural features that affect land use in the county.

Two different levels of detail, or orders, have been used mapping the soils of Grafton County. Order II mapping was used for approximately 80 percent of the county and is intended to supply soil data for intensive land use that require detailed information about the soil resources for making predictions of suitability for use and treatment needs. This information can be used in planning for general agriculture, construction, community development, and similar uses that require precise knowledge of the soils and their variability. Order III mapping was used for the remaining 20 percent of the county and is intended to supply soil data for extensive land uses that do not require precise knowledge of small areas or detailed soil information. Such survey areas are usually dominated by a single land use and have few subordinate uses. This information can be used in planning for forestry, wildlife and recreational uses.

## History and Population

The first settlement in Grafton County was made at Lebanon in 1761 by pioneers from Connecticut. The county was formed in 1771, and its original boundaries are essentially unchanged.

The county contains 39 incorporated towns and one unincorporated town. Lebanon is the only city in the county. Some of the larger towns are Hanover, Littleton, Plymouth, and Haverhill. In 1988 the population of Grafton County was 74,453 (4) and was fairly well distributed over the southern and western parts of the county but somewhat more dense in the Connecticut River Valley. The summer population is

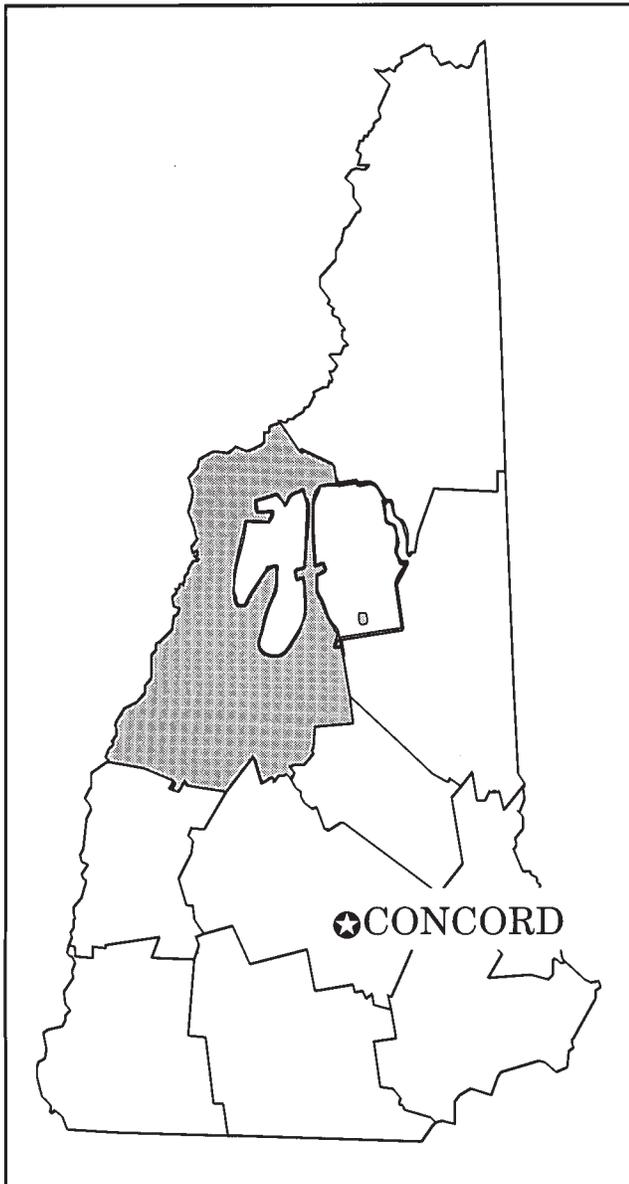


Figure 1.— Location of Grafton County in New Hampshire

estimated to be two to three times the normal population.

### Physiography, Relief, and Drainage

This county lies within the Mountain and Valley section of New England. More than two thirds of its land area forms a fan-shaped plateau that extends from the northwest to the southeast.

The plateau slopes in all directions from the north-central part, joining the base of the White Mountains, where the average elevation is about 1,000 feet above sea level, to the outer edges, where the average elevation is about 1,200 feet. The remaining third, or

northeast part, of the county is mountainous.

Elevations reach 3,000 feet in many places, and 12 peaks rise above 4,000 feet. Mt. Lincoln, for example, is 5,108 feet high, and Mt. Lafayette is 5,249 feet.

A number of lower mountain ranges, extending mainly north and south, cross the plateaus. The major ranges contain Moose Mountain, Mt. Cube, and Black Mountain in the western part, Gardner Mountain in the northwest part, and Mt. Cardigan in the south-central part. These mountains range from 2,000 to 3,000 feet above sea level. Scattered over the plateau are numerous small monadnocks which stand well above its general level. The plateau is deeply dissected throughout, and only small remnants of the plateau remain at the original level. Most of the streams, especially the lateral streams which flow west to Connecticut River, have cut narrow, deep valleys with steep sides. A few streams, however, flow through hanging valleys, or basins, characterized by a somewhat subdued topography. One example of the latter is the Mascoma Basin, where the streams are sluggish, swamps are numerous, and the hills generally are smoother than elsewhere. Wild Ammonoosuc River Valley is a good example of a deeply entrenched valley. The narrow strip along its western edge has hilly relief.

The central belt of the plateau comprises fragmentary plateau tops and generally steep sides with, in places, lower hills or benches at the base and along the streams. There are many gently sloping areas between the plateau tops and the steeper breaks to the bottoms.

The outer edges of the plateau are closely serrated by the entrenched valley of the Connecticut River. In the extreme northern part, the valley is narrow, but throughout most of its extent, it is 1 mile wide. Wide bottoms and smooth, broad terraces are in places, particularly at Haverhill, Piermont, Orford, and Hanover. At the point where the Connecticut River touches the northwest corner of the county, the elevation is 780 feet, and at the point where the river touches the southwest corner, it is 320 feet. The Ammonoosuc River, the principal tributary to the Connecticut River, flows across the northern part of the county in a deeply entrenched valley containing some bottom land and terraces. On the upper reaches of the Pemigewasset River, which heads in the White Mountains, the valley has steep sides, but in the southern part of the county, this valley is a width of 1 mile in places and includes broad bottoms and terraces. The Baker River, the principal tributary of the Pemigewasset River, flows in a deeply entrenched valley between the mountain section and the northeast edge of the plateau. The elevation at the point of

confluence of these two rivers at Plymouth is about 500 feet.

A number of lakes are scattered over the county. The largest are Squam Lake in the southeast part, Newfound Lake in the south-central part, and the system of lakes associated with Mascoma Lake in the southwest part. The poorly drained areas or swamps are comparatively small meadows, filled-in lakes, and hollows in the mountains.

## Farming

In 1987 there were 356 farms in Grafton County covering 80,871 acres. The majority of full-time farms are dairy operations. Of the total farm acreage, 30,100 acres was in cropland; 7,198 acres in pasture; 41,602 acres in woodland; and 1,971 acres in farmsteads, buildings, roads, and other uses (11).

The major crops grown in the county in terms of acreage planted are hay and silage corn used as feed for dairy cows. Other locally important crops are apples, other small fruits, vegetables, and Christmas trees. Many farmers supplement their income by producing maple syrup.

## Forestry

Much of the original forest in the county was cleared for farming in the early 1800s, primarily for use as pasture, and most of the present forest vegetation is second or third grown. When farming declined in the mid to late 1800s, most of the abandoned land reverted to forest.

The forest cover varies widely with differences in relief. Generally below an elevation of 1,000 feet, over the southern part of the county the dominant forest tree is white pine, which is mixed with white oak, red oak, sugar maple, red maple, ash, gray birch, aspen, and hemlock. Between 1,000 and 2,500 feet the forest consists mainly of yellow birch, beech, sugar maple, red maple, red spruce, white pine, hemlock, white birch, aspen, and oak. Between 2,500 and 3,500 feet red spruce, balsam fir, and white birch are common, although little merchantable timber grows above and elevation of 3,000 feet. Above 3,500 feet, the vegetation is mainly stunted spruce. In 1983 about 986,900 acres or 90 percent of the county was forested (10).

The forests in the county support a wide variety of industries, including the production of lumber, cordwood, and wooden products such as furniture, pallets, dowels, and spools. The forests are also used for recreational purposes such as hiking, hunting, cross country skiing, and snowmobiling.

## Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Winters in Grafton County are cold, and summers are moderately warm. The mountainous areas are markedly cooler than the lowlands. In winter, snow is frequent, sometimes in the form of blizzards, and covers the ground much of the time. Total annual precipitation is nearly always adequate for crops that are suited to local temperatures.

Table 1 gives data on temperature and precipitation for the survey area, as recorded at Hanover, Monroe, and Woodstock for the period 1951 to 1981. 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 temperatures at Hanover, Monroe, and Woodstock are 21, 16, and 21 degrees F., respectively, and the average daily minimum temperature is 11 degrees at Hanover and Woodstock and 5 degrees at Monroe. The lowest temperature on record, which occurred at Monroe on January 14, 1957, is -36 degrees. In summer the average temperature is 65 degrees at Monroe and Woodstock and 67 degrees at Hanover, and the average daily maximum temperature is 78 degrees. The highest recorded temperature, which occurred at Hanover on August 2, 1975, is 103 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.

The total annual precipitation is 37 inches in Hanover and Monroe and 45 inches in Woodstock. Of that, about 45 percent usually falls in April through September, which includes the growing season for most crops. The heaviest 1-day rainfall during the period of record was 4.14 inches at Woodstock on October 24, 1959. Thunderstorms occur on about 16 days each year, and most occur in summer.

Average seasonal snowfall is 75 inches at Hanover, 72 inches at Monroe, and 94 inches at Woodstock. The greatest snow depth at any one time during the period of record was 47 inches at Hanover, 48 inches at Monroe, and 65 inches at Woodstock. On the average, 59 days at Hanover, 62 days at Monroe, and 65 days at Woodstock 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 mid-afternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The percentage of possible sunshine is 60 percent in summer and 45 percent in winter. The prevailing wind is from the northeast. Average windspeed is highest, 8 miles per hour, in spring.

## How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify

soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties, but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

This survey area was mapped at two levels of detail. At the more detailed level, map units are narrowly defined and map unit boundaries were plotted and verified at closely spaced intervals. At the less detailed

level, map units are broadly defined and boundaries were plotted and verified at wider intervals. In the legend for the detailed soil maps, narrowly defined units are indicated by symbols in which the first letter is uppercase and the second is lowercase. For broadly defined units, the first and second letters are uppercase.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas (6,7). The differences are the result of better knowledge of the soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in different survey areas.

### **Map Unit Composition**

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils

for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils, but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.



# General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of two or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map 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 soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The names and delineations of the soils on the map do not in all instances match those on maps of adjacent survey areas. The differences are the result of changes in soil classification and mapping procedures.

## Soil Descriptions

### 1. Windsor-Hitchcock-Quonset

*Nearly level to very steep, very deep, well drained and excessively drained, sandy and silty soils formed in glacial outwash and lacustrine sediments on terraces and lake plains (fig. 2).*

The landscape of this unit is characterized by mainly nearly level to gently sloping terraces separated by moderately steep to very steep escarpments. The escarpments mainly are between the terraces but also separate the terraces from the nearly level flood plains

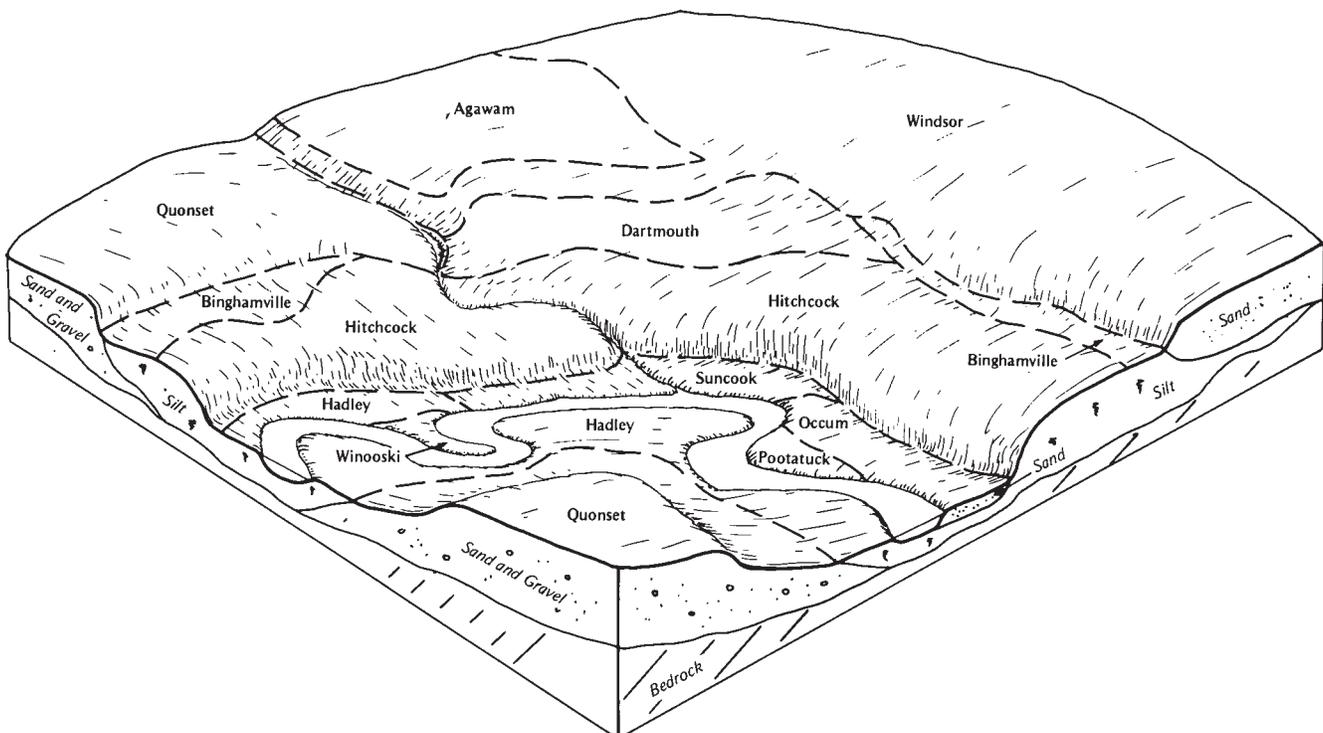


Figure 2.— Typical pattern of soils and underlying material in the Windsor-Hitchcock-Quonset unit.

of the Connecticut River and its tributaries. A few areas of the terraces are strongly sloping. The escarpments range from moderately steep to very steep. The flood plains are nearly level. Most of the drainageways are deeply entrenched in these very erodible soils. The terraces are flanked by strongly sloping to very steep glaciated hills. In many areas the terraces immediately adjacent to the hills are poorly drained. The vegetation of the terraces is dominantly white pine and hemlock and some areas of sugar maple, red oak, and elm. Much of the native vegetation of the flood plains is grasses.

Most of this unit has been cleared for farming. Silage corn and grass-legume hay are grown in support of daily farming. Small fruits and vegetables for local use are grown in a few areas. These terraces are also the sites of the major urban development. The uncleared acreage of this unit consists of the steep and very steep escarpments and ravines and the nearly level, poorly drained areas.

This unit makes up about 3 percent of the survey area. The unit is about 23 percent Windsor soils, 17 percent Hitchcock soils, 10 percent Quonset soils, and 60 percent minor soils.

The Windsor soils are on nearly level to strongly sloping terraces and moderately steep to very steep escarpments. The soils are very deep, excessively drained, and sandy.

The Hitchcock soils are on nearly level to strongly sloping terraces and lake plains and moderately steep to very steep escarpments. The soils are very deep, well drained, and silty and have finely stratified, slowly permeable underlying material.

The Quonset soils are on nearly level to strongly sloping terraces and moderately steep to very steep escarpments.

The soils are very deep, excessively drained, and sandy.

The common minor soils are Suncook, Occum, Hadley, Pootatuck, and Winooski soils on flood plains and Dartmouth, Agawam, and Binghamville soils on terraces.

The nearly level to gently sloping terraces and flood plains of the unit are suited to silage corn, grasses, and legumes. The growing season is marginal for grain corn. The low available water capacity of the Windsor and Quonset soils is the main limitation for farming. The erosion hazard on strongly sloping areas make them best suited to hayland or pasture. Most of the escarpment areas are forested and are generally too steep and erodible for other uses.

On the nearly level to strongly sloping areas of the Windsor and Quonset soils, slope and rapid permeability are the main limitations for most types of

community development. The Hitchcock soils have similar limitations and are also limited by the slowly permeable substratum and high potential frost action. The flood plains have severe limitations for urban development because of annual flooding in the lower areas and flooding at least once in 10 years on the higher areas. On the terrace escarpments, slope and erosion limit use to woodland and green belts.

This unit is suitable for trees. The Windsor and Quonset soils and the silty escarpment areas are well suited to softwood production, especially white pine. Slope is the main limitation on the escarpment areas. The rest of the unit is suited to hardwoods and softwoods, but softwood regeneration is dependent on controlling hardwood growth.

## 2. Bernardston-Cardigan-Pittstown

*Gently sloping to very steep, very deep and moderately deep, well drained and moderately well drained, silty and loamy soils formed in glacial till on uplands (fig. 3).*

The landscape of this unit is characterized by smooth, strongly sloping hills and very narrow valleys. In some areas, the hilltops are broad with nearly level to gently sloping areas of very deep and moderately deep soils. Some other areas are sharp, steep hills on landforms controlled by the underlying bedrock.

Some of this unit has been cleared. Most of the cleared areas are on gently sloping hilltops and strongly sloping hillsides. A few of the gently sloping areas are used to produce silage corn, but most of the areas are used for hayland and pasture. The rest of the unit is a variety of forest. Hardwoods are the climax stage, but all stages of succession are common and the types range from quaking aspen and white pine to sugar maple and red oak. Most roads in this unit run parallel to the ridges of the very narrow valleys.

This unit makes up about 15 percent of the survey area. The unit is about 22 percent Bernardston soils, 19 percent Cardigan soils, 18 percent Pittstown soils, and 41 percent soils of minor extent.

The Bernardston soils are very deep, well drained, and silty and have a dense, slowly permeable substratum. The soils are on smooth hills that range from gently sloping to very steep. Stones commonly cover less than 1 percent to 3 percent of the surface unless the area has been cleared for farming.

The Cardigan soils are well drained and silty and are 20 to 40 inches deep to bedrock. The soils are mainly in irregular patterns with Kearsarge soils and rock outcrops. Slopes range from gently sloping to very steep. Some areas have smooth slopes, but most slopes are irregular and uneven. Unless cleared,

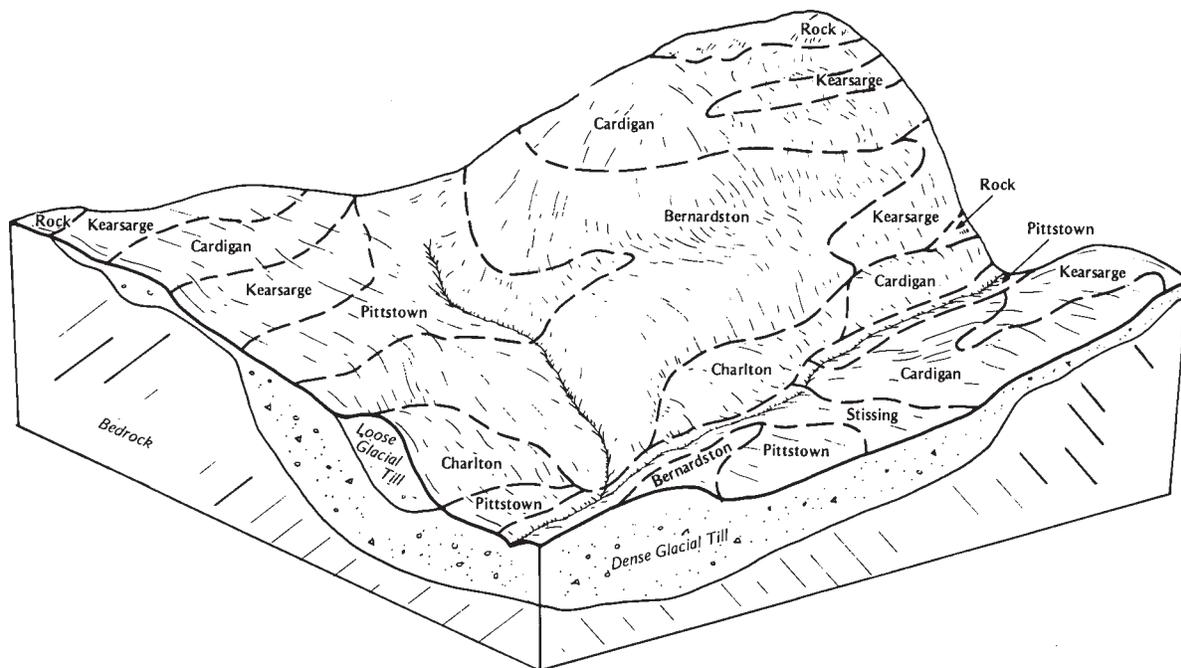


Figure 3.— Typical pattern of soils and underlying material in the Bernardston-Cardigan-Pittstown unit.

stones cover from less than 1 percent to 3 percent of the surface.

The Pittstown soils are very deep, moderately well drained, and loamy and have a dense, slowly permeable, loamy substratum. The soils are on smooth areas that range from gently sloping to strongly sloping, but a few are moderately steep. Stones cover less than 1 percent to 3 percent of the surface unless the area has been cleared for farming.

The common minor soils are Kearsarge, Charlton, and Stissing soils. Areas of rock outcrop are throughout the unit near Cardigan and Kearsarge soils.

If the surface stones are removed and adequate erosion control measures are used on this unit, the gently sloping areas on the hills are moderately well suited to row crops. The areas of Pittstown soils can be tilled earlier in the spring and crops harvested later in the fall if adequate drainage is provided. The strongly sloping to moderately steep areas are best suited to hayland and pasture. The stony areas have limited use as pasture.

This unit is well suited to most trees, and productivity is moderate to moderately high. The forest types are dominantly hardwoods and white pine early in the succession. Woodland management on these soils is limited by slope, windthrow hazard, and erosion along skid trails and access roads.

The bedrock and slowly permeable hardpans in this unit limit community development. Residential development requires careful selection of the areas.

### 3. Adams-Colton

*Nearly level to very steep, very deep, excessively drained, sandy soils formed in stratified water deposited sediments on terraces, kames, and eskers (fig. 4).*

The landscape of this unit is characterized by nearly level to gently sloping terraces separated by very steep escarpments. The escarpments also separate the terraces from the flood plains of the major streams of the northern, central, and eastern parts of the county. The terraces mainly are nearly level to gently sloping, but a few areas are strongly sloping. The escarpments mainly are very steep, but some areas are moderately steep. Drainageways commonly are deeply entrenched in these terraces of erodible soils. The flood plains below the escarpments are nearly level and range from excessively drained to very poorly drained. The terraces are flanked by moderately steep to very steep glaciated hills. In many areas, the terrace soils adjacent to the hills are poorly drained. The native vegetation of the terraces is mainly white pine and

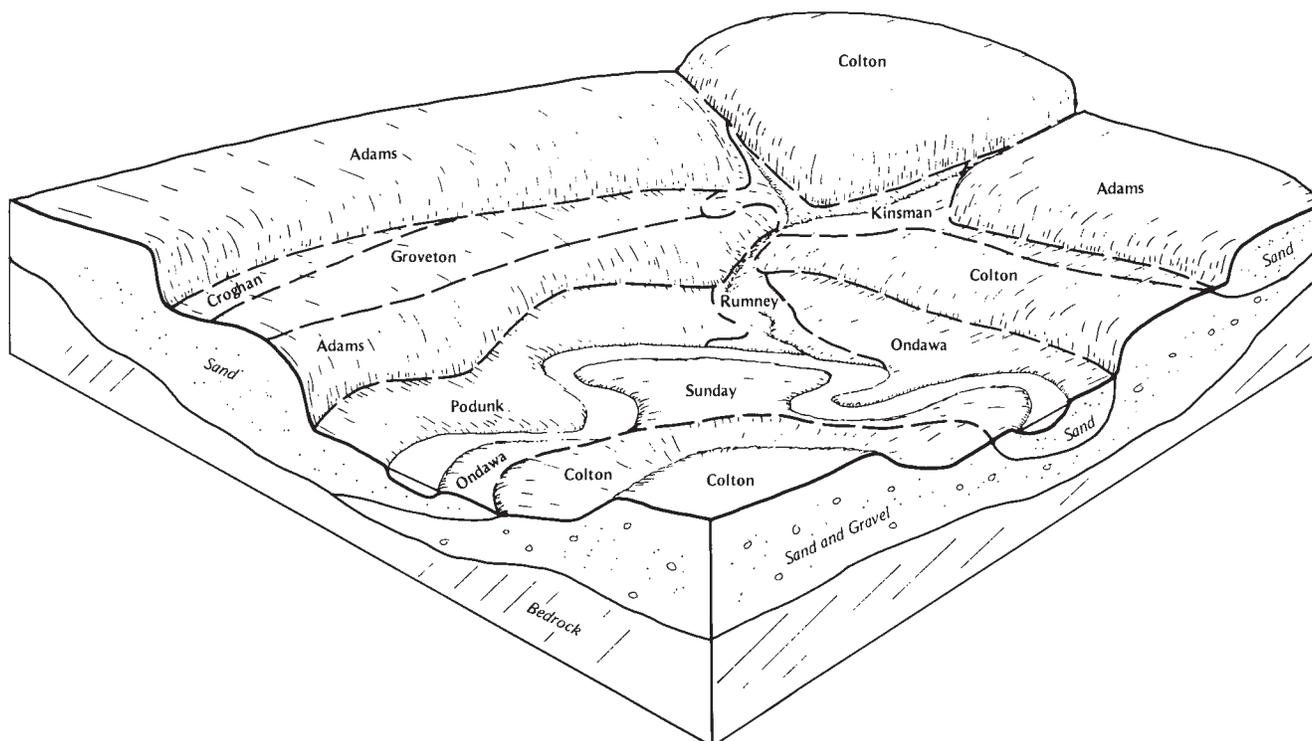


Figure 4.— Typical pattern of soils and underlying material in the Adams-Colton unit.

hemlock and some areas of sugar maple, red oak, and elm. Much of the vegetation of the flood plains is native grasses and some red maple, elm, and white pine.

Most of this unit has been cleared for farming, mainly dairy farming in the Connecticut and Ammonoosuc River valleys. The other areas have some limited farming. Some small scale production of truck crops and small fruits is done in the Pemigewasset and Baker River valleys, which are also the sites of the major urban development. The wooded areas of this unit originally consisted of the steep escarpments and ravines and the poorly drained and very poorly drained areas, but many nearly level, well drained or excessively well drained areas have reverted to woodland.

This unit makes up about 8 percent of the survey area. The unit is about 30 percent Adams soils, 22 percent Colton soils, and 48 percent soils of minor extent.

The Adams soils are on nearly level to strongly sloping terraces and moderately steep to very steep escarpments. The soils are very deep, excessively drained, and sandy.

The Colton soils are on nearly level to strongly sloping terraces and moderately steep to very steep escarpments. The soils are very deep, excessively

drained, and sandy and have an extremely gravelly subsoil and substratum.

The common minor soils on flood plains are Sunday, Ondawa, Podunk, and Rumney soils. The common minor soils on terraces are Croghan, Groveton, and Kinsman soils.

The nearly level to gently sloping major soils of this unit are moderately well suited to the production of row crops. The major limitation is droughtiness. The soils are well suited to the production of forage crops, particularly legumes, for hay or pasture. The erosion hazard on the strongly sloping or very steep areas limits their use to forage crops. The steep escarpment areas are mainly forested and are too steep and erodible for other uses.

The nearly level to strongly sloping areas of Adams and Colton soils are limited by slope and rapid permeability for most types of community development. The flood plain soils have severe limitations for urban development because of the flooding hazard. The terrace escarpments have severe slope and erosion limitations and are best suited to woodland and green belts.

The soils of this unit are suitable for trees. The Adams, Colton, and Sunday soils are suitable for softwood production, especially white pine. Soils on the escarpment areas are limited by the moderately steep

to very steep slopes. The other soils of this unit generally are suitable for hardwoods, and production of softwoods in those areas is dependent on controlling growth of hardwoods.

#### 4. Marlow-Peru

*Nearly level to very steep, very deep, well drained and moderately well drained, loamy soils formed in glacial till on uplands (fig. 5).*

The landscape of this unit is characterized by smooth hills and uniformly sloping mountainsides. A few isolated areas of shallow soils and rock outcrops are on the landscape, mainly along major valleys.

A small part of this unit is open farmland. These areas are the well drained and moderately well drained and are gently to strongly sloping. Forage production for hay and pasture is the major use, but a few gently sloping areas are used for row crops, primarily silage corn. The rest of the unit is forested. Hardwood forest is the climax woodland type. Sugar maple, beech, white and yellow birch, and red oak are the dominant species. Roads in these areas generally parallel the ridges or are steep and winding where they hill.

This unit makes up about 22 percent of the survey area. The unit is about 28 percent Marlow soils, 21 percent Peru soils, and 51 percent soils of minor extent.

The Marlow soils are very deep, well drained, and loamy and have a dense, slowly permeable substratum. The soils are on smooth, convex, gently sloping to steep areas. Surface stones are common but rarely cover more than 1 percent of the surface. Areas that are farmed have had most of the surface stones removed for tillage.

The Peru soils are very deep, moderately well drained, and loamy and have a dense, slowly permeable substratum. These soils are mainly on uniform, slightly concave slopes and have a seasonal water table that is at a depth of 18 to 30 inches during the fall and spring. Stones cover less than 1 percent of the surface. Areas that are farmed have had the surface stones removed to permit tillage.

The common minor soils are Berkshire, Tunbridge, and Lyman soils and areas of rock outcrop.

Where the surface stones have been removed, the gently sloping areas of the Marlow and Peru soils are well suited to agriculture. The Peru soils may require

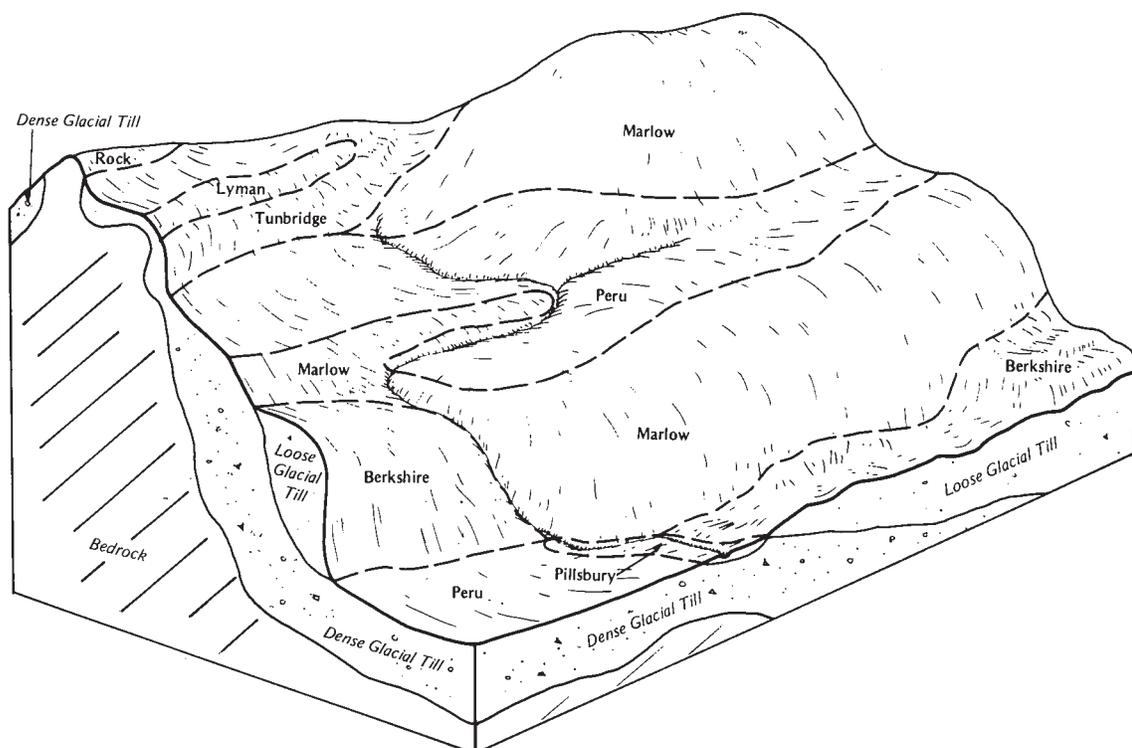


Figure 5.— Typical pattern of soils and underlying material in the Marlow-Peru unit.

drainage to allow early spring tillage. Some erosion control measures should be used if row crops are grown. On the strongly sloping areas of these soils, the erosion hazard generally prohibits row crops unless intensive erosion control measures are used. These erodible areas are better suited to forage production, and excellent yields of legumes and grasses can be obtained. The moderately steep areas are suited to forage production and are used primarily for pasture; the operation of modern forage harvesting equipment on these areas is inefficient and hazardous. The very stony areas have limited use for unimproved pasture.

The soils of this unit are well suited to most commercial tree species, and productivity is moderate to moderately high. The main forest types are hardwoods and white pine early in the succession. Yellow birch and balsam fir are common on the areas of Peru soils. Woodland management is limited by slope, windthrow hazard, and erosion along skid trails and access roads.

The slopes, stoniness, and slowly permeable

hardpan in these areas limit the potential for community development. A few areas are suitable for low-density development. Careful planning is required to avoid erosion and pollution of ground water.

### 5. Tunbridge-Lyman

*Gently sloping or undulating to very steep, moderately deep and shallow, well drained and somewhat excessively drained, loamy soils formed in glacial till on uplands (fig. 6).*

The landscape of this unit is characterized by rugged hills and mountains. The slopes are irregular, and rock outcrops are common. The valleys are strongly sloping to steep. They have fast-flowing streams that have little or no flood plain.

Most areas of this unit are forested. A few areas have been cleared for farming, but the slope, stoniness, and rock outcrops limit their use to forage crops for hay or pasture. Most of these cleared areas are reverting to woodland. The woodland types are

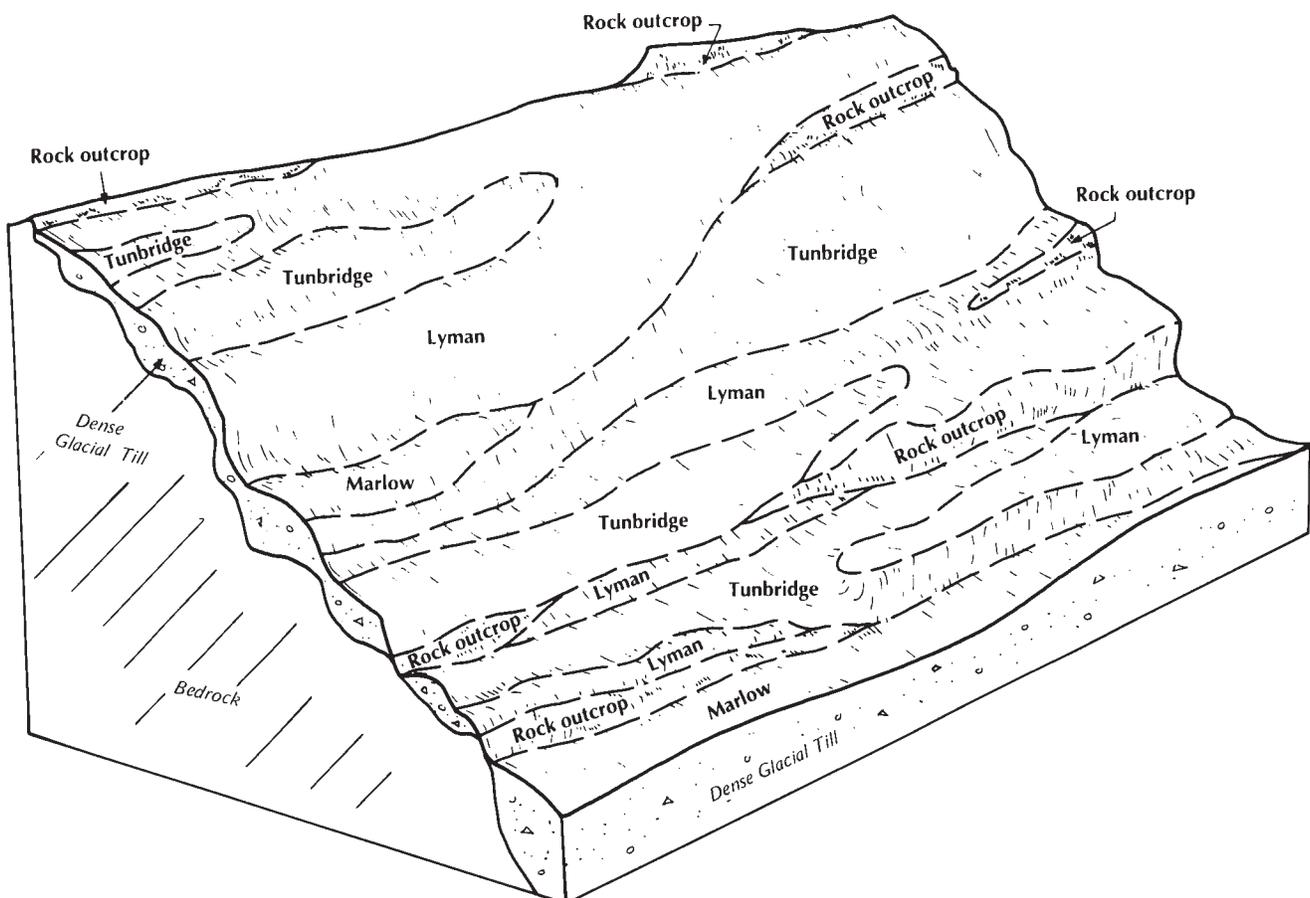


Figure 6.— Typical pattern of soils and underlying material in the Tunbridge-Lyman unit.

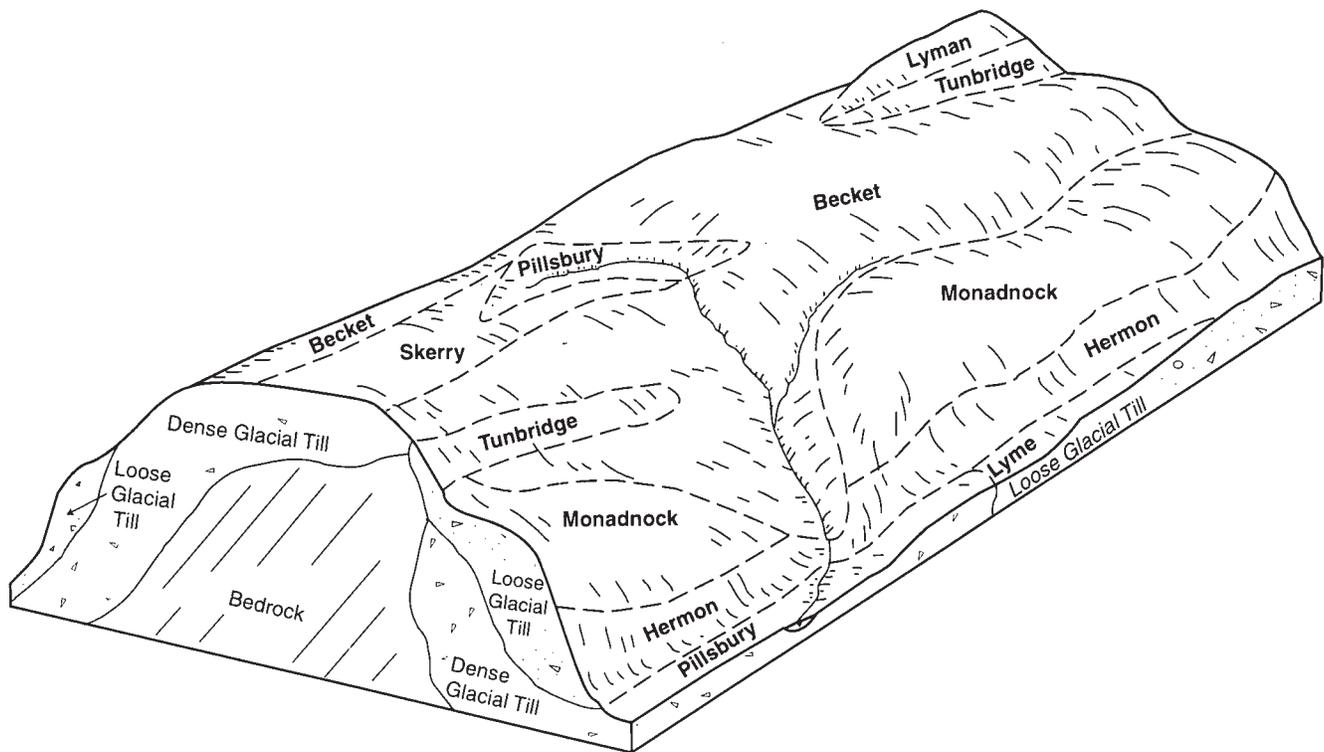


Figure 7.— Typical pattern of soils and underlying material in the Becket-Monadnock-Hermon unit.

highly variable. The Tunbridge soils commonly support climax types of hardwood; sugar maple, beech, and ash are the dominant species. Northern red oak is common on the south-facing slopes. The droughty Lyman soils may have a mixed-forest climax type, but the more drought-resistant softwoods (white pine, red pine, hemlock, and red spruce) dominate. Few roads cross these areas. They either roughly parallel the ridges or cross through the few low notches in the mountain chains.

This unit makes up about 15 percent of the survey area. The unit is about 45 percent Tunbridge soils, 25 percent Lyman soils, and 30 percent soils of minor extent.

The Tunbridge soils are well drained and loamy and are 20 to 40 inches deep to bedrock. The soils are in an irregular pattern with Lyman soils and rock outcrops. Slopes range from gently sloping and undulating side slopes and hilltops to very steep mountainsides. Some areas have smooth slopes, but most slopes are irregular and broken. Stones cover from less than 1 percent to 3 percent of the surface.

The common minor soils in this unit are Marlow soils which makes up about 5 percent of this map unit. Rock outcrops are common, and small areas of wet soils are in pockets where the bedrock blocks drainage.

Slope, surface stones, and rock outcrops severely limit this unit for farming. Some areas have limited potential for forage production or orchards.

The soils of this unit are suited to most tree species, and productivity is moderate to moderately high. The main forest types are hardwoods and white pine early in the succession. The Lyman areas are better suited to softwoods. Woodland management is limited on these soils by windthrow hazard, slope, erosion hazard along skid trails and access roads, and rock outcrops.

Slope, moderately deep and shallow soils, surface stones, and rock outcrops severely limit the potential of these soils for community development. Low-density, limited residential development is possible in carefully selected areas. Erosion and pollution of ground water are hazards.

## 6. Becket-Monadnock-Hermon

*Gently sloping and undulating to very steep, very deep, well drained and somewhat excessively drained, loamy soils formed in glacial till on uplands (fig. 7).*

The landscape of this unit is characterized by smooth hills and uniformly sloping mountainsides in the areas of Becket soils and irregular slopes in the areas of Monadnock and Hermon soils.

A small part of this unit has been cleared. The cleared areas of Becket soils are on gently sloping and strongly sloping hills and some moderately steep hills. The cleared areas of Monadnock and Hermon soils are on undulating and rolling hills and side slopes. Most of the areas are used for hayland and pasture. A few areas are used for row crops, mostly silage corn. The rest of the unit is forested. Hardwood forest is the climax type on the Becket soils, and the Monadnock and Hermon soils are mainly mixed softwoods, white pine, and hemlock. The dominant hardwoods are sugar maple, beech, white birch, and red oak. Roads through these areas usually follow the narrow valleys. Roads through the hills are mainly narrow, steep, and winding.

This unit makes up about 21 percent of the survey area. The unit is about 33 percent Becket soils, 22 percent Monadnock soils, 12 percent Hermon soils, and 33 percent soils of minor extent.

The Becket soils are very deep, well drained, and loamy and have a dense, slowly permeable, sandy substratum that is locally known as hardpan. The soils are on smooth, uniform hills with slopes that range from gently sloping to very steep. Stones commonly cover from less than 1 percent to 3 percent of the surface unless the area has been cleared for farming.

The Monadnock soils are very deep, well drained, loamy soils and have a sandy substratum. The soils are on irregular or complex slopes that range from undulating to very steep. Stones commonly cover more than 1 percent of the surface unless the area has been cleared for farming.

The Hermon soils are very deep, somewhat excessively drained, and loamy and have a sandy subsoil and substratum that have a high percentage of cobbles, stones, and boulders. The soils are on irregular or complex slopes that range from undulating to very steep. Stones and boulders commonly cover more than 1 percent of the surface unless the area has been cleared for farming.

The common minor soils are the moderately well drained Skerry and Waumbek soils and the poorly drained Pillsbury soils. The moderately deep Tunbridge soils are in a complex pattern with the shallow Lyman soils and rock outcrops.

Where the surface stones have been removed, the gently sloping areas of Becket soils and undulating areas of Monadnock soils are well suited to row crops and the droughty Hermon soils are moderately well suited. Erosion control measures, such as diversions and grass waterways, contour tillage, and winter cover crops, should be used if continuous row crops are grown. These soils are well suited to forage production for hay or pasture. The included wetter soils usually require drainage for maximum productivity. The strongly

sloping to moderately steep and rolling to hilly areas are best suited to forage production. The very stony areas have limited use for pasture.

The soils of this unit are well suited to most trees, and productivity is moderate to moderately high. The main forest types are hardwoods and white pine early in the succession. Woodland management has few limitations other than slope and erosion along skid trails and access roads.

Slope, stoniness, and permeability limit this unit for community development. Low-density residential development is possible in carefully selected areas if careful design is used to avoid erosion and pollution of ground water.

## 7. Hermon-Tunbridge-Lyman

*Undulating to very steep, very deep to shallow, somewhat excessively drained and well drained, loamy soils formed in glacial till on uplands (fig. 8).*

The landscape of this unit is characterized by rugged hills and mountains that have irregular slopes and numerous bedrock outcrops. Valleys are steep and contain fast-flowing streams that have little or no flood plain.

Most of the areas of this unit are forested. A few areas have been cleared for farming, but the slope, stoniness, and droughtiness limit use to forage crops for hay and pasture. Most of the cleared areas have been abandoned and are reverting to woodland. Woodland types are highly variable. The Hermon and Tunbridge areas usually have climax types of hardwood, and the dominant species are sugar maple, beech, ash and red oak on the south-facing slopes. Some areas of the droughty Lyman soils are mixed forest, but usually the softwood species of white pine, red pine, red spruce, and hemlock dominate. Roads in these areas either parallel ridges or cross through notches in mountain chains.

This unit makes up about 15 percent of the survey area. The unit is about 26 percent Hermon soils, 26 percent Tunbridge soils, 21 percent Lyman soils, and 27 percent minor soils and rock outcrops.

The Hermon soils are very deep, somewhat excessively drained, and loamy and have a high percent of cobbles, stones, and boulders in the subsoil and substratum. The soils are on irregular or complex slopes that range from undulating to very steep. Stones and boulders commonly cover more than 1 percent of the surface, but they cover as much as 15 percent in areas south and east of the hills and mountaintops.

The Tunbridge soils are well drained and loamy and are 20 to 40 inches deep to bedrock. The soils are

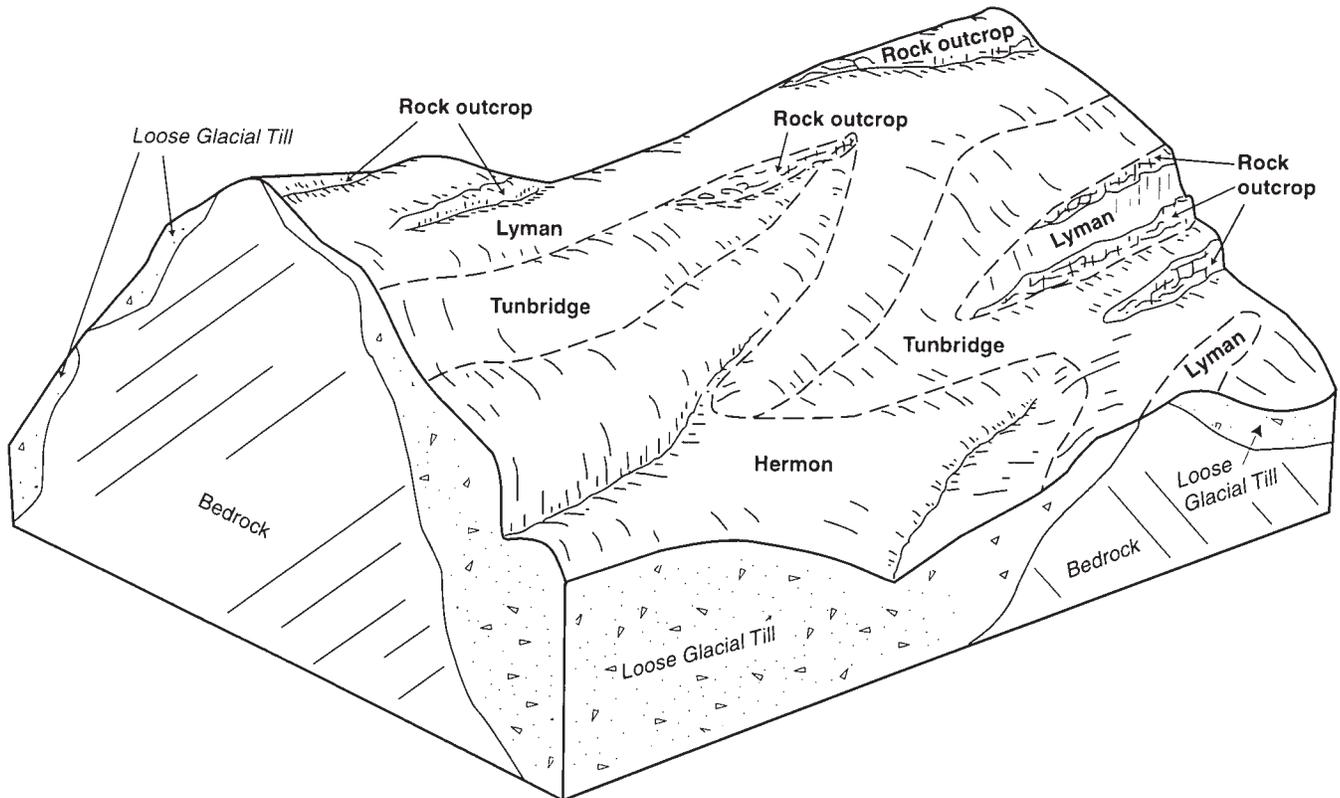


Figure 8.— Typical pattern of soils and underlying material in the Hermon-Tunbridge-Lyman unit.

mainly in an irregular pattern with Lyman soils and rock outcrops. Slopes range from gently sloping and undulating to very steep. Some areas have smooth slopes, but normally the slopes are irregular and broken. Stones commonly cover from less than 1 percent to 3 percent of the surface.

The Lyman soils are somewhat excessively drained, loamy soils and are 10 to 20 inches deep to bedrock. The soils are mainly in irregular patterns with the Tunbridge soils and rock outcrops. The soils range from gently sloping and undulating to very steep. Some areas have smooth, uniform slopes, but most slopes are irregular and broken. Stones cover from less than 1 percent to 3 percent of the surface.

The main soils of minor extent are Becket soils and smaller areas of Marlow, Peru, and Waumbek soils. Rock outcrops are common, and small areas of wet soils occupy pockets where the bedrock blocks drainage.

The slopes, stones, and rock outcrops severely limit this unit for farming.

Most areas of this unit are forested. The soils are suited to most tree species, and productivity is moderate to moderately high. The main forest types on

the Hermon and Tunbridge soils are hardwood and white pine early in the succession. The Lyman soils are generally better suited to softwoods. Woodland management is limited by slope, windthrow hazard, erosion along skid trails and access roads, and, in some areas, surface stones, boulders, and rock outcrops.

The slopes, depth to bedrock, stones, and rock outcrops severely limit the potential of these areas for community development. Low-density, limited residential development is possible in carefully selected areas if special design is used to avoid erosion and pollution of ground water.

### 8. Saddleback-Ricker

*Very steep, very shallow to moderately deep, well drained to excessively drained, loamy and organic soils formed in glacial till and organic material on mountainsides (fig. 9).*

The landscape of this unit is characterized by very steep mountainsides and mountaintops. These areas are generally above an elevation of 2,500 feet and are snow covered from October through May. On north-

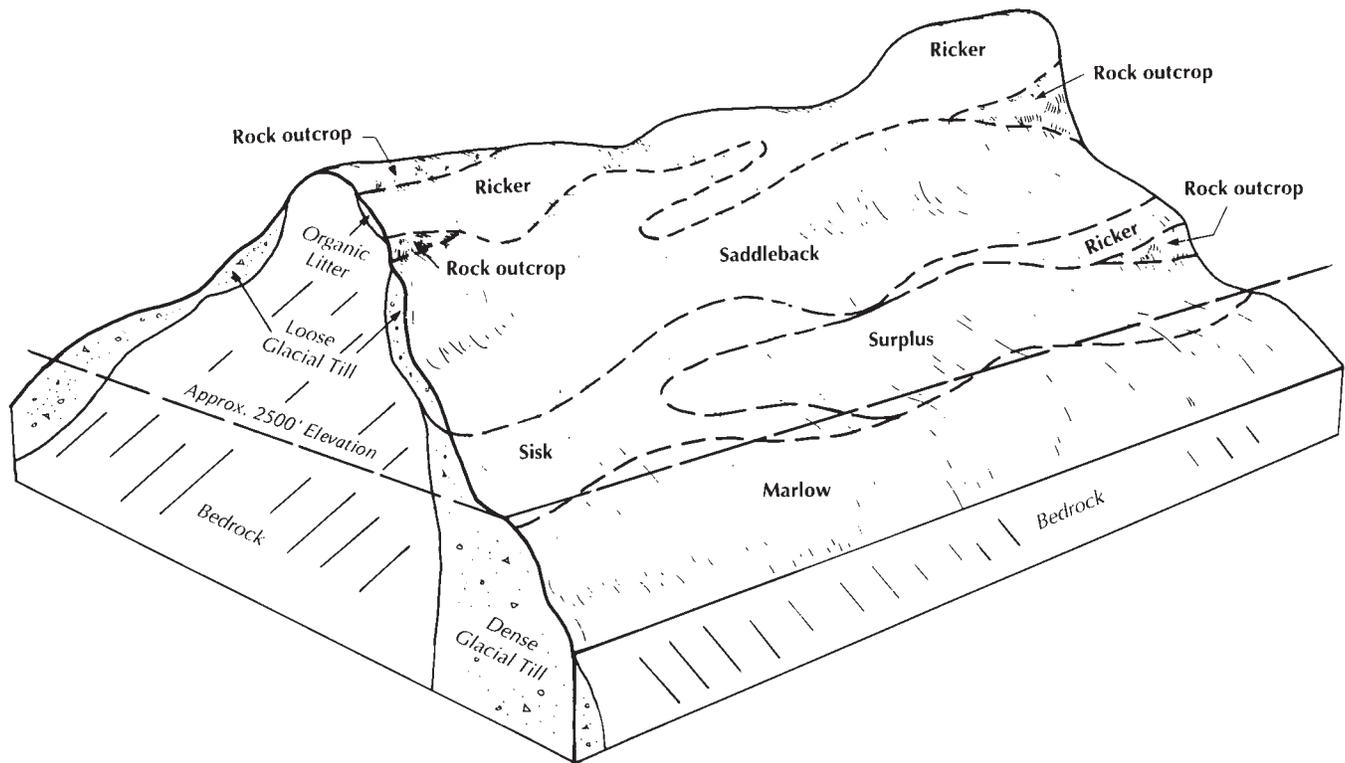


Figure 9.— Typical pattern of soils and underlying material in the Saddle-Ricker unit.

facing slopes in the northern and central parts of the survey area, the elevation is 2,000 feet.

Most areas of this unit are forested. Tree growth is usually poor and decreases with increasing elevation. Most areas of hardwoods are beech and yellow birch. The common softwoods are red spruce and balsam fir. The unit is generally unsuitable for commercial timber production because of the very slow tree growth.

This unit makes up about 1 percent of the survey area. The unit is about 33 percent Saddleback soils, and 18 percent Ricker soils, and 49 percent minor soils and rock outcrops.

The Saddleback soils are on very steep slopes on high mountains. The soils are well drained and loamy and are 10 to 20 inches deep to bedrock.

The Ricker soils are very shallow to moderately deep, well drained to excessively drained, and mainly organic. They are formed by slowly decomposing mosses and plant remains. In some areas a thin layer of sandy loam or loamy sand is between the organic

material and the bedrock. The depth to bedrock ranges from 1 to 26 inches.

The common minor areas are bedrock outcrops and rocky slopes and numerous soils, mainly Sisk and Surplus soils.

Most areas of this unit are forested. In a few areas, particularly on north-facing slopes, narrow areas have been cleared for ski trails. Tree species are restricted to those that survive the extreme cold and very short growing season. Yellow birch and beech are the common hardwoods, and a few sugar maples are at lower elevations. Red spruce and balsam fir are the common softwoods. Tree growth is slow, and productivity is low. Stunted alpine fir and mountain birch are at elevations of 3,000 feet or more. Some areas have only alpine grasses and mosses.

The climate in this unit is too severe for farming. Climate and accessibility are severe limitations for most other uses. Hiking trails through these areas require careful planning to avoid damaging the soil and vegetation.

## Detailed Soil Map Units

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The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Marlow fine sandy loam, 3 to 8 percent slopes, is a phase of the Marlow series.

Some map units are made up of two or more major soils. These map units are called soil complexes, soil associations, or undifferentiated groups.

A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Tunbridge-Lyman complex, 8 to 15 percent slopes, is an example.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated

soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Monadnock-Hermon association, hilly, very stony, 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 similar interpretations can be made for use and management. The pattern and proportion of the soils in the mapped areas are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Lyme and Moosilauke soils, 0 to 3 percent slopes, very stony, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, gravel is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

### Soil Descriptions

#### 1—Occum fine sandy loam, frequently flooded

This soil is well drained, nearly level, and very deep. It is on loamy flood plains along the southern half of the Connecticut River and its tributaries. The areas are usually long and narrow. Where tributaries enter the main valley, the areas are generally fan shaped deltas.

Areas of this soil range from 5 to 50 acres in size. Slopes range from 0 to 3 percent (fig. 10).

The typical sequence, depth, and composition of the layers of this soil is as follows—

*Surface layer:*

0 to 8 inches, very dark grayish brown fine sandy loam

*Subsoil:*

8 to 25 inches, brown fine sandy loam

*Substratum:*

25 to 44 inches, olive brown loamy fine sand

44 to 65 inches, olive fine sand

Some areas are underlain by sand and gravel at a depth of 20 to 36 inches.

### ***Inclusions***

Included with this soil in the mapping are low ridges of excessively drained Suncook soils and narrow drainageways of moderately well drained Pootatuck soils or poorly drained Rippowam soils. Also included adjacent to fast-flowing streams are small areas that are gravelly and very gravelly fine sandy loam throughout and areas with 1 to 4 inches of recently deposited loamy fine sand over the original surface. Included soils make up about 10 percent of this unit.

### ***Major properties of the Occum soil***

*Permeability:* Moderately rapid in the surface layer and subsoil; rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 4 to 6 feet

*Potential frost action:* Moderate

*Flood hazard:* At least once in 2 years from November through April. Flooding during the growing season is rare.

Most areas of this soil are being farmed. Some small isolated areas or areas in a nonfarm region are forested.

### ***Use and Management***

#### **Farming**

This soil is classified as prime farmland in this survey area. The soil can be used for continuous row crops, and good yields of silage, corn, grasses, and legumes are obtained with the proper use of lime and fertilizers. Winter cover crops help prevent erosion during flooding and can be incorporated into the surface layer to maintain and increase organic matter



Figure 10.— Corn stubble on Occum fine sandy loam, frequently flooded, with Hitchcock silt loam, 15 to 60 percent slopes on the escarpment in the background.

levels. Areas subject to very erosive flood flows should be used for grasses and legumes.

### **Woodland**

Fertility and moisture are favorable for high quality hardwoods. This soil is limited for woodland management by flood hazard and plant competition. In many areas timber quality may be reduced by ice damage during flooding. Access to some areas may be a limitation to logging operations. Site preparation after harvest helps reduce the invasion of undesirable species.

### **Community development**

This Occum soil has severe limitations for all types of community development due to flooding. These areas are floodwater channels, and diking to prevent flooding usually causes flooding in another area.

Flooding is a severe limitation for onsite septic systems, and there is a severe hazard of ground-water pollution because the sandy, rapidly permeable substratum may not adequately filter the effluent.

### **Recreation**

This soil is limited by the flood hazard for recreational uses. Limitations are severe for camp areas and playgrounds and moderate for picnic areas, hiking paths and trails. These areas are subject to ice damage, erosion, and sedimentation.

### **Wildlife Habitat**

This soil has good suitability for the development of habitat for openland or woodland wildlife. It is very poorly suited for wetland wildlife habitat. Frequent flooding will severely damage water impoundments in these areas.

The capability class is I.

## **2—Suncook loamy fine sand**

This soil is very deep, nearly level, and excessively drained. It is on low flood plains of the southern half of the Connecticut River. The areas are long and narrow along the river and semirounded along tributaries. They range from 5 to over 100 acres in size. Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 8 inches, dark grayish brown loamy fine sand

*Substratum:*

8 to 32 inches, olive brown loamy fine sand

32 to 65 inches, olive fine sand

Some areas along fast-flowing streams have a gravelly or very gravelly substratum.

### ***Inclusions***

Included with this soil in mapping are areas of moderately well drained soils and a few narrow areas of well drained Hadley or Occum soils. Also included are occasionally flooded areas. Included areas make up about 15 percent of this unit.

### ***Major properties of the Suncook soil***

*Permeability:* Rapid to very rapid throughout

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 3 to 6 feet

*Potential frost action:* Low

*Flood hazard:* At least once in 2 years from March through May. Flooding is rare during the growing season. Some areas in major valleys are subject to occasional flooding.

Most areas of this soil are farmed, but a few areas are forested. Some areas have been used for commercial and industrial development.

### ***Use and Management***

#### **Farming**

Droughtiness is the major limitation. Yields are generally low unless irrigation is used. Winter cover crops help prevent erosion during spring flooding and can be incorporated into the surface layer to maintain and increase organic matter levels.

#### **Woodland**

Fertility and moisture are adequate for good tree growth. This soil is limited for woodland management by flood hazard and seedling mortality. In many areas timber quality may be reduced by ice damage during early spring flooding. Access to some areas may be a limitation to logging operations. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

#### **Community development**

This soil is severely limited for most types of community development due to flood hazard. Many of these areas are floodwater channels, and diking to prevent flooding usually causes flooding in another area. Construction of underground utilities through these areas is difficult because the sides of excavations tend to slough.

Onsite sewage disposal systems have severe

limitations due to flood hazard and poor filtering. The sandy, very permeable substratum does not effectively filter the effluent, and there is a hazard of ground-water pollution.

#### **Recreation.**

This soil has severe limitations for camping or playgrounds and athletic fields due to flood hazard. The flood hazard and the sandy, droughty surface are moderate limitations for picnic areas and hiking trails. Ground cover is difficult to establish and maintain on this droughty soil, and the areas are susceptible to erosion and sedimentation during flooding.

#### **Wildlife Habitat**

Suitability is poor for habitat areas for openland and woodland wildlife and very poor for wetland wildlife.

The capability subclass is IIIs.

### **4—Pootatuck very fine sandy loam**

This soil is very deep, nearly level, and moderately well drained. It is on loamy flood plains of the southern half of the Connecticut River and its tributaries. The areas are irregular in shape and range from 5 to 40 acres in size. Slopes range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil is as follows—

*Surface layer:*

0 to 7 inches, dark brown very fine sandy loam

*Subsoil:*

7 to 19 inches, olive brown fine sandy loam

19 to 24 inches, mottled, olive brown fine sandy loam

*Substratum:*

24 to 32 inches, mottled, grayish brown fine sandy loam

32 to 47 inches, mottled, olive gray loamy sand

47 to 65 inches, olive gray sand

Some areas along fast-flowing streams have a gravelly subsoil and very gravelly substratum. On broad flood plains, some areas are very fine sandy loam in the subsoil and loamy very fine sand in the substratum.

#### ***Inclusions***

Included with this soil in mapping are areas of excessively drained Suncook soils, well drained Occum soils, and poorly drained Rippowam soils. The Suncook and Occum soils are on low, narrow ridges or slightly higher areas. The Rippowam soils are on very narrow abandoned stream channels. Also included are areas with very recent flood depositions of 4 to 5 inches of loamy sand and areas which are only

occasionally flooded. The included soils make up about 10 percent of this unit.

#### ***Major properties of the Pootatuck soil***

*Permeability:* Moderate to moderately rapid in the surface layer and subsoil; rapid to very rapid in the substratum

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 1.5 to 2.5 feet from November through April

*Potential frost action:* Moderate

*Flood hazard:* At least once in 2 years from November through April. Flooding during the growing season mainly is rare. Some areas in major valleys are subject to occasional flooding.

Most areas of this soil are farmed. A few isolated areas or areas in a nonfarming region are forested.

#### ***Use and Management***

##### **Farming**

This soil is classified as prime farmland in this survey area. Winter cover crops and manure will help maintain the organic matter levels, and the cover crops will provide protection from erosion during spring flooding. Artificial drainage will permit earlier tillage in the spring, but adequate outlets may be difficult to locate on this nearly level soil.

##### **Woodland**

Fertility and moisture are favorable for high quality hardwoods. This soil is limited for woodland management by flood hazard and plant competition. In many areas timber quality may be reduced by ice damage during flooding. Access to some areas may be a limitation to logging operations. Site preparation following harvest helps reduce the invasion of undesirable species.

##### **Community Development**

This soil is limited for community development by flooding, wetness, and frost action. Any type of construction must be designed to withstand flooding. The construction of underground utilities through these areas is difficult because the sides of shallow excavations tend to slough. Deep excavations usually require special equipment and should be planned for midsummer to avoid the high water table. This soil is severely limited for dwellings without basements by flooding and for dwellings with basements by flooding

and wetness. Flooding and frost action are severe limitations for local roads and streets. Frost action can be overcome by providing coarser grained base material to frost depth and installing drainage.

The flooding, wetness, and poor filtering are severe limitations for onsite waste disposal systems. The sandy, very permeable subsoil and substratum do not effectively filter effluent, and there is a hazard of ground-water pollution.

### Recreation

This soil has severe limitations for camp areas, playgrounds, and athletic fields due to flood hazard. Limitations are moderate for picnic areas, hiking paths and trails due to flooding and wetness. The soil is susceptible to erosion and sedimentation during flooding.

### Wildlife Habitat

Suitability is fair for habitat areas for openland wildlife and good for woodland wildlife. This soil is poorly suited for wetland wildlife habitat.

The capability subclass is llw.

## 5—Rippowam fine sandy loam

This soil is very deep, nearly level, and poorly drained. It is on loamy flood plains and oxbows along the southern half of the Connecticut River and its tributaries. The areas are mainly irregular or narrow, curving shapes and range in size from 5 to 25 acres. Slopes range from 0 to 3 percent (fig. 11).

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

0 to 10 inches, dark grayish brown fine sandy loam

#### *Subsoil:*

10 to 18 inches, mottled, dark grayish brown sandy loam

#### *Substratum:*

18 to 26 inches, mottled, olive gray fine sandy loam

26 to 40 inches, mottled, olive gray loamy sand

40 to 65 inches, mottled, dark olive gray gravelly loamy sand

Some areas along fast-flowing streams have a gravelly subsoil. A few areas along slow-flowing streams are fine sandy loam throughout or have surface layer and subsoil of very fine sandy loam.

### Inclusions

Included in this unit are low, very poorly drained areas with a surface layer of mucky peat and mounds or narrow ridges of moderately well drained Pootatuck soils and well drained Occum soils. Also included are

areas with 1 to 4 inches of recently deposited fine sand, very fine sand, or silt and areas which are only occasionally flooded. The included soils make up about 15 percent of this unit.

### ***Major properties of the Rippowam soil***

*Permeability:* Moderate to moderately rapid in the surface layer and subsoil; rapid to very rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 0 to 1.5 feet from September through June

*Potential frost action:* High

*Flood hazard:* At least once in 2 years mainly from October through May. Some areas will flood during the summer following heavy rains.

Most areas of this soil are forested. Some areas have been cleared and are used for hayland or pasture. A few areas are used for row crops.

### ***Use and Management***

#### Farming

This soil is moderately well suited for row crops. Wetness in late spring and early fall delays tillage and planting and is a limitation during harvest. The soil is well suited for use as hayland or pasture. Grasses and legumes on this soil must be able to tolerate prolonged wetness, flooding, and severe frost heaving.

#### Woodland

Fertility and moisture are fair to poor for hardwood growth and fair to good for softwoods, especially red spruce and balsam fir. This soil is limited for woodland management by flood hazard, equipment limitations, seedling mortality, windthrow hazard, and plant competition. In many areas timber quality may be reduced by ice damage during flooding. Access to some areas may be a limitation to logging operations.

Equipment limitations due to wetness are reduced if tree harvesting and management operations are restricted to times when the ground is frozen or during the driest summer months. Seedling mortality can be reduced by special site preparation or by favoring species that are suited for wet sites. Windthrow hazard can be reduced by careful thinning to avoid surface-root damage caused by harvesting equipment. Site preparation following tree harvest helps decrease the invasion of undesirable species.

#### Community Development

This soil has severe limitations for all phases of



Figure 11.— Flooded area of Rippowam fine sandy loam adjacent to Windsor loamy fine sand, 8 to 15 percent slopes. The good vegetative cover maintained through proper grazing helps control erosion.

community development due to frequent flooding, prolonged wetness, poor filtering, and frost action.

The soil, however, improves and maintains water quality by acting as a natural filter to remove harmful chemicals, nutrients, and sediment. It also recharges ground-water aquifers and stores runoff to lessen flood damage.

#### Recreation

This soil has severe limitations for camp areas, playgrounds, and athletic fields due to flood hazard and wetness. Limitations are severe for picnic areas and hiking paths and trails due to wetness. The soil is susceptible to erosion and sedimentation during flooding.

#### Wildlife Habitat

Suitability is fair for woodland, openland, and wetland wildlife habitat. Water impoundments are susceptible to flood damage and sedimentation.

The capability subclass is IIIw.

### 8—Hadley silt loam, frequently flooded

This soil is very deep, nearly level, and well drained. It is on silty flood plains of the southern half of the Connecticut River. The areas are irregular in shape and range from 5 to 50 acres in size. Slopes range from 0 to 3 percent (fig. 12).

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 10 inches, dark brown silt loam

*Substratum:*

10 to 22 inches, olive silt loam

22 to 42 inches, olive very fine sandy loam

42 to 65 inches, olive loamy fine sand

Some areas of this soil have 1 to 4 inches of recently deposited loamy fine sand or loamy very fine sand on the surface.

#### *Inclusions*

Included with this unit are narrow ridges of excessively drained Suncook soils and well drained

Occur soils. Moderately well drained Winooski soils and poorly drained Limerick soils are in narrow depressions and old stream channels. The included soils make up about 10 percent of this unit.

### ***Major properties of the Hadley soil***

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 4 to 6 feet; November to April

*Potential frost action:* High

*Flood hazard:* At least once in two years from February through April. Flooding during the growing season is rare.

Most areas of this soil are farmed. Very few areas are forested or have been developed for residential or commercial uses.

## ***Use and Management***

### **Farming**

This soil is classified as prime farmland in this survey area. Excellent yields of silage corn, grasses, and legumes are obtained with the proper use of lime and fertilizer. Where row crops are grown, winter cover crops protect the soil from erosion during flooding and can be incorporated into surface layer to maintain organic matter levels.

### **Woodland**

Fertility and moisture are favorable for the growth of high quality hardwoods. Flood hazard and plant competition on this soil are limitations that affect woodland management. In many areas timber quality may be reduced by ice damage during flooding. Access to some areas may be a limitation to logging



Figure 12.— Spring flooding along the Connecticut River on an area of Hadley silt loam, frequently flooded.

operations. Special site preparation following harvest helps reduce the invasion of undesirable species.

### **Community Development**

This soil has severe limitations for most phases of community development due to frequent flooding. This soil is usually a floodwater channel, and diking to prevent flooding will often cause flooding in another area.

### **Recreation**

This soil has severe limitations for camping areas, playgrounds, and athletic fields due to frequent flooding. It has severe limitations for hiking paths and trails due to wetness and erosion hazard. This soil is subject to ice damage, erosion, and sedimentation during flooding. Any facilities should be designed to withstand flooding.

### **Wildlife Habitat**

Suitability of this soil is good for habitat for openland and woodland wildlife. This soil is very poorly suited for wetland wildlife habitat except as a resting or nesting area adjacent to wetlands.

The capability class is I.

## **9—Winooski silt loam**

This soil is very deep, nearly level, and moderately well drained. It is on silty flood plains of the southern half of the Connecticut River and its tributaries. Some areas are broad and irregular in shape, and others are narrow and curving. The areas range from 5 to 50 acres in size. Slopes range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 8 inches, dark grayish brown silt loam

*Substratum:*

8 to 18 inches, faintly mottled, brown silt loam

18 to 28 inches, mottled, brown silt loam

28 to 36 inches, mottled, dark grayish brown very fine sandy loam

36 to 42 inches, mottled, grayish brown very fine sandy loam

42 to 65 inches, mottled, olive gray loamy very fine sand

### ***Inclusions***

Included with this soil in mapping are small depressions of poorly drained Limerick soils and low mounds or ridges of well drained Hadley soils and excessively drained Suncook soils. Also included are

areas which are only occasionally flooded. The included soils make up about 15 percent of this unit.

### ***Major properties of the Winooski soil***

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 1.5 to 3.0 feet from November through April

*Potential frost action:* High

*Flood hazard:* At least once in 2 years from February through April. Flooding during the growing season mainly is rare. Some areas in major valleys are subject to occasional flooding.

Most areas of this soil are farmed. A few isolated areas and areas in nonfarming regions are forested.

### ***Use and Management***

#### **Farming**

This soil is classified as prime farmland in this survey area. Excellent yields of silage corn, grasses, and legumes are obtained with the proper use of lime and fertilizer. The seasonal wetness may delay tillage of this soil. Subsurface drainage may be limited by the lack of adequate outlets on this nearly level soil. Winter cover crops help protect the soil from erosion when flooded. Legumes, particularly alfalfa, are difficult to maintain because of the high frost action. Land grading to improve surface drainage will increase the rate of winter survival.

#### **Woodland**

Fertility and moisture are favorable for high quality hardwoods. This soil is limited for woodland management by flood hazard and plant competition. In many areas timber quality may be reduced by ice damage during flooding. Access to some areas may be a limitation to logging operations. Special site preparation following tree harvest helps decrease invasion of undesirable species.

#### **Community Development**

This soil is limited for community development by flooding, wetness, and frost action. Any type of construction must be designed to withstand flooding. Shallow excavations fill with water. Deep excavations should be planned for midsummer to avoid ground water. This soil has severe limitations for dwellings without basements due to flooding, and for dwellings with basements due to flooding and wetness.

Limitations on this soil are severe for local roads and streets due to flooding and frost action. Frost action can be overcome by providing coarser grained base material to frost depth and installing drainage.

Flooding and wetness limit onsite sewage disposal systems.

### **Recreation**

This soil has severe limitations for camp areas, playgrounds, and athletic fields due to flood hazard. Limitations on this soil are moderate for picnic areas due to flooding and wetness. This soil is susceptible to ice damage, erosion, and sedimentation during flooding.

### **Wildlife Habitat**

Suitability is fair for habitat areas for openland wildlife and good for woodland wildlife. This soil is poorly suited for wetland wildlife habitat.

The capability subclass is Ilw.

## **15—Searsport mucky peat**

This soil is very deep, nearly level, and very poorly drained. It is in depressions on sandy outwash plains and terraces. The areas are generally oval. They range from 5 to 50 acres in size. Slopes range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

0 to 12 inches, dark reddish brown mucky peat

12 to 17 inches, gray fine sandy loam

#### *Substratum:*

17 to 25 inches, gray loamy fine sand

25 to 65 inches, olive medium and fine sand

Some areas of this soil have a surface layer of black fine sandy loam.

### ***Inclusions***

Included with this soil in mapping are small areas of very poorly drained Chocorua soils, poorly drained Kinsman soils, and moderately well drained Croghan soils. Chocorua and Kinsman soils are throughout this unit. Croghan soils are on slightly higher benches or low ridges. The included soils make up about 15 percent of this unit.

### ***Major properties of the Searsport soil***

*Permeability:* Rapid in the surface layer and subsoil; rapid to very rapid in the substratum

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 1.0 foot above the surface to a depth of 1.0 foot from January through December.

This soil is subject to prolonged periods of ponding.

*Potential frost action:* Moderate

*Flood hazard:* None

The areas of this soil are a forest of water-tolerant trees or have a marshgrass and sedge cover.

## ***Use and Management***

### **Farming**

This soil is too wet for agricultural uses. Most areas are in low frost pockets with less than 90 frost-free days annually.

### **Woodland**

Fertility and moisture are so variable that onsite investigation is required to assess the potential. This soil is limited for woodland management by equipment limitations, seedling mortality, windthrow hazard, and plant competition.

Equipment limitations due to wetness are reduced if tree harvesting and management operations are restricted to times when the ground is frozen. Seedling mortality can be reduced by site preparation or by favoring species that are suited for wet sites.

Windthrow hazard can be reduced by careful thinning to avoid surface-root damage caused by harvesting equipment. Site preparation following tree harvest helps decrease invasion of undesirable species.

### **Community Development**

This soil has severe limitations for all phases of community development due to prolonged wetness, ponding, and mucky peat in the surface layer.

Ponding and poor filtering are severe limitations for onsite sewage disposal.

The soil, however, improves and maintains water quality by acting as a natural filter to remove harmful chemicals, nutrients, and sediment. The areas also recharge ground-water aquifers and store runoff to lessens flood damage.

### **Recreation**

This soil has severe limitations for all types of recreational development due to ponding and the mucky peat in the surface layer.

### Wildlife Habitat

Suitability is poor for habitat areas for openland and woodland wildlife. Suitability is fair for wetland wildlife habitat. These areas are frequently flooded by beaver dams.

The capability subclass is VIIw.

### 22A—Colton loamy sand, 0 to 3 percent slopes

This soil is very deep, nearly level, and excessively drained. It is on sandy terraces and outwash plains. The areas are irregularly shaped and range in size from 5 to 45 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 8 inches, dark brown loamy sand

8 to 11 inches, gray loamy sand

*Subsoil:*

11 to 12 inches, very dark gray gravelly loamy fine sand

12 to 18 inches, yellowish red gravelly loamy sand

18 to 22 inches, yellowish brown gravelly loamy sand

*Substratum:*

22 to 65 inches, very pale brown very gravelly loamy sand

### Inclusions

Included with this soil in mapping are areas of excessively drained Adams soils, moderately well drained Croghan soils, and areas with surface stones and boulders that are 5 to 30 feet apart. The Adams soils are throughout this unit. The Croghan soils are along the base of slopes, in depressions, and along drainageways. Also included are small areas with slopes of more than 3 percent. Included soils make up about 15 percent of this unit.

### Major properties of the Colton soil

*Permeability:* Rapid in the surface layer and subsoil; very rapid in the substratum

*Available water capacity:* Very low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil were cleared for farming at one time, but many areas have been abandoned and have reverted to woodland. A few areas are farmed or are used for residential, commercial, or industrial

development. Many of the commercial sand and gravel operations in the area are in this unit.

### Use and Management

#### Farming

The droughtiness of this soil is the primary limitation for farming. The soil is moderately well suited for row crops. However, the short growing season and cool summers restrict the choice of crop varieties. Heavy applications of manure and winter cover crops incorporated into the surface layer will help maintain and increase the organic matter level and the available water capacity. Even with the proper use of lime and fertilizer, only fair yields of grasses and legumes are normally obtained without irrigation. Winterkill of legumes is a concern in depressions on this nearly level soil because the depressions may be covered by ice following midwinter thaws.

#### Woodland

Soil moisture is adequate for good softwood growth, especially eastern white pine, on this soil.

Seedling mortality is a limitation for woodland management. This limitation can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

#### Community Development

This soil has several limitations for community development. The sides of excavations tend to slough, and deep excavations may require special equipment. Droughtiness is a severe limitation for the establishment of lawns and landscaping.

The sandy and gravelly, very permeable subsoil and substratum do not effectively filter the effluent from onsite waste disposal systems, and there is a hazard of ground-water pollution.

This soil is a probable source of gravel, but extensive test pitting should be done at the site.

#### Recreation

Use of this soil is limited for playgrounds and athletic fields. There is a moderate limitation where the surface is gravelly. Maintaining adequate grass cover on athletic fields is a concern on this droughty soil.

#### Wildlife Habitat

Suitability of this soil is fair for habitat areas for openland wildlife and poor for woodland wildlife. This excessively drained soil is very poorly suited for wetland wildlife habitat except as a resting or nesting area adjacent to wetlands.

The capability subclass is IIIs.

## 22B—Colton loamy sand, 3 to 8 percent slopes

This soil is very deep, gently sloping, and excessively drained. It is on sandy terraces and outwash plains. The areas are irregularly shaped and range in size from 5 to 60 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 8 inches, dark brown loamy sand

8 to 11 inches, gray loamy sand

*Subsoil:*

11 to 12 inches, very dark gray gravelly loamy fine sand

12 to 18 inches, yellowish red gravelly loamy sand

18 to 22 inches, yellowish brown gravelly loamy sand

*Substratum:*

22 to 65 inches, very pale brown very gravelly loamy sand

### ***Inclusions***

Included with this soil in mapping are areas of excessively drained Adams soils, moderately well drained Croghan soils, and areas with surface stones and boulders that are 5 to 30 feet apart. The Adams soils are throughout this unit. The Croghan soils are along the base of slopes, in depressions, and along drainageways. Also included are small areas with slopes of less than 3 percent or more than 8 percent. Included soils make up about 15 percent of this unit.

### ***Major properties of the Colton soil***

*Permeability:* Rapid in the surface layer and subsoil; very rapid in the substratum

*Available water capacity:* Very low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil were cleared for farming at one time, but many areas have been abandoned and have reverted to woodland. A few areas are farmed or are used for residential, commercial, or industrial development. Many of the commercial sand and gravel operations in the area are in this unit.

## ***Use and Management***

### **Farming**

The droughtiness of this soil is the primary limitation for farming. The soil is moderately well suited for row crops. However, the short growing season and cool summers restrict the choice of crop varieties. Heavy application of manure and winter cover crops incorporated into the surface layer will help maintain and increase the organic matter level and the available water capacity. Even with the proper use of lime and fertilizer, only fair yields of grasses and legumes are normally obtained.

### **Woodland**

Soil moisture is adequate for good softwood growth, especially eastern white pine. Seedling mortality is a limitation that affects woodland management. This limitation can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

### **Community Development**

This soil has several limitations for community development. The sides of excavations tend to slough, and deep excavations may require special equipment. Slope is a moderate limitation for small commercial buildings. Droughtiness is a severe limitation for the establishment of lawns and landscaping.

The gravelly, very permeable subsoil and substratum do not effectively filter the effluent from onsite waste disposal systems, and there is a hazard of ground-water pollution.

This soil is a probable source of gravel, but extensive test pitting should be done at the site.

### **Recreation**

This soil has moderate limitations for playgrounds and athletic fields due to slope and small stones. Maintaining adequate grass cover on athletic fields is a concern on this droughty soil.

### **Wildlife Habitat**

Suitability of this soil is fair for habitat areas for openland wildlife and poor for woodland wildlife. This excessively drained soil is very poorly suited for wetland wildlife habitat except as resting or nesting areas adjacent to wetlands.

The capability subclass is IIIs.



Figure 13.— This area of Colton loamy sand, 8 to 15 percent slopes, is used for growing hay.

## 22C—Colton loamy sand, 8 to 15 percent slopes

This soil is very deep, sloping, and excessively drained. It is on sandy terraces and outwash plains. The areas are irregularly shaped and range in size from 5 to 25 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

### *Surface layer:*

0 to 8 inches, dark brown loamy sand

8 to 11 inches, gray loamy sand

### *Subsoil:*

11 to 12 inches, very dark gray gravelly loamy fine sand

12 to 18 inches, yellowish red gravelly loamy sand

18 to 22 inches, yellowish brown gravelly loamy sand

### *Substratum:*

22 to 65 inches, very pale brown very gravelly loamy sand

### ***Inclusions***

Included with this soil in mapping are areas of excessively drained Adams soils, moderately well drained Croghan soils, and areas with surface stones and boulders that are 5 to 30 feet apart. The Adams soils are throughout this unit. The Croghan soils are along the base of slopes, in depressions, and along drainageways. Also included are small areas with slopes of less than 8 percent or more than 15 percent. Included soils make up about 15 percent of this unit.

### ***Major properties of the Colton soil***

*Permeability:* Rapid in the surface layer and subsoil; very rapid in the substratum

*Available water capacity:* Very low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil were cleared for farming at one time, but many areas have been abandoned and have reverted to woodland. A few areas are farmed or are used for residential and industrial development. Many of the commercial sand and gravel operations in the area are in this unit.

### ***Use and Management***

#### **Farming**

The droughtiness of this soil and the moderate erosion hazard are the primary limitations for farming. The soil is better suited for drought-resistant grasses and legumes than to row crops (fig. 13). The short growing season and cool summers restrict the choice of crop varieties. Heavy applications of manure and winter cover crops incorporated into surface layer will help maintain and increase the organic matter level and the available water capacity. Fertilizers are leached quickly through this soil, and frequent, light

applications to hay and pasture areas are more economical than single heavy applications. Even with the proper use of lime and fertilizer, only fair yields of grasses and legumes are normally obtained.

### **Woodland**

Soil moisture is adequate for good softwood growth, especially eastern white pine.

Seedling mortality is a limitation that affects woodland management. This limitation can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

### **Community Development**

This soil is limited by slope and droughtiness. The construction of roads and streets may make it necessary to use significant grading. The resulting road cuts and disturbed areas are difficult to revegetate on this droughty soil. The sides tend to slough. Deep excavations may require special equipment. Erosion is an additional concern during periods of construction. After construction, the droughtiness is a severe limitation for the establishment of lawns and landscaping.

The sandy and gravelly, very permeable subsoil and substratum do not effectively filter the effluent from onsite waste disposal systems, and there is a hazard of ground-water pollution.

This soil is a probable source of gravel, but extensive test pitting should be done at the site.

### **Recreation**

The slope of this soil is a limitation for most recreational uses. This limitation is moderate for camp and picnic areas and severe for playgrounds and athletic fields. Hiking paths and trails have few limitations, but areas of heavy use should be designed to prevent erosion.

### **Wildlife Habitat**

Suitability of this soil is fair for habitat areas for openland wildlife and poor for woodland wildlife. This excessively drained soil is very poorly suited for wetland wildlife habitat except as resting or nesting areas adjacent to wetlands.

The capability subclass is IVs.

## **22E—Colton loamy sand, 15 to 60 percent slopes**

This soil is very deep, moderately steep to very steep, and excessively drained. It is on sandy terrace escarpments, ravines, and eskers. The areas are long and narrow and range from 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

0 to 8 inches, dark brown loamy sand

8 to 11 inches, gray loamy sand

#### *Subsoil:*

11 to 12 inches, very dark gray gravelly loamy fine sand

12 to 18 inches, yellowish red gravelly loamy sand

18 to 22 inches, yellowish brown gravelly loamy sand

#### *Substratum:*

22 to 65 inches, very pale brown very gravelly loamy sand

### ***Inclusions***

Included with this soil in mapping are small areas with slopes of less than 15 percent on narrow terraces and ridgetops and few areas with slopes of more than 60 percent. Moderately well drained Croghan or poorly drained Kinsman soils in places are on narrow ravine floors. In some areas the ravines have cut into the underlying glacial till and the ravine floors include the poorly drained Lyme or Pillsbury soils. Along major valleys, the lower portion of some escarpments are stratified silts. Bedrock outcrops are common along the base of some escarpments. The included soils make up about 25 percent of this unit.

### ***Major properties of the Colton soil***

*Permeability:* Rapid in the surface layer and subsoil; very rapid in the substratum

*Available water capacity:* Very low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil are woodland.

### ***Use and Management***

#### **Farming**

The moderately steep to very steep slopes make this soil unsuited for farming.

#### **Woodland**

Soil moisture is adequate for good softwood growth, especially eastern white pine, but erosion hazard, equipment limitations, and seedling mortality are limitations that affect woodland management.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes and with frequent water bars and culverts, then seeding with

drought-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by the use of track equipment and careful planning to avoid steepest areas. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

### **Community Development**

This soil is severely limited by slope for all phases of community development. Sides of excavations in this soil tend to slough, and deep excavations may require special equipment. The construction of roads and streets through the soil may make it necessary to use extensive cuts to reduce slopes. The resulting road cuts and disturbed areas are difficult to stabilize and revegetate on this droughty soil.

Poor filtering and slope severely limit suitability for onsite sewage disposal systems. The sandy and gravelly, very permeable subsoil and substratum do not effectively filter the effluent, and there is a hazard of ground-water pollution.

This soil is a probable source of sand and gravel, but extensive test pitting should be done at the site.

### **Recreation**

This soil has severe slope limitations for all recreational uses. Heavily used hiking paths and trails should be designed to prevent erosion.

### **Wildlife Habitat**

Suitability of this soil is poor for habitat areas for openland and woodland wildlife habitat. This excessively drained soil is very poorly suited for wetland wildlife habitat except as resting or nesting areas adjacent to wetlands.

The capability subclass is VIIIe.

## **24A—Agawam fine sandy loam, 0 to 3 percent slopes**

This soil is very deep, nearly level, and well drained. It is on loamy terraces along the southern half of the Connecticut River valley. The areas are long and irregular in shape and range from 5 acres to over 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

0 to 10 inches, very dark grayish brown fine sandy loam

#### *Subsoil:*

10 to 19 inches, strong brown fine sandy loam

19 to 23 inches, light olive brown sandy loam

#### *Substratum:*

23 to 65 inches, light yellowish brown loamy coarse sand

### ***Inclusions***

Included with this soil in mapping are areas of excessively drained Windsor soils, well drained Hitchcock soils, and moderately well drained Dartmouth soils. The Windsor soils are along escarpment breaks and on low ridges. The Hitchcock soils usually are near breaks to upland or glacial till soils. The Dartmouth soils are in depressions and at the base of upland slopes. Also included are moderately well drained areas which have a loamy surface layer and a sandy subsoil and substratum, and narrow areas with slopes exceeding 3 percent. Included areas make up 10 percent of this unit.

### ***Major properties of the Agawam soil***

*Permeability:* Moderately rapid to rapid in the surface layer and subsoil; rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil are in cropland. A few small areas are forested, and some areas have been used for residential and commercial development.

### ***Use and Management***

#### **Farming**

This soil is classified as prime farmland in this survey area. Excellent yields of corn silage and hay are obtained with the proper use of lime and fertilizer (fig. 14).

#### **Woodland**

Fertility and moisture are favorable on this Agawam soil for high quality hardwoods. Plant competition is a limitation for woodland management. Site preparation following harvest helps reduce the invasion of undesirable species.

#### **Community Development**

The sides of excavations in this soil tend to slough, and deep excavations may require special equipment.

The sandy, very permeable substratum does not effectively filter the effluent from onsite waste disposal



Figure 14.— Corn on Agawam fine sandy loam, pasture on Charlton fine sandy loam, 15 to 25 percent slopes, woodland on Tunbridge-Lyman-Rock outcrop complex, 25 to 60 percent slopes, very stony.

systems, and there is a hazard of ground-water pollution.

This soil is a probable source of sand and gravel, but extensive test pitting should be done at the site.

#### Recreation

This soil is suited for most recreational uses.

#### Wildlife Habitat

Suitability is good for habitat for openland or woodland wildlife. This soil is very poorly suited for wetland wildlife habitat except as resting or nesting areas adjacent to wetlands.

The capability class is I.

#### 24B—Agawam fine sandy loam, 3 to 8 percent slopes

This soil is very deep, gently sloping, and well drained. It is on loamy terraces along the southern half of the Connecticut River valley. The areas are irregular in shape and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 10 inches, very dark grayish brown fine sandy

loam

*Subsoil:*

10 to 19 inches, strong brown fine sandy loam

19 to 23 inches, light olive brown sandy loam

*Substratum:*

23 to 65 inches, light yellowish brown loamy coarse sand

#### Inclusions

Included with this soil in mapping are small areas of excessively drained Windsor soils, well drained Hitchcock soils, and moderately well drained Dartmouth soils. The Windsor soils are along escarpment breaks and on low ridges. The Hitchcock soils usually are near breaks to upland or glacial till soils. The Dartmouth soils are in depressions and at the base of upland slopes. Also included are moderately well drained areas which have a loamy surface layer and a sandy subsoil and substratum, and areas with slopes of less than 3 percent or more than 8 percent. Included areas make up 15 percent of this unit.

#### Major properties of the Agawam soil

*Permeability:* Moderately rapid to rapid in the surface layer and subsoil; rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil are in cropland. A few small areas are forested, and some areas are used for residential and commercial development.

### ***Use and Management***

#### **Farming**

This soil is classified as prime farmland in this survey area. Excellent yields of corn silage and hay are obtained with the proper use of lime and fertilizer (fig. 15). The erosion hazard is moderate, but if contour cropping, minimum tillage, and winter cover crops are used, this soil can be used for continuous row crops.

#### **Woodland**

Fertility and moisture are favorable on this Agawam soil for high quality hardwoods. Plant competition is a limitation for woodland management. Site preparation

following tree harvest helps decrease invasion of undesirable species.

#### **Community Development**

This Agawam soil is limited for community development by erosion hazard during construction, sloughing, and slope. Limiting surface disturbance is an effective method of controlling the moderate erosion hazard. The sides of excavations tend to slough, and deep excavations may require special equipment. The slope limitation on the soil for small commercial buildings may be reduced by cut and fill.

The sandy, very permeable substratum does not effectively filter the effluent from onsite waste disposal systems, and there is a hazard of ground-water pollution.

This soil is a probable source of sand and gravel, but extensive test pitting should be done at the site.

#### **Recreation**

This soil has a moderate slope limitation for playgrounds and athletic fields due to the amount of land shaping needed.



Figure 15.— Corn stubble on Agawam fine sandy loam, 3 to 8 percent slopes. The undulating surface is characteristic of the sandy terrace soils.

**Wildlife Habitat**

Suitability is good for habitat for openland or woodland wildlife. This soil is very poorly suited for wetland wildlife habitat except as resting or nesting areas adjacent to wetlands.

The capability subclass is IIe.

**26A—Windsor loamy fine sand, 0 to 3 percent slopes**

This soil is very deep, nearly level, and excessively drained. It is on sandy terraces and outwash plains along the southern half of the Connecticut River valley. The areas are irregular in shape and range from 5 acres to more than 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 10 inches, dark yellowish brown loamy fine sand

*Subsoil:*

10 to 18 inches, yellowish brown loamy fine sand

18 to 27 inches, olive brown loamy fine sand

*Substratum:*

27 to 33 inches, pale olive fine sand

33 to 65 inches, light olive gray fine sand

**Inclusions**

Included with this soil in mapping are small depressions of moderately well drained Deerfield soils and poorly drained Walpole soils. Also included are areas with slopes of more than 3 percent and areas with a fine sandy loam surface layer. The included soils make up about 10 percent of this unit.

**Major properties of the Windsor soil**

*Permeability:* Rapid throughout

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Many areas of this soil are farmed. Some areas are forested, and some areas have been used for residential or commercial development.

**Use and Management****Farming**

The droughtiness of this Windsor soil is the major limitation. Fair to good yields of silage corn, grasses,

and legumes are obtained with the proper use of lime and fertilizer. Incorporating crop residue into surface layer and adding manure to the soil will increase the organic matter content and improve the water holding capacity of the soil. Winterkill of legumes is a concern in depressions on this nearly level soil because of ice coverage following midwinter thaws.

**Woodland**

Soil moisture is adequate for good softwood growth, especially eastern white pine.

This soil is limited for woodland management by seedling mortality. This limitation can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

**Community Development**

This soil is limited for most phases of community development. The sides of excavations tend to slough, and deep excavations may require special equipment. After construction, droughtiness is a moderate limitation for the establishment of lawns and landscaping.

The sandy, very permeable subsoil and substratum do not effectively filter the effluent from onsite waste disposal systems, and there is a hazard of ground-water pollution.

This soil is a probable source of sand, but extensive test pitting should be done at the site.

**Recreation**

This soil has moderate limitations for most recreational uses because of the sandy texture and the low available water holding capacity. Maintaining adequate grass cover on athletic fields is a concern on this droughty soil.

**Wildlife Habitat**

Suitability is poor for habitat areas for openland and woodland wildlife and very poor for wetland wildlife habitat.

The capability subclass is IIIs.

**26B—Windsor loamy fine sand, 3 to 8 percent slopes**

This soil is very deep, gently sloping or undulating, and excessively drained. It is on sandy terraces and outwash plains along the southern half of the Connecticut River valley. The areas are mainly irregular in shape and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—



Figure 16.— This area of Windsor loamy fine sand, 3 to 8 percent slopes, is used as a source of sand.

*Surface layer:*

0 to 10 inches, dark yellowish brown loamy fine sand

*Subsoil:*

10 to 18 inches, yellowish brown loamy fine sand

18 to 27 inches, olive brown loamy fine sand

*Substratum:*

27 to 33 inches, pale olive fine sand

33 to 65 inches, light olive gray fine sand

***Inclusions***

Included with this soil in mapping are small depressions of moderately well drained Deerfield soils and poorly drained Walpole soils. Also included are areas with slopes of less than 3 percent or more than 8 percent and areas with a fine sandy loam surface layer. The included soils make about 15 percent of this unit.

***Major properties of the Windsor soil***

*Permeability:* Rapid throughout

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Many areas of this soil are farmed. Some areas are forested, and some areas have been used for residential or commercial development.

***Use and Management***

***Farming***

The droughtiness of this Windsor soil is the major limitation. Fair to good yields of silage corn, grasses, and legumes are obtained with the proper use of lime and fertilizer. Incorporating crop residue into surface layer and adding manure to the soil will increase the organic matter content and improve the water holding capacity of the soil. Contour farming and winter cover crops are needed to control erosion if these undulating soils are used for continuous row crops.

***Woodland***

Soil moisture is adequate for good softwood growth, especially eastern white pine.

This soil is limited for woodland management by seedling mortality. This limitation can be reduced by

planting seedlings in the spring to obtain sufficient moisture from early-season rains.

### Community Development

This soil is limited by droughtiness and sandy texture for most phases of community development. The sides of excavations tend to slough, and deep excavations may require special equipment. After construction, droughtiness is a moderate limitation for the establishment of lawns and landscaping.

The sandy, very permeable subsoil and substratum do not effectively filter the effluent from onsite waste disposal systems, and there is a hazard of ground-water pollution.

This soil is a probable source of sand, but extensive test pitting should be done at the site (fig. 16).

### Recreation

This soil has moderate limitations for most recreational uses because of the sandy texture and the low available water capacity. Slope is a moderate limitation that may make it necessary to use extra land shaping for areas used as playgrounds. Maintaining adequate grass cover on athletic fields is a concern on this droughty soil.

### Wildlife Habitat

Suitability is poor for habitat areas for openland and

woodland wildlife and very poor for wetland wildlife habitat.

The capability subclass is IIIs.

## 26C—Windsor loamy fine sand, 8 to 15 percent slopes

This soil is very deep, strongly sloping or rolling, and excessively drained. It is on sandy terraces and outwash plains along the southern half of the Connecticut River valley. The areas are mainly irregular in shape and range from 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

0 to 10 inches, dark yellowish brown loamy fine sand

#### *Subsoil:*

10 to 18 inches, yellowish brown loamy fine sand

18 to 27 inches, olive brown loamy fine sand

#### *Substratum:*

27 to 33 inches, pale olive fine sand

33 to 65 inches, light olive gray fine sand

### *Inclusions*

Included with this soil in mapping are small areas of moderately well drained Deerfield soils and poorly drained Walpole soils in depressions and at the base of



Figure 17.— Hay on Windsor loamy fine sand, 8 to 15 percent slopes (foreground), corn on Agawam fine sandy loam, 0 to 3 percent slopes.

slopes. Also included are areas with slopes of less than 8 percent or more than 15 percent and areas with a fine sandy loam surface layer. The included soils make up about 15 percent of this unit.

### ***Major properties of the Windsor soil***

*Permeability:* Rapid throughout

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil are forested or have been used for residential or commercial development. Some areas are farmed.

### ***Use and Management***

#### **Farming**

Droughtiness and the erosion hazard limit farming of this soil to hayland or pasture (fig. 17). Fair to good yields of grasses and legumes are obtained with the proper use of lime and fertilizer. The addition of manure will increase the organic matter content of the soil and help improve the water holding capacity.

#### **Woodland**

Soil moisture is adequate for good softwood growth, especially eastern white pine.

This soil is limited for woodland management by seedling mortality. This limitation can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

#### **Community Development**

This soil has limitations for most phases of community development due to slope and the sandy texture. The sides of excavations tend to slough, and deep excavations may require special equipment. Limitations are moderate for dwellings with or without basements due to slope. This soil has moderate slope limitations for the construction of roads and streets. The resulting road cuts and disturbed areas are difficult to revegetate on this droughty soil. Erosion is a concern during periods of construction but can be controlled with sediment catch basins, heavy mulching, hay bales, terraces, and diversions. After construction, droughtiness and slope are moderate limitations for the establishment of lawns and landscaping. Slope limitations on this unit generally can be overcome with cut and fill to level areas.

The sandy, very permeable subsoil and substratum do not effectively filter the effluent from onsite waste

disposal systems, and there is a hazard of ground-water pollution.

This soil is a probable source of sand, but extensive test pitting should be done at the site.

#### **Recreation**

This soil is limited for most recreational development by slope and the sandy, droughty conditions. Limitations for this soil are moderate for camp and picnic areas due to slope and droughtiness. Limitations are severe for playgrounds and athletic fields due to slope. This soil has moderate limitations for hiking paths and trails because of the sandy texture.

#### **Wildlife Habitat**

Suitability is poor for habitat areas for openland and woodland wildlife and very poor for wetland wildlife habitat.

The capability subclass is IVs.

## **26E—Windsor loamy fine sand, 15 to 60 percent slopes**

This soil is very deep, moderately steep to very steep, and excessively drained. It is on sandy terrace escarpments along the southern half of the Connecticut River valley. The areas are mainly long and narrow, but some broaden to include severely truncated areas. The areas range from 5 acres to more than 60 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 10 inches, dark yellowish brown loamy fine sand

*Subsoil:*

10 to 18 inches, yellowish brown loamy fine sand

18 to 27 inches, olive brown loamy fine sand

*Substratum:*

27 to 33 inches, pale olive fine sand

33 to 65 inches, light olive gray fine sand

### ***Inclusions***

Included with this soil in mapping are small or narrow areas with slopes of less than 15 percent and a few areas with slopes of more than 60 percent. Moderately well drained Deerfield soils or poorly drained Walpole soils in places are on narrow ravine floors. In some areas the ravines have cut into the underlying glacial till and the ravine floors include the poorly drained Stissing soils. Along major valleys the lower portion of some escarpments are stratified silts. Bedrock outcrops are common along the base of some escarpments, especially escarpments bordering flood

plains. The included soils make up about 15 percent of this unit.

### ***Major properties of the Windsor soil***

*Permeability:* Rapid throughout

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil are forested, and a few moderately steep areas are used for pasture.

### ***Use and Management***

#### **Farming**

The steep slopes and severe erosion hazard are limitations for all farming of the soil. Operation of modern farming equipment on these slopes is hazardous. Some of the moderately steep areas can be used for pasture, but maintenance of good quality grasses and legumes is a concern. Severe erosion may develop along cattle trails.

#### **Woodland**

Soil moisture is adequate for good softwood growth, especially eastern white pine, but this soil is limited for woodland management by erosion hazard, equipment limitations, and seedling mortality.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with drought-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by the use of track equipment and careful planning to avoid steepest areas. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

#### **Community Development**

This soil has severe limitations for most phases of community development due to steep slopes. The sides of excavations tend to slough, and deep excavations may require special equipment. Erosion is a concern during periods of construction but can generally be controlled on this rapidly permeable soil with measures such as sediment catch basins, heavy mulching, hay bales, terraces, and diversions. This soil has severe slope limitations for the construction of roads and streets. The resulting road cuts and disturbed areas are difficult to revegetate on this droughty soil.

Slope limits onsite waste disposal. Also, the sandy,

very permeable subsoil and substratum do not effectively filter the effluent from onsite waste disposal systems, and there is a hazard of ground-water pollution.

This soil is a probable source of sand, but extensive test pitting should be done at the site.

#### **Recreation**

Slope is the major limitation for most uses.

#### **Wildlife Habitat**

Suitability is poor for habitat areas for openland and woodland wildlife and very poor for wetland wildlife habitat.

The capability subclass is VIIs.

### **27A—Groveton fine sandy loam, 0 to 3 percent slopes**

This soil is very deep, nearly level, and well drained. It is on loamy terraces and outwash plains. The areas are irregular in shape and range from 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 3 inches, dark brown fine sandy loam

*Subsoil:*

3 to 8 inches, brown fine sandy loam

8 to 28 inches, yellowish brown fine sandy loam

*Substratum:*

28 to 48 inches, light yellowish brown loamy fine sand

48 to 65 inches, light yellowish brown fine sand

Some areas have a substratum of gravelly loamy sand.

#### ***Inclusions***

Included with this soil in mapping are small areas of excessively drained Adams soils and moderately well drained Madawaska soils. Adams soils are on low ridges and along the edges of escarpments. Madawaska soils are in depressions and along the base of slopes. Also included in this unit are areas with slopes of more than 3 percent. Inclusions make up about 10 percent of this unit.

### ***Major properties of the Groveton soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil are forested. Some areas are used for farming, and some areas are used for residential development.

### ***Use and Management***

#### **Farming**

This soil is classified as prime farmland in this survey area. However, the short growing season and cool summers restrict the choice of crop varieties. Good yields of grasses and legumes can be obtained with the proper use of lime and fertilizer. The organic matter content can be maintained by incorporating crop residue, winter cover crops, and manure into the surface layer.

#### **Woodland**

Fertility and moisture are favorable on this Groveton soil for high quality hardwoods. There are few limitations for woodland management or logging operations.

#### **Community Development**

This Groveton soil has few limitations for most phases of community development. There are concerns during construction because the sides of excavations tend to slough, and deep excavations may require special equipment.

This soil is a probable source of sand, but extensive test pitting should be done at the site.

#### **Recreation**

This soil has few limitations for recreational uses.

#### **Wildlife Habitat**

Suitability is good for habitat for openland and woodland wildlife. This soil is poorly suited for wetland wildlife except as resting or nesting areas adjacent to wetlands.

The capability class is I.

### **27B—Groveton fine sandy loam, 3 to 8 percent slopes**

This soil is very deep, gently sloping, and well drained. It is on loamy terraces and outwash plains. The areas are irregular in shape and range from 5 to 45 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 3 inches, dark brown fine sandy loam

*Subsoil:*

3 to 8 inches, brown fine sandy loam

8 to 28 inches, yellowish brown fine sandy loam

*Substratum:*

28 to 48 inches, light yellowish brown loamy fine sand

48 to 65 inches, light yellowish brown fine sand

Some areas have a substratum of gravelly loamy sand.

### ***Inclusions***

Included with this soil in mapping are small areas of excessively drained Adams soils, moderately well drained Madawaska and Croghan soils, and poorly drained Kinsman soils. Adams soils are on low ridges and along the edges of escarpments. Madawaska, Croghan, and Kinsman soils are in depressions and along the base of slopes. Also included in this unit are areas with slopes of less than 3 percent or more than 8 percent. Inclusions make up about 15 percent of this unit.

### ***Major properties of the Groveton soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil are forested. Some areas are used for farming or residential development.

### ***Use and Management***

#### **Farming**

This soil is classified as prime farmland in this survey area. However, the short growing season and cool summers restrict the choice of crop varieties. Good yields of grasses and legumes can be obtained with the proper use of lime and fertilizer. Contour farming and conservation tillage help to control erosion. The organic matter content can be maintained by incorporating crop residue, winter cover crops, and manure into the surface layer.

#### **Woodland**

Fertility and moisture are favorable on this Groveton soil for high quality hardwoods. There are few limitations for woodland management or logging operations.

#### **Community Development**

This Groveton soil has few limitations for most

phases of community development, but the erosion hazard is moderate during construction. Limiting surface disturbance is an effective method of controlling erosion. There are concerns during construction because the sides of excavations tend to slough, and deep excavations may require special equipment.

This soil is a probable source of sand, but extensive test pitting should be done at the site.

### **Recreation**

This soil has a moderate slope limitation for playgrounds and athletic fields due to the amount of landshaping required to level the area.

### **Wildlife Habitat**

Suitability is good for habitat for openland and woodland wildlife. This soil is poorly suited for wetland wildlife except as resting or nesting areas adjacent to wetlands.

The capability subclass is IIe.

## **27C—Groveton fine sandy loam, 8 to 15 percent slopes.**

This soil is very deep, strongly sloping, and well drained. It is on loamy terraces and outwash plains. The areas are irregular in shape and range from 5 to 45 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 3 inches, dark brown fine sandy loam

*Subsoil:*

3 to 8 inches, brown fine sandy loam

8 to 28 inches, yellowish brown fine sandy loam

*Substratum:*

28 to 48 inches, light yellowish brown loamy fine sand

48 to 65 inches, light yellowish brown fine sand

Some areas have a substratum of gravelly loamy sand.

### ***Inclusions***

Included with this soil in mapping are small areas of excessively drained Adams soils, moderately well drained Madawaska, Nicholville, and Croghan soils, and poorly drained Kinsman and Pemi soils. Adams soils are along the edges of escarpments. Madawaska, Nicholville, and Croghan soils are in depressions and along the base of slopes. Kinsman and Pemi soils are in narrow ravine floors and at the base of slopes. Also included in this unit are areas with slopes of less than 8 percent or more than 15 percent. A few areas of rock

outcrop are along the base of escarpments. Some areas have finer textures throughout the soil. Inclusions make up about 15 percent of this unit.

### ***Major properties of the Groveton soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil are forested. A few areas have been cleared and are in grass or woodland. Some areas are used for residential development.

### ***Use and Management***

#### **Farming**

Slope and erosion hazard are the main limitations. The short growing season and cool summers restrict the choice of crop varieties. Good yields of grasses and legumes can be obtained with the proper use of lime and fertilizer. Contour farming and conservation tillage help to control erosion. The organic matter content can be maintained by incorporating crop residue, winter cover crops, and manure into surface layer.

#### **Woodland**

Fertility and moisture are favorable on this Groveton soil for high quality hardwoods. There are few limitations for woodland management or logging operations.

#### **Community Development**

This Groveton soil is limited by slope and a moderate erosion hazard for most phases of community development. Limiting surface disturbance is an effective method of controlling erosion. The sides of excavations tend to slough, and deep excavations may require special equipment. The slope of this soil is a moderate limitation for dwellings with or without basements and local roads and streets. Most slope limitations can be reduced by cut and fill techniques.

The slope is a moderate limitation for onsite waste disposal but can be reduced by cut and fill to level an area for an absorption field.

This soil is a probable source of sand, but extensive test pitting should be done at the site.

#### **Recreation**

This soil is limited by slope for recreational

developments. Limitations are severe for playgrounds and athletic fields and moderate for picnic and camping areas. This soil has few limitations for hiking paths and trails, but areas of heavy use should be designed to prevent erosion.

#### **Wildlife Habitat**

Suitability is good for habitat for openland and woodland wildlife. This soil is very poorly suited for wetland wildlife except as resting or nesting areas adjacent to wetlands.

The capability subclass is IIIe.

### **27E—Groveton fine sandy loam, 15 to 60 percent slopes**

This soil is very deep, moderately steep to very steep, and well drained. It is on loamy terrace escarpments and ravines. The areas are long and narrow and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 3 inches, dark brown fine sandy loam

*Subsoil:*

3 to 8 inches, brown fine sandy loam

8 to 28 inches, yellowish brown fine sandy loam

*Substratum:*

28 to 48 inches, light yellowish brown loamy fine sand

48 to 65 inches, light yellowish brown fine sand

Some areas have a substratum of gravelly loamy sand.

#### ***Inclusions***

Included with this soil in mapping are small areas of excessively drained Adams soils and poorly drained Kinsman and Pemi soils. Adams soils are along the edges of escarpments. Kinsman and Pemi soils are in narrow ravine floors and at the base of slopes. Also included in this unit are areas with slopes of less than 15 percent or more than 60 percent. A few areas of rock outcrop are along the base of escarpments. Some areas have finer textures throughout the soil. Inclusions make up about 15 percent of this unit.

#### ***Major properties of the Groveton soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil are forested. Some of the moderately steep areas have been cleared. Some other areas are woodland.

### ***Use and Management***

#### **Farming**

Slope and erosion hazard are severe limitations for all farming of this soil. Some of the moderately steep areas can be used for pasture, but maintenance of good quality grasses and legumes is a concern. Severe erosion may develop along livestock trails.

#### **Woodland**

Fertility and moisture are favorable on this Groveton soil for high quality hardwoods, but erosion hazard and equipment limitations affect woodland management.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by the use of track equipment and careful planning to avoid steepest areas.

#### **Community Development**

This soil is severely limited by steep slopes. Roads and streets through the soil will need extensive cuts resulting in side slopes that are difficult to stabilize. The sides of excavations tend to slough, and deep excavations may require special equipment. Limiting surface disturbance is an effective method of controlling erosion on the soil. The slope of this soil is a severe limitation for dwellings with or without basements, for small commercial buildings, and for local roads and streets. Most slope limitations can be reduced by cut and fill techniques.

The slope is a severe limitation for onsite waste disposal but can be reduced by cut and fill to level an area for an absorption field.

This soil is a probable source of sand, but extensive test pitting should be done at the site.

#### **Recreation**

This soil has severe limitations for recreational uses due to slope. Areas of heavy use should be designed to prevent erosion.

#### **Wildlife Habitat**

Suitability is good for habitat for openland and woodland wildlife. This soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIIe.

## 28A—Madawaska fine sandy loam, 0 to 3 percent slopes

This soil is very deep, nearly level, and moderately well drained. It is on loamy terraces and outwash plains. The areas are irregularly shaped and range from 5 to 35 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 11 inches, dark brown fine sandy loam

11 to 15 inches, light gray fine sandy loam

*Subsoil:*

15 to 22 inches, mottled, yellowish red fine sandy loam

22 to 31 inches, mottled, brown fine sandy loam

*Substratum:*

31 to 33 inches, mottled, olive gray fine sand

33 to 65 inches, mottled, olive brown sand

In some areas the lower part of the subsoil and the substratum are gravelly.

### ***Inclusions***

Included with this soil in mapping are small areas of moderately well drained Croghan soils, well drained Groveton soils, and poorly drained Kinsman soils. The Croghan soils are throughout some areas of this unit. The Groveton soils are on slightly higher areas. The Kinsman soils are in depressions and along the base of slopes. Also included in this unit are areas with slopes of more than 3 percent. The included soils make up about 15 percent of this unit.

### ***Major properties of the Madawaska soil***

*Permeability:* Moderately rapid in the surface layer and subsoil and rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 1.5 to 3.0 feet from November through May

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are farmed. A few areas have reverted to forest or have been used for commercial or residential development.

### ***Use and Management***

#### **Farming**

This soil is classified as prime farmland in this survey area. It is suited for silage corn, small grains, grasses, and vegetables. However, the short growing season and cool summers restrict the choice of crop varieties. Good yields of grasses and legumes can be

obtained with the proper use of lime and fertilizer. Artificial drainage will allow earlier tillage in the spring. The potential for frost action may result in severe winterkill of legumes. The organic matter content can be maintained by incorporating crop residue, winter cover crops, and manure into surface layer.

#### **Woodland**

Fertility and moisture are favorable on this Madawaska soil for high quality hardwoods. Plant competition is a limitation for woodland management. Site preparation following harvest helps reduce the invasion of undesirable species.

#### **Community Development**

Wetness and frost action are the major limitations for community development. The sides of excavations tend to slough and fill with water. Deep excavations may require special equipment. Wetness is a moderate limitation of the soil as a site for dwellings without basements and for small commercial buildings, and wetness is a severe limitation for dwellings with basements. This limitation can be overcome with foundation drains that control wetness and frost action. Moderate limitations for local roads and streets due to frost action can be overcome by providing coarser grained base material to frost depth.

The rapidly permeable substratum may not adequately filter the effluent from onsite waste disposal systems, and there is a hazard of ground-water pollution. Wetness due to the seasonal high water table is an additional limitation that may make it necessary to use fill to raise septic tank absorption fields.

This soil is a probable source of sand, but extensive test pitting should be done at the site.

#### **Recreation**

This soil has moderate limitations for recreational uses due to wetness. In addition, playgrounds and athletic fields are limited by small stones.

#### **Wildlife Habitat**

Suitability is good for habitat for openland or woodland wildlife. This soil is poorly suited for wetland wildlife habitat.

The capability subclass is llw.

## 28B—Madawaska fine sandy loam, 3 to 8 percent slopes

This soil is very deep, gently sloping, and moderately well drained. It is on loamy terraces and outwash plains. The areas are irregularly shaped and range from 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 11 inches, dark brown fine sandy loam

11 to 15 inches, light gray fine sandy loam

*Subsoil:*

15 to 22 inches, mottled, yellowish red fine sandy loam

22 to 31 inches, mottled, brown fine sandy loam

*Substratum:*

31 to 33 inches, mottled, olive gray fine sand

33 to 65 inches, mottled, olive brown sand

In some areas the lower part of the subsoil and the substratum layers are gravelly.

### ***Inclusions***

Included with this soil in mapping are small areas of moderately well drained Croghan soils, well drained Groveton soils, and poorly drained Kinsman soils. The Croghan soils are throughout some areas of this unit. The Groveton soils are on slightly higher areas. The Kinsman soils are in depressions and along the base of slopes. Also included in this unit are areas with slopes of less than 3 percent or more than 8 percent. The included soils make up about 15 percent of this unit.

### ***Major properties of the Madawaska soil***

*Permeability:* Moderately rapid in the surface layer and subsoil and rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 1.5 to 3.0 feet from November through May

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are farmed. A few areas have reverted to forest or have been used for commercial or residential development.

### ***Use and Management***

#### **Farming**

This soil is classified as prime farmland in this survey area. It is suited for silage corn, small grains, grasses, and vegetables. The short growing season and cool summers restrict the choice of crop varieties. Good yields of grasses and legumes can be obtained with the proper use of lime and fertilizer. Artificial drainage will allow earlier tillage in the spring. By incorporating crop residue and winter cover crops into surface layer, in combination with conservation tillage, organic matter content can be maintained and erosion

can be controlled, which will allow this soil to be cropped continually. The potential for frost action may result in severe winterkill of legumes.

#### **Woodland**

Fertility and moisture are favorable on this Madawaska soil for high quality hardwoods. Plant competition is a limitation for woodland management. Site preparation following harvest helps reduce the invasion of undesirable species.

#### **Community Development**

The seasonal high water, frost action, and erosion hazard of this soil are limitations for community development. Erosion can be kept to a minimum by limiting the amount of surface disturbance to only the areas of immediate development. The sides of excavations tend to slough and fill with water. Deep excavations may require special equipment. Wetness is a moderate limitation of this soil as a site for dwellings without basements and for small commercial buildings, and wetness is a severe limitation for dwellings with basements. This limitation can be overcome with foundation drains to control wetness and frost action. Moderate limitations for local roads and streets due to frost action can be overcome by providing coarser grained base material to frost depth.

The rapidly permeable substratum may not adequately filter the effluent from onsite waste disposal systems, and there is a hazard of ground-water pollution. Wetness due to the seasonal high water table is an additional limitation that may make it necessary to use fill to raise septic tank absorption fields.

This soil is a probable source of sand, but extensive test pitting should be done at the site.

#### **Recreation**

This soil has moderate limitations for recreational uses due to wetness. In addition, slope and small stones are moderate limitations for playgrounds and athletic fields.

#### **Wildlife Habitat**

Suitability is good for habitat for openland or woodland wildlife. This soil is poorly suited for wetland wildlife habitat.

The capability subclass is IIw.

### **36A—Adams loamy sand, 0 to 3 percent slopes**

This soil is very deep, nearly level, and excessively drained. It is on sandy terraces and outwash plains

along streams and rivers. The areas are generally long and narrow and range from 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, dark brown loamy sand

*Subsoil:*

6 to 10 inches, strong brown loamy sand

10 to 26 inches, light yellowish brown sand

*Substratum:*

26 to 65 inches, pale yellow sand

Some areas of this Adams soil have a gravelly surface layer or a surface layer of fine sandy loam.

### **Inclusions**

Included with this soil in mapping are small depressions or drainageways of moderately well drained Croghan soils or poorly drained Kinsman soils. Areas of excessively drained Colton soils and well drained Groveton soils are throughout some areas of this unit. Also included are small areas with slopes of more than 3 percent and areas with surface stones and boulders 5 to 30 feet apart. Included soils make up less than 15 percent of this unit.

### **Major properties of the Adams soil**

*Permeability:* Rapid in the surface layer and subsoil; very rapid in the substratum

*Available water capacity:* Very low

*Depth to bedrock:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil were farmed, but many are reverting to woodland. A few areas are farmed or are used for residential, commercial, and industrial development.

### **Use and Management**

#### **Farming**

Droughtiness, low fertility, and the short growing season severely limit farming of this soil. Under intensive management, fair to good yields of hay and silage corn are produced. Incorporating crop residue into surface layer and adding manure to the soil will increase the organic matter content and improve the water holding capacity of the soil. Winterkill of legumes is a concern in depressions on this nearly level soil because of ice coverage following midwinter thaws. Small fruits and vegetables are produced on a few areas by utilizing mulches and irrigation.

#### **Woodland**

Soil moisture is adequate for good softwood growth, especially eastern white pine, on this Adams soil. Seedling mortality is a limitation for woodland management. This limitation can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

#### **Community Development**

This soil is limited by droughtiness and sandy texture for most phases of community development. The sides of excavations tend to slough, and deep excavations may require special equipment. After construction, the droughtiness is a severe limitation for the establishment of lawns and landscaping.

The sandy, very permeable subsoil and substratum do not effectively filter the effluent from onsite waste disposal systems, and there is a hazard of ground-water pollution.

This soil is a probable source of sand, but extensive test pitting should be done at the site.

#### **Recreation**

This soil has few limitations for recreational uses other than the low available water capacity. Maintaining adequate grass cover on playgrounds and athletic fields may be a concern on this droughty soil.

#### **Wildlife Habitat**

This soil is poorly suited for habitat for openland or woodland wildlife and very poorly suited for wetland wildlife habitat except as resting or nesting areas adjacent to wetlands.

The capability subclass is IIIs.

### **36B—Adams loamy sand, 3 to 8 percent slopes.**

This soil is very deep, gently sloping, and excessively drained. It is on sandy terraces and outwash plains along streams and rivers. The areas are mainly long and narrow and range from 5 to 25 acres in size (fig. 18).

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, dark brown loamy sand

*Subsoil:*

6 to 10 inches, strong brown loamy sand

10 to 26 inches, light yellowish brown sand

*Substratum:*

26 to 65 inches, pale yellow sand

Some areas of this Adams soil have a gravelly surface layer or a surface layer of fine sandy loam.

### ***Inclusions***

Included with this soil in mapping are small depressions or drainageways of moderately well drained Croghan soils or poorly drained Kinsman soils. Areas of excessively drained Colton soils and well drained Groveton soils are throughout this unit. Also included are small areas with slopes of less than 3 percent or more than 8 percent and areas with surface stones and boulders 5 to 30 feet apart. Included soils make up less than 15 percent of this unit.

### ***Major properties of the Adams soil***

*Permeability:* Rapid in the surface layer and subsoil; very rapid in the substratum

*Available water capacity:* Very low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil were farmed, but many have reverted to woodland. A few areas are farmed or are used for residential and industrial development.

## ***Use and Management***

### **Farming**

Droughtiness, low fertility, moderate erosion hazard, and the short growing season severely limit farming of this soil. Under intensive management, fair to good yields of hay and silage corn are produced. Incorporating crop residue into surface layer and adding manure to the soil will increase the organic matter content and improve the water holding capacity of the soil. Winterkill of legumes is a concern in depressions because of ice coverage following midwinter thaws. Small fruits and vegetables are produced on a few areas by utilizing mulches and irrigation.

### **Woodland**

Soil moisture is adequate for good softwood growth, especially eastern white pine, on this Adams soil. Seedling mortality is a limitation for woodland management. This limitation can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

### **Community Development**

This Adams soil is limited by slope and sandy,



Figure 18.— Adams loamy sand, 3 to 8 percent slopes and 15 to 60 percent slopes used for pasture and barnyard, Tunbridge-Lyman fine sandy loam, 15 to 25 percent slopes used for hayland and pasture.

droughty conditions. The slope of this soil is a moderate limitation for small commercial buildings. The sides of excavations tend to slough, and deep excavations may require special equipment. After construction, droughtiness is a severe limitation for the establishment of lawns and landscaping.

The sandy, very permeable subsoil and substratum do not effectively filter the effluent from onsite waste disposal systems, and there is a hazard of ground-water pollution.

This soil is a probable source of sand, but extensive test pitting should be done at the site.

### Recreation

This soil has moderate slope limitations for playgrounds and athletic fields. Maintaining adequate grass cover on the soil is an additional concern on this droughty soil.

### Wildlife Habitat

This soil is poorly suited for habitat for openland or woodland wildlife and very poorly suited for wetland wildlife habitat except as resting or nesting areas adjacent to wetlands.

The capability subclass is IIIs.

## 36C—Adams loamy sand, 8 to 15 percent slopes

This soil is very deep, strongly sloping, and excessively drained. It is on sandy terraces and outwash plains along streams and rivers. The areas are generally rounded or long and narrow and range from 5 to 10 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, brown loamy sand

*Subsoil:*

6 to 10 inches, strong brown loamy sand

10 to 24 inches, light yellowish brown sand

*Substratum:*

26 to 65 inches, pale yellow sand

Some areas of this Adams soil have a gravelly surface layer or a surface layer of fine sandy loam. In some areas erosion and tillage have mixed most or all of the subsoil into the surface layer.

Included with this soil in mapping are small depressions or drainageways of moderately well drained Croghan soils or poorly drained Kinsman soils. Areas of excessively drained Colton soils and well drained Groveton soils are throughout some areas of

this unit. Also included are small areas with slopes of less than 8 percent or more than 15 percent and areas with surface stones and boulders 5 to 30 feet apart. Included soils make up about 15 percent of this unit.

### *Major properties of the Adams soil*

*Permeability:* Rapid in the surface layer and subsoil; very rapid in the substratum

*Available water capacity:* Very low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil are forested. A few areas are used for hay or pasture, and a few areas are used for residential or commercial development.

### *Use and Management*

#### Farming

Droughtiness, low fertility, severe erosion, and the short growing season limit farming of this soil to hay and pasture. Under intensive management, fair yields of hay are produced. Incorporating crop residue into surface layer and adding manure to the soil will increase the organic matter content and improve the water holding capacity of the soil.

#### Woodland

Soil moisture is adequate for good softwood growth, especially eastern white pine, on this Adams soil.

Seedling mortality is a limitation for woodland management. This limitation can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

#### Community Development

This Adams soil is limited by slope and the sandy, droughty conditions. Limitations are moderate for dwellings with or without basements due to slope. The construction of roads and streets through the soil may make it necessary to use significant grading. The resulting road cuts and disturbed areas are difficult to revegetate on this droughty soil. The sides of excavations in this soil tend to slough, and deep excavations may require special equipment. Erosion is a limitation during periods of construction but generally can be controlled. After construction, droughtiness is a severe limitation for the establishment of lawns and landscaping.

In areas requiring onsite sewage disposal, there is a

hazard of ground-water pollution because the sandy, very permeable subsoil and substratum do not effectively filter effluent.

This soil is a probable source of sand, but extensive test pitting should be done at the site.

#### **Recreation**

This soil is limited for recreational uses by the slope. Limitations are moderate for camp and picnic areas and severe for playgrounds and athletic fields. This soil has few limitations for hiking paths and trails, but areas of heavy use should be designed to prevent erosion.

#### **Wildlife Habitat**

This soil is poorly suited for habitat for openland or woodland wildlife and is very poorly suited for wetland wildlife habitat except as resting or nesting areas adjacent to wetlands.

The capability subclass is IVs.

### **36E—Adams loamy sand, 15 to 60 percent slopes**

This soil is very deep, moderately steep to very steep, and excessively drained. It is on sandy terrace escarpments along streams and rivers. The areas are mainly long and narrow, but some broaden to include severely truncated areas. This unit ranges from 5 acres to more than 90 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, dark brown loamy sand

*Subsoil:*

6 to 10 inches, strong brown loamy sand

10 to 26 inches, light yellowish brown sand

*Substratum:*

26 to 65 inches, pale yellow sand

Some areas of this Adams soil have a gravelly surface layer or a surface layer of fine sandy loam.

#### ***Inclusions***

Included with this soil in mapping are small or narrow areas with slopes of less than 15 percent and a few areas with slopes of more than 60 percent. Moderately well drained Croghan soils or poorly drained Kinsman soils are on some narrow ravine floors. In some areas the ravines have cut into the underlying glacial till and the ravine floors include poorly drained Pillsbury soils. Along major valleys the lower portion of some escarpments are stratified silts. Bedrock outcrops are common along the base of some

escarpments, especially escarpments bordering flood plains. Also included are small areas with surface stones and boulders 5 to 30 feet apart. The included soils make up 15 percent of this unit.

#### ***Major properties of the Adams soil***

*Permeability:* Rapid in the surface layer and subsoil; very rapid in the substratum

*Available water capacity:* Very low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil are woodland.

#### ***Use and Management***

##### **Farming**

The steep slopes and erosion hazard are severe limitations for all farming of this soil. Some of the less steep areas can be used for pasture, but maintenance of good quality grasses and legumes is a concern. Severe erosion may develop along cattle trails.

##### **Woodland**

Soil moisture is adequate for good softwood growth, especially eastern white pine, but slope, erosion hazard, and seedling mortality limit woodland management.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with drought-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by the use of track equipment and careful planning to avoid steepest areas. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

##### **Community Development**

This Adams soil has severe limitations for most phases of community development due to slope. Roads and streets through the soil need extensive cuts, and the side slopes are difficult to stabilize and revegetate on this droughty soil.

Slope limits onsite waste disposal. Also, the sandy, very permeable subsoil and substratum do not effectively filter the effluent from onsite waste disposal systems, and there is a hazard of ground-water pollution.

This soil is a probable source of sand, but extensive test pitting should be done at the site.

**Recreation**

This soil has severe limitations for recreational uses due to slope. Waterbars on hiking trails in this unit will reduce erosion.

**Wildlife Habitat**

This soil is poorly suited for habitat for openland or woodland wildlife and very poorly suited for wetland wildlife habitat except as resting or nesting areas adjacent to wetlands.

The capability subclass is VIIe.

**56B—Becket fine sandy loam, 3 to 8 percent slopes**

This soil is very deep, gently sloping, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 20 acres in size. The surface of some areas has stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 7 inches, dark yellowish brown fine sandy loam

*Subsoil:*

7 to 14 inches, dark brown fine sandy loam

14 to 18 inches, strong brown fine sandy loam

18 to 22 inches, light olive brown fine sandy loam

*Substratum:*

22 to 65 inches, olive gray, very firm gravelly loamy fine sand

**Inclusions**

Included with this unit are small areas with slopes of less than 3 percent or more than 8 percent. In depressions and along narrow drainageways are moderately well drained Skerry soils and poorly drained Pillsbury soils. Also included are small isolated areas of rock outcrop and shallow or moderately deep soils. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

**Major properties of the Becket soil**

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 2.0 to 3.5 feet from March to April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil have been cleared for farming. Some are reverting to woodland. Other areas have been used for residential or commercial development.

**Use and Management****Farming**

This unit is classified as prime farmland in this survey area. It is well suited for row crops, but the short growing season and cool summers restrict the choice of crop varieties. Good yields of silage corn, grasses, and legumes can be obtained with the proper use of lime and fertilizers. Continuous row cropping is mainly not practical because of the moderate erosion hazard. Row crops can be grown in rotation with grasses and legumes. Contour tillage and strip cropping will generally keep soil losses to a minimum when row crops are grown.

**Woodland**

Fertility and moisture are favorable on this Becket soil for high quality hardwoods. Windthrow hazard and plant competition are limitations that affect woodland management.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

**Community Development**

This soil is limited by the perched water table in the spring, a slowly permeable hardpan, and frost action. Foundation drains will help control wetness and frost action. This soil has a moderate limitation for local roads and streets due to frost action. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage. This soil has a moderate limitation for lawns and landscaping due to small stones.

For onsite sewage disposal systems, the slow permeability of the substratum is a severe limitation that can be overcome with fill to raise and increase the size of absorption fields.

**Recreation**

This soil has a moderate limitation for camping and

picnic areas due to slow permeability in the substratum. There is a moderate limitation for playgrounds and athletic fields due to slope.

#### **Wildlife Habitat**

Suitability is good for habitat areas for openland wildlife and fair for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IIe.

### **56C—Becket fine sandy loam, 8 to 15 percent slopes**

This soil is very deep, strongly sloping, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 30 acres in size. The surface of some areas has stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 7 inches, dark yellowish brown fine sandy loam

*Subsoil:*

7 to 14 inches, dark brown fine sandy loam

14 to 18 inches, strong brown fine sandy loam

18 to 22 inches, light olive brown fine sandy loam

*Substratum:*

22 to 65 inches, olive gray, very firm gravelly loamy fine sand.

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. In depressions and along narrow drainageways are moderately well drained Skerry soils and poorly drained Pillsbury soils. Also included are small isolated areas of rock outcrop and shallow or moderately deep soils. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

#### **Major properties of the Becket soil**

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 2.0 to 3.5 feet from March to April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil have been cleared for farming. Some areas are reverting to woodland. Other areas have been used for residential or commercial developments.

## **Use and Management**

### **Farming**

This unit is well suited for farming, but the short growing season and cool summers restrict the choice of crop varieties. Fair to good yields of silage corn, grasses, and legumes can be obtained with the proper use of lime and fertilizers. Continuous row cropping is mainly not practical because of the moderate erosion hazard. Row crops can be grown in rotation with grasses and legumes. Contour tillage and strip cropping will generally keep soil losses to a minimum when row crops are grown.

### **Woodland**

Fertility and moisture are favorable on this Becket soil for high quality hardwoods. Windthrow hazard and plant competition are limitations for woodland management.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

### **Community Development**

This soil is limited by a perched water table in the spring, a slowly permeable hardpan, slope, and frost action. Foundation drains will help to control wetness and frost action. The slope of this soil is a moderate limitation for dwellings without basements. Soil wetness and slope are moderate limitations for dwellings with basements and for shallow excavations. This soil has moderate limitations for local roads and streets due to slope and frost action. This limitation can be overcome by using cut and fill, providing coarser grained base material to frost depth, and installing drainage. This soil has moderate limitations for lawns and landscaping due to small stones and slope. Slope limitations on this unit can be reduced by using cut and fill to level these strongly sloping areas. However, cuts made into slopes below the hardpan may make it necessary to use drainage to remove water on the hardpan during wet times of the year.

For onsite sewage disposal, the slowly permeable substratum is a severe limitation that can be overcome with fill to raise and increase the size of absorption fields.

### Recreation

This soil has moderate limitations for camping and picnic areas due to slope and slow permeability in the substratum. Limitations are severe for playgrounds and athletic fields due to slope.

### Wildlife Habitat

Suitability is good for habitat areas for openland wildlife and fair for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IIIe.

## 56D—Becket fine sandy loam, 15 to 25 percent slopes

This soil is very deep, moderately steep, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 15 acres in size. The surface of some areas has stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 7 inches, dark yellowish brown fine sandy loam

*Subsoil:*

7 to 14 inches, dark brown fine sandy loam

14 to 18 inches, strong brown fine sandy loam

18 to 22 inches, light olive brown fine sandy loam

*Substratum:*

22 to 65 inches, olive gray, very firm gravelly loamy fine sand

### Inclusions

Included with this unit are small areas with slopes of less than 15 percent or more than 25 percent. In depressions and along narrow drainageways are moderately well drained Skerry soils and poorly drained Pillsbury soils. Also included are small isolated areas of rock outcrop and shallow or moderately deep soils. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

### Major properties of the Becket soil

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 2.0 to 3.5 feet from March to April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil have been cleared for farming. Some areas are reverting to woodland. Other areas have been used for residential or commercial developments.

### Use and Management

#### Farming

Slope and severe erosion hazard are the major limitations. Intensive erosion control measures such as diversions, contour stripcropping, and winter cover crops are necessary to prevent excessive erosion. The soil is best suited for pasture because the slopes make the operation of modern farm equipment hazardous.

#### Woodland

Fertility and moisture are favorable on this Becket soil for high quality hardwoods. Erosion hazard, slope, windthrow hazard, and plant competition are limitations for woodland management.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by careful planning to avoid steepest areas. Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

#### Community Development

This Becket soil is severely limited by slope, a perched water table in the spring, a slowly permeable hardpan, and frost action. Building foundation drains will help to control wetness and frost action. Slope limitations can be reduced by using cut and fill techniques to level this area. However, cuts made into slopes below the hardpan may make it necessary to use drainage to remove the water on the hardpan during wet times of the year.

For onsite sewage disposal, the slow permeability of the substratum and the slope are severe limitations that can be overcome with fill to raise and increase the size of absorption fields.

#### Recreation

This soil has severe limitations for camping areas,

picnic areas, playgrounds, and athletic fields due to slope. There is a moderate limitation for hiking trails due to slope.

#### **Wildlife Habitat**

Suitability is fair for habitat areas for openland and woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IVe.

### **57B—Becket fine sandy loam, 3 to 8 percent slopes, very stony**

This soil is very deep, gently sloping, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 45 acres in size. Stones are mainly 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 7 inches, dark yellowish brown fine sandy loam

*Subsoil:*

7 to 14 inches, dark brown fine sandy loam

14 to 18 inches, strong brown fine sandy loam

18 to 22 inches, light olive brown fine sandy loam

*Substratum:*

22 to 65 inches, olive gray, very firm gravelly loamy fine sand

#### ***Inclusions***

Included with this unit are small areas with slopes of less than 3 percent or more than 8 percent. In depressions and along narrow drainageways are moderately well drained Skerry soils and poorly drained Pillsbury soils. Also included are small isolated areas of rock outcrop and shallow or moderately deep soils. A few areas have surface stones less than 5 feet apart. The included soils make up about 15 percent of this unit.

#### ***Major properties of the Becket soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 2.0 to 3.5 feet from March to April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this unit are forested. Other areas

have been used for residential or commercial developments.

### ***Use and Management***

#### **Farming**

This unit is too stony for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones. If the soil is cleared of surface stones, it meets the criteria for prime farmland. The short growing season and cool summers restrict the choice of crop varieties. The moderate erosion hazard limits the use of this unit for row crops, but forage crops of grasses and legumes can be grown.

#### **Woodland**

Fertility and moisture are favorable on this Becket soil for high quality hardwoods. Windthrow hazard and plant competition are limitations for woodland management.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

#### **Community Development**

This soil is limited by a perched water table in the spring, a slowly permeable hardpan, and frost action. Wetness is moderate limitation for dwellings with basements and for shallow excavations. Foundation drains will help to control wetness and frost action. This soil has a moderate limitation for local roads and streets due to frost action. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage. Limitations are moderate for lawns and landscaping due to large stones.

For onsite sewage disposal systems, the slowly permeable substratum is a severe limitation that can be overcome with fill to raise and increase the size of absorption fields.

#### **Recreation**

This soil has moderate limitations for camping and picnic areas due to slow permeability in the substratum. There is a severe limitation for

playgrounds and athletic fields due to large stones and slope.

### **Wildlife Habitat**

Suitability is poor for habitat areas for openland wildlife and fair for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

### **57C—Becket fine sandy loam, 8 to 15 percent slopes, very stony**

This soil is very deep, strongly sloping, and well drained. It is on loamy glaciated hills and mountainsides. The areas are irregular in shape and range from 10 to 75 acres in size. Stones are mainly 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 7 inches, dark yellowish brown fine sandy loam

*Subsoil:*

7 to 14 inches, dark brown fine sandy loam

14 to 18 inches, strong brown fine sandy loam

18 to 22 inches, light olive brown fine sandy loam

*Substratum:*

22 to 65 inches, olive gray, very firm gravelly loamy fine sand

### ***Inclusions***

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. In depressions and along narrow drainageways are moderately well drained Skerry soils and poorly drained Pillsbury soils. Also included are small isolated areas of rock outcrop and shallow or moderately deep soils. A few areas have surface stones less than 5 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Becket soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 2.0 to 3.5 feet from March to April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this unit are forested. Other areas have been developed for residential or commercial uses.

## ***Use and Management***

### **Farming**

This soil is too stony for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones. Even if the soil is cleared of surface stones, the short growing season and cool summers restrict the choice of crop varieties. The moderate erosion hazard limits the use of this unit for row crops, but forage crops of grasses and legumes can be grown.

### **Woodland**

Fertility and moisture are favorable on this Becket soil for high quality hardwoods. Windthrow hazard and plant competition are limitations that affect woodland management.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

### **Community Development**

This soil is limited by a perched water table in the spring, a slowly permeable hardpan, slope, and frost action. Foundation drains will help to control wetness and frost action. Slope is a moderate limitation for dwellings without basements. Wetness and slope are moderate limitations for dwellings with basements and for shallow excavations. There are moderate limitations for local roads and streets due to slope and frost action. They can be overcome by using cut and fill techniques, providing coarser grained base material to frost depth, and installing drainage. This soil has moderate limitations for lawns and landscaping due to large stones and slope. Slope limitations can be reduced by using cut and fill techniques to level these strongly sloping areas. However, cuts made into slopes below the hardpan may make it necessary to use drainage to remove the water on the hardpan during wet times of the year. For onsite sewage disposal systems, the slowly permeable substratum is a severe limitation that can be overcome with fill to raise and increase the size of absorption fields.

### **Recreation**

This soil has moderate limitations for camping and

picnic areas due to slope and slow permeability in the substratum. Limitations are severe for playgrounds and athletic fields due to slope.

### **Wildlife Habitat**

Suitability is poor for habitat areas for openland wildlife and fair for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

### **57D—Becket fine sandy loam, 15 to 25 percent slopes, very stony**

This soil is very deep, moderately steep, and well drained. It is on loamy glaciated hills and mountainsides. The areas are irregular in shape and range from 5 to 100 acres in size. Stones are mainly 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical Becket sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 7 inches, dark yellowish brown fine sandy loam

*Subsoil:*

7 to 14 inches, dark brown fine sandy loam

14 to 18 inches, strong brown fine sandy loam

18 to 22 inches, light olive brown fine sandy loam

*Substratum:*

22 to 65 inches, olive gray, very firm gravelly loamy fine sand

### ***Inclusions***

Included with this unit are small areas with slopes of less than 15 percent or more than 25 percent. In depressions and along narrow drainageways are moderately well drained Skerry soils and poorly drained Pillsbury soils. Also included are small isolated areas of rock outcrop and shallow or moderately deep soils. A few areas have surface stones and boulders less than 5 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Becket soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 2.0 to 3.5 feet from March to April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested. Other areas

have been used for residential or commercial developments.

### ***Use and Management***

#### **Farming**

This soil is too steep and stony for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones. The severe erosion hazard limits the use of this soil even if the soil is cleared of surface stones.

#### **Woodland**

Fertility and moisture are favorable on this Becket soil for high quality hardwoods. Erosion hazard, slope, windthrow hazard, and plant competition are limitations that affect woodland management.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by careful planning to avoid steepest areas. Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

#### **Community Development**

This soil is severely limited by slope, a perched water table in the spring, a slowly permeable hardpan, and frost action. Foundation drains will help to control wetness and frost action. Slope limitations can be reduced by using cut and fill techniques to level this moderately steep soil. However, cuts made into slopes below hardpan layers may make it necessary to use drainage to remove the water on the hardpan during wet times of the year.

For onsite sewage disposal systems, the slowly permeable substratum and slope are severe limitations that can be overcome with fill to raise and increase the size of absorption fields.

#### **Recreation**

This soil has a severe limitation for camping areas, picnic areas, playgrounds, and athletic fields due to the moderately steep slopes. Limitations are moderate for hiking paths and trails due to slope.

### Wildlife Habitat

Suitability is poor for habitat areas for openland wildlife and fair for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VI<sub>s</sub>.

### 57E—Becket fine sandy loam, 25 to 35 percent slopes, very stony

This soil is very deep, steep, and well drained. It is on loamy glaciated hills and mountainsides. The areas are irregular in shape and range from 10 to 60 acres in size. Stones are mainly 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 7 inches, dark yellowish brown fine sandy loam

*Subsoil:*

7 to 14 inches, dark brown fine sandy loam

14 to 18 inches, strong brown fine sandy loam

18 to 22 inches, light olive brown fine sandy loam

*Substratum:*

22 to 65 inches, olive gray, very firm gravelly loamy fine sand

### Inclusions

Included with this unit are small areas with slopes of less than 25 percent or more than 35 percent. In depressions and along narrow drainageways are moderately well drained Skerry soils and poorly drained Pillsbury soils. Also included are small isolated areas of rock outcrop and shallow or moderately deep soils. A few areas have surface stones and boulders less than 5 feet apart. The included soils make up about 15 percent of this unit.

### Major properties of the Becket soil

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 2.0 to 3.5 feet from March to April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested. Other areas have been used for residential or commercial developments.

### Use and Management

#### Farming

The steep slopes and surface stones make this soil unsuited for farming.

#### Woodland

Fertility and moisture are favorable on this Becket soil for high quality hardwoods. Erosion hazard, slope, windthrow hazard, and plant competition are limitations that affect woodland management.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by using track equipment and careful planning to avoid the steepest areas within the unit. Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

#### Community Development

This soil is severely limited by steep slopes, slow permeability in the substratum, and an erosion hazard during construction operations. At times when the surface of this soil is disturbed, extraordinary erosion control measures are needed. Slope limitations can be reduced by cut and fill. However, cuts made into slopes below hardpan layers may make it necessary to use drainage to remove the water on the hardpan during wet times of the year.

For onsite sewage disposal systems, the slowly permeable substratum and slope are severe limitations that can be overcome with special designs and fill to raise and increase the size of absorption fields.

#### Recreation

This soil has severe limitations for recreational developments due to slope.

#### Wildlife Habitat

Suitability is poor for habitat areas for openland wildlife and fair for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIIIs.

### **59B—Waumbek loamy sand, 3 to 8 percent slopes, very stony**

This soil is very deep, gently sloping or undulating, and moderately well drained. It is on glaciated valleys and hillsides. The areas are irregular in shape and range from 5 to 30 acres in size. Stones are generally 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

1 inch to 0, slightly decomposed needles, moss, leaves, and twigs

0 to 4 inches, black partially decomposed herbaceous and woody material

4 to 9 inches, light brownish gray loamy sand

*Subsoil:*

9 to 10 inches, dark reddish brown loamy sand

10 to 13 inches, dark reddish brown cobbly loamy sand

13 to 20 inches, strong brown very cobbly loamy sand

20 to 25 inches, dark yellowish brown very cobbly loamy sand with gray mottles

*Substratum:*

25 to 41 inches, dark grayish brown very cobbly loamy sand

41 to 65 inches, grayish brown very cobbly loamy sand

Some areas of this unit have surface layer of loamy fine sand.

#### ***Inclusions***

Included with this unit are low mounds or ridges of somewhat excessively drained Hermon soils, nearly level areas of poorly drained Lyme and Moosilauke soils in depressions and along narrow drainageways, and small areas with slopes of less than 3 percent or more than 8 percent. Also included are areas that have been cleared of surface stones for farming. A few areas have surface stones less than 5 feet apart. The included soils make up about 15 percent of this unit.

#### ***Major properties of the Waumbek soil***

*Permeability:* Moderately rapid to rapid in the surface layer and subsoil; rapid in the substratum

*Available water capacity:* Very low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 1.5 to 2.5 feet from November through May

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this unit are forested. A few areas have been cleared for farming, but many are reverting to woodland. Other areas have been used for residential or commercial developments.

#### ***Use and Management***

##### **Farming**

This unit is too stony for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones. Even if the soil is cleared of surface stones, the spring wetness, summer droughtiness, and moderate erosion hazard are limitations. The short growing season and cool summers restrict the choice of crop varieties.

##### **Woodland**

Fertility and moisture are adequate on this Waumbek soil for good tree growth. This soil is limited for woodland management by windthrow hazard and plant competition.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

##### **Community Development**

Wetness, frost action, and stoniness are the main limitations. The sides of excavations slough and fill with water. Deep excavations may require special equipment. In many areas the large stones and boulders in the substratum are an additional limitation for excavations. Wetness is a severe limitation for dwellings with basements and a moderate limitation for dwellings without basements. Foundation drains are needed to control wetness and frost action. Erosion control measures such as sediment catch basins, heavy mulches, straw bales, terraces, and diversions should be used during periods of construction. Wetness and large stones are moderate limitations for lawns and landscaping.

Wetness and poor filtering are severe limitations for onsite sewage disposal systems. Also, the very permeable subsoil and substratum do not effectively filter effluent, and there is a hazard of ground-water pollution.

This soil is a probable source of sand and gravel, but extensive test pitting should be done at the site.

##### **Recreation**

This soil has moderate limitations for camping and picnic areas due to wetness and large stones. Limitations are severe for playgrounds and athletic

fields due to stoniness. Soil wetness is moderate limitation for hiking paths and trails.

#### **Wildlife Habitat**

Suitability is poor for habitat areas for openland wildlife and fair for woodland wildlife. These soils are very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

### **59C—Waumbek loamy sand, 8 to 15 percent slopes, very stony**

This soil is very deep, strongly sloping or rolling, and moderately well drained. It is on glaciated valleys and hilltops. The areas are irregular in shape and range from 5 to 50 acres in size. Stones are generally 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

1 inch to 0, slightly decomposed needles, moss, leaves, and twigs

0 to 4 inches, black partially decomposed herbaceous and woody material

4 to 9 inches, light brownish gray loamy sand

#### *Subsoil:*

9 to 10 inches, dark reddish brown loamy sand

10 to 13 inches, dark reddish brown cobbly loamy sand

13 to 20 inches, strong brown very cobbly loamy sand

20 to 25 inches, dark yellowish brown very cobbly loamy sand with gray mottles

#### *Substratum:*

25 to 41 inches, dark grayish brown very cobbly loamy sand

41 to 65 inches, grayish brown very cobbly loamy sand

Some areas of this unit have a surface layer of loamy fine sand.

#### ***Inclusions***

Included with this unit are low mounds or ridges of somewhat excessively drained Hermon soils, nearly level areas of poorly drained Lyme and Moosilauke soils in depressions and along narrow drainageways, and small areas with slopes of less than 8 percent or more than 15 percent. Also included are a few areas that have been cleared of surface stones for farming. A few areas have surface stones less than 5 feet apart. The included soils make up about 15 percent of this unit.

#### ***Major properties of the Waumbek soil***

*Permeability:* Moderately rapid to rapid in the surface layer and subsoil; rapid in the substratum

*Available water capacity:* Very low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 1.5 to 2.5 feet from November through May

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested. A few areas have been cleared for farming, but many of these are reverting to woodland. Other areas have been used for residential or commercial developments.

### ***Use and Management***

#### **Farming**

This soil is too stony for most farming other than pasture. The degree of pasture improvement that can be done on the soil depends on the amount of surface stones. Even if the soil is cleared of surface stones, the slope, spring wetness, summer droughtiness, and moderate erosion hazard are limitations. The short growing season and cool summers restrict the choice of crop varieties.

#### **Woodland**

Fertility and moisture are adequate for good tree growth. This soil is limited for woodland management by windthrow hazard and plant competition.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

#### **Community Development**

This soil is limited by wetness, slope, frost action, and stoniness for most phases of community development. The sides of shallow excavations tend to slough and fill with water, and deep excavations may require special equipment. In many areas the large stones and boulders in the substratum are an additional concern for excavations. Slope and wetness are moderate limitations for dwellings without basements. Limitations for dwellings with basements are severe due to wetness. Foundation drains are needed to control wetness and frost action. Limitations are moderate for lawns and landscaping due to wetness, large stones, and slope. Erosion control measures such as sediment catch basins, heavy mulches, straw bales, terraces, and diversions should be used during periods of construction.

Wetness and poor filtering properties are severe limitations for sites of onsite sewage disposal systems. The very permeable subsoil and substratum

do not effectively filter effluent, and there is a hazard of ground-water pollution.

This soil is a probable source of sand and gravel, but extensive test pitting should be done at the site.

### Recreation

This soil has moderate limitations for camping and picnic areas due to slope, wetness, and large stones. Limitations are severe for playgrounds and athletic fields due to stoniness and slope. Soil wetness and large stones are moderate limitations for hiking paths and trails.

### Wildlife Habitat

Suitability is poor for habitat areas for openland wildlife and fair for woodland wildlife. The soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

## 61B—Tunbridge-Lyman-Rock outcrop complex, 3 to 8 percent slopes

The Tunbridge and Lyman soils in this unit are in such an intricate pattern that it was not practical to map them separately. The Tunbridge soils are loamy, moderately deep, and well drained. The Lyman soils are loamy, shallow, and somewhat excessively drained. These soils are on undulating or gently sloping hilltops and hillsides. The areas are roughly oval or irregular in shape and range from 5 to 40 acres in size. Rock outcrops are less than 100 feet apart. Stones are mainly 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface. Tunbridge soils make up 40 percent of this unit, Lyman soils 30 percent, rock outcrops 15 percent, and other soils 15 percent.

The typical sequence, depth, and composition of the layers of the Tunbridge soil are as follows—

#### *Surface layer:*

0 to 1 inch, dark reddish brown fine sandy loam

1 to 3 inches, pinkish gray fine sandy loam

#### *Subsoil:*

3 to 11 inches, strong brown fine sandy loam

11 to 21 inches, yellowish brown fine sandy loam

#### *Substratum:*

21 to 28 inches, light yellowish brown fine sandy loam

28 inches, hard schist bedrock

The typical sequence, depth, and composition of the layers of the Lyman soil are as follows—

#### *Surface layer:*

0 to 3 inches, dark reddish brown fine sandy loam

#### *Subsoil:*

3 to 7 inches, yellowish brown fine sandy loam

7 to 12 inches, yellowish red loam

12 to 16 inches, olive gravelly loam

16 inches, hard schist bedrock

### ***Inclusions***

Included with this complex are areas that are nearly level, areas of well drained Marlow soils or moderately well drained Peru soils, and areas of very shallow soils. In some areas bedrock blocks the drainage patterns and the moderately deep to shallow soils are moderately well drained to poorly drained. These inclusions make up about 10 percent of this complex. Also included are small areas with surface stones less than 5 feet apart and areas that are more than 15 percent rock outcrop. These inclusions make up about 5 percent of this complex.

### ***Major properties of the Tunbridge soil***

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* Moderate

*Depth to bedrock:* 20 to 40 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

### ***Major properties of the Lyman soil***

*Permeability:* Moderately rapid throughout

*Available water capacity:* Very low

*Depth to bedrock:* 10 to 20 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this complex are woodland. A few areas have been cleared for pasture, but most are reverting to woodland. A few scattered areas have been used for homesites.

### ***Use and Management***

#### **Farming**

Stones and rock outcrops are major limitations. Some areas may have limited potential for hayland or pasture, depending on amount and size of the rock outcrops and surface stones. Erosion is a concern in areas adjoining broad smooth rock outcrops because the soil is mainly too shallow to support adequate plant cover.

#### **Woodland**

Fertility and moisture are adequate on these Tunbridge and Lyman soils. However windthrow is a hazard and seedling mortality and plant competition are additional limitations on Lyman soils.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused

by harvesting equipment. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains. Site preparation following harvest helps reduce the invasion of undesirable species.

Because of the size, shape, or slope of the rock outcrops, the establishment of roads is difficult in some areas.

### **Community Development**

These soils are limited for community development by depth to bedrock, rock outcrops, frost action, and surface stones. Construction and installation of underground utilities often require drilling and blasting the bedrock to obtain desired grades and depths. Foundation drains are to remove water on the bedrock and in the fractures. Foundation drains will also reduce the moderate frost action. Gravity outlets for the drains may be difficult to locate or require additional blasting.

The depth to bedrock is a severe limitation for onsite waste disposal systems. Areas with sufficient depth for the system must be located or a site must be filled to obtain adequate depth. The included areas of Marlow and Peru soils have the necessary depth, but have limitations of slow permeability and seasonal water table.

### **Recreation**

These soils have moderate to severe limitations for most recreational uses. Stoniness is a moderate limitation on the Tunbridge soils if used for camp or picnic. On areas of Lyman soils or rock outcrop, limitations are severe for camp or picnic areas due to the shallow depth to bedrock and for a playground or athletic field due to the depth to bedrock and large stones. Maintaining adequate grass cover on the shallow, droughty Lyman areas is limitation.

### **Wildlife Habitat**

Suitability for habitat on Tunbridge soils is poor for openland wildlife and good for woodland wildlife. Lyman soils are poorly suited for openland and woodland wildlife habitat. The soils are very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

## **61C—Tunbridge-Lyman-Rock outcrop complex, 8 to 15 percent slopes**

The Tunbridge and Lyman soils in this unit are in such an intricate pattern that it was not practical to map them separately. The Tunbridge soils are loamy, moderately deep, and well drained. The Lyman soils are loamy, shallow, and somewhat excessively drained.

These soils are on rolling or strongly sloping hilltops and hillsides. The areas are roughly oval or irregular in shape and range from 5 to 40 acres in size. Rock outcrops are less than 100 feet apart. Stones are mainly 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface. Tunbridge soils make up 40 percent of this unit, Lyman soils 30 percent, rock outcrops 15 percent, and other soils 15 percent.

The typical sequence, depth, and composition of the layers of the Tunbridge soil are as follows—

#### *Surface layer:*

0 to 1 inch, dark reddish brown fine sandy loam

1 to 3 inches, pinkish gray fine sandy loam

#### *Subsoil:*

3 to 11 inches, strong brown fine sandy loam

11 to 21 inches, yellowish brown fine sandy loam

#### *Substratum:*

21 to 28 inches, light yellowish brown fine sandy loam

28 inches, hard schist bedrock

The typical sequence, depth, and composition of the layers of the Lyman soil are as follows—

#### *Surface layer:*

0 to 3 inches, dark reddish brown fine sandy loam

#### *Subsoil:*

3 to 7 inches, yellowish brown fine sandy loam

7 to 12 inches, yellowish red loam

12 to 16 inches, olive gravelly loam

16 inches, hard schist bedrock

### ***Inclusions***

Included with this complex are areas that are nearly level, areas of well drained Marlow soils or moderately well drained Peru soils, and areas of very shallow soils. In some areas bedrock blocks the drainage patterns and the moderately deep to shallow soils are moderately well drained to poorly drained. These inclusions make up about 10 percent of this complex. Also included are small areas with surface stones less than 5 feet apart and areas that are more than 15 percent rock outcrop. These inclusions make up about 5 percent of this complex.

### ***Major properties of the Tunbridge soil***

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* Moderate

*Depth to bedrock:* 20 to 40 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

### ***Major properties of the Lyman soil***

*Permeability:* Moderately rapid throughout

*Available water capacity:* Very low

*Depth to bedrock:* 10 to 20 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this complex are wooded. A few areas have been cleared for pasture, but most are reverting to woodland. A few scattered areas have been used for homesites.

### ***Use and Management***

#### **Farming**

The surface stones and rock outcrops are the major limitations. Some areas may have limited potential for hayland or pasture, depending on the amount and size of the rock outcrops and surface stones. Erosion is a concern in areas adjoining broad, smooth rock outcrops because the soil is mainly too shallow to support adequate plant cover.

#### **Woodland**

Fertility and moisture are adequate on these Tunbridge and Lyman soils. However, windthrow hazard is a hazard and seedling mortality and plant competition are additional limitations on Lyman soils.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains. Site preparation following harvest helps reduce the invasion of undesirable species.

Because of the size, shape, or slope of the outcrop, roads are difficult to establish in some areas.

#### **Community Development**

These soils are limited for community development by slope, depth to bedrock, rock outcrops, frost action, and surface stones. Limitations are moderate on the Tunbridge soils for local roads and streets due to depth to bedrock, slope, and frost action and severe on the Lyman soils due to shallow depth. Either drilling and blasting of the bedrock or covering with additional fill material will be needed to obtain desired grades and depths.

Frost action can be overcome by providing coarser grained base material to frost depth and installing drainage. Construction and installation of underground utilities often require drilling and blasting bedrock to obtain desired grades and depths. Foundation drains are required to remove water on the bedrock and in the fractures. Foundation drains will also reduce the moderate frost action. The depth to bedrock is a severe limitation for onsite waste disposal systems. Areas

with sufficient depth for the system must be located or a site must be filled to obtain adequate depth. The included areas of Marlow and Peru soils have the necessary depth, but have limitations of slow permeability and seasonal water table.

#### **Recreation**

These soils have moderate to severe limitations for most recreational uses. There is a moderate limitation on the Tunbridge soils if used for camp or picnic areas due to slope and surface stoniness. On areas of Lyman soils or rock outcrop, limitations are severe for camp or picnic areas due to the shallow depth to bedrock. For a playground or athletic field, there are severe limitations due to the slope, depth to bedrock, and large stones. Maintaining adequate grass cover on the shallow, droughty Lyman areas is also a concern.

#### **Wildlife Habitat**

Suitability for habitat on Tunbridge soils is poor for openland wildlife and good for woodland wildlife. Lyman soils are poorly suited for openland and woodland wildlife habitat. These soils are very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

### **61D—Tunbridge-Lyman-Rock outcrop complex, 15 to 25 percent slopes.**

The Tunbridge and Lyman soils in this unit are in such an intricate pattern that it was not practical to map them separately. The Tunbridge soils are loamy, moderately deep, and well drained. The Lyman soils are loamy, shallow, and somewhat excessively drained. These soils are on moderately steep hilltops and hillsides. The areas are roughly oval or irregular in shape and range from 5 to 40 acres in size. Rock outcrops are less than 100 feet apart. Stones are mainly 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface. Tunbridge soils make up 40 percent of this unit, Lyman soils 30 percent, rock outcrops 15 percent, and other soils 15 percent.

The typical sequence, depth, and composition of the layers of the Tunbridge soil are as follows—

*Surface layer:*

0 to 1 inch, dark reddish brown fine sandy loam

1 to 3 inches, pinkish gray fine sandy loam

*Subsoil:*

3 to 11 inches, strong brown fine sandy loam

11 to 21 inches, yellowish brown fine sandy loam

*Substratum:*

21 to 28 inches, light yellowish brown fine sandy loam

28 inches, hard schist bedrock

The typical sequence, depth, and composition of the layers of the Lyman soil are as follows—

*Surface layer:*

0 to 3 inches, dark reddish brown fine sandy loam

*Subsoil:*

3 to 7 inches, yellowish brown fine sandy loam

7 to 12 inches, yellowish red loam

12 to 16 inches, olive gravelly loam

16 inches, hard schist bedrock

### ***Inclusions***

Included with this complex areas of well drained Marlow soils or moderately well drained Peru soils, areas of soils with slopes of less than 15 percent or more than 25 percent, and areas of very shallow soils. In some areas bedrock blocks the drainage patterns and the moderately deep to shallow soils are moderately well drained to poorly drained. These inclusions make up about 10 percent of this complex. Also included are small areas with surface stones less than 5 feet apart and areas that are more than 15 percent rock outcrop. These inclusions make up about 5 percent of this complex.

### ***Major properties of the Tunbridge soil***

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* Moderate

*Depth to bedrock:* 20 to 40 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

### ***Major properties of the Lyman soil***

*Permeability:* Moderately rapid throughout

*Available water capacity:* Very low

*Depth to bedrock:* 10 to 20 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this complex are woodland. A few areas have been cleared for pasture, but most are reverting to woodland. A few scattered areas have been used for homesites (fig. 19).

### ***Use and Management***

#### **Farming**

The slope, stones, and rock outcrops are major limitations for all but unimproved pasture. Erosion is a concern in areas adjoining broad smooth rock outcrops because the soil is mainly too shallow to support adequate plant cover.

#### **Woodland**

Fertility and moisture are adequate on these



Figure 19.— This area of Tunbridge-Lyman-Rock outcrop complex, 15 to 25 percent slopes, is used for woodland.

Tunbridge and Lyman soils. However, windthrow and slope are hazards and seedling mortality and plant competition are additional limitations on Lyman soils.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by using track equipment and careful planning to avoid the steepest areas within the unit. Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains. Site preparation following harvest helps reduce the invasion of undesirable species.

Because of the size, shape, or slope of the rock outcrops, the establishment of roads is difficult in some areas.

### **Community Development**

These soils are limited for community development by slope, depth to bedrock, rock outcrops, frost action, and surface stones. Slope limits construction and installation of underground utilities, and often drilling and blasting the bedrock are required to obtain desired grades and depths. Foundation drains are to remove water on the bedrock and in the fractures. Foundation drains will also reduce the moderate frost action. Gravity outlets for the drains may be difficult to locate or require additional blasting.

The depth to bedrock and slope are severe limitations for onsite waste disposal systems. Areas with sufficient depth for the system must be located or a site must be filled to obtain adequate depth. The included areas of Marlow and Peru soils have the necessary depth, but have limitations of slow permeability and seasonal water table.

### **Recreation**

These soils have severe limitations for most recreational uses because of slope and the depth to bedrock.

### **Wildlife Habitat**

Suitability for habitat on Tunbridge soils is poor for openland wildlife and good for woodland wildlife. Lyman soils are poorly suited for openland and woodland wildlife habitat. The soils are very poorly suited for wetland wildlife habitat.

The capability subclass is VII.

## **61E—Tunbridge-Lyman-Rock outcrop complex, 25 to 60 percent slopes**

The Tunbridge and Lyman soils in this unit are in such an intricate pattern that it was not practical to map them separately. The Tunbridge soils are loamy, moderately deep, and well drained. The Lyman soils are loamy, shallow, and somewhat excessively drained. These soils are on steep and very steep mountains and hillsides. The areas are roughly oval or irregular in shape and range from 5 to 40 acres in size. Rock outcrops are less than 100 feet apart. Stones are mainly 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface. Tunbridge soils make up 40 percent of this unit, Lyman soils 30 percent, rock outcrops 15 percent, and other soils 15 percent.

The typical sequence, depth, and composition of the layers of the Tunbridge soil are as follows—

#### *Surface layer:*

0 to 1 inch, dark reddish brown fine sandy loam

1 to 3 inches, pinkish gray fine sandy loam

#### *Subsoil:*

3 to 11 inches, strong brown fine sandy loam

11 to 21 inches, yellowish brown fine sandy loam

#### *Substratum:*

21 to 28 inches, light yellowish brown fine sandy loam

28 inches, hard schist bedrock

The typical sequence, depth, and composition of the layers of the Lyman soil are as follows—

#### *Surface layer:*

0 to 3 inches, dark reddish brown fine sandy loam

#### *Subsoil:*

3 to 7 inches, yellowish brown fine sandy loam

7 to 12 inches, yellowish red loam

12 to 16 inches, olive gravelly loam

16 inches, hard schist bedrock

### ***Inclusions***

Included with this complex are areas of well drained Marlow soils or moderately well drained Peru soils and areas with slopes of less than 25 percent or more than 60 percent. In some areas bedrock blocks the drainage patterns and the moderately deep to shallow soils are moderately well drained to poorly drained. These inclusions make up about 10 percent of this complex. Also included are small areas with surface stones less than 5 feet apart and areas that are more than 15 percent rock outcrop. These inclusions make up about 5 percent of this complex.

### **Major properties of the Tunbridge soil**

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* Moderate

*Depth to bedrock:* 20 to 40 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

### **Major properties of the Lyman soil**

*Permeability:* Moderately rapid throughout

*Available water capacity:* Very low

*Depth to bedrock:* 10 to 20 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this complex are wooded.

### **Use and Management**

#### **Farming**

The steep and very steep slopes, surface stones, and rock outcrops prohibit farming.

#### **Woodland**

Fertility and moisture are adequate on these Tunbridge and Lyman soils. However, the soils are limited for woodland management by erosion hazard, slope, seedling mortality, and windthrow hazard. On areas of Lyman soils, plant competition is an additional limitation.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by careful planning to avoid steepest areas. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains. Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

Because of the size, shape, or slope of the rock outcrop, roads are difficult to establish in some areas.

#### **Community Development**

Steep and very steep slopes, rock outcrops, surface stones, and bedrock at a depth of less than 40 inches are severe limitations for any type of community development. Any construction may make it necessary to use special designs.

The depth to bedrock and steep slopes are severe limitations for onsite waste disposal systems. Areas

with sufficient depth for the system must be located or a site must be filled to obtain adequate depth. The included areas of Marlow and Peru soils have the necessary depth, but have limitations of slow permeability and seasonal water table.

#### **Recreation**

These steep and very steep soils have severe limitations for recreational uses. Trails should be planned across these slopes as much as possible. Hiking trails crossing the soil should have frequent water bars to prevent excessive erosion, and trails on broad, smooth, steep areas of rock outcrop are slippery. The large steep outcrops frequently provide natural scenic overlooks that should be considered in planning trails. Maintaining vegetation on these steep slopes is very difficult on the shallow soils, and erosion is a severe hazard.

#### **Wildlife Habitat**

Suitability for habitat on Tunbridge soils is poor for openland wildlife and fair for woodland wildlife. Lyman soils are poorly suited for openland and woodland wildlife habitat. These soils are very poorly suited for wetland wildlife habitat.

The capability subclass is VIIIs.

### **62B—Charlton fine sandy loam, 3 to 8 percent slopes**

This soil is very deep, gently sloping, and well drained. It is on loamy glaciated hills along the western part of the survey area. The areas are oval and range from 5 to 20 acres in size. The surface of some areas has stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

1 inch to 0, loose leaves and twigs

0 to 6 inches, dark brown fine sandy loam

#### *Subsoil:*

6 to 11 inches, dark yellowish brown gravelly fine sandy loam

11 to 23 inches, yellowish brown gravelly fine sandy loam

23 to 28 inches, light olive brown gravelly fine sandy loam

#### *Substratum:*

28 to 65 inches, olive brown gravelly sandy loam

Some areas are sandier in the substratum.

#### **Inclusions**

Included with this unit are small areas with slopes of

less than 3 percent or more than 8 percent. In depressions and along narrow drainageways are moderately well drained and poorly drained, loamy soils. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Charlton soil***

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil have been cleared for farming. Some areas are reverting to woodland. Other areas have been used for residential or commercial developments.

### ***Use and Management***

#### **Farming**

This soil is classified as prime farmland in this survey area. It is well suited for row crops. Some erosion control measures, such as contour tillage and winter cover crops, should be used if continuous row cropping is planned. This soil is well suited for forage crops. Good to excellent yields of silage corn, grasses and legumes can be obtained with the proper use of lime and fertilizers.

#### **Woodland**

Fertility and moisture are favorable on this Charlton soil for high quality hardwoods. There are few limitations for woodland management or logging operations.

#### **Community Development**

This soil has few limitations for most phases of community development. Subsurface stones may be a concern when excavating.

#### **Recreation**

This soil has moderate limitations due to slope and small stones for playgrounds and athletic fields.

#### **Wildlife Habitat**

Suitability is good for habitat areas for openland and woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IIe.

## **62C—Charlton fine sandy loam, 8 to 15 percent slopes**

This soil is very deep, strongly sloping, and well drained. It is on loamy glaciated hills along the western part of the survey area. The areas are irregular in shape and range from 5 to 25 acres in size. The surface of some areas has stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

1 inch to 0, loose leaves and twigs.

0 to 6 inches, dark brown fine sandy loam.

*Subsoil:*

6 to 11 inches, dark yellowish brown gravelly fine sandy loam.

11 to 23 inches, yellowish brown gravelly fine sandy loam.

23 to 28 inches, light olive brown gravelly fine sandy loam.

*Substratum:*

28 to 65 inches, olive brown gravelly sandy loam.

Some areas are sandier in the substratum.

### ***Inclusions***

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. In depressions and along narrow drainageways are moderately well drained and poorly drained, loamy soils. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the soil***

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil have been cleared for farming. Some areas are reverting to woodland. Other areas have been used for residential or commercial developments.

### ***Use and Management***

#### **Farming**

This Charlton soil is well suited for forage production, but slope and erosion hazard make it only

moderately well suited for row crops. Some erosion control measures such as contour tillage, stripcropping, and winter cover crops should be used if continuous row cropping is planned. Good to excellent yields of grasses and legumes can be obtained with the proper use of lime and fertilizers. This is one of the better soils in the county for the production of alfalfa.

### **Woodland**

Fertility and moisture are favorable on this Charlton soil for high quality hardwoods. This soil has few limitations for woodland management or logging operations.

### **Community Development**

The slope of this soil is a moderate limitation for most phases of community development. Subsurface stones may be a concern when excavating. With careful planning and layout of building lots, less sloping portions of this unit can be used.

For onsite waste disposal, the slope of this soil is a moderate limitation which can be reduced by cut and fill to level an area.

### **Recreation**

This soil has moderate limitations for camping and picnic areas due to slope. Limitations are severe for playgrounds and athletic fields due to slope and small stones. Hiking paths and trails can be planned and maintained with few limitations.

### **Wildlife Habitat**

Suitability is good for habitat areas for openland and woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IIIe.

## **62D—Charlton fine sandy loam, 15 to 25 percent slopes**

This soil is very deep, moderately steep, and well drained. It is on loamy glaciated hills along the western part of the survey area. The areas are irregular in shape and range from 5 to 15 acres in size. The surface of some areas has stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

1 inch to 0, loose leaves and twigs  
0 to 6 inches, dark brown fine sandy loam

#### *Subsoil:*

6 to 11 inches, dark yellowish brown gravelly fine sandy loam  
11 to 23 inches, yellowish brown gravelly fine sandy loam  
23 to 28 inches, light olive brown gravelly fine sandy loam

#### *Substratum:*

28 to 65 inches, olive brown gravelly sandy loam  
Some areas are sandier in the substratum.

### ***Inclusions***

Included with this unit are small areas with slopes of less than 15 percent or more than 25 percent. In depressions and along narrow drainageways are moderately well drained and poorly drained, loamy soils. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the soil***

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil have been cleared for farming. Some areas are reverting to woodland. Other areas have been used for residential or commercial developments.

### ***Use and Management***

#### **Farming**

This Charlton soil is not suited for row crops because of its moderately steep slopes and severe erosion hazard. This soil is moderately well suited for forage production. Good yields of grasses and legumes can be obtained with the proper use of lime and fertilizers. These areas are best suited for pasture because the slopes make the operation of farm equipment inefficient and hazardous.

#### **Woodland**

Fertility and moisture are favorable on this Charlton soil for high quality hardwoods. This soil is limited for woodland management by erosion hazard and slope.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with

shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by careful planning to avoid steepest areas.

### **Community Development**

The slope of this soil is a severe limitation for most phases of community development. Subsurface stones may be a concern when excavating. Areas of this soil may require significant erosion control measures during periods of construction to control soil loss and to prevent sedimentation below the site. Most slope limitations can be reduced by cut and fill techniques to level areas.

For onsite waste disposal, the slope of this soil is a severe limitation which can be reduced by cut and fill or special system designs.

### **Recreation**

This soil is limited by slope for recreational developments. Limitations are severe for playgrounds, athletic fields, and picnic and camping areas. This soil has a moderate limitation for the design and maintenance of hiking paths and trails.

### **Wildlife Habitat**

Suitability is fair for habitat areas for openland wildlife and good for woodland wildlife habitat. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IVe.

## **63B—Charlton fine sandy loam, 3 to 8 percent slopes, very stony**

This soil is very deep, gently sloping, and well drained. It is on loamy glaciated hills along the western part of the survey area. The areas are oval and range from 5 to 30 acres in size. Stones are 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

1 inch to 0, loose leaves and twigs  
0 to 6 inches, dark brown fine sandy loam

#### *Subsoil:*

6 to 11 inches, dark yellowish brown gravelly fine sandy loam  
11 to 23 inches, yellowish brown gravelly fine sandy loam  
23 to 28 inches, light olive brown gravelly fine sandy loam

#### *Substratum:*

28 to 65 inches, olive brown gravelly sandy loam  
Some areas are sandier in the substratum.

### ***Inclusions***

Included with this unit are small areas with slopes of less than 3 percent or more than 8 percent. In depressions and along narrow drainageways are moderately well drained and poorly drained, loamy soils. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the soil***

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil are forested. Other areas have been used for residential or commercial developments.

### ***Use and Management***

#### **Farming**

This unit is too stony for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones. If cleared of surface stones, the soil meets criteria for prime farmland. This soil is well suited for forage crops.

#### **Woodland**

Fertility and moisture are favorable on this Charlton soil for high quality hardwoods. There are few limitations for woodland management or logging operations.

#### **Community Development**

This soil has few limitations for most phases of community development. Surface stones are a moderate limitation for the establishment and maintenance of lawns. Subsurface stones may be a concern when excavating.

#### **Recreation**

This soil has moderate limitations for camping and picnic areas due to large surface stones. There is a severe limitation for playgrounds and athletic fields due to large stones.

### Wildlife Habitat

Suitability is poor for habitat areas for openland wildlife and good for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

### 63C—Charlton fine sandy loam, 8 to 15 percent slopes, very stony

This soil is very deep, strongly sloping, and well drained. It is on loamy glaciated hills along the western part of the survey area. The areas are irregular in shape and range from 5 to 75 acres in size. Stones are 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

1 inch to 0, loose leaves and twigs

0 to 6 inches, dark brown fine sandy loam

*Subsoil:*

6 to 11 inches, dark yellowish brown gravelly fine sandy loam

11 to 23 inches, yellowish brown gravelly fine sandy loam

23 to 28 inches, light olive brown gravelly fine sandy loam

*Substratum:*

28 to 65 inches, olive brown gravelly sandy loam

Some areas are sandier in the substratum.

### Inclusions

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. In depressions and along narrow drainageways are moderately well drained and poorly drained, loamy soils. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

### Major properties of the soil

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this unit are forested. Other areas have been used for residential or commercial developments.

### Use and Management

#### Farming

This unit is too stony for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones.

#### Woodland

Fertility and moisture are favorable on this Charlton soil for high quality hardwoods. There are few limitations for woodland management or logging operations.

#### Community Development

The slope of this soil is a moderate limitation for most phases of community development. Surface stones are a moderate limitation for the establishment and maintenance of lawns. Subsurface stones can be a concern when excavating. Slope limitations can be reduced by cut and fill techniques to level areas.

The slope of this soil is a moderate limitation for onsite sewage disposal. This limitation can be reduced by cut and fill to level an area for an absorption field.

#### Recreation

This soil is limited by slope and large stones. Limitations are severe for playgrounds and athletic fields, while picnic and camping areas are moderately affected. Hiking paths and trails can be planned and maintained with few limitations.

#### Wildlife Habitat

Suitability is poor for habitat areas for openland wildlife and good for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

### 63D—Charlton fine sandy loam, 15 to 25 percent slopes, very stony

This soil is very deep, moderately steep, and well drained. It is on loamy glaciated hills along the western part of the survey area. The areas are irregular in shape and range from 5 to 100 acres in size. Stones are 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

1 inch to 0, loose leaves and twigs

0 to 6 inches, dark brown fine sandy loam

*Subsoil:*

6 to 11 inches, dark yellowish brown gravelly fine sandy loam

11 to 23 inches, yellowish brown gravelly fine sandy loam

23 to 28 inches, light olive brown gravelly fine sandy loam

*Substratum:*

28 to 65 inches, olive brown gravelly sandy loam

Some areas are sandier in the substratum.

***Inclusions***

Included with this unit are small areas with slopes of less than 15 percent or more than 25 percent. In depressions and along narrow drainageways are moderately well drained and poorly drained, loamy soils. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

***Major properties of the soil***

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this unit are forested. Other areas have been used for residential or commercial developments.

***Use and Management*****Farming**

This unit is too stony for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones. The slope makes the operation of farm equipment hazardous.

**Woodland**

Fertility and moisture are favorable on this Charlton soil for high quality hardwoods. Erosion hazard and slope affect woodland management.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by careful planning to avoid steepest areas.

**Community Development**

The slope of this soil is a severe limitation for all

phases of community development. Subsurface stones may be a concern when excavating. Areas of this soil will need significant erosion control measures during periods of construction to control soil loss and to prevent sedimentation below the site. Slope limitations can be reduced by cut and fill techniques to level an area.

For onsite sewage disposal systems, slope is a severe limitation.

**Recreation**

This soil is limited by slope and large stones. Slope limitations are severe if the soil is used for camp and picnic areas. Limitations are severe due to large stones and slope where areas of this soil are used for playgrounds or athletic fields. The slope of this soil is a moderate limitation for the design and construction of hiking paths and trails.

**Wildlife Habitat**

Suitability of this soil is poor for habitat areas for openland wildlife and good for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

**63E—Charlton fine sandy loam, 25 to 35 percent slopes, very stony**

This soil is very deep, steep, and well drained. It is on loamy glaciated hills and mountains along the western part of the survey area. The areas are irregular in shape and range from 5 to 50 acres in size. Stones are 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

1 inch to 0, loose leaves and twigs

0 to 6 inches, dark brown fine sandy loam

*Subsoil:*

6 to 11 inches, dark yellowish brown gravelly fine sandy loam

11 to 23 inches, yellowish brown gravelly fine sandy loam

23 to 28 inches, light olive brown gravelly fine sandy loam

*Substratum:*

28 to 65 inches, olive brown gravelly sandy loam

Some areas are sandier in the substratum.

***Inclusions***

Included with this unit are small areas with slopes of less than 25 percent or more than 35 percent. In

depressions and along narrow drainageways are moderately well drained and poorly drained, loamy soils. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

### **Major properties of the soil**

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this unit are forested. Other areas have been used for residential or commercial developments.

### **Use and Management**

#### **Farming**

This unit is too stony for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones. The steep slopes make the operation of farm equipment extremely hazardous.

#### **Woodland**

Fertility and moisture are favorable on this Charlton soil for high quality hardwoods. Erosion hazard and slope affect woodland management.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by careful planning to avoid steepest areas.

#### **Community Development**

The slope of this soil is a severe limitation for all phases of community development. Subsurface stones may be a concern when excavating. Areas of this soil will need significant erosion control measures during periods of construction to control soil loss and to prevent sedimentation below the site. Most slope limitations on this unit can be reduced by cut and fill techniques to level an area.

For onsite waste disposal systems, slope is a severe limitation.

#### **Recreation**

This soil has severe slope limitations for recreational developments. The large surface stones

are an additional limitation for playgrounds and athletic fields.

#### **Wildlife Habitat**

Suitability of this soil is poor for habitat areas for openland wildlife and good for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIIs.

### **72B—Berkshire loam, 3 to 8 percent slopes**

This soil is very deep, gently sloping, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 25 acres in size. The surface of some areas has stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 7 inches, very dark grayish brown loam

7 to 8 inches, pinkish gray loam

*Subsoil:*

8 to 12 inches, dark brown loam

12 to 18 inches, brown loam

*Substratum:*

18 to 65 inches, very dark grayish brown friable loam

#### **Inclusions**

Included with this unit are small areas with slopes of less than 3 percent or more than 8 percent. In depressions and along narrow drainageways are moderately well drained Peru soils and poorly drained Lyme and Pillsbury soils. Also included are small areas of Monadnock and Tunbridge soils. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

### **Major properties of the Berkshire soil**

*Permeability:* Moderate to moderately rapid throughout.

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are used for hay and pasture. Some areas have been used for cultivated crops, and a few areas have been used for residential or commercial developments. A few areas are reverting to woodland.

## **Use and Management**

### **Farming**

This soil is classified as prime farmland in this survey area. However, the short growing season and cool summers restrict the choice of crop varieties. Excellent yields of silage corn, grasses, and legumes can be obtained with the proper use of lime and fertilizers. The use of conservation tillage or stripcropping to control erosion and the use of winter cover crops will allow this soil to be used for continuous row crops.

### **Woodland**

Fertility and moisture are favorable on this Berkshire soil for high quality hardwoods.

### **Community Development**

This soil has a moderate limitation due to frost action for local roads and streets. This limitation can be overcome by providing coarser grained base material to frost depth. The moderate limitation for small commercial buildings due to slope can be reduced by cut and fill to level the soil.

### **Recreation**

This soil has moderate limitations for playgrounds and athletic fields due to slope and small stones. Hiking paths and trails can be planned and maintained with few limitations.

### **Wildlife Habitat**

Suitability is good for habitat areas for openland wildlife and woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IIe.

## **72C—Berkshire loam, 8 to 15 percent slopes**

This soil is very deep, strongly sloping, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 25 acres in size. The surface of some areas has stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

0 to 7 inches, very dark grayish brown loam

7 to 8 inches, pinkish gray loam

#### *Subsoil:*

8 to 12 inches, dark brown loam

12 to 18 inches, brown loam

#### *Substratum:*

18 to 65 inches, very dark grayish brown friable loam

### **Inclusions**

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. In depressions and along narrow drainageways are moderately well drained Peru soils and poorly drained Lyme and Pillsbury soils. Also included are small areas of Monadnock and Tunbridge soils. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

### **Major properties of the Berkshire soil**

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are used for hay and pasture. Some areas have been used for cultivated crops, and a few have been used for residential or commercial developments. A few areas are reverting to woodland.

## **Use and Management**

### **Farming**

This soil is not suited for row crops due to its slope and erosion hazard. However, it is well suited for grasses and legumes for hay or pasture.

### **Woodland**

Fertility and moisture are favorable on this Berkshire soil for high quality hardwoods.

### **Community Development**

This soil has a moderate limitation for shallow excavations, dwellings with or without basements, local roads and streets, and lawns due to slope. The slope of this soil is a severe limitation for small commercial buildings. Foundation drains will help to control frost action. There is a moderate limitation for local roads and streets due to frost action. It can be overcome by providing coarser grained base material to frost depth and installing drainage. Limitations due to slope can be reduced by cut and fill to level the soil.

For onsite waste disposal, the slope of this soil is a

moderate limitation that can be reduced by cut and fill or special system designs.

### Recreation

This soil is limited by slope. Limitations for this soil are severe for playgrounds and athletic fields and moderate for picnic areas and camping areas. Hiking trails can be planned and maintained with few limitations.

### Wildlife Habitat

Suitability is good for habitat areas for openland wildlife and woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IIIe.

## 72D—Berkshire loam, 15 to 25 percent slopes

This soil is very deep, moderately steep, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 15 acres in size. The surface of some areas has stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

0 to 7 inches, very dark grayish brown loam

7 to 8 inches, pinkish gray loam

#### *Subsoil:*

8 to 12 inches, dark brown loam

12 to 18 inches, brown loam

#### *Substratum:*

18 to 65 inches, very dark grayish brown friable loam

### **Inclusions**

Included with this unit are small areas with slopes of less than 15 percent or more than 25 percent. In depressions and along narrow drainageways are moderately well drained Peru soils and poorly drained Lyme and Pillsbury soils. Also included are small areas of Monadnock and Tunbridge soils. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

### **Major properties of the Berkshire soil**

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are used for hay and pasture. Some areas have been used for residential or commercial developments, and a few are reverting to woodland.

### Farming

This soil is poorly suited for row crops due to its slope and erosion hazard. However, it is well suited for grasses and legumes for hay or pasture, but the slopes make the operation of modern haying equipment hazardous.

### Woodland

Fertility and moisture are favorable on this Berkshire soil for high quality hardwoods. Slope limits the use of equipment, but this limitation can be reduced by careful planning to avoid the steepest areas.

### Community Development

This soil has severe slope limitations for shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, and lawns. Limitations due to slope can be reduced by cut and fill to level the soil.

For onsite sewage disposal, the slope is a severe limitation that can be reduced by cut and fill or special system designs.

### Recreation

The slope of this soil is the main limitation. It is severe for playgrounds, athletic fields, picnic areas, and camping areas. This soil has a moderate limitation for the design and maintenance of hiking paths and trails.

### Wildlife Habitat

Suitability is fair for habitat areas for openland wildlife and good for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IVe.

## 73B—Berkshire loam, 3 to 8 percent slopes, very stony

This soil is very deep, gently sloping, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 30 acres in size. Surface stones are mainly 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

0 to 7 inches, very dark grayish brown loam

7 to 8 inches, pinkish gray loam

*Subsoil:*

8 to 12 inches, dark brown loam

12 to 18 inches, brown loam

*Substratum:*

18 to 65 inches, very dark grayish brown friable loam

### ***Inclusions***

Included with this unit are small areas with slopes of less than 3 percent or more than 8 percent. In depressions and along narrow drainageways are moderately well drained Peru soils and poorly drained Lyme and Pillsbury soils. Also included are small areas of Monadnock and Tunbridge soils. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Berkshire soil***

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested. Some areas have been used for unimproved pasture or residential development.

### ***Use and Management***

#### **Farming**

This soil is too stony for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones. If cleared of surface stones, the soil meets the criteria for prime farmland. This soil is well suited for forage crops.

#### **Woodland**

Fertility and moisture are favorable on this Berkshire soil for high quality hardwoods. There are few limitations to woodland management.

#### **Community Development**

This soil is limited for community development by frost action and slope. Limitations for local roads and streets are moderate due to frost action and can be overcome by providing coarser grained base material to frost depth. The moderate limitation for small commercial buildings due to slope can be reduced by cut and fill to level the soil.

#### **Recreation**

This soil has a moderate limitation for camping areas and picnic areas due to large stones. Limitations are severe for playgrounds and athletic fields due to large stones. Hiking paths and trails can be planned and maintained with few limitations.

#### **Wildlife Habitat**

Suitability is poor for habitat areas for openland wildlife and good for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

### **73C—Berkshire loam, 8 to 15 percent slopes, very stony**

This soil is very deep, strongly sloping, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 35 acres in size. Surface stones are mainly 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 7 inches, very dark grayish brown loam

7 to 8 inches, pinkish gray loam

*Subsoil:*

8 to 12 inches, dark brown loam

12 to 18 inches, brown loam

*Substratum:*

18 to 65 inches, very dark grayish brown friable loam

### ***Inclusions***

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. In depressions and along narrow drainageways are moderately well drained Peru soils and poorly drained Lyme and Pillsbury soils. Also included are small areas of Monadnock and Tunbridge soils. A few areas have surface stones less than 5 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Berkshire soil***

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested. Some areas

have been used for unimproved pasture or residential development.

### ***Use and Management***

#### **Farming**

This soil is generally too stony for cultivated crops or hay, although if cleared of surface stones, it can be used for pasture. Lime, fertilizers, and seed will improve pasture quality and carrying capacity.

#### **Woodland**

Fertility and moisture are favorable for high quality hardwoods. There are few limitations to woodland management.

#### **Community Development**

This soil is limited by slope, frost action and large stones. The slope of this soil is a moderate limitation for shallow excavations, dwellings with or without basements, local roads and streets, lawns, and landscaping. Large stones are an additional limitation for lawns and landscaping. The slope of this soil is a severe limitation for small commercial buildings. This soil has a moderate limitation for local roads and streets due to frost action. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage. Limitations due to slope can be reduced by cut and fill to level the soil.

Slope is a moderate limitation in areas of onsite sewage disposal systems. This limitation can be reduced by cut and fill to level an area for an absorption field.

#### **Recreation**

This soil is limited for recreational developments by slope and large stones. Limitations are severe for playgrounds and athletic fields and moderate for picnic areas and camping areas. Hiking paths and trails can be planned and maintained with few limitations.

#### **Wildlife Habitat**

Suitability is poor for habitat areas for openland wildlife and good for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

### **73D—Berkshire loam, 15 to 25 percent slopes, very stony**

This soil is very deep, moderately steep, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 60 acres in size. Surface stones are 5

to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

0 to 7 inches, very dark grayish brown loam

7 to 8 inches, pinkish gray loam

#### *Subsoil:*

8 to 12 inches, dark brown loam

12 to 18 inches, brown loam

#### *Substratum:*

18 to 65 inches, very dark grayish brown friable loam

### ***Inclusions***

Included with this unit are small areas with slopes of less than 15 percent or more than 25 percent. In depressions and along narrow drainageways are moderately well drained Peru soils and poorly drained Lyme and Pillsbury soils. Also included are small areas of Monadnock and Tunbridge soils. A few areas have surface stones less than 5 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Berkshire soil***

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested. Some areas have been used for unimproved pasture or residential development.

### ***Use and Management***

#### **Farming**

This soil is too stony for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones. The moderately steep slopes make the operation of farm equipment hazardous.

#### **Woodland**

Fertility and moisture are favorable on this Berkshire soil for high quality hardwoods. Slope limits the use of equipment. This limitation can be reduced by careful planning to the avoid steepest areas within the unit.

#### **Community Development**

This soil has severe slope limitations for most phases of community development. Slope limitations can be reduced by cut and fill to level the soil.

The slope of this soil is a severe limitation for onsite

waste disposal systems. This limitation can be reduced by cut and fill to level an area for an absorption field.

### Recreation

This soil is limited by slope and large stones. Slope limitations for this soil are severe for camp areas and picnic areas. Limitations are severe due to large stones and slope for playgrounds or athletic fields. The slope of this soil is a moderate limitation for the design and construction of hiking paths and trails.

### Wildlife Habitat

Suitability is poor for habitat areas for openland wildlife and good for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

## 73E—Berkshire loam, 25 to 35 percent slopes, very stony

This soil is very deep, steep, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 40 acres in size. Surface stones are mainly 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

0 to 7 inches, very dark grayish brown loam

7 to 8 inches, pinkish gray loam

#### *Subsoil:*

8 to 12 inches, dark brown loam

12 to 18 inches, brown loam

#### *Stratum:*

18 to 65 inches, very dark grayish brown friable loam

### **Inclusions**

Included with this unit are small areas with slopes of less than 25 percent or more than 35 percent.

In depressions and along narrow drainageways are moderately well drained Peru soils and poorly drained Lyme and Pillsbury soils. Also included are small areas of Monadnock and Tunbridge soils. A few areas have surface stones less than 5 feet apart. The included soils make up about 15 percent of this unit.

### **Major properties of the Berkshire soil**

*Permeability:* Moderate to moderately rapid throughout.

*Available water capacity:* High.

*Depth to bedrock:* More than 65 inches.

*Depth to dense basal till:* More than 65 inches.

*Depth to water table:* More than 6 feet.

*Potential frost action:* Moderate.

*Flood hazard:* None.

Most areas of this soil are forested. Some areas have been used for unimproved pasture or residential development.

## **Use and Management**

### Farming

This soil is too stony and steep for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones. The steep slopes make the operation of farm equipment extremely hazardous.

### Woodland

Fertility and moisture are favorable on this Berkshire soil for high quality hardwoods. Slope limits the use of equipment. This limitation can be reduced by using track equipment and careful planning to avoid the steepest areas within the unit.

### Community Development

This soil has severe limitations for community development due to slope. Slope limitations can be reduced by cut and fill to level the soil.

The slope of this soil is a severe limitation for onsite waste disposal systems. This limitation can be reduced by cut and fill to level an area for an absorption field.

### Recreation

This soil has severe slope limitations for recreational developments. The large surface stones are an additional limitation for playgrounds and athletic fields.

### Wildlife Habitat

Suitability is poor for habitat areas for openland wildlife and good for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIIs.

## 76B—Marlow fine sandy loam, 3 to 8 percent slopes

This soil is very deep, gently sloping, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 40 acres in size. Some areas have stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

0 to 3 inches, very dark gray fine sandy loam

3 to 6 inches, gray fine sandy loam

*Subsoil:*

6 to 13 inches, yellowish red fine sandy loam

13 to 17 inches, light olive brown fine sandy loam

17 to 31 inches, olive gravelly fine sandy loam

*Substratum:*

31 to 65 inches, olive gray, very firm fine sandy loam

### ***Inclusions***

Included with this unit are small areas with slopes of less than 3 percent or more than 8 percent. In depressions and along narrow drainageways are moderately well drained Peru soils and poorly drained Pillsbury soils. Also included are small isolated areas of Tunbridge or Lyman soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of this Marlow soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum.

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 2.0 to 3.5 feet from March through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil have been cleared for farming. Some areas are reverting to woodland. Other areas have been used for residential developments.

### ***Use and Management***

#### **Farming**

This Marlow soil is classified as prime farmland in this survey area. The short growing season and cool summers restrict the choice of crop varieties, and the long slopes require contour farming and winter cover crops. Excellent yields of silage corn, grasses, and legumes can be obtained with the proper use of lime and fertilizers. Home gardens have good yields of small fruits and vegetables, but very little truck farming is done in the county. Continuous row cropping is mainly not practical because of the moderate erosion hazard. Row crops can be grown in rotation with grasses and legumes. Contour tillage and strip cropping will keep erosion to a minimum when row crops are grown.

#### **Woodland**

Fertility and moisture are favorable on this Marlow soil for high quality hardwoods. Windthrow hazard and

plant competition are limitations that affect woodland management.

Windthrow hazard can be reduced by careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

### **Community Development**

This soil is limited for most types of community development by the perched water table in the spring, a slowly permeable hardpan, and moderate frost action. Wetness is a moderate limitation for dwellings with basements. Foundation drains will help to control wetness and frost action. The dense substratum and wetness are moderate limitations for shallow excavations. There is a moderate limitation for local roads and streets due to frost action. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage.

For onsite sewage disposal, the depth to the slowly permeable hardpan is a severe limitation that can be overcome with fill to raise absorption fields.

### **Recreation**

This soil has moderate limitations for camping and picnic areas due to slow permeability in the substratum. There is a moderate limitation for playgrounds and athletic fields due to slope and small stones.

### **Wildlife Habitat**

Suitability is good for habitat areas for openland and woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IIe.

## **76C—Marlow fine sandy loam, 8 to 15 percent slopes**

This soil is very deep, strongly sloping, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 20 acres in size. Some areas have stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 3 inches, very dark gray fine sandy loam

3 to 6 inches, gray fine sandy loam

*Subsoil:*

6 to 13 inches, yellowish red fine sandy loam

13 to 17 inches, light olive brown fine sandy loam

17 to 31 inches, olive gravelly fine sandy loam

*Substratum:*

31 to 65 inches, olive gray, very firm fine sandy loam

### ***Inclusions***

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. In depressions and along narrow drainageways are moderately well drained Peru soils and poorly drained Pillsbury soils. Also included are small isolated areas of Tunbridge or Lyman soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of this Marlow soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 2.0 to 3.5 feet from March through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil have been cleared for farming. Some areas are reverting to woodland. Other areas have been used for residential development.

### ***Use and Management***

#### **Farming**

The erosion hazard on this strongly sloping Marlow soil is such that, even with intensive erosion control measures, row crops cannot be grown without excessive soil losses. Excellent yields of grasses and legumes can be obtained with the proper use of lime and fertilizer. Home gardens have good yields of small fruits and vegetables, but very little truck farming is done in the county.

#### **Woodland**

Fertility and moisture are favorable on this Marlow soil for high quality hardwoods. Windthrow hazard and plant competition are limitations that affect woodland management.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused

by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

### **Community Development**

This soil is limited by the perched water table in the spring, a slowly permeable hardpan, slope, and moderate frost action. The dense hardpan, wetness, and slope are moderate limitations for shallow excavations. Slope limitations are moderate for dwellings without basements. Wetness and slope are moderate limitations for dwellings with basements. Foundation drains will help to control wetness. There is a moderate limitation for local roads and streets due to frost action. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage. Slope limitations can generally be reduced by cut and fill. However, cuts made into slopes below hardpan layers may make it necessary to use drainage to remove the water on the hardpan during wet times of the year.

For onsite sewage disposal, the depth to the slowly permeable hardpan is a severe limitation that can be overcome with fill to raise absorption fields.

### **Recreation**

This soil has moderate limitations for camping and picnic areas due to slope and slow permeability in the substratum. There is a severe limitation for playgrounds and athletic fields due to slope. Hiking trails can be planned and maintained with few limitations.

### **Wildlife Habitat**

This Marlow soil has good suitability for habitat areas for openland and woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IIIe.

## **76D—Marlow fine sandy loam, 15 to 25 percent slopes**

This soil is very deep, moderately steep, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 20 acres in size. Some areas have stones and boulders more than 30 feet apart and mainly more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 3 inches, very dark gray fine sandy loam

3 to 6 inches, gray fine sandy loam

*Subsoil:*

6 to 13 inches, yellowish red fine sandy loam

13 to 17 inches, light olive brown fine sandy loam

17 to 31 inches, olive gravelly fine sandy loam

*Substratum:*

31 to 65 inches, olive gray, very firm fine sandy loam

### **Inclusions**

Included with this unit are small areas with slopes of less than 15 percent or more than 25 percent. In depressions and along narrow drainageways are moderately well drained Peru soils and poorly drained Pillsbury soils. Also included are small isolated areas of Tunbridge or Lyman soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

### **Major properties of this Marlow soil**

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 2.0 to 3.5 feet from March through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil have been cleared for farming. Some areas are reverting to woodland. Other areas have been used for residential development.

### **Use and Management**

#### **Farming**

The erosion hazard on this moderately steep Marlow soil is such that, even with intensive erosion control measures, row crops cannot be grown without excessive soil losses. This soil is best suited for pasture because the moderately steep slopes make the operation of modern haying equipment difficult and hazardous.

#### **Woodland**

Fertility and moisture are favorable on this Marlow soil for high quality hardwoods. Erosion hazard, slope, windthrow hazard, and plant competition are factors that affect woodland management.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by careful planning to avoid steepest areas. Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

### **Community Development**

The slope of this soil is a severe limitation for all phases of community development. The perched water table and frost action are additional limitations. Limitations due to slope can generally be reduced by cut and fill to level the soil. However, cuts made into slopes below hardpan layers may make it necessary to use drainage to remove the water on the hardpan during wet times of the year.

For onsite sewage disposal, the slow permeability, depth to hardpan, and slope are severe limitations that may make it necessary to use fill to raise and level absorption fields.

### **Recreation**

This soil has severe limitations for camping areas, picnic areas, playgrounds, and athletic fields due to slope. Hiking paths and trails have moderate slope limitations.

### **Wildlife Habitat**

Suitability is fair for habitat areas for openland wildlife and good for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IVe.

## **77B—Marlow fine sandy loam, 3 to 8 percent slopes, very stony**

This soil is very deep, gently sloping, and well drained. It is on loamy glaciated hilltops and mountainsides. These areas are irregular in shape and range from 5 to 40 acres in size. Surface stones are mainly 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 3 inches, very dark gray fine sandy loam

3 to 6 inches, gray fine sandy loam

*Subsoil:*

6 to 13 inches, yellowish red fine sandy loam

13 to 17 inches, light olive brown fine sandy loam

17 to 31 inches, olive gravelly fine sandy loam

*Substratum:*

31 to 65 inches, olive gray, very firm fine sandy loam

**Inclusions**

Included with this unit are small areas with slopes of less than 3 percent or more than 8 percent. In depressions and along narrow drainageways are moderately well drained Peru soils and poorly drained Pillsbury soils. Also included are small isolated areas of Tunbridge or Lyman soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

**Major properties of this Marlow soil**

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 2.0 to 3.5 feet from March through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested. A few areas are used as unimproved pasture or for residential developments.

**Use and Management****Farming**

This soil is too stony for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones. If cleared of surface stones, the soil is prime farmland in this survey area. The short growing season and cool summers restrict the choice of crop varieties, but forage crops of grasses and legumes can be grown.

**Woodland**

Fertility and moisture are favorable on this Marlow soil for high quality hardwoods. Windthrow hazard and plant competition are limitations that affect woodland management.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused

by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

**Community Development**

This soil is limited for most types of community development by the perched water table in the spring, a slowly permeable hardpan, and moderate frost action. The dense hardpan and wetness are moderate limitations for shallow excavations in this soil. Wetness is a moderate limitation for dwellings with basements. Foundation drains will help to control wetness. There is a moderate limitation for local roads and streets due to frost action. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage.

For onsite sewage disposal, the slow permeability and depth to hardpan are severe limitations that may make it necessary to use fill to raise absorption fields.

**Recreation**

This soil has moderate limitations for camping and picnic areas due to slow permeability in the substratum. There is a moderate limitation for playgrounds and athletic fields due to large stones and slope. Hiking trails can be planned and maintained with few limitations.

**Wildlife Habitat**

Suitability is fair for habitat areas for openland wildlife and good for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

**77C—Marlow fine sandy loam, 8 to 15 percent slopes, very stony**

This soil is very deep, strongly sloping and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 100 acres in size. Surface stones are generally 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 3 inches, very dark gray fine sandy loam

3 to 6 inches, gray fine sandy loam

*Subsoil:*

6 to 13 inches, yellowish red fine sandy loam  
 13 to 17 inches, light olive brown fine sandy loam  
 17 to 31 inches, olive gravelly fine sandy loam

*Substratum:*

31 to 65 inches, olive gray, very firm fine sandy loam

**Inclusions**

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. In depressions and along narrow drainageways are moderately well drained Peru soils and poorly drained Pillsbury soils. Also included are small isolated areas of Tunbridge or Lyman soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

**Major properties of this Marlow soil**

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 2.0 to 3.5 feet from March through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested. Other areas are used for unimproved pasture. A few areas have been used for residential or commercial developments.

**Use and Management****Farming**

This soil is too stony for most farming other than pasture. If cleared of surface stones, the soil is excellent grassland, but the slope and erosion hazard limit use for row crops.

**Woodland**

Fertility and moisture are favorable on this Marlow soil for high quality hardwoods. Windthrow hazard and plant competition are limitations that affect woodland management.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species. In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads

may require coarser grained base material to frost depth and drainage to reduce frost action.

**Community Development**

This soil is limited by the perched water table in the spring, a slowly permeable hardpan, slope, and moderate frost action. The dense hardpan, wetness, and slope of this soil are moderate limitations for shallow excavations. Limitations are moderate for dwellings without basements due to slope. Wetness and slope are moderate limitations for dwellings with basements. Foundation drains will help to control wetness and reduce frost action. There is a moderate limitation for local roads and streets due to slope and frost action. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage. Slope limitations can generally be reduced by cut and fill. However, cuts made into slopes below hardpan layers may make it necessary to use drainage to remove the water on the hardpan during wet times of the year.

For onsite sewage disposal, slow permeability and depth to hardpan are severe limitations that may make it necessary to use fill to raise absorption fields.

**Recreation**

This soil has moderate limitations for camping and picnic areas due to slope and to slow permeability in the substratum. There is a severe limitation for playgrounds and athletic fields due to slope. Hiking trails can be planned and maintained with few limitations.

**Wildlife Habitat**

Suitability is fair for habitat areas for openland wildlife and good for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VI<sub>s</sub>.

**77D—Marlow fine sandy loam, 15 to 25 percent slopes, very stony**

This soil is very deep, moderately steep, and well drained. It is on loamy glaciated hilltops and mountainsides. These areas are irregular in shape and range from 5 to 100 acres in size. Surface stones are mainly 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 3 inches, very dark gray fine sandy loam

3 to 6 inches, gray fine sandy loam

*Subsoil:*

6 to 13 inches, yellowish red fine sandy loam

13 to 17 inches, light olive brown fine sandy loam

17 to 31 inches, olive gravelly fine sandy loam

*Substratum:*

31 to 65 inches, olive gray, very firm fine sandy loam

### ***Inclusions***

Included with this unit are small areas with slopes of less than 15 percent or more than 25 percent. In depressions and along narrow drainageways are moderately well drained Peru soils and poorly drained Pillsbury soils. Also included are small isolated areas of Tunbridge or Lyman soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of this Marlow soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 2.0 to 3.5 feet from March through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested. A few areas are used for unimproved pasture. Some areas have been used for residential developments.

### ***Use and Management***

#### **Farming**

This soil is too stony and steep for most farming other than pasture. Good to excellent yields of grasses and legumes are obtained with the proper use of lime and fertilizers. The slope of this soil make the operation of modern haying equipment difficult and hazardous.

#### **Woodland**

Fertility and moisture are favorable on this Marlow soil for high quality hardwoods. Erosion hazard, slope, windthrow hazard, and plant competition are factors that affect woodland management.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by

careful planning to avoid steepest areas. Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

### **Community Development**

This soil is limited for community development by slope, the perched water table, and a slowly permeable hardpan. The slope of this soil is a severe limitation for dwellings with or without basements, shallow excavations, local roads, streets, lawns, and landscaping. Foundations drains will help to control wetness and frost action. Limitations due to slope can be reduced by cut and fill to level the soil. However, cuts made into slopes below hardpan layers may make it necessary to use drainage to remove the water on the hardpan during wet times of the year.

For onsite sewage disposal, the slow permeability, depth to hardpan, and slope are severe limitations that may make it necessary to use fill to raise and level absorption fields.

### **Recreation**

This soil has severe limitations for camping areas, picnic areas, playgrounds, and athletic fields due to slope. Hiking paths and trails have moderate slope limitations.

### **Wildlife Habitat**

Suitability is fair for habitat areas for openland wildlife and good for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

## **77E—Marlow fine sandy loam, 25 to 35 percent slopes, very stony**

This soil is very deep, steep, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 125 acres in size. Surface stones are generally 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 3 inches, very dark gray fine sandy loam

3 to 6 inches, gray fine sandy loam

*Subsoil:*

6 to 13 inches, yellowish red fine sandy loam

13 to 17 inches, light olive brown fine sandy loam

17 to 31 inches, olive gravelly fine sandy loam

*Substratum:*

31 to 65 inches, olive gray, very firm fine sandy loam

### ***Inclusions***

Included with this unit are small areas with slopes of less than 25 percent or more than 35 percent. In depressions and along narrow drainageways are moderately well drained Peru soils and poorly drained Pillsbury soils. Also included are small isolated areas of Tunbridge or Lyman soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of this Marlow soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 2.0 to 3.5 feet from March through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested. A few areas have been developed for residential uses.

### ***Use and Management***

#### **Farming**

This soil is too stony and steep for most farming other than pasture. Good to excellent yields of grasses and legumes are obtained with the proper use of lime and fertilizers. The slopes of this soil make the operation of modern haying equipment difficult and extremely hazardous.

#### **Woodland**

Fertility and moisture are favorable on this Marlow soil for high quality hardwoods. Erosion hazard, slope, windthrow hazard, and plant competition are factors that affect woodland management.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by careful planning to avoid steepest areas. Windthrow

hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

### **Community Development**

This soil is limited for community development by slope, the perched water table in the spring, and a slowly permeable hardpan. The slope of this soil is a severe limitation for dwellings with or without basements, shallow excavations, local roads, streets, lawns, and landscaping. Foundation drains will help to control wetness and frost action. Limitations due to slope can be reduced by cut and fill to level the soil. However, cuts made into slopes below hardpan layers may make it necessary to use drainage to remove the water on the hardpan during wet times of the year.

For onsite sewage disposal, the slow permeability, depth to hardpan, and slope are severe limitations that may make it necessary to use fill to raise and level absorption fields.

### **Recreation**

This soil has severe limitations for recreational uses due to slope.

### **Wildlife Habitat**

Suitability is fair for habitat areas for openland wildlife and good for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VII.

## **78B—Peru fine sandy loam, 3 to 8 percent slopes**

This soil is very deep, gently sloping, and moderately well drained. It is on loamy hilltops, mountainsides, and valley floors. The areas are mainly oval and range from 5 to 75 acres in size. Some areas have stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, very dark grayish brown fine sandy loam

*Subsoil:*

6 to 8 inches, dark brown fine sandy loam

8 to 12 inches, dark reddish brown fine sandy loam

12 to 18 inches, dark brown fine sandy loam  
 18 to 21 inches, mottled, dark brown fine sandy loam  
 21 to 24 inches, mottled, grayish brown fine sandy loam

*Substratum:*

24 to 65 inches, mottled, olive gray, firm sandy loam

***Inclusions***

Included with this unit are small areas with slopes of less than 3 percent or more than 8 percent. On low mounds or narrow ridges are the well drained Marlow soils. In depressions and along narrow drainageways are the poorly drained Pillsbury soils. Also included are small isolated areas of Tunbridge or Lyman soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

***Major properties of the Peru soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum.

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 1.5 to 2.5 feet from November through May

*Potential frost action:* High

*Flood hazard:* None

Most areas of this soil are farmed. Some areas are reverting to woodland. A few areas have been used for residential developments.

***Use and Management***

**Farming**

This Peru soil is classified as prime farmland in this survey area. The short growing season and cool summers restrict the choice of crop varieties. Seasonal wetness is the main limitation for farming. Drainage of the soil will allow earlier tillage. Continuous row crops can be grown if conservation tillage and contour farming are used to control erosion. Undrained areas are best suited for hay and pasture crops (fig. 20). This soil is excellent grassland, but frost heaving and winter kill are limitations for legumes.

**Woodland**

Fertility and moisture are favorable for high quality hardwoods. This soil is limited for woodland management by windthrow hazard and plant competition.

Windthrow hazard can be reduced by careful thinning and by avoiding surface-root damage caused



Figure 20.— Peru fine sandy loam, 3 to 8 percent slopes, on the left and Pillsbury fine sandy loam, 0 to 3 percent slopes, very stony on the right. Both areas are used for pasture.

by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

### **Community Development**

This soil is limited for community development by wetness, a slowly permeable hardpan, and frost action. Wetness is a severe limitation for shallow excavations and for dwellings with basements. Wetness is a moderate limitation for dwellings without basements. Foundation drains are needed to control wetness and frost action. Frost action is severe limitation for local roads and streets. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage. This soil has a moderate limitation for lawns and landscaping due to wetness.

For onsite sewage disposal, wetness and the slowly permeable hardpan are severe limitations that may make it necessary to use fill to raise absorption fields.

### **Recreation**

This soil has moderate limitations for camping and picnic areas due to wetness and slow permeability. Limitations are moderate for playgrounds and athletic fields due to slope, small stones, and wetness. Soil wetness is a moderate limitation for hiking paths and trails.

### **Wildlife Habitat**

Suitability is good for habitat for openland and woodland wildlife. This moderately well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IIe.

## **78C—Peru fine sandy loam, 8 to 15 percent slopes**

This soil is very deep, strongly sloping, and moderately well drained. It is on loamy glaciated hilltops and mountainsides. The areas are mainly long and irregular in shape and range from 5 to 50 acres in size. Some areas have stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, very dark grayish brown fine sandy loam

*Subsoil:*

6 to 8 inches, dark brown fine sandy loam

8 to 12 inches, dark reddish brown fine sandy loam

12 to 18 inches, dark brown fine sandy loam

18 to 21 inches, mottled, dark brown fine sandy loam

21 to 24 inches, mottled, grayish brown fine sandy loam

*Substratum:*

24 to 65 inches, mottled, olive gray, firm sandy loam

### ***Inclusions***

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. On low mounds or narrow ridges are the well drained Marlow soils. In depressions and along narrow drainageways are the poorly drained Pillsbury soils. Also included are small isolated areas of Tunbridge or Lyman soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Peru soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 1.5 to 2.5 feet from November through May

*Potential frost action:* High

*Flood hazard:* None

Most areas of this soil are farmed. Some areas are reverting to woodland. A few areas have been used for residential developments.

### ***Use and Management***

#### **Farming**

The slope and erosion hazard limit farming of this soil to hay and pasture. Seasonal wetness is a main limitation. Drainage of the soil will allow better varieties of grass and legumes to be grown. This soil is excellent grassland, but frost heaving and winter kill are limitations for legumes.

#### **Woodland**

Fertility and moisture are favorable on this Peru soil for high quality hardwoods. This soil is limited for woodland management by windthrow hazard and plant competition.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

### Community Development

This soil is limited by wetness, a slowly permeable hardpan, slope, and frost action. Wetness is a severe limitation for dwellings with basements and for shallow excavations. Wetness and slope are moderate limitations for dwellings without basements. Foundation drains can be used to control wetness and frost action. Frost action is a severe limitation for local roads and streets. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage. Wetness and slope are moderate limitations for lawns and landscaping. Slope can generally be reduced by cut and fill to level the soil. However, cuts made into slopes below hardpan layers may make it necessary to use drainage to remove the water on the hardpan during wet times of the year.

For onsite sewage disposal, wetness and slow permeability are severe limitations that may make it necessary to use fill to raise absorption fields.

### Recreation

This soil has moderate limitations for camping and picnic areas due to slope, wetness, and slow permeability. Limitations are severe for playgrounds and athletic fields due to slope. Soil wetness is moderate limitation for hiking paths and trails.

### Wildlife Habitat

Suitability is fair for habitat areas for openland wildlife and good for woodland wildlife. This soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IIIe.

## 79B—Peru fine sandy loam, 3 to 8 percent slopes, very stony

This soil is very deep, gently sloping, and moderately well drained. It is on loamy glaciated hilltops, mountainsides, and valley floors. The areas are mainly irregular in shape and range from 5 to 100 acres in size. Surface stones are mainly 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, very dark grayish brown fine sandy loam

*Subsoil:*

6 to 8 inches, dark brown fine sandy loam

8 to 12 inches, dark reddish brown fine sandy loam

12 to 18 inches, dark brown fine sandy loam

18 to 21 inches, mottled, dark brown fine sandy loam

21 to 24 inches, mottled, grayish brown fine sandy loam

*Substratum:*

24 to 65 inches, mottled, olive gray, firm sandy loam

### Inclusions

Included with this unit are small areas with slopes of less than 3 percent or more than 8 percent. On low mounds or narrow ridges are the well drained Marlow soils. In depressions and along narrow drainageways are the poorly drained Pillsbury soils. Also included are small isolated areas of Tunbridge or Lyman soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

### Major properties of the Peru soil

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 1.5 to 2.5 feet from November through May

*Potential frost action:* High

*Flood hazard:* None

This soil is mainly forested. A few areas are used as unimproved pasture or for residential development.

### Use and Management

#### Farming

This unit is too stony for most farming other than pasture (fig. 21). The degree of pasture improvement that can be done depends on the amount of surface stones. If cleared of surface stones, the soil is classified as prime farmland in this survey area. Seasonal wetness is a main limitation. Drainage of the soil will allow better grass and legume varieties to be grown. This is an excellent grassland soil, but frost heaving and winter kill are limitations for legumes.

#### Woodland

Fertility and moisture are favorable on this Peru soil for high quality hardwoods. This soil is limited for woodland management by windthrow hazard and plant competition.

Windthrow hazard can be decreased with careful



Figure 21.— Peru fine sandy loam, 3 to 8 percent slopes, very stony, used for pasture.

thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

### Community Development

This soil is limited for community development by wetness, a slowly permeable hardpan, and frost action. Wetness is a severe limitation for dwellings with basements and for shallow excavations. It is a moderate limitation for dwellings without basements. Foundation drains will help to control wetness and frost action. Frost action is a severe limitation for local roads and streets. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage. This soil is limited for lawns and landscaping due to wetness and large stones.

For onsite sewage disposal, soil wetness and slow permeability are severe limitations that may make it necessary to use fill to raise absorption fields.

### Recreation

This soil has moderate limitations for camping and picnic areas due to wetness and slow permeability.

Limitations are moderate for playgrounds and athletic fields due to slope, large stones, and wetness. Soil wetness is moderate limitation for hiking paths and trails.

### Wildlife Habitat

Suitability is fair for habitat areas for openland wildlife and good for woodland wildlife. The soils is very poorly suited for wetland wildlife habitat.

The capability subclass is VI<sub>s</sub>.

### 79C—Peru fine sandy loam, 8 to 15 percent slopes, very stony

This soil is very deep, strongly sloping, and moderately well drained. It is on loamy glaciated hilltops and mountainsides. The areas are mainly oval and range from 5 to 100 acres in size. Surface stones are mainly 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, very dark grayish brown fine sandy loam

*Subsoil:*

6 to 8 inches, dark brown fine sandy loam

8 to 12 inches, dark reddish brown fine sandy loam

12 to 18 inches, dark brown fine sandy loam

18 to 21 inches, mottled, dark brown fine sandy loam  
21 to 24 inches, mottled, grayish brown fine sandy loam

*Substratum:*

24 to 65 inches, mottled, olive gray, firm sandy loam

### ***Inclusions***

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. On low mounds or narrow ridges are the well drained Marlow soils. In depressions and along narrow drainageways are the poorly drained Pillsbury soils. Also included are small isolated areas of Tunbridge or Lyman soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Peru soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 1.5 to 2.5 feet from November through May

*Potential frost action:* High

*Flood hazard:* None

This soil is mainly forested. A few areas are used as unimproved pasture or for residential developments.

### ***Use and Management***

#### **Farming**

This soil is too stony for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones. Seasonal wetness is a main limitation. Drainage of the soil will allow better grass and legume varieties to be grown. This soil is excellent grassland, but frost heaving and winter kill are limitations for legumes.

#### **Woodland**

Fertility and moisture are favorable on this Peru soil for high quality hardwoods. This soil is limited for woodland management by windthrow hazard and plant competition.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the

hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

### **Community Development**

This soil is limited for community development by wetness, a slowly permeable hardpan, slope, and frost action. Wetness is a severe limitation for dwellings with basements and for shallow excavations. Wetness and slope are moderate limitations for dwellings without basements. Foundation drains are needed to control wetness and frost action. Frost action is a severe limitation for local roads and streets. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage. This soil has severe limitations for lawns and landscaping due to large stones, wetness, and slope. Limitations due to slope can generally be reduced by cut and fill to level the soil. However, cuts made into slopes below hardpan layers may make it necessary to use drainage to remove the water on the hardpan during wet times of the year.

For onsite sewage disposal, wetness and slow permeability are severe limitations that may make it necessary to use fill to raise absorption fields.

### **Recreation**

This soil has moderate limitations for camping and picnic areas due to slope, wetness, and large stones. Limitations are severe for playgrounds and athletic field due to slope. Wetness is a moderate limitation for hiking paths and trails.

### **Wildlife Habitat**

Suitability is fair for habitat areas for openland wildlife and good potential for woodland wildlife. This soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

## **79D—Peru fine sandy loam, 15 to 25 percent slopes, very stony**

This soil is very deep, moderately steep, and moderately well drained. It is on loamy glaciated hilltops and mountainsides. The areas are mainly irregular or oval and range from 5 to 50 acres in size. Surface stones are mainly 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, very dark grayish brown fine sandy loam

*Subsoil:*

6 to 8 inches, dark brown fine sandy loam  
 8 to 12 inches, dark reddish brown fine sandy loam  
 12 to 18 inches, dark brown fine sandy loam  
 18 to 21 inches, mottled, dark brown fine sandy loam  
 21 to 24 inches, mottled, grayish brown fine sandy loam

*Substratum:*

24 to 65 inches, mottled, olive gray, firm sandy loam

### ***Inclusions***

Included with this unit are small areas with slopes of less than 15 percent or more than 25 percent. On low mounds or narrow ridges are the well drained Marlow soils. In depressions and along narrow drainageways are the poorly drained Pillsbury soils. Also included are small isolated areas of Tunbridge or Lyman soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Peru soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 1.5 to 2.5 feet from November through May

*Potential frost action:* High

*Flood hazard:* None

This soil is mainly forested. A few areas are used as unimproved pasture or for residential developments.

### ***Use and Management***

#### **Farming**

This unit is too stony and steep for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones and percent slope. Seasonal wetness is a main limitation. This soil is excellent grassland, but frost heaving and winter kill are limitations for legumes.

#### **Woodland**

Fertility and moisture are favorable on this Peru soil for high quality hardwoods. This soil is limited for woodland management by erosion hazard, slope, windthrow hazard, and plant competition.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by

careful planning to avoid steepest areas. Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

#### **Community Development**

This soil is limited for community development by wetness, a slowly permeable hardpan, slope, and frost action. Wetness and slope are severe limitations for dwellings with basements and for shallow excavations. Slope limitations for this soil are severe for dwellings without basements. Foundation drains will help to control wetness and frost action. Frost action and slope are severe limitations for local roads and streets. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage. Slope limitations are severe for lawns and landscaping. Slope limitations can generally be reduced by cut and fill to level the soil. However, cuts made into slopes below hardpan layers may make it necessary to use drainage to remove the water on the hardpan during wet times of the year.

For onsite sewage disposal, wetness and slow permeability are severe limitations that may make it necessary to use fill to raise absorption fields.

#### **Recreation**

This soil has severe limitations for camping areas, picnic areas, playgrounds, and athletic fields due to slope. Wetness and slope are moderate limitations for hiking paths and trails.

#### **Wildlife Habitat**

Suitability is fair for habitat areas for openland wildlife and good for woodland wildlife. This soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

### **90B—Tunbridge-Lyman complex, 3 to 8 percent slopes**

The Tunbridge and Lyman soils in this unit are in such intricate patterns that it was not practical to map them separately. The Tunbridge soils are loamy, moderately deep, and well drained. The Lyman soils are loamy, shallow, and somewhat excessively drained. These soils are on undulating or gently sloping hilltops and hillsides. The areas are roughly oval or irregular in

shape and range from 5 to 50 acres in size. Surface stones are more than 30 feet apart and generally more than 80 feet apart. Tunbridge soils make up about 45 percent of this unit, Lyman soils 30 percent, and other soils 25 percent of this unit.

The typical sequence, depth, and composition of the layers of the Tunbridge soil are as follows—

*Surface layer:*

0 to 1 inch, dark reddish brown fine sandy loam

1 to 3 inches, pinkish gray fine sandy loam

*Subsoil:*

3 to 11 inches, strong brown fine sandy loam

11 to 21 inches, yellowish brown fine sandy loam

*Substratum:*

21 to 28 inches, light yellowish brown fine sandy loam

28 inches, hard schist bedrock

In areas that have been farmed, tillage has mixed the surface layer and part of the subsoil into a dark grayish brown fine sandy loam that is 6 to 8 inches thick.

The typical soil sequence, depth, and composition of the layers of the Lyman soil are as follows—

*Surface layer:*

0 to 3 inches, dark reddish brown fine sandy loam

*Subsoil:*

3 to 7 inches, yellowish brown fine sandy loam

7 to 12 inches, yellowish red loam

12 to 16 inches, olive gravelly loam

16 inches, hard schist bedrock

In areas that have been farmed, tillage has mixed the surface layer and part of the subsoil into a dark grayish brown fine sandy loam that is 6 to 8 inches thick.

### ***Inclusions***

Included in this complex are areas of nearly level soils and areas of well drained Marlow soils or moderately well drained Peru soils. In some areas bedrock blocks the drainage patterns and the moderately deep to shallow soils are moderately well drained to poorly drained. These inclusions make up about 15 percent of this complex. Also included are small areas where the surface has stones less than 30 feet apart and occasional rock outcrops. These inclusions make up about 10 percent of this complex.

### ***Major properties of the Tunbridge soil***

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* Moderate

*Depth to bedrock:* 20 to 40 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

### ***Major properties of the Lyman soil***

*Permeability:* Moderately rapid throughout

*Available water capacity:* Very low

*Depth to bedrock:* 10 to 20 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this complex have been cleared for farming. Some areas are still farmed, but many are reverting to woodland. A few areas are used for residential development.

### ***Use and Management***

#### **Farming**

This complex is moderately well suited for row crops. With the proper use of lime and fertilizers, yields are good on the Tunbridge soils but only fair on the Lyman soils. The choice of crops and crop varieties is somewhat restricted by the short growing season. If row crops are grown, tillage should be on the contour. Winter cover crops help control erosion and if incorporated into surface layer, help maintain organic matter content. The soils are well suited for grasses and legumes for hay or pasture. Yield are generally good yields except on the shallow Lyman areas, where yields are only fair and stands are difficult to maintain.

#### **Woodland**

Fertility and moisture are adequate on these Tunbridge and Lyman soils for good tree growth. These soils are limited for woodland management by windthrow hazard. On areas of Lyman soils, seedling mortality and plant competition are additional limitations.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains. Site preparation following harvest helps reduce the invasion of undesirable species.

#### **Community Development**

Bedrock at a depth of less than 40 inches is the primary limiting factor for community development. Homes with basements are either located in the included very deep soils, require blasting to obtain the desired depth, or built above the rock. Foundation drains are needed to remove water on the bedrock and in the fractures. Foundation drains will also reduce the moderate frost action limitations. Gravity outlets for the drains may be difficult to locate or require additional

blasting. Drilling and blasting generally are necessary for installing underground utilities.

For local roads and streets, limitations are severe on the Lyman soils due to depth to bedrock and moderate on the Tunbridge soils due to frost action and depth to bedrock. Road construction on the Lyman soils requires drilling and blasting to obtain desired grades and depths. Frost action limitations can be overcome by providing coarser grained base material to frost depth and installing drainage.

For onsite sewage disposal, the depth to bedrock is a severe limitation. Areas with sufficient depth for the system must be located, or a site must be filled to obtain adequate depth. The included areas of Marlow and Peru soils have the necessary depth but are limited by slow permeability and a seasonal water table.

### **Recreation**

These soils have moderate to severe limitations for most recreational uses. Limitations for camp and picnic areas are moderate on areas of Tunbridge soils and severe on areas of Lyman soils due to small surface stones on the Tunbridge and the shallow depth to bedrock of the Lyman soils. These soils have severe limitations if used as a playground or athletic field due to small surface stones and depth to bedrock. Maintaining adequate grass cover on the shallow, droughty Lyman soils is also a concern.

### **Wildlife Habitat**

Suitability for habitat areas for openland and woodland wildlife is good on areas of Tunbridge soils and poor on areas of Lyman soils. Both soils are very poorly suited for wetland wildlife habitat.

The capability subclass is IIIe.

## **90C—Tunbridge-Lyman complex, 8 to 15 percent slopes**

The Tunbridge and Lyman soils in this unit are in such intricate patterns that it was not practical to map them separately. The Tunbridge soils are loamy, moderately deep, and well drained. The Lyman soils are loamy, shallow, and somewhat excessively drained. These soils are on rolling or strongly sloping hilltops and hillsides. The areas are roughly oval or irregular in shape and range from 5 to 75 acres in size. Surface stones are more than 30 feet apart and generally more than 80 feet apart. Tunbridge soils make up about 45 percent of this unit, Lyman soils 30 percent, and other soils 25 percent of this unit.

The typical sequence, depth, and composition of the layers of the Tunbridge soil are as follows—

#### *Surface layer:*

0 to 1 inch, dark reddish brown fine sandy loam

1 to 3 inches, pinkish gray fine sandy loam

#### *Subsoil:*

3 to 11 inches, strong brown fine sandy loam

11 to 21 inches, yellowish brown fine sandy loam

#### *Substratum:*

21 to 28 inches, light yellowish brown fine sandy loam

28 inches, hard schist bedrock

In areas that have been farmed, tillage has mixed the surface layer and part of the subsoil into a dark grayish brown fine sandy loam that is 6 to 8 inches thick.

The typical soil sequence, depth, and composition of the layers of the Lyman soil are as follows—

#### *Surface layer:*

0 to 3 inches, dark reddish brown fine sandy loam

#### *Subsoil:*

3 to 7 inches, yellowish brown fine sandy loam

7 to 12 inches, yellowish red loam

12 to 16 inches, olive gravelly loam

16 inches, hard schist bedrock

In areas that have been farmed, tillage has mixed the surface layer and part of the subsoil into a dark grayish brown fine sandy loam that is 6 to 8 inches thick.

### ***Inclusions***

Included in this complex are areas of soils with slopes of less than 8 percent or more than 15 percent and areas of well drained Marlow soils or moderately well drained Peru soils. In some areas bedrock blocks the drainage patterns and the moderately deep to shallow soils are moderately well drained to poorly drained. These inclusions make up about 15 percent of this complex. Also included are small areas where the surface has stones less than 30 feet apart and occasional rock outcrops. These inclusions make up about 10 percent of this complex.

#### ***Major properties of the Tunbridge soil***

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* Moderate

*Depth to bedrock:* 20 to 40 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

#### ***Major properties of the Lyman soil***

*Permeability:* Moderately rapid throughout

*Available water capacity:* Very low

*Depth to bedrock:* 10 to 20 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this complex have been used for farming. A few areas are still farmed, but many are reverting to woodland. A few areas are used for residential development.

### ***Use and Management***

#### **Farming**

The areas of Tunbridge soils in this complex are moderately well suited for row crops, but the areas of Lyman soils are poorly suited. Erosion and the low available water capacity of the Lyman soils are the major limitations. Contour stripcropping and winter cover crops will reduce soil losses, but the soils are best suited for grasses and legumes for hay and pasture. With the proper use of lime and fertilizers, good yields of forage crops can be obtained on the Tunbridge soils. The Lyman soils will mainly produce fair yields. Stands of deep rooted grasses and legumes may be difficult to maintain on the shallow, droughty Lyman soils.

#### **Woodland**

Fertility and moisture are adequate on these Tunbridge and Lyman soils for good tree growth. The soils are limited for woodland management by windthrow hazard. On areas of Lyman soils, seedling mortality and plant competition are additional limitations.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains. Site preparation following harvest helps reduce the invasion of undesirable species.

#### **Community Development**

Bedrock at a depth of less than 40 inches is the primary limiting factor for community development. The slope limits excavations. Road construction through the soil will mainly encounter bedrock. Drilling and blasting of the bedrock or covering with additional fill material will be required. Road construction on the Lyman soils requires drilling and blasting to obtain desired grades and depths. Moderate limitations for frost action on the Tunbridge soils can be overcome by providing coarser grained base material to frost depth and installing drainage. Drilling and blasting generally are necessary for underground utilities and home basements. Intensive site investigation and special building design may be needed for home building. Foundation drains are needed to remove water on the

bedrock and in the fractures. Foundation drains will also reduce the moderate frost action. Gravity outlets for the drains may make it necessary to use additional blasting.

For onsite sewage disposal, the depth to bedrock is a severe limitation. Areas must be located with sufficient depth for the system, or a site must be filled to obtain adequate depth. The included areas of Marlow and Peru soils have the necessary depth, but have limitations of slow permeability and a seasonal water table.

#### **Recreation**

These soils have moderate to severe limitations for most recreational uses. Limitations for camp and picnic areas are moderate on areas of Tunbridge soils and severe on areas of Lyman soils due to small surface stones on the Tunbridge soils and the shallow depth to bedrock of the Lyman soils. These soils have severe limitations if used as a playground or athletic field due to small surface stones and depth to bedrock. Maintaining adequate grass cover on the shallow, droughty Lyman areas is also a concern. There are few limitations for construction and maintenance of hiking paths and trails, but they should be built on the contour to prevent erosion.

#### **Wildlife Habitat**

Suitability for habitat areas for openland and woodland wildlife is good on areas of Tunbridge soils and poor on areas of Lyman soils. Both soils are very poorly suited for wetland wildlife habitat.

The capability subclass is IVe.

### **90D—Tunbridge-Lyman complex, 15 to 25 percent slopes**

The Tunbridge and Lyman soils in this unit are in such intricate patterns that it was not practical to map them separately. The Tunbridge soils are loamy, moderately deep, and well drained. The Lyman soils are loamy, shallow, and somewhat excessively drained. These soils are on hilly or moderately steep hilltops and mountainsides. The areas are roughly oval or irregular in shape and range from 5 to 100 acres in size. Surface stones are more than 30 feet apart and generally more than 80 feet apart. Tunbridge soils make up about 45 percent of this unit, Lyman soils 30 percent, and other soils 25 percent of this unit.

The typical sequence, depth, and composition of the layers of the Tunbridge soil are as follows—

*Surface layer:*

0 to 1 inch, dark reddish brown fine sandy loam

1 to 3 inches, pinkish gray fine sandy loam

*Subsoil:*

3 to 11 inches, strong brown fine sandy loam

11 to 21 inches, yellowish brown fine sandy loam

*Substratum:*

21 to 28 inches, light yellowish brown fine sandy loam

28 inches, hard schist bedrock

In areas that have been farmed, tillage has mixed the surface layer and part of the subsoil into a dark grayish brown fine sandy loam that is 6 to 8 inches thick.

The typical soil sequence, depth, and composition of the layers of the Lyman soil are as follows—

*Surface layer:*

0 to 3 inches, dark reddish brown fine sandy loam

*Subsoil:*

3 to 7 inches, yellowish brown fine sandy loam

7 to 12 inches, yellowish red loam

12 to 16 inches, olive gravelly loam

16 inches, hard schist bedrock

In areas that have been farmed, tillage has mixed the surface layer and part of the subsoil into a dark grayish brown fine sandy loam that is 6 to 8 inches thick.

### ***Inclusions***

Included in this complex are areas of soils that have slopes of less than 15 percent or more than 25 percent and areas of well drained Marlow soils or moderately well drained Peru soils. In some areas bedrock blocks the drainage patterns and the moderately deep to shallow soils are moderately well drained to poorly drained. These inclusions make up about 15 percent of this complex. Also included are small areas where the surface has stones less than 30 feet apart and occasional rock outcrops. These inclusions make up about 10 percent of this complex.

#### ***Major properties of the Tunbridge soil***

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* Moderate

*Depth to bedrock:* 20 to 40 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

#### ***Major properties of the Lyman soil***

*Permeability:* Moderately rapid throughout

*Available water capacity:* Very low

*Depth to bedrock:* 10 to 20 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this complex have been used for

farming. A few areas are still farmed, but most are reverting to woodland. A few scattered areas are used for residential development.

### ***Use and Management***

#### **Farming**

Farming for row crops is limited by the moderately steep slopes and severe erosion hazard. These areas are best suited for grasses and legumes for pasture. Hay crops can be harvested, but use of modern haying equipment on the steeper slopes is hazardous. With the proper use of lime and fertilizers, fair yields of forage crops can be obtained. Stands of deep rooted grasses and legumes may be difficult to maintain on the shallow, droughty Lyman soils.

#### **Woodland**

Fertility and moisture are adequate for good tree growth. The soils are limited for woodland management by erosion hazard, slope, seedling mortality, and windthrow hazard. On areas of Lyman soils, plant competition is an additional limitation.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by careful planning to avoid steepest areas. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains. Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

#### **Community Development**

Bedrock at a depth of less than 40 inches and the moderately steep slopes are severe limitations for community development on this unit. Slope limitations are severe for shallow excavations, dwellings with or without basements, and local roads and streets. Road construction through the soil will mainly encounter bedrock. Drilling and blasting generally are necessary for road construction and the installation of underground utilities. Buildings with basements mainly require special design and bedrock excavation on these shallow and moderately deep soils. Intensive site investigation may locate areas of the included very deep soils where construction will not encounter bedrock. Foundation drains are needed to remove water on the bedrock and in the fractures. Foundation drains will also reduce frost action. Gravity outlets for

foundation drains may make it necessary to use additional blasting to obtain desired grade.

For onsite sewage disposal, the bedrock and moderately steep slopes are severe limitations. Areas must be located with sufficient depth for the system, or a site must be filled to obtain adequate depth. The included areas of Marlow and Peru soils have the necessary depth but have limitations of slow permeability and a seasonal water table.

### Recreation

These soils have severe limitations for most recreational uses. Limitations are severe for camp and picnic areas due to the slope of this unit and depth to bedrock of the Lyman soils. These soils have severe limitations if used as a playground or athletic field due to the slope, depth to bedrock, and small surface stones. Maintaining adequate grass cover on the shallow, droughty Lyman areas is also a concern. Excavations to level the soil are limited by the shallow depth to bedrock of the Lyman soils. Limitations are moderate for hiking paths and trails due to slope. Trails with heavy use should be planned built on the contour with frequent water bars to prevent erosion.

### Wildlife Habitat

Suitability for habitat areas on the Tunbridge soils is fair for openland wildlife and good for woodland wildlife. Lyman soils have poor potential for openland and woodland wildlife habitat. Both soils are very poorly suited for wetland wildlife habitat.

The capability subclass is VIe.

## 101—Ondawa fine sandy loam, frequently flooded

This soils is well drained, nearly level, and very deep. It is on loamy flood plains in the north, central, and eastern parts of the county. The areas are irregularly shaped and range from 5 to 45 acres in size. Slopes range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 10 inches, very dark grayish brown fine sandy loam

*Subsoil:*

10 to 33 inches, olive brown fine sandy loam

*Substratum:*

33 to 65 inches, pale brown fine sand

In areas along fast-flowing streams, the substratum commonly is gravelly or very gravelly sand.

### Inclusions

Included with this soil in mapping are small depressions and very narrow abandoned stream channels of moderately well drained Podunk soils and poorly drained Rumney soils. Also included are low, narrow ridges of excessively drained Sunday soils. The included soils make up about 10 percent of this unit.

### Major properties of the Ondawa soil

*Permeability:* Moderately rapid in the surface layer and subsoil; moderately rapid to rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* At least once in 2 years from November through April. Flooding during the growing season is rare.

Most areas of this soil are farmed. Some small isolated areas or areas in a nonfarm region are forested.

### Use and Management

#### Farming

This soil is classified as prime farmland in this survey area. It can be used for continuous row crops if cover crops are grown to protect it from erosion during winter and early spring flooding. The short growing season and cool summers restrict the choice of crop varieties that can be grown. Good to excellent yields of silage corn, grasses, and legumes can be obtained with the proper use of lime and fertilizers. Areas subject to fast-flowing floodwaters are best suited for hay and pasture. Legumes are subject to winterkill and flooding.

#### Woodland

Fertility and moisture are favorable for high quality hardwoods. This soil is limited for woodland management by flood hazard and plant competition. In many areas timber quality may be reduced by ice damage during flooding. Access to some areas may be a limitation for logging operations. Site preparation following harvest helps reduce the invasion of undesirable species.

#### Community Development

This Ondawa soil has severe limitations for all types of community development due to frequent flooding.

These areas are floodwater channels, and diking to prevent flooding generally causes flooding in another area.

Flooding is a severe limitation for onsite septic systems, and there is a severe hazard of ground-water pollution because the sandy, rapidly permeable substratum may not adequately filter the effluent.

### Recreation

The soil is limited for recreational use by flooding. Limitations are moderate for picnic areas and hiking paths and trails and severe for camping areas and playgrounds. These areas are subject to ice damage, erosion, or sedimentation.

### Wildlife Habitat

This soil has good suitability for habitat for woodland wildlife and fair suitability for openland wildlife. It is very poorly suited for wetland wildlife habitat. Frequent flooding will severely damage water impoundments.

The capability class is I.

## 102—Sunday loamy sand

This soil is very deep, nearly level, and excessively drained. It is on flood plains in the northern, central, and eastern parts of the county. The areas are irregular in shape and range from 5 to 40 acres in size. Slopes range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 9 inches, very dark grayish brown loamy sand

*Substratum:*

9 to 23 inches, very dark grayish brown loamy sand

23 to 47 inches, dark grayish brown sand

47 to 65 inches, grayish brown coarse sand

Some areas along fast-flowing streams have a gravelly or very gravelly substratum.

### Inclusions

Included with this soil in mapping are areas along larger streams that are only occasionally flooded, very small or very narrow, low ridges of well drained Ondawa soils, and moderately well drained Podunk soils. Also included are areas of moderately well drained, sandy soils. The included soils make up about 10 percent of this unit.

### Major properties of the Sunday soil

*Permeability:* Rapid to very rapid throughout

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* At least once in 2 years from March through October. Flooding is rare during the growing season. Some areas in major valleys are subject to only occasional flooding.

Most areas of this soil are farmed. Areas in nonfarming regions are mainly forested. A few areas have been used as a source of sand and gravel.

## Use and Management

### Farming

Droughtiness, flooding, and a short growing season limit the Sunday soil for farming. The soil is suited for drought-tolerant grasses and legumes that can withstand flooding. The short growing season and cool summers restrict the choice of crop varieties that can be grown. Row crops can be grown, but yields are mainly moderate to low without irrigation and the choice of crop varieties is limited by the growing season. Heavy applications of manure will increase the available water capacity. Winter cover crops should be grown to protect the soil during flooding and then incorporated into surface layer to increase organic matter content.

### Woodland

Fertility and moisture are adequate for good tree growth. This soil is limited for woodland management by flood hazard and seedling mortality. In many areas timber quality may be reduced by ice damage during early spring flooding. Access to some areas may be a limitation for logging operations. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

### Community Development

This soil is severely limited by the flood hazard. Many areas of the soil are floodwater channels, and diking to prevent flooding generally causes flooding in another area. Construction of underground utilities through the soil is difficult because the sides of excavations tend to slough. Deep excavations mainly require special equipment.

Areas of onsite waste disposal systems have severe limitations due to flood hazard and poor filtering. The sandy, very permeable substratum does not effectively filter the effluent from onsite waste disposal systems, and there is a hazard of ground-water pollution.

### Recreation

This soil has severe limitations for camping areas,

playgrounds, and athletic fields due to flood hazard. The sandy, droughty surface layer is an additional limitation for these uses and is also a moderate limitation for picnic areas and hiking trails. Ground cover is difficult to establish and maintain on this droughty soil, and the areas are susceptible to erosion and sedimentation during flooding.

### **Wildlife Habitat**

Suitability is poor for habitat areas for openland and woodland wildlife and very poor for wetland wildlife habitat.

The capability subclass is IIIs.

## **104—Podunk fine sandy loam**

This soil is very deep, nearly level, and moderately well drained. It is on loamy flood plains in the northern, central, and eastern parts of the county. The areas are irregular in shape and range from 5 to 40 acres in size. Slopes range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

### *Surface layer:*

0 to 11 inches, dark grayish brown fine sandy loam  
11 to 14 inches, very dark grayish brown fine sandy loam

### *Subsoil:*

14 to 24 inches, mottled, yellowish brown fine sandy loam

### *Substratum:*

24 to 33 inches, brown loamy fine sand  
33 to 65 inches, pale brown coarse sand

Some areas along fast-flowing streams have a gravelly subsoil and a gravelly or very gravelly substratum. Where this soil is on broad flood plains, some areas are very fine sandy loam in the surface layer and subsoil and loamy fine sand or loamy very fine sand in the substratum.

### ***Inclusions***

Included with this soil in mapping are areas of excessively drained Sunday soils, well drained Ondawa soils, and poorly drained Rumney soils. The Sunday and Ondawa soils are on low, narrow ridges or slightly higher areas. The Rumney soils are on very narrow abandoned stream channels. Also included are areas with very recent flood depositions of 4 to 5 inches of loamy sand and areas which are only occasionally flooded. The included soils make up 5 to 10 percent of this unit.

### ***Major properties of the Podunk soil***

*Permeability:* Moderately rapid in the surface layer and

subsoil; moderately rapid to rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 1.5 to 3.0 feet from November through May

*Potential frost action:* High

*Flood hazard:* At least once in 2 years from November through April. Flooding during the growing season is rare. Some areas in major valleys are subject to only occasional flooding

Most areas of this soil are farmed. A few isolated areas or areas in a nonfarming region are forested.

## ***Use and Management***

### **Farming**

This soil is classified as prime farmland in this survey area. It can be used for continuous row crops, but the short growing season and cool summers restrict the choice of crop varieties. Winter cover crops and manure incorporated into the surface layer will help maintain the organic matter levels in the soil, and the cover crops will provide protection during spring flooding. Artificial drainage will permit earlier tillage in the spring, but adequate outlets may be difficult to locate.

### **Woodland**

Fertility and moisture are favorable on for high quality hardwoods. This soil is limited for woodland management by flood hazard and plant competition. In many areas timber quality may be reduced by ice damage during flooding. Access to some areas may be a limitation for logging operations. Site preparation following harvest helps reduce the invasion of undesirable species.

### **Community Development**

This soil is limited for community development by flooding, wetness, and frost action. Any type of construction must be designed to withstand flooding. The construction of underground utilities through the soil is difficult because the sides of shallow excavations tend to slough. Deep excavations mainly require special equipment and should be planned for midsummer to avoid the high water table. This soil is severely limited as a site for dwellings without basements by flooding and for dwellings with basements by flooding and wetness. Flooding and frost action are severe limitation for local roads and streets. Frost action limitations can be overcome by providing coarser grained base material to frost depth and installing drainage.

For onsite waste disposal, the flooding, wetness, and poor filtering properties of this soil are severe limitations. The sandy, very permeable subsoil and substratum do not effectively filter effluent, and there is a hazard of ground-water pollution.

### Recreation

This soil has severe limitations for camp areas, playgrounds, and athletic fields due to flood hazard. Limitations are moderate for picnic areas and hiking paths and trails due to flooding and wetness. This soil is susceptible to erosion and sedimentation during flooding.

### Wildlife Habitat

Suitability is fair potential for habitat areas for openland wildlife and good for woodland wildlife. This soil is poorly suited for wetland wildlife habitat.

The capability subclass is llw.

## 105—Rumney loam

This soil is very deep, nearly level, and poorly drained. It is on loamy flood plains in the northern, central, and eastern parts of the county. The areas are mainly irregular in shape or narrow and curving and range in size from 5 to 25 acres. Slopes range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 8 inches, very dark grayish brown loam

*Subsoil:*

8 to 16 inches, mottled, dark grayish brown fine sandy loam

16 to 24 inches, mottled, dark grayish brown fine sandy loam

*Substratum:*

24 to 65 inches, mottled, dark grayish brown loamy sand

### Inclusions

Included in this unit are narrow ridges and small mounds of moderately well drained Podunk soils and well drained Ondawa soils. Also included are narrow oxbows of very poorly drained Medomak soils. Some areas of this unit are subject to only occasional flooding. The included soils make up about 10 percent of this unit.

### Major properties of the Rumney soil

*Permeability:* Moderately rapid in the surface layer and subsoil; rapid to very rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 0 to 1.5 feet from November through May

*Potential frost action:* High

*Flood hazard:* At least once in 2 years from October through May. Some areas will flood during the summer following heavy rains.

This soil is mainly forested. Some areas have been cleared and are used for hayland or pasture. A few areas are used for row crops.

## Use and Management

### Farming

The soil is moderately well suited for row crops. Wetness in late spring and early fall delays tillage and planting and is a concern during harvest. The short growing season and cool summers restrict the choice of crop varieties that can be grown. The soil is well suited for use as hayland or pasture. Grasses and legumes must be able to tolerate prolonged wetness, flooding, and severe frost heaving.

### Woodland

Fertility and moisture are fair to poor for hardwood growth and fair to good for softwoods, especially red spruce and balsam fir. This soil is limited for woodland management by flood hazard, slope, seedling mortality, windthrow hazard, and plant competition. In many areas timber quality may be reduced by ice damage during flooding. Access to some areas may be a limitation for logging operations.

Equipment limitations due to wetness are reduced if tree harvesting and management operations are restricted to times when the ground is frozen or during the driest summer months. Seedling mortality can be reduced by special site preparation or planting species that are suited for wet sites. Windthrow hazard can be reduced by careful thinning to avoid surface-root damage caused by harvesting equipment. Site preparation following tree harvest helps decrease invasion of undesirable species.

### Community Development

This soil has severe limitations for all phases of community development due to frequent flooding, prolonged wetness, and frost action.

Limitations are severe for areas of onsite waste disposal systems due to flooding, wetness, and poor filtering properties.

The areas of this soil improve and maintain water quality by acting as natural filters to remove harmful chemicals, nutrients, and sediment. They also recharge

ground-water aquifers and store runoff, which lessens flood damage.

### Recreation

This soil has severe limitations for camp areas, playgrounds, and athletic fields due to flood hazard and wetness. Limitations are severe for picnic areas and hiking paths and trails due to wetness. These areas are susceptible to erosion and sedimentation during flooding.

### Wildlife Habitat

Suitability is fair for woodland, openland, and wetland wildlife habitat. Water impoundments are susceptible to flood damage and sedimentation.

The capability subclass is Illw.

## 108—Hadley silt loam, occasionally flooded

This soil is very deep, nearly level, and well drained. It is on the higher areas of the silty flood plains of the southern half of the Connecticut River. The areas are irregular in shape and range from 5 to 100 acres in size. Slopes range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 10 inches, dark brown silt loam

*Substratum:*

10 to 22 inches, olive silt loam

22 to 42 inches, olive very fine sandy loam

42 to 65 inches, olive loamy fine sand

Some areas of this soil have 1 to 4 inches of recently deposited loamy fine sand or loamy very fine sand on the surface.

### Inclusions

Included with this unit are small deltas of moderately well drained Pootatuck soils and well drained Occum soils deposited by small streams. Moderately well drained Winooski soils and poorly drained Limerick soils in places are in narrow depressions and old stream channels. The included soils make up about 10 percent of this unit.

### Major properties of the Hadley soil

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 4 to 6 feet from November through April

*Potential frost action:* High

*Flood hazard:* At least once in 2 to 10 years from February through April. Flooding during the growing season is rare.

Most areas of this soil are farmed. Very few areas are forested.

## Use and Management

### Farming

This soil is classified as prime farmland in this survey area. Excellent yields of silage corn, grasses, and legumes are obtained with the proper use of lime and fertilizer. When row crops are grown, winter cover crops should be used to protect this soil from erosion during flooding and then incorporated into surface layer to maintain organic matter levels.

### Woodland

Fertility and moisture are favorable for high quality hardwoods. Flood hazard and plant competition are limitations that affect woodland management. In many areas timber quality may be reduced by ice damage during flooding. Access to some areas may be a limitation for logging operations. Special site preparation following harvest helps reduce the invasion of undesirable species.

### Community Development

This soil has severe limitations for most phases of community development due to flooding. Any construction should be designed to withstand flooding and frost action.

### Recreation

This soil has a severe limitation for camping areas and a moderate limitation for playgrounds and athletic fields due to flooding. The areas of this soil are not generally subject to flood flows but are mainly backwater areas and are subject to varying degrees of sedimentation.

### Wildlife Habitat

Suitability is good for habitat for openland and woodland wildlife. The suitability for wetland wildlife habitat development is very poor. Areas adjacent to open water or wetlands may be suited for resting or nesting areas.

The capability class is I.

## 109—Limerick silt loam

This soil is very deep, nearly level, and poorly drained. It is on silty flood plains and oxbows along the southern half of the Connecticut River and its

tributaries. The areas are irregular in shape or narrow and curving and range in size from 5 to 35 acres. Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 5 inches, dark grayish brown silt loam

*Substratum:*

5 to 14 inches, mottled, dark grayish brown and olive gray silt loam

14 to 65 inches, mottled, dark grayish brown very fine sandy loam

Some areas have 1 to 4 inches of recently deposited very fine sand or silt on the surface.

### **Inclusions**

Included with this soil in mapping are narrow depressions of very poorly drained soils that may have mucky surface layer. Also included are low mounds or narrow ridges of moderately well drained Winooski soils, well drained Hadley soils, or excessively drained Suncook soils. The included soils make up about 15 percent of this unit.

### **Major properties of the Limerick soil**

*Permeability:* Moderate

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 0.5 to 1.5 feet from November through June

*Potential frost action:* High

*Flood hazard:* At least once in 2 years from November through May. Some areas will flood during the summer following heavy rains.

Most areas of this soil are used as hayland or pasture. A few areas are used for row crops. Other areas are forested or are wetland reeds and grasses.

### **Use and Management**

#### **Farming**

Farming of this soil is limited to hayland and pasture by the flooding and prolonged wetness. Grasses and legumes must be able to tolerate prolonged wetness, flooding, and severe frost heaving. Land shaping and smoothing to improve surface drainage will reduce winterkill of grasses and legumes.

#### **Woodland**

Fertility and moisture are fair to poor for hardwood growth and fair to good for softwoods, especially red spruce and balsam fir. Flood hazard, slope, seedling mortality, windthrow hazard, and plant competition are

limitations that affect woodland management. In many areas timber quality may be reduced by ice damage during flooding. Access to some areas may be a limitation for logging operations.

Equipment limitations due to wetness are reduced if tree harvesting and management operations are restricted to times when the ground is frozen or during the driest summer months. Seedling mortality can be reduced by special site preparation or by planting species that are suited for wet sites. Windthrow hazard can be reduced by careful thinning to avoid surface-root damage caused by harvesting equipment. Site preparation following tree harvest helps decrease invasion of undesirable species.

### **Community Development**

This soil has severe limitations for all phases of community development due to prolonged wetness and frequent flooding.

The areas of this soil improve and maintain water quality by acting as natural filters to remove harmful chemicals, nutrients, and sediment. They also recharge ground-water aquifers and store runoff, which lessens flood damage.

### **Recreation**

This Limerick soil has severe limitations for all recreational uses due to prolonged wetness and flood hazard.

### **Wildlife Habitat**

Suitability is fair for habitat for openland or woodland wildlife. Suitability is good for wetland wildlife habitat. Water impoundments are susceptible to flood damage and sedimentation.

The capability subclass is IVw.

## **114—Walpole-Binghamville complex**

The Walpole and Binghamville soils in this unit are in such intricate patterns that it was not practical to map them separately. The Walpole soils are sandy, very deep, nearly level, and poorly drained. The Binghamville soils are loamy, very deep, nearly level, and poorly drained. These soils are on long, narrow terraces of the Connecticut River valley. Slopes typically are 0 to 3 percent but are as much as 5 percent. Areas of the soil range from 5 to 25 acres in size. Walpole soils make up about 45 percent of this complex, Binghamville soils 40 percent, and other soils 15 percent.

The typical sequence, depth, and composition of the layers of the Walpole soil are as follows—

*Surface layer:*

0 to 8 inches, very dark gray fine sandy loam

*Subsoil:*

8 to 13 inches, gray fine sandy loam

13 to 21 inches, dark grayish brown fine sandy loam  
and yellowish red and strong brown mottles

*Substratum:*

21 to 24 inches, light olive brown sand

24 to 30 inches, grayish brown sand

30 to 65 inches, olive gray loamy sand

The typical sequence, depth, and composition of the layers of the Binghamville soil are as follows—

*Surface layer:*

0 to 6 inches, very dark grayish brown silt loam

*Subsoil:*

6 to 10 inches, dark grayish brown silt loam

10 to 18 inches, dark grayish brown very fine sandy  
loam

*Substratum:*

18 to 65 inches, olive gray very fine sandy loam

***Inclusions***

Included with this complex in mapping are low depressional areas of very poorly drained, sandy or silty soils, small low mounds and ridges of moderately well drained Dartmouth and Deerfield soils, and a few areas with slopes of more than 5 percent. Also included adjacent to the glaciated hills are areas that have surface stones 5 to 30 feet apart. The included soils make up about 15 percent of this unit.

***Major properties of the Walpole soil***

*Permeability:* Moderately rapid in the surface layer and subsoil; rapid in the substratum

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 0 to 1.0 foot from November through May

*Potential frost action:* High

*Flood hazard:* None

***Major properties of the Binghamville soil***

*Permeability:* Moderate in the surface layer, moderate to moderately slow in the subsoil, and slow in the substratum

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 0.5 to 1.5 feet from November through June

*Potential frost action:* High

*Flood hazard:* None

Most areas of this complex are farmed. Some areas are forested, and a few have been used for residential or commercial development.

***Use and Management*****Farming**

Farming is severely limited by seasonal wetness. The soils are moderately well suited for row crop production but are well suited for forage production for pasture. Where row crops are grown, the seasonal wetness commonly delays spring tillage and can be a concern during fall harvest. Land shaping will eliminate areas of seasonal ponding and reduce winterkill. Good yields of forage crops for hay or pasture can be obtained with proper use of lime and fertilizers.

**Woodland**

Fertility and moisture are fair to poor for hardwood growth and fair to good for softwoods, especially red spruce and balsam fir. These soils are limited for woodland management by slope, seedling mortality, windthrow hazard, and plant competition.

Equipment limitations due to prolonged wetness are reduced if tree harvesting and management operations are restricted to times when the ground is frozen or during the driest summer months. Seedling mortality can be reduced by with site preparation or by planting species suited for wet sites. Windthrow hazard can be reduced by careful thinning to avoid surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

**Community Development**

These soils are limited for community development by the high water table, seasonal wetness, and frost action. Wetness is a severe limitation for shallow excavations and for dwellings with or without basements. There are severe limitations on areas of Walpole soils because the sides of excavations slough. Foundation drains are needed to control wetness and frost action. Locating drain outlets on these level and nearly level areas may be a concern. These soils have severe limitations for local roads and streets due to wetness and frost action. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage. Limitations for lawns and landscaping on the soil are severe due to wetness.

These soils have severe limitations for onsite sewage disposal. In areas of Walpole soils, wetness and poor filtering are limitations. The rapidly permeable

substratum may not effectively filter effluent, and there is a hazard of ground-water pollution. In areas of Binghamville soils, wetness and slow permeability are limitations. In many places the limitations can be overcome with fill to raise and increase the size of absorption fields.

The areas of these soils improve and maintain water quality by acting as natural filters to remove harmful chemicals, nutrients, and sediment. They also recharge ground-water aquifers and store runoff, which lessens flood damage.

### Recreation

These soils have severe limitations for camping areas, picnic areas, playgrounds, and athletic fields due to wetness. Limitations are severe for hiking trails and paths due to wetness. Erosion hazard is an additional limitation on the silty Binghamville soils.

### Wildlife Habitat

Suitability is fair on the soil for habitat for openland or woodland wildlife. The suitability for wetland wildlife habitat is good on areas of Walpole soils and fair on areas of Binghamville soils.

The capability subclass is IVw.

## 130A—Hitchcock silt loam, 0 to 3 percent slopes

This soil is very deep, nearly level, and well drained. It is on silty terraces along the southern half of the Connecticut River valley. The areas are long and irregular in shape and range from 5 to over 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

0 to 6 inches, brown silt loam

6 to 8 inches, gray silt loam

#### *Subsoil:*

8 to 13 inches, light olive brown silt loam

13 to 19 inches, light yellowish brown silt loam

#### *Substratum:*

19 to 31 inches, grayish brown silt loam

31 to 65 inches, olive gray silt

Some areas of this Hitchcock soil have a surface layer of fine sandy loam or sandy loam and a subsoil and substratum of silty clay loam or silty clay.

### *Inclusions*

Included with this soil in mapping are small areas of moderately well drained Dartmouth soils and poorly drained Binghamville soils in depressions and along

drainageways. Pockets or low mounds of well drained Agawam soils are throughout some areas of this unit. A few areas have slopes of more than 3 percent. The included areas make up about 15 percent of this unit.

### *Major properties of the Hitchcock soil*

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* High

*Flood hazard:* None

Most areas of this soil in cropland. Some areas have been used for residential or commercial development. A few areas are woodland.

### *Use and Management*

#### Farming

This soil is classified as prime farmland in this survey area. Good to excellent yields of corn silage and hay are obtained with the proper use of lime and fertilizer. Early spring tillage and fall harvests may be hindered during wet years because when wet the soil does not support heavy equipment. Land shaping to improve surface drainage will ease this limitation and improve winter survival of legumes. Winter cover crops help protect the soil from erosion during spring runoff. Incorporating cover crop residue into the surface layer will help to maintain organic matter levels.

#### Woodland

Fertility and moisture are favorable on this Hitchcock soil for high quality hardwoods. Plant competition is a limitation that affects woodland management. Site preparation following harvest helps reduce the invasion of undesirable species.

#### Community Development

This Hitchcock soil has severe limitations for local roads and streets due to frost action. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage.

For onsite sewage disposal, the slowly permeable substratum is a severe limitation that can be overcome by building a larger leach field.

#### Recreation

This soil has moderate limitations for recreational uses due to slow permeability. The erodibility of this soil is a severe limitation for hiking paths and trails.

### Wildlife Habitat

Suitability of this soil is good for habitat for openland or woodland wildlife. This soil is very poorly suited for wetland wildlife habitat except as resting or nesting areas adjacent to wetlands.

The capability class is I.

### 130B—Hitchcock silt loam, 3 to 8 percent slopes

This soil is very deep, gently sloping, and well drained. It is on silty terraces along the southern half of the Connecticut River valley. The areas are long and irregular in shape and range from 5 to over 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, brown silt loam

6 to 8 inches, gray silt loam

*Subsoil:*

8 to 13 inches, light olive brown silt loam

13 to 19 inches, light yellowish brown silt loam

*Substratum:*

19 to 31 inches, grayish brown silt loam

31 to 65 inches, olive gray silt

Some areas of this Hitchcock soil have a surface layer of fine sandy loam or sandy loam and a subsoil and substratum of silty clay loam or silty clay.

#### ***Inclusions***

Included with this soil in mapping are small areas of moderately well drained Dartmouth soils and poorly drained Binghamville soils in depressions and along drainageways. Pockets or low mounds of well drained Agawam soils are throughout some areas of this unit. A few areas have slopes of less than 3 percent or more than 8 percent. The included areas make up about 15 percent of this unit.

#### ***Major properties of the Hitchcock soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* High

*Flood hazard:* None

Most areas of this soil are cropland. Some areas have been used for residential or commercial development. A few areas are woodland.

### ***Use and Management***

#### **Farming**

This Hitchcock soil is suitable for farming. Good to excellent yields of corn silage and hay are obtained with the proper use of lime and fertilizer. Early spring tillage and fall harvests may be hindered during wet years because when wet the soil does not support heavy equipment. Land shaping to improve surface drainage will reduce this concern and improve winter survival of legumes. Areas of this highly erodible soil used for continuous row crops require intensive erosion control measures, including minimum tillage, cover crops, diversions, contour stripcropping, and grass waterways. Incorporating cover crop residue into the surface layer will help to maintain organic matter levels.

#### **Woodland**

Fertility and moisture are favorable on this Hitchcock soil for high quality hardwoods. Plant competition is a limitation that affects woodland management. Site preparation following harvest helps reduce the invasion of undesirable species.

#### **Community Development**

This Hitchcock soil has severe limitations for local roads and streets due to frost action. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage. Erosion control measures are needed during construction on this erodible soil. These measures include, but are not limited to, heavy mulches, natural and artificial woven mats, hay bales, rock riprap, sediment catch basins, diversions, and construction during dry periods.

For onsite sewage disposal, the slowly permeable substratum is a severe limitation that can be overcome by building a larger leach field.

#### **Recreation**

This soil has a moderate limitation for camping and picnic areas due to slow permeability. Slope and slow permeability are moderate limitations for playgrounds and athletic fields. The erodibility of this soil is a severe limitation for hiking paths and trails.

#### **Wildlife Habitat**

Suitability of this soil is good for habitat for openland or woodland wildlife. This soil is very poorly suited for wetland wildlife habitat except as resting or nesting areas adjacent to wetlands.

The capability subclass is IIe.

### 130C—Hitchcock silt loam, 8 to 15 percent slopes

This soil is very deep, sloping, and well drained. It is on silty terraces along the southern half of the Connecticut River valley. The areas are irregular in shape and range from 5 to over 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, brown silt loam

6 to 8 inches, gray silt loam

*Subsoil:*

8 to 13 inches, light olive brown silt loam

13 to 19 inches, light yellowish brown silt loam

*Substratum:*

19 to 31 inches, grayish brown silt loam

31 to 65 inches, olive gray silt

Some areas of this Hitchcock soil have a surface layer of fine sandy loam or sandy loam and a subsoil and substratum of silty clay loam or silty clay.

#### ***Inclusions***

Included with this soil in mapping are small areas of moderately well drained Dartmouth soils and poorly drained Binghamville soils in depressions and along drainageways. Pockets or low mounds of well drained Agawam soils are throughout some areas of this unit. A few areas have slopes of less than 8 percent or more than 15 percent. The included areas make up about 15 percent of this unit.

#### ***Major properties of the Hitchcock soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* High

*Flood hazard:* None

Some areas of this soil are farmed. Some areas have been used for residential and commercial development, and some areas are woodland.

#### ***Use and Management***

##### **Farming**

The slope and erodibility of this soil result in excessive erosion when row crops are grown. This soil is best suited for grasses and legumes. Good to excellent yields can be obtained with the proper use of lime and fertilizer.

##### **Woodland**

Fertility and moisture are favorable on this Hitchcock soil for high quality hardwoods. Erosion hazard and plant competition are limitations that affect woodland management.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Site preparation following harvest helps reduce the invasion of undesirable species.

##### **Community Development**

This Hitchcock soil is limited by slope and frost action. This soil has a moderate slope limitation for dwellings with or without basements and for shallow excavations. Slope limitations can be reduced by using cut and fill techniques to level these sloping areas. The slope and frost action of this soil are moderate limitations for local roads and streets. Cut and fill techniques can be used to level areas, and providing coarser grained base material to frost depth and installing drainage will help overcome frost action. Erosion control measures are needed during construction on this highly erodible soil. These measures include, but are not limited to, heavy mulches, natural and artificial woven mats, hay bales, rock riprap, sediment catch basins, diversions, and construction during dry periods.

For onsite sewage disposal, the slowly permeable substratum is a severe limitation that can be overcome by building a larger leach field.

##### **Recreation**

This soil has a moderate limitation for camping and picnic areas due to slope and slow permeability. Slope is a severe limitation for playgrounds and athletic fields. The erodibility of this soil is a severe limitation for hiking paths and trails.

##### **Wildlife Habitat**

Suitability of this soil is good for habitat for openland or woodland wildlife. This soil is very poorly suited for wetland wildlife habitat except as resting or nesting areas adjacent to wetlands.

The capability subclass is IIIe.

### 130E—Hitchcock silt loam, 15 to 60 percent slopes

This soil is very deep, moderately steep to very steep, and well drained. It is on silty terrace

escarpments along the southern half of the Connecticut River valley. The areas are long and irregular in shape and range from 5 to over 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, brown silt loam

6 to 8 inches, gray silt loam

*Subsoil:*

8 to 13 inches, light olive brown silt loam

13 to 19 inches, light yellowish brown silt loam

*Substratum:*

19 to 31 inches, grayish brown silt loam

31 to 65 inches, olive gray silt

Some areas of this Hitchcock soil have a surface layer of fine sandy loam or sandy loam and a subsoil and substratum of silty clay loam or silty clay.

### ***Inclusions***

Included with this soil in mapping are small areas of moderately well drained Dartmouth soils and poorly drained Binghamville soils in depressions and along drainageways, excessively drained Windsor soils at the border of the escarpment, and a few areas of rock outcrop. A few areas have slopes of less than percent. The included areas make up about 10 percent of this unit.

### ***Major properties of the Hitchcock soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* High

*Flood hazard:* None

Most areas of this soil are woodland. A few areas have been cleared and are in grass or are reverting to woodland.

### ***Use and Management***

#### **Farming**

The steep slopes and erosion hazard are severe limitations for all farming of this soil. Some of the moderately steep areas may be used for pasture, but maintenance of good quality grasses and legumes is a concern. Erosion is severe along some livestock trails.

#### **Woodland**

Fertility and moisture are favorable on this

Hitchcock soil for high quality hardwoods. Erosion hazard, slope, and plant competition are limitations that affect woodland management.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by careful planning to avoid steepest areas. Seedling mortality can be reduced by special site preparation such as bedding or furrowing. Site preparation following harvest helps reduce the invasion of undesirable species.

#### **Community Development**

This Hitchcock soil has severe limitations due to the moderately steep to very steep slopes. Any activity that disturbs the plant cover of this soil risks causing excessive erosion and the resulting sedimentation of adjoining areas, streams, and lakes.

For onsite sewage disposal, the slope and slowly permeable substratum are severe limitations that can be overcome with cut and fill to level an area and by building a larger leach field.

#### **Recreation**

This soil has severe limitations for recreational uses due to the moderately steep to very steep slopes and the erodibility.

#### **Wildlife Habitat**

Suitability of this soil is poor for habitat for openland wildlife and good for woodland wildlife. This soil is very poorly suited for wetland wildlife habitat except as resting or nesting areas adjacent to wetlands.

The capability subclass is VIIe.

### **132A—Dartmouth silt loam, 0 to 3 percent slopes**

This soil is very deep, nearly level, and moderately well drained. It is on silty terraces along the southern half of the Connecticut River valley. The areas are long and irregular in shape and range from 5 to over 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 11 inches, olive brown silt loam

*Subsoil:*

11 to 22 inches, light olive brown very fine sandy loam

*Substratum:*

22 to 65 inches, gray very fine sandy loam

Some areas of this Dartmouth soil are silty clay

loam or silty clay in the subsoil and substratum, and some areas have a surface layer of fine sandy loam or sandy loam.

### ***Inclusions***

Included with this soil in mapping are small low mounds or pockets of well drained Hitchcock soils and poorly drained Binghamville soils in depressions and along drainageways. A few areas have slopes of more than 3 percent. The included areas make up about 15 percent of this unit.

### ***Major properties of the Dartmouth soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 1.5 to 3.5 feet from November through April

*Potential frost action:* High

*Flood hazard:* None

Many areas of this soil are farmed. Some areas have been used for residential and commercial development. A few areas are woodland.

### ***Use and Management***

#### **Farming**

This soil is classified as prime farmland in this survey area. Good to excellent yields of corn silage and hay are obtained with the proper use of lime and fertilizer. Early spring tillage and fall harvests may be hindered during wet years because when wet this soil does not support heavy equipment. Land shaping to improve surface drainage will reduce this limitation and improve winter survival of legumes. In areas that are row cropped, winter cover crops should be grown to prevent erosion and then incorporated into surface layer help maintain organic matter levels.

#### **Woodland**

Fertility and moisture are favorable on this Dartmouth soil for high quality hardwoods. Plant competition is a limitation that affects woodland management. Site preparation following harvest helps reduce the invasion of undesirable species.

#### **Community Development**

This Dartmouth soil is limited for community development by wetness and frost action. Wetness limitations are moderate for dwellings without

basements and severe for dwellings with basements and for shallow excavations. Foundation drains will help to control wetness and frost action. Locating drain outlets on this nearly level soil may be a concern. Severe frost action for local roads and streets can be overcome by providing coarser grained base material to frost depth and installing drainage.

For onsite sewage disposal, wetness and slow permeability are severe limitations that can be overcome with fill to raise absorption fields.

#### **Recreation**

Limitations are moderate for camping areas, picnic areas, playgrounds, and athletic fields due to wetness and slow permeability. This soil has a severe erosion limitation for hiking paths and trails.

#### **Wildlife Habitat**

Suitability is good for habitat for openland or woodland wildlife. This soil is poorly suited for wetland wildlife except as resting or nesting areas adjacent to wetlands.

The capability subclass is Ilw.

### **132B—Dartmouth silt loam, 3 to 8 percent slopes**

This soil is very deep, gently sloping, and moderately well drained. It is on silty terraces along the southern half of the Connecticut River valley. The areas are long and irregular in shape and range from 5 to over 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 11 inches, olive brown silt loam

*Subsoil:*

11 to 22 inches, light olive brown very fine sandy loam

*Substratum:*

22 to 65 inches, gray very fine sandy loam

Some areas of this Dartmouth soil are silty clay loam or silty clay in the subsoil and substratum, and some areas have a surface layer of fine sandy loam or sandy loam.

### ***Inclusions***

Included with this soil in mapping are small low mounds or pockets of well drained Hitchcock soils and poorly drained Binghamville soils in depressions and along drainageways. A few areas have slopes of less than 3 percent or more than 8 percent. The included areas make up about 15 percent of this unit.

### **Major properties of the Dartmouth soil**

*Permeability:* Moderate in the surface layer and subsoil; moderately slow to slow in the substratum

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 1.5 to 3.5 feet from November through April

*Potential frost action:* High

*Flood hazard:* None

Many areas of this soil are farmed. Some areas have been used for residential and commercial development. A few areas are woodland.

### **Use and Management**

#### **Farming**

Slope and erosion limit farming to hayland and pasture. Areas of row crops may require intensive erosion control measures such as stripcropping and winter cover crops. Good to excellent yields of corn silage and hay are obtained with the proper use of lime and fertilizer. Early spring tillage and fall harvests may be hindered during wet years because when wet this soil does not support heavy equipment.

#### **Woodland**

Fertility and moisture are favorable on this Dartmouth soil for high quality hardwoods. Plant competition is a limitation that affects woodland management. Site preparation following harvest helps reduce the invasion of undesirable species.

#### **Community Development**

This Dartmouth soil is limited for community development by wetness and frost action. Wetness limitations are moderate for dwellings without basements and severe for dwellings with basements and for shallow excavations. Foundation drains will help to control wetness and frost action. Locating drain outlets on this nearly level soil may be a concern. Severe frost action for local roads and streets can be overcome by providing coarser grained base material to frost depth and installing drainage.

For onsite sewage disposal, wetness and slow permeability are severe limitations that can be overcome with fill to raise absorption fields.

#### **Recreation**

Limitations are moderate for camping and picnic areas due to wetness and slow permeability. Limitations are moderate for playgrounds and athletic

fields because of slope, wetness, and slow permeability. This soil has a severe erosion limitation for hiking paths and trails.

#### **Wildlife Habitat**

Suitability is good for habitat for openland or woodland wildlife. This soil is poorly suited for wetland wildlife except as resting or nesting areas adjacent to wetlands.

The capability subclass is IIe.

### **173C—Berkshire loam, 8 to 15 percent slopes, extremely stony**

This soil is very deep, strongly sloping, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 20 acres in size. Surface stones are less than 5 feet apart and cover from 3 to 15 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 7 inches, very dark grayish brown loam

7 to 8 inches, pinkish gray loam

*Subsoil:*

8 to 12 inches, dark brown loam

12 to 18 inches, brown loam

*Substratum:*

18 to 65 inches, very dark grayish brown friable loam

#### **Inclusions**

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. In depressions and along narrow drainageways are moderately well drained Peru soils and poorly drained Pillsbury soils. Also included are small areas of Monadnock and Tunbridge soils. A few areas are essentially paved with surface stones. The included soils make up about 15 percent of this unit.

### **Major properties of the Berkshire soil**

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested. A few areas are used for residential development.

## ***Use and Management***

### **Farming**

The large amount of surface stones effectively prohibits any farming of this soil.

### **Woodland**

Fertility and moisture are favorable on this Berkshire soil for high quality hardwoods. Slope limits the use of equipment.

### **Community Development**

This soil is limited for community development by slope, frost action, and large stones. Slope limitations are moderate for shallow excavations, dwellings with or without basements, and local roads and streets. This soil has a severe limitation for small commercial buildings due to slope. Moderate frost action in this soil is an additional limitation for local roads and streets that can be reduced by providing coarser grained base material to frost depth and installing drainage. Foundation drains will reduce frost action. Slope limitations can be reduced by cut and fill to level the soil.

Slope is a moderate limitation for onsite waste disposal systems. This limitation can be reduced by cut and fill to level an area for an absorption field.

### **Recreation**

This soil has severe limitations for picnic areas and camping areas due to large stones. Limitations are severe for playgrounds and athletic fields due to large stones and slope. The slope and large stones are moderate limitations for the design and construction of hiking paths and trails.

### **Wildlife Habitat**

Suitability is poor for habitat areas for openland wildlife and fair for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VII<sub>s</sub>.

## **173D—Berkshire loam, 15 to 25 percent slopes, extremely stony**

This soil is very deep, moderately steep, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 60 acres in size. Surface stones are less than 5 feet apart and cover from 3 to 15 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

0 to 7 inches, very dark grayish brown loam

7 to 8 inches, pinkish gray loam

#### *Subsoil:*

8 to 12 inches, dark brown loam

12 to 18 inches, brown loam

#### *Substratum:*

18 to 65 inches, very dark grayish brown friable loam

## ***Inclusions***

Included with this unit are small areas with slopes of less than 15 percent or more than 25 percent. In depressions and along narrow drainageways are moderately well drained Peru soils and poorly drained Pillsbury soils. Also included are small areas of Monadnock and Tunbridge soils. A few areas are essentially paved with surface stones. The included soils make up about 15 percent of this unit.

## ***Major properties of the Berkshire soil***

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested. A few areas are used for residential development.

## ***Use and Management***

### **Farming**

The large amount of surface stones effectively prohibits any farming of this soil.

### **Woodland**

Fertility and moisture are favorable on this Berkshire soil for high quality hardwoods. Slope limits the use of equipment.

### **Community Development**

This soil has limitations for community development due to slope and large stones. Limitations are severe for shallow excavations, dwellings with or without basements, and local roads and streets due to slope. Slope limitations can be reduced by cut and fill to level the soil. The large stones and slope of this soil are limitations for lawns and landscaping.

Slope is a severe limitation for onsite waste

disposal systems. This limitation can be reduced by cut and fill to level an area for an absorption field.

### Recreation

This soil is limited by slope and large stones for recreational uses. Limitations are severe for a picnic area, camping area, playground, or athletic field. The slope and large surface stones of this soil are moderate limitations for the design and construction of hiking paths and trails.

### Wildlife Habitat

Suitability is poor for habitat areas for openland wildlife and fair for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VII<sub>s</sub>.

## 173E—Berkshire loam, 25 to 35 percent slopes, extremely stony

This soil is very deep, steep, and well drained. It is on loamy glaciated hilltops and mountainsides. The areas are irregular in shape and range from 5 to 40 acres in size. Surface stones are less than 5 feet apart and cover from 3 to 15 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

0 to 7 inches, very dark grayish brown loam

7 to 8 inches, pinkish gray loam

#### *Subsoil:*

8 to 12 inches, dark brown loam

12 to 18 inches, brown loam

#### *Substratum:*

18 to 65 inches, very dark grayish brown friable loam

### **Inclusions**

Included with this unit are small areas with slopes of less than 25 percent or more than 35 percent. In depressions and along narrow drainageways are moderately well drained Peru soils and poorly drained Pillsbury soils. Also included are small areas of Monadnock and Tunbridge soils. A few areas are essentially paved with surface stones. The included soils make up about 15 percent of this unit.

### **Major properties of the Berkshire soil**

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested.

### **Use and Management**

#### **Farming**

The large amount of surface stones and steep slopes effectively prohibit any farming of this soil.

#### **Woodland**

Fertility and moisture are favorable for high quality hardwoods.

Slope limits the use of equipment.

#### **Community Development**

This soil has limitations for community development due to slope. Slope limitations are severe for shallow excavations, dwellings with or without basements, local roads and streets, and small commercial buildings. Slope limitations can be reduced by cut and fill to level this areas.

Slope is a severe limitation for onsite waste disposal systems. This limitation can be reduced by cut and fill to level an area for an absorption field.

#### **Recreation**

This soil has a severe slope limitation for recreational developments. Large surface stones are an additional limitation for picnic areas, camping areas, playgrounds, or athletic fields.

#### **Wildlife Habitat**

Suitability is poor for habitat areas for openland wildlife and fair for woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VII<sub>s</sub>.

## 201—Ondawa fine sandy loam, occasionally flooded

This soil is very deep, nearly level, and well drained. It is on loamy flood plains in the northern, central, and eastern parts of the county. The areas are irregularly shaped and range from 5 to 75 acres in size. Slopes range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

0 to 10 inches, very dark grayish brown fine sandy loam

#### *Subsoil:*

10 to 33 inches, olive brown fine sandy loam

#### *Substratum:*

33 to 65 inches, pale brown fine sand

In areas along fast-flowing streams, the substratum

commonly is gravelly or very gravelly sand.

### ***Inclusions***

Included with this soil in mapping are small depressions and very narrow abandoned stream channels of moderately well drained Podunk soils and poorly drained Rumney soils. Also included are narrow low ridges of excessively drained Sunday soils. The included soils make up 10 percent of this unit.

### ***Major properties of the Ondawa soil***

*Permeability:* Moderately rapid in the surface layer and subsoil; moderately rapid to rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* At least once in 2 to 10 years from November through April. Flooding during the growing season is rare.

Most areas of this soil are farmed. Some small isolated areas or areas in a nonfarm region are forested.

### ***Use and Management***

#### **Farming**

This soil is classified as prime farmland in the survey area. It can be used for continuous row crops, but the short growing season and cool summers restrict the choice of crop varieties. Good to excellent yields of silage corn, grasses, and legumes can be obtained with the proper use of lime and fertilizers. Legumes are subject to winterkill and should be able to withstand flooding. Winter cover crops and manure incorporated into surface layer will help maintain the organic matter levels, and the cover crops will provide protection against erosion during flooding.

#### **Woodland**

Fertility and moisture are favorable for high quality hardwoods. This soil is limited for woodland management by flood hazard and plant competition. In many areas timber quality may be reduced by ice damage during flooding. Access to some areas may be a limitation for logging operations. Site preparation following harvest helps reduce the invasion of undesirable species.

#### **Community Development**

This Ondawa soil has severe limitations for all types of community development due to frequent flooding. Any construction must be designed to withstand

flooding. Excavations in this soil tend to slough. Deep excavations generally require special equipment.

Flooding is a severe limitation for onsite septic systems, and there is a severe hazard of ground-water pollution because the sandy, rapidly permeable substratum may not adequately filter the effluent.

#### **Recreation**

These soils are limited for recreational use by flooding. Limitations are moderate for playgrounds and athletic fields and severe for camping areas. These soils are generally backwater areas that are subject to varying degrees of sedimentation.

#### **Wildlife Habitat**

Suitability for woodland and openland wildlife habitat is good. Suitability is very poor for habitat for wetland wildlife.

The capability class is I.

### **254B—Monadnock and Hermon soils, 3 to 8 percent slopes**

This unit is on very deep, undulating glaciated hilltops and mountainsides. It consists of well drained Monadnock soils and somewhat excessively drained Hermon soils. The areas are irregular in shape and range from 5 to 15 acres in size. Some areas have stones and boulders more than 30 feet apart and generally more than 80 feet apart. Some areas are mainly Monadnock soils, some areas are mainly Hermon soils, and some are both soils. The Monadnock and Hermon soils were mapped together because they have no major differences in use and management. The total acreage of the unit is about 45 percent Monadnock soils, 40 percent Hermon soils, and 15 percent other soils.

The typical sequence, depth, and composition of the layers of the Monadnock soil are as follows—

*Surface layer:*

0 to 4 inches, dark grayish brown fine sandy loam

4 to 6 inches, gray fine sandy loam

*Subsoil:*

6 to 10 inches, yellowish red fine sandy loam

10 to 18 inches, yellowish brown very fine sandy loam

18 to 23 inches, light olive brown fine sandy loam

*Substratum:*

23 to 65 inches, pale olive loamy sand

The typical sequence, depth, and composition of the layers of the Hermon soil are as follows—

*Surface layer:*

0 to 5 inches, dark grayish brown fine sandy loam

5 to 7 inches, light gray fine sandy loam

**Subsoil:**

7 to 15 inches, dark yellowish brown gravelly fine sandy loam

15 to 22 inches, light olive brown gravelly loamy sand

**Substratum:**

22 to 65 inches, grayish brown very gravelly loamy sand

Some areas of Hermon soils have a surface layer of loamy sand.

**Inclusions**

Included with this unit are small areas with slopes of less than 3 percent or more than 8 percent. In depressions and along narrow drainageways are moderately well drained Waumbek soils and poorly drained Lyme or Moosilauke soils. Some areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

**Major properties of the Monadnock soil**

*Permeability:* Moderate in the surface layer and subsoil; moderately rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

**Major properties of the Hermon soil**

*Permeability:* Rapid throughout

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this unit have been cleared for farming. Some areas are reverting to woodland. Other areas have been developed for residential or commercial uses.

**Use and Management****Farming**

This unit is well suited for row crops, but the short growing season and cool summers restrict the choice of crop varieties. Fair to good yields of silage corn, grasses, and legumes can be obtained with the proper use of lime and fertilizers. Continuous row cropping is generally not practical because of the moderate erosion hazard. Row crops can be grown in rotation

with grasses and legumes. Contour tillage and winter cover crops will generally keep erosion to a minimum when row crops are grown.

**Woodland**

Fertility and moisture are adequate for good tree growth. These soils are limited for woodland management due to plant competition on the Monadnock soils and seedling mortality on the Hermon soils.

Site preparation following harvest helps reduce the invasion of undesirable species. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

**Community Development**

These soils have moderate limitations due to slope for small commercial buildings. Large stones in the Hermon soils are an additional moderate limitation for small commercial buildings. Excavations in the soil for basements and underground utilities have severe limitations because the sides tend to slough. Deep excavations may require special equipment. Subsurface stones and boulders in the soil may be a concern during construction and excavation operations. In some areas there are enough subsurface stones and boulders that disposal becomes a concern. The droughty Hermon soils in this unit have moderate limitations for the establishment of lawns and landscaping.

The gravelly, very permeable subsoil and substratum in the Hermon soils do not effectively filter the effluent from onsite waste disposal systems, and there is a hazard of ground-water pollution.

These soils are a probable source of sand and gravel, but screening or crushing is required to remove large stones. Extensive test pitting should be done at the site.

**Recreation**

These soils have moderate limitations for playgrounds and athletic fields due to slope and small stones. Leveling by cut and fill may expose the stony, droughty substratum, and maintaining adequate grass cover is a concern.

**Wildlife Habitat**

Monadnock soils in this unit have good suitability for habitat areas for openland and woodland wildlife. Hermon soils have fair suitability for openland and woodland wildlife habitat. This unit is very poorly suited for wetland wildlife habitat.

The capability subclass is IIe.

## 254C—Monadnock and Hermon soils, 8 to 15 percent slopes

This unit is on very deep, rolling glaciated hilltops and mountainsides. It consists of well drained Monadnock soils and somewhat excessively drained Hermon soils. The areas are irregular in shape and range from 5 to 45 acres in size. Some areas have stones and boulders more than 30 feet apart and generally more than 80 feet apart. Some areas are mainly Monadnock soils, some areas are mainly Hermon soils, and some are both soils. The Monadnock and Hermon soils were mapped together because they have no major differences in use and management. The total acreage of the unit is about 45 percent Monadnock soils, 40 percent Hermon soils, and 15 percent other soils.

The typical sequence, depth, and composition of the layers of the Monadnock soil are as follows—

*Surface layer:*

0 to 4 inches, dark grayish brown fine sandy loam  
4 to 6 inches, gray fine sandy loam

*Subsoil:*

6 to 10 inches, yellowish red fine sandy loam  
10 to 18 inches, yellowish brown very fine sandy loam  
18 to 23 inches, light olive brown fine sandy loam

*Substratum:*

23 to 65 inches, pale olive loamy sand

The typical sequence, depth, and composition of the layers of the Hermon soil are as follows—

*Surface layer:*

0 to 5 inches, dark grayish brown fine sandy loam  
5 to 7 inches, light gray fine sandy loam

*Subsoil:*

7 to 15 inches, dark yellowish brown gravelly fine sandy loam  
15 to 22 inches, light olive brown gravelly loamy sand

*Substratum:*

22 to 65 inches, grayish brown very gravelly loamy sand

Some areas of Hermon soils have a surface layer of loamy sand.

### ***Inclusions***

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. In depressions and along narrow drainageways are moderately well drained Waumbek soils and poorly drained Lyme or Moosilauke soils. Some areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Monadnock soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

### ***Major properties of the Hermon soil***

*Permeability:* Rapid throughout

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of the unit have been cleared for farming. Some areas are reverting to woodland. Other areas have been used for residential or commercial developments.

## ***Use and Management***

### **Farming**

Slope, erosion hazard, the moderate to low available water capacity, and the short growing season are the main limitations. Intensive erosion control measures such as diversions, contour stripcropping, and winter cover crops are necessary to prevent excessive erosion. These areas are best suited for cool-season, drought-tolerant legumes and grasses. The deep root zone and excellent surface drainage make the soils very well suited for alfalfa production. Good to excellent yields of alfalfa and alfalfa-grass mixtures are obtained with the proper use of lime and fertilizers.

### **Woodland**

Fertility and moisture are adequate on for good tree growth. These soils are limited for woodland management due to plant competition on the Monadnock soils and seedling mortality on the Hermon soils.

Site preparation following harvest helps reduce the invasion of undesirable species. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

### **Community Development**

The slope of these Monadnock and Hermon soils is a moderate limitation for many phases of community

development and a severe limitation for most commercial developments. Slope limitations on this unit can be reduced by cut and fill techniques. Excavations for basements and underground utilities have severe limitations because the sides tend to slough. Deep excavations may require special equipment. In some areas there are enough subsurface stones and boulders that disposing of them becomes a concern. Moderate erosion control measures should be used during periods of construction. Road cuts will be difficult to shape in the stony subsoil, and the droughtiness of the exposed underlying material is a limitation for revegetating these cuts. Lawns and landscaping have moderate limitations on this unit due to slope and a moderate limitation on the Hermon soil due to its droughty conditions.

The soils in this unit have limitations if used for onsite sewage disposal. The slope of the Monadnock soils is a moderate limitation. Areas of Hermon soils have severe limitations due to the gravelly, very permeable subsoil and substratum that do not effectively filter the effluent, resulting in a hazard of ground-water pollution.

These soils are a probable source of sand and gravel, but screening or crushing is required to remove large stones. Extensive test pitting should be done at the site.

### Recreation

The slope limits recreational developments. Limitations are severe for playgrounds and athletic fields and moderate for picnic and camping areas. Hiking trails can be planned and maintained with few limitations.

### Wildlife Habitat

Monadnock soils in this unit have good suitability for habitat areas for openland and woodland wildlife. Hermon soils have fair suitability for openland and woodland wildlife habitat. These soils are very poorly suited for wetland wildlife habitat.

The capability subclass is IIIe.

## 254D—Monadnock and Hermon soils, 15 to 25 percent slopes

This unit is on very deep, hilly glaciated uplands and mountainsides. It consists of well drained Monadnock soils and somewhat excessively drained Hermon soils. The areas are irregular in shape and range from 5 to 15 acres in size. Some areas have stones and boulders more than 30 feet apart and generally more than 80 feet apart. Some areas are mainly Monadnock soils, some areas are mainly Hermon soils, and some are

both soils. The Monadnock and Hermon soils were mapped together because they have no major differences in use and management. The total acreage of the unit is about 45 percent Monadnock soils, 40 percent Hermon soils, and 15 percent other soils.

The typical sequence, depth, and composition of the layers of the Monadnock soil are as follows—

#### *Surface layer:*

0 to 4 inches, dark grayish brown fine sandy loam

4 to 6 inches, gray fine sandy loam

#### *Subsoil:*

6 to 10 inches, yellowish red fine sandy loam

10 to 18 inches, yellowish brown very fine sandy loam

18 to 23 inches, light olive brown fine sandy loam

#### *Substratum:*

23 to 65 inches, pale olive loamy sand

The typical sequence, depth, and composition of the layers of the Hermon soil are as follows—

#### *Surface layer:*

0 to 5 inches, dark grayish brown fine sandy loam

5 to 7 inches, light gray fine sandy loam

#### *Subsoil:*

7 to 15 inches, dark yellowish brown gravelly fine sandy loam

15 to 22 inches, light olive brown gravelly loamy sand

#### *Substratum:*

22 to 65 inches, grayish brown very gravelly loamy sand

Some areas of Hermon soils have a surface layer of loamy sand.

### ***Inclusions***

Included with this unit are small areas with slopes of less than 15 percent or more than 25 percent. In depressions and along narrow drainageways are moderately well drained Waumbek soils and poorly drained Lyme or Moosilauke soils. Some areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Monadnock soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

### ***Major properties of the Hermon soil***

*Permeability:* Rapid throughout

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of the unit have been cleared for farming. Some areas are reverting to woodland. Other areas have been used for residential or commercial developments.

### **Use and Management**

#### **Farming**

These soils have severe limitations for farming due to slope, erosion hazard, the moderate to low available water capacity, and short growing season. Intensive erosion control measures such as diversions, contour stripcropping, and winter cover crops are necessary to prevent excessive erosion. These areas are best suited for cool-season, drought-tolerant legumes and grasses. The deep root zone and excellent surface drainage make the soils very well suited for alfalfa production. Fair to good yields of alfalfa and alfalfa-grass mixtures are obtained with the proper use of lime and fertilizers. These areas are best suited for pasture because the slopes make the operation of haying equipment hazardous.

#### **Woodland**

Fertility and moisture are adequate on these Monadnock and Hermon soils for good tree growth. Erosion hazard and equipment limitations are moderate limitations. Additional management concerns are moderate plant competition on the Monadnock soils and moderate seedling mortality on the Hermon soils.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by careful planning to avoid steepest areas. Site preparation following harvest helps reduce the invasion of undesirable species. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

#### **Community Development**

The slope of these Monadnock and Hermon soils is a severe limitation for all phases of community development.

Excavations for basements and underground utilities have severe limitations because the sides tend to slough. Deep excavations may require special equipment. In some areas there are enough subsurface stones and boulders that disposing of them becomes a

concern. Slope limitations on this unit can be reduced by cut and fill techniques. Erosion control measures such as sediment catch basins, heavy mulches, straw bales, terraces, and diversions should be used during periods of construction. Road cuts will be difficult to shape in the stony subsoil. The droughtiness of the Hermon soil and the slope of this unit are severe limitations for establishing vegetation for lawns, landscaping, and road cuts.

For onsite sewage disposal, the slope of the soil is a severe limitation. Areas of Hermon soils have severe limitations due to the gravelly, very permeable subsoil and substratum that do not effectively filter the effluent, resulting in a hazard of ground-water pollution.

These soils are a probable source of sand and gravel, but screening or crushing is required to remove large stones. Extensive test pitting should be done at the site.

#### **Recreation**

The slope limits recreational developments. Limitations are severe for camping areas, picnic areas, playgrounds, and athletic fields. These soils have moderate limitations for hiking paths and trails.

#### **Wildlife Habitat**

These soils have fair suitability for habitat areas for openland wildlife. Suitability for habitat areas for woodland wildlife is good on areas of Monadnock soils and fair on areas of Hermon soils. The potential for wetland wildlife habitat on these well drained and somewhat excessively drained soils is very poor.

The capability subclass is IVe.

### **255B—Monadnock and Hermon soils, 3 to 8 percent slopes, very stony**

This unit is on very deep, undulating glaciated hilltops and mountainsides. It consists of well drained Monadnock soils and somewhat excessively drained Hermon soils. The areas are irregular in shape and range from 5 to 29 acres in size. Stones and boulders are 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface. Some areas are mainly Monadnock soils, some areas are mainly Hermon soils, and some are both soils. The Monadnock and Hermon soils were mapped together because they have no major differences in use and management. The total acreage of the unit is about 45 percent Monadnock soils, 40 percent Hermon soils, and 15 percent other soils.

The typical sequence, depth, and composition of the layers of the Monadnock soil are as follows—

*Surface layer:*

0 to 4 inches, dark grayish brown fine sandy loam

4 to 6 inches, gray fine sandy loam

*Subsoil:*

6 to 10 inches, yellowish red fine sandy loam

10 to 18 inches, yellowish brown very fine sandy loam

18 to 23 inches, light olive brown fine sandy loam

*Substratum:*

23 to 65 inches, pale olive loamy sand

The typical sequence, depth, and composition of the layers of the Hermon soil are as follows—

*Surface layer:*

0 to 5 inches, dark grayish brown fine sandy loam

5 to 7 inches, light gray fine sandy loam

*Subsoil:*

7 to 15 inches, dark yellowish brown gravelly fine sandy loam

15 to 22 inches, light olive brown gravelly loamy sand

*Substratum:*

22 to 65 inches, grayish brown very gravelly loamy sand

Some areas of Hermon soils have a surface layer of loamy sand.

***Inclusions***

Included with this unit are small areas with slopes of less than 3 percent or more than 8 percent. In depressions and along narrow drainageways are moderately well drained Waumbek soils and poorly drained Lyme or Moosilauke soils. Some areas have surface stones less than 5 feet apart. The included soils make up about 15 percent of this unit.

***Major properties of the Monadnock soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

***Major properties of the Hermon soil***

*Permeability:* Rapid throughout

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this unit are forested. A few areas are

used as pasture, and some areas have been used for residential development.

***Use and Management*****Farming**

These Monadnock and Hermon soils are too stony for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones. Even if these areas are cleared of surface stones, the short growing season and cool summers restricts the choice of crop varieties. The moderate erosion hazard limits the use of this unit for row crops, but forage crops of grasses and legumes can be grown.

**Woodland**

Fertility and moisture are adequate on these Monadnock and Hermon soils for good tree growth. These soils are limited for woodland management due to plant competition on the Monadnock soils and seedling mortality on the Hermon soils.

Site preparation following harvest helps reduce the invasion of undesirable species. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

**Community Development**

These soils have moderate limitations due to slope and surface stoniness for most phases of community development. Excavations for basements and underground utilities have severe limitations because the sides tend to slough. Deep excavations may require special equipment. In many areas the large stones and boulders in the substratum are an additional limitation for excavations. Road cuts will be difficult to shape in the stony subsoil and substratum. The droughtiness of the Hermon soil and surface stones on this unit are moderate limitations for the establishment of vegetation along road cuts and for lawns and landscaping.

In the Hermon soils, the gravelly, very permeable subsoil and substratum do not effectively filter the effluent from onsite waste disposal systems, and there is a hazard of ground-water pollution.

These soils are a probable source of sand and gravel, but screening or crushing is required to remove large stones. Extensive test pitting should be done at the site.

**Recreation**

These soils have limitations for most recreational uses due to surface stones. Limitations are moderate

for picnic and camping areas and severe for playgrounds and athletic fields. Hiking paths and trails have moderate limitations on areas of Hermon soils.

#### **Wildlife Habitat**

These soils have poor suitability for openland wildlife habitat development. Suitability for habitat areas for woodland wildlife is good on areas of Monadnock soils and fair on areas of Hermon soils. The suitability for wetland wildlife habitat on the soils is very poor.

The capability subclass is VIs.

### **255C—Monadnock and Hermon soils, 8 to 15 percent slopes, very stony**

This unit is on very deep, rolling glaciated hilltops and mountainsides. It consists of well drained Monadnock soils and somewhat excessively drained Hermon soils. The areas are irregular in shape and range from 5 to 125 acres in size. Stones and boulders are 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface. Some areas are mainly Monadnock soils, some areas are mainly Hermon soils, and some are both soils. The Monadnock and Hermon soils were mapped together because they have no major differences in use and management. The total acreage of the unit is about 45 percent Monadnock soils, 40 percent Hermon soils, and 15 percent other soils.

The typical sequence, depth, and composition of the layers of the Monadnock soil are as follows—

*Surface layer:*

0 to 4 inches, dark grayish brown fine sandy loam

4 to 6 inches, gray fine sandy loam

*Subsoil:*

6 to 10 inches, yellowish red fine sandy loam

10 to 18 inches, yellowish brown very fine sandy loam

18 to 23 inches, light olive brown fine sandy loam

*Stratum:*

23 to 65 inches, pale olive loamy sand

The typical sequence, depth, and composition of the layers of the Hermon soil are as follows—

*Surface layer:*

0 to 5 inches, dark grayish brown fine sandy loam

5 to 7 inches, light gray fine sandy loam

*Subsoil:*

7 to 15 inches, dark yellowish brown gravelly fine sandy loam

15 to 22 inches, light olive brown gravelly loamy sand

*Stratum:*

22 to 65 inches, grayish brown very gravelly loamy sand

Some areas of Hermon soils have a surface layer of loamy sand.

#### ***Inclusions***

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. In depressions and along narrow drainageways are moderately well drained Waumbek soils and poorly drained Lyme or Moosilauke soils. Some areas have surface stones less than 5 feet apart. The included soils make up about 15 percent of this unit.

#### ***Major properties of the Monadnock soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

#### ***Major properties of the Hermon soil***

*Permeability:* Rapid throughout

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this unit are forested. A few areas are used as pasture, and some areas have been used for residential development.

#### ***Use and Management***

##### **Farming**

These Monadnock and Hermon soils are too stony for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones. Even if these areas are cleared of surface stones, the slope and erosion hazard severely limit the use of this unit for row crops, but forage crops of grasses and legumes can be grown.

##### **Woodland**

Fertility and moisture are adequate on these Monadnock and Hermon soils for good tree growth. These soils are limited for woodland management due to plant competition on the Monadnock soils and seedling mortality on the Hermon soils.

Site preparation following harvest helps reduce the invasion of undesirable species. Seedling mortality can



Figure 22.— This area of Hermon soils in an area of Monadnock and Hermon soils, 8 to 15 percent slopes, is used as a source of sand and gravel for use in construction.

be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

### Community Development

The slope and surface stoniness are limitations for most phases of community development. Slope limitations on this unit can be reduced by cut and fill techniques. Excavations for basements and underground utilities have severe limitations because the sides tend to slough. Deep excavations may require special equipment. In many areas the large stones and boulders in the substratum are an additional limitation for excavations. Erosion control measures such as sediment catch basins, heavy mulches, straw bales, terraces, and diversions should be used during periods of construction. Road cuts will be difficult to shape in the stony subsoil and substratum. The droughtiness of the Hermon soil, surface stones, and slope are moderate limitations for the establishment of vegetation along road cuts and for lawns and landscaping.

The soils in this unit have limitations for onsite sewage disposal. The slope of the Monadnock soils is a moderate limitation. Areas of Hermon soils have severe limitations due to the gravelly, very permeable subsoil and substratum that do not effectively filter the effluent, resulting in a hazard of ground-water pollution.

These soils are a probable source of sand and gravel, but screening or crushing is required to remove large stones. Extensive test pitting should be done at the site (fig. 22).

### Recreation

These Monadnock and Hermon soils are limited by slope and stoniness for most recreational development. Limitations are moderate for picnic and camping areas and severe for playgrounds and athletic fields. Hiking paths and trails have moderate limitations on the Hermon soils due to large stones.

### Wildlife Habitat

Monadnock soils in this unit are poorly suited for

habitat areas for openland wildlife. The Hermon soils have fair suitability for openland and woodland wildlife habitat. These soils are very poorly suited for wetland wildlife habitat.

The suitability for wetland wildlife habitat on the soil is very poor.

The capability subclass is VIs.

### **255D—Monadnock and Hermon soils, 15 to 25 percent slopes, very stony**

This unit is on very deep, hilly glaciated uplands and mountainsides. It consists of well drained Monadnock soils and somewhat excessively drained Hermon soils. The areas are irregular in shape and range from 5 to 150 acres in size. Stones and boulders are 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface. Some areas are mainly Monadnock soils, some areas are mainly Hermon soils, and some are both soils. The Monadnock and Hermon soils were mapped together because they have no major differences in use and management. The total acreage of the unit is about 45 percent Monadnock soils, 40 percent Hermon soils, and 15 percent other soils.

The typical sequence, depth, and composition of the layers of the Monadnock soil are as follows—

*Surface layer:*

0 to 4 inches, dark grayish brown fine sandy loam

4 to 6 inches, gray fine sandy loam

*Subsoil:*

6 to 10 inches, yellowish red fine sandy loam

10 to 18 inches, yellowish brown very fine sandy loam

18 to 23 inches, light olive brown fine sandy loam

*Substratum:*

23 to 65 inches, pale olive loamy sand

The typical sequence, depth, and composition of the layers of the Hermon soil are as follows—

*Surface layer:*

0 to 5 inches, dark grayish brown fine sandy loam

5 to 7 inches, light gray fine sandy loam

*Subsoil:*

7 to 15 inches, dark yellowish brown gravelly fine sandy loam

15 to 22 inches, light olive brown gravelly loamy sand

*Substratum:*

22 to 65 inches, grayish brown very gravelly loamy sand

Some areas of Hermon soils have a surface layer of loamy sand.

#### ***Inclusions***

Included with this unit are small areas with slopes of less than 15 percent or more than 25 percent. In

depressions and along narrow drainageways are moderately well drained Waumbek soils and poorly drained Lyme or Moosilauke soils. Some areas have surface stones less than 5 feet apart. The included soils make up about 15 percent of this unit.

#### ***Major properties of the Monadnock soil***

*Permeability:* Moderate in the surface layer and subsoil; moderately rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

#### ***Major properties of the Hermon soil***

*Permeability:* Rapid throughout

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this unit are forested. A few areas are used as pasture, and some areas have been used for residential development.

#### ***Use and Management***

##### **Farming**

These Monadnock and Hermon soils are too stony for farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones. Even if the soils are cleared of surface stones, slope and erosion hazard severely limit the use of this unit for row crops, but forage crops of grasses and legumes can be grown. These areas are best suited for pasture because the slopes make the operation of haying equipment hazardous.

##### **Woodland**

Fertility and moisture are adequate on these Monadnock and Hermon soils for good tree growth. These soils are limited for woodland management due to erosion hazard and equipment limitations. Additional management concerns are plant competition on the Monadnock soils and seedling mortality on the Hermon soils.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by careful

planning to avoid steepest areas. Site preparation following harvest helps reduce the invasion of undesirable species. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

### Community Development

The slope and surface stoniness of these Monadnock and Hermon soils are severe limitations for most phases of community development. Excavations for basements and underground utilities have severe limitations because the sides tend to slough. Deep excavations may require special equipment. In many areas the large stones and boulders in the substratum are an additional limitation for excavations. Slope limitations on this unit can be reduced by cut and fill techniques. Erosion control measures such as sediment catch basins, heavy mulches, straw bales, terraces, and diversions should be used during periods of construction. Road cuts will be difficult to shape in the stony subsoil and substratum. The droughtiness of the Hermon soil along with the surface stones and slope are moderate to severe limitations for the establishment of vegetation along road cuts and for lawns and landscaping.

For onsite sewage disposal, the slope of the soil is a severe limitation. Areas of Hermon soils have severe limitations due to the gravelly, very permeable subsoil and substratum that do not effectively filter the effluent, resulting in a hazard of ground-water pollution.

These soils are a probable source of sand and gravel, but screening or crushing is required to remove large stones. Extensive test pitting should be done at the site.

### Recreation

The slope limit recreational developments. Limitations are severe for camping areas, picnic areas, playgrounds, and athletic fields. These soils have moderate limitations for the layout and use of hiking paths and trails.

### Wildlife Habitat

These soils are poorly suited for habitat areas for openland wildlife. Suitability for habitat areas for woodland wildlife is good on areas of Monadnock soils and fair on areas of Hermon soils. The suitability for wetland wildlife habitat on these well drained and somewhat excessively drained soils is very poor.

The capability subclass is VIs.

## 255E—Monadnock and Hermon soils, 25 to 35 percent slopes, very stony

This unit is on very deep, steep glaciated hilltops and mountainsides. It consists of well drained Monadnock soils and somewhat excessively drained Hermon soils. The areas are irregular in shape and range from 5 to 150 acres in size. Stones and boulders are 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface. Some areas are mainly Monadnock soils, some areas are mainly Hermon soils, and some are both soils. The Monadnock and Hermon soils were mapped together because they have no major differences in use and management. The total acreage of the unit is about 45 percent Monadnock soils, 40 percent Hermon soils, and 15 percent other soils.

The typical sequence, depth, and composition of the layers of the Monadnock soil are as follows—

#### *Surface layer:*

0 to 4 inches, dark grayish brown fine sandy loam

4 to 6 inches, gray fine sandy loam

#### *Subsoil:*

6 to 10 inches, yellowish red fine sandy loam

10 to 18 inches, yellowish brown very fine sandy loam

18 to 23 inches, light olive brown fine sandy loam

#### *Substratum:*

23 to 65 inches, pale olive loamy sand

The typical sequence, depth, and composition of the layers of the Hermon soil are as follows—

#### *Surface layer:*

0 to 5 inches, dark grayish brown fine sandy loam

5 to 7 inches, light gray fine sandy loam

#### *Subsoil:*

7 to 15 inches, dark yellowish brown gravelly fine sandy loam

15 to 22 inches, light olive brown gravelly loamy sand

#### *Substratum:*

22 to 65 inches, grayish brown very gravelly loamy sand

Some areas of Hermon soils have a surface layer of loamy sand.

### ***Inclusions***

Included with this unit are small areas with slopes of less than 25 percent or more than 35 percent. In depressions and along narrow drainageways are moderately well drained Waumbek soils and poorly drained Lyme or Moosilauke soils. Some areas have surface stones less than 5 feet apart. The included soils make up about 15 percent of this unit.

### **Major properties of the Monadnock soil**

*Permeability:* Moderate in the surface layer and subsoil; moderately rapid in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

### **Major properties of the Hermon soil**

*Permeability:* Rapid throughout

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this unit are forested.

### **Use and Management**

#### **Farming**

These Monadnock and Hermon soils are too stony and steep for most farming.

#### **Woodland**

Fertility and moisture are adequate on these Monadnock and Hermon soils for good tree growth. These soils are limited for woodland management due to erosion hazard and slope. Additional management concerns are plant competition on the areas of Monadnock soils and seedling mortality on the Hermon soils.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by careful planning to avoid steepest areas. Site preparation following harvest helps reduce the invasion of undesirable species. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

#### **Community Development**

The slope of these Monadnock and Hermon soils is a severe limitation for most phases of community development. Excavations for basements and underground utilities have severe limitations because the sides tend to slough. Deep excavations may require special equipment. In many areas the large stones and boulders in the substratum are an additional limitation for excavations. Slope limitations

can be reduced by cut and fill to level the soil. Erosion control measures such as sediment catch basins, heavy mulches, straw bales, terraces, and diversions should be used during periods of construction. Road cuts will be difficult to shape in the stony subsoil and substratum. The droughtiness of the Hermon soils and the slope and stoniness are limitations for landscaping and the establishment of vegetation along road cuts.

For onsite sewage disposal, the slope of the soil is a severe limitation. Areas of Hermon soils have severe limitations due to the gravelly, very permeable subsoil and substratum that do not effectively filter the effluent, resulting in a hazard of ground-water pollution.

These soils are a probable source of sand and gravel, but screening or crushing is required to remove large stones. Extensive test pitting should be done at the site.

#### **Recreation**

These Monadnock and Hermon soils have severe slope limitations for camp and picnic areas. The slope and stoniness of the soil are severe limitations for playgrounds or athletic fields. These soils have moderate limitations for the design and construction of hiking paths and trails, and the large stones on Hermon soils are an additional limitation.

#### **Wildlife Habitat**

These soils are poorly suited for habitat areas for openland wildlife. Suitability for habitat areas for woodland wildlife is good on areas of Monadnock soils and fair on areas of Hermon soils. The suitability for wetland wildlife habitat on these well drained and somewhat excessively drained soils is very poor.

The capability subclass is VIIs.

## **295—Greenwood mucky peat**

This is a very deep, nearly level, and very poorly drained organic soil. It is in depressions on terraces and outwash plains and in upland valleys. The areas are irregularly shaped and range from 5 to 150 acres in size. Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 10 inches, dark reddish brown and black partially decomposed herbaceous and woody materials

*Subsurface layer:*

10 to 19 inches, black and very dark brown highly decomposed herbaceous and woody materials

19 to 38 inches, dark reddish brown and very dark brown partially decomposed herbaceous and woody materials

**Substratum:**

38 to 45 inches, very dusky red and very dark brown slightly decomposed herbaceous and woody materials

45 to 65 inches, reddish brown and very dusky brown partially decomposed herbaceous and woody materials

**Inclusions**

Included with this soil in mapping are areas of Chocorua, Ossipee, and Peacham soils on similar landscapes and small areas of open water. The included soils make up about 10 percent of this unit.

**Major properties of the soil**

*Permeability:* Moderate to moderately rapid throughout

*Available water capacity:* High

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 1 foot above the surface to 1.0 foot below all year

*Potential frost action:* High

*Flood hazard:* None

Most areas of this soil are water-tolerant woodland or open bogs.

**Use and Management****Farming**

This soil is severely limited for farming by wetness.

**Woodland**

Fertility and moisture are so variable on this Greenwood soil that an onsite investigation is required to assess the potential. Equipment limitations, seedling mortality, windthrow hazard, and plant competition affect woodland management. Access to some areas may be a limitation for logging operations.

Equipment limitations due to wetness are reduced if tree harvesting and management operations are restricted to times when the ground is frozen. Seedling mortality can be reduced by special site preparation or by planting species that are suited for wet sites. Windthrow hazard can be reduced by careful thinning to avoid surface-root damage caused by harvesting equipment. Site preparation following tree harvest helps decrease invasion of undesirable species.

**Community Development**

This Greenwood soil has severe limitations for all phases of community development due to wetness, ponding, excess humus, subsidence, low strength, and frost action. Typically, there are no corrective measures to reduce these limitations.

The areas of this soil improve and maintain water quality by acting as natural filters to remove harmful chemicals, nutrients, and sediment. They also recharge ground-water aquifers and store runoff, which lessens flood damage.

**Recreation**

This very poorly drained soil has severe limitations for recreational developments due to ponding and excess humus.

**Wildlife Habitat**

This soil is poorly suited for habitat for openland or woodland wildlife. Suitability for wetland wildlife habitat is good.

The capability subclass is VIIw.

**298—Pits, gravel**

This unit consists of areas from which gravel or sand has been removed for construction purposes. The excavations are commonly 10 to 40 feet deep and have steep sides and a nearly level floor. They are irregularly shaped and range from 3 to about 50 acres in size. Some have been partially filled and used as a dump. Some other areas of this unit have small pools of water.

Very low available water holding capacity makes this unit droughty. Runoff is generally slow. Permeability varies but is commonly moderately rapid to very rapid.

A few areas of this unit have been reclaimed and planted with eastern white pine or used for homesites and recreational areas. Most other areas are either still active pits or have been abandoned and have a sparse vegetation of woody bushes, grasses, and annuals.

The very low available water capacity makes this unit generally unsuited for farming and woodland. A hazard of ground-water pollution limits the unit for waste disposal. Onsite investigation is needed to determine the suitability of the gravel pit for most uses and to determine the method of reclamation.

Capability subclass: not assigned.

**299—Udorthents, smoothed**

This unit consists of soil material that has been reworked by machinery. Most of the areas consist of cuts and fills associated with borrow pits and quarries and construction sites for industrial, commercial, and residential buildings, highways, and airports. These areas are dominantly nearly level, but along the perimeter of the unit they are typically strongly sloping

to very steep. They range in size from about 5 to 115 acres.

The soil material in this unit is variable and ranges from sandy or loamy glacial till to sand and gravel. Some areas consist of boulders, stones, and cobbles that have been separated from finer material. Other areas have old building materials, stumps, pieces of asphalt, and other rubble mixed with soil material.

### ***Inclusions***

Included with this unit are small borrow pits or quarries, areas that have been covered with an impermeable surface, and small areas of undisturbed soils that commonly are compacted and shaped to some extent but otherwise resemble the undisturbed soils surrounding areas of Udorthents. Included areas make up about 10 percent of this unit.

The permeability of the material in this unit ranges from very rapid to slow. The available water capacity of the unit ranges from very low to moderate. Depth to bedrock is generally more than 65 inches.

Because of the variability of this unit, onsite investigation is needed to evaluate the potential of the unit for any use.

Capability subclass: not assigned.

## **310A—Quonset loamy sand, 0 to 3 percent slopes**

This soil is very deep, nearly level, and excessively drained. It is on gravelly stream terraces and outwash plains along the southern half of the Connecticut River valley. The areas are irregular in shape and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 8 inches, dark brown loamy sand

*Subsoil:*

8 to 20 inches, yellowish brown very gravelly sand

*Substratum:*

20 to 24 inches, light olive brown very gravelly sand

24 to 44 inches, olive brown very gravelly coarse sand

44 to 65 inches, brown sand

In some areas the layers range from extremely gravelly to nongravelly. Some areas have a gravelly or very gravelly surface layer.

### ***Inclusions***

Included with this soil in mapping are areas of excessively drained Windsor soils and depressions or narrow drainageways of moderately well drained Deerfield soils. Also included are small areas with

slopes of more than 3 percent. The included soils make up about 10 percent of this unit.

### ***Major properties of the soil***

*Permeability:* Moderately rapid to rapid in the surface layer and subsoil; very rapid in the substratum

*Available water capacity:* Very low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil have been cleared for farming. A few areas are still farmed. Many areas are reverting to woodland or are used for residential or commercial development. Many of the commercial sand and gravel operations in Grafton County are in this unit.

### **Farming**

The droughtiness of this soil is the primary limitation for farming. The soil is moderately well suited for row crops. Heavy applications of manure and winter cover crops incorporated into the surface layer will help maintain and increase the organic matter level and the available water capacity. Even with the proper use of lime and fertilizer, only fair yields of silage corn, grasses, and legumes are generally obtained without irrigation. Winterkill of legumes is a concern in depressions on this nearly level soil because of ice coverage following midwinter thaws.

### **Woodland**

Moisture content is adequate for good softwood growth, especially eastern white pine.

This soil is limited for woodland management by seedling mortality. This limitation can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

### **Community Development**

This soil has few limitations for most phases of community development. The sides of excavations tend to slough, and deep excavations may require special equipment. After construction, the droughtiness is a severe limitation for the establishment of lawns and landscaping.

For onsite waste disposal, there is a severe limitation because the gravelly, very permeable subsoil and substratum do not effectively filter the effluent, and there is a hazard of ground-water pollution.

This soil is a probable source of gravel, but extensive test pitting should be done at the site.

### Recreation

This soil has moderate limitations for playgrounds and athletic fields due to small stones. Maintaining adequate grass cover on athletic fields is a concern on this droughty soil.

### Wildlife Habitat

Suitability is poor for habitat areas for openland or woodland wildlife. This soil is very poorly suited for wetland wildlife except as resting or nesting areas adjacent to wetlands.

The capability subclass is IIIs.

## 310B—Quonset loamy sand, 3 to 8 percent slopes

This soil is very deep, undulating, and excessively drained. It is on gravelly stream terraces and outwash plains along the southern half of the Connecticut River valley. The areas are irregular in shape and range from 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 8 inches, dark brown loamy sand

*Subsoil:*

8 to 20 inches, yellowish brown very gravelly sand

*Substratum:*

20 to 24 inches, light olive brown very gravelly sand

24 to 44 inches, olive brown very gravelly coarse sand

44 to 65 inches, brown sand

In some areas the layers range from extremely gravelly to nongravelly. Some areas have a gravelly or very gravelly surface layer.

### Inclusions

Included with this soil in mapping are areas of excessively drained Windsor soils and depressions or narrow drainageways of moderately well drained Deerfield soils. Also included are small areas with slopes of less than 3 percent or more than 8 percent. The included soils make up about 10 percent of this unit.

### Major properties of the soil

*Permeability:* Moderately rapid to rapid in the surface layer and subsoil; very rapid in the substratum

*Available water capacity:* Very low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil have been cleared for farming. A few areas are still farmed. Many areas are reverting to woodland or are used for residential or commercial development. Many of the commercial sand and gravel operations in the county are in this unit.

## Use and Management

### Farming

The droughtiness of this soil is the primary limitation for farming. The soil is moderately well suited for row crops. Heavy applications of manure and winter cover crops incorporated into the surface layer will help maintain and increase the organic matter level and the available water capacity. Winter cover crops and contour tillage will help control erosion. Even with the proper use of lime and fertilizer, only fair yields of silage corn, grasses, and legumes are generally obtained without irrigation.

### Woodland

Moisture content is adequate for good softwood growth, especially eastern white pine.

This soil is limited for woodland management by seedling mortality. This limitation can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

### Community Development

This Quonset soil has few limitations for most phases of community development. Erosion is a concern during construction. This can be controlled by limiting the area of exposed soil. This soil has severe limitations for excavations because the sides of excavations tend to slough. Deep excavations may require special equipment. After construction, the droughtiness is a severe limitation for the establishment of lawns and landscaping.

For onsite waste disposal, there is a severe limitation because the gravelly, very permeable subsoil and substratum do not effectively filter the effluent, and there is a hazard of ground-water pollution.

This soil is a probable source of gravel, but extensive test pitting should be done at the site.

### Recreation

This soil has moderate limitations for playgrounds and athletic fields due to slope and small stones. Maintaining adequate grass cover on athletic fields is a concern on this droughty soil.

### Wildlife Habitat

Suitability is poor for habitat areas for openland or

woodland wildlife. This soil is very poorly suited for wetland wildlife except as resting or nesting areas adjacent to wetlands.

The capability subclass is IIIs.

### **310C—Quonset loamy sand, 8 to 15 percent slopes**

This soil is very deep, rolling, and excessively drained. It is on gravelly stream terraces and outwash plains along the southern half of the Connecticut River valley. The areas are irregular in shape and range from 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 8 inches, dark brown loamy sand

*Subsoil:*

8 to 20 inches, yellowish brown very gravelly sand

*Substratum:*

20 to 24 inches, light olive brown very gravelly sand

24 to 44 inches, olive brown very gravelly coarse sand

44 to 65 inches, brown sand

In some areas the layers range from extremely gravelly to nongravelly. Some areas have a gravelly or very gravelly surface layer.

#### ***Inclusions***

Included with this soil in mapping are areas of excessively drained Windsor soils and depressions or narrow drainageways of moderately well drained Deerfield soils. Also included are small areas with slopes of less than 8 percent or more than 15 percent. The included soils make up about 10 percent of this unit.

#### ***Major properties of the soil***

*Permeability:* Moderately rapid to rapid in the surface layer and subsoil; very rapid in the substratum

*Available water capacity:* Very low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil have been cleared for farming. A few areas are still farmed. Many areas are reverting to woodland or are used for residential or commercial development. Many of the commercial

sand and gravel operations in the county are in this unit.

### ***Use and Management***

#### **Farming**

The droughtiness of this soil is the primary limitation for farming. The slope and erosion hazard make this soil poorly suited for row crops. Yields of grasses and legumes are only fair on soil even with the proper use of lime and fertilizer. Areas used as pasture may require careful stocking or rotation grazing. Overgrazing will allow low quality grasses and forbes to take over and reduce the forage quality.

#### **Woodland**

Moisture content is adequate for good softwood growth, especially eastern white pine.

This soil is limited for woodland management by seedling mortality. This limitation can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

#### **Community Development**

This soil is limited for community development by slope and erosion. Limitations are severe for excavations because the sides tend to slough, and deep excavations may require special equipment. The slope of this soil is a moderate limitations for dwellings with or without basements and a severe limitation for small commercial buildings. This soil has moderate slope limitations for roads and streets, and the resulting cuts and side slopes are difficult to stabilize and revegetate on this droughty soil. Erosion is a concern during periods of construction but can generally be controlled with a few simple measures. After construction, the droughtiness is a severe limitation for the establishment of lawns and landscaping.

For onsite sewage disposal, there is a severe limitation because the gravelly, very permeable subsoil and substratum do not effectively filter the effluent, and there is a hazard of ground-water pollution.

This soil is a probable source of gravel, but extensive test pitting should be done at the site.

#### **Recreation**

The slope of this soil is a limitation for most recreational uses. Soil limitations are moderate for camp and picnic areas and severe for playgrounds and

athletic fields. There are few limitations for hiking paths and trails, but areas of heavy use should be designed to prevent erosion.

#### **Wildlife Habitat**

Suitability is poor for habitat areas for openland or woodland wildlife. This soil is very poorly suited for wetland wildlife except as resting or nesting areas adjacent to wetlands.

The capability subclass is IVs.

### **310E—Quonset loamy sand, 15 to 60 percent slopes**

This soil is very deep, moderately steep to very steep, and excessively drained. It is on gravelly escarpment of stream terraces and in deep ravines in outwash plains along the southern half of the Connecticut River valley. The areas are irregular in shape and range from 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 8 inches, dark brown loamy sand

*Subsoil:*

8 to 20 inches, yellowish brown very gravelly sand

*Substratum:*

20 to 24 inches, light olive brown very gravelly sand

24 to 44 inches, olive brown very gravelly coarse sand

44 to 65 inches, brown sand

In some areas the layers range from extremely gravelly to nongravelly. Some areas have a gravelly or very gravelly surface layer.

#### ***Inclusions***

Included with this soil in mapping are small areas along narrow ravines where the soil has been entrenched to bedrock or to the stony glacial till and areas along the lower part of the escarpment that are sandy or silty. Also included are small areas with slopes of less than 15 percent or more than 60 percent. The included soils make up about 15 percent of this unit.

#### ***Major properties of the soil***

*Permeability:* Moderately rapid to rapid in the surface layer and subsoil; very rapid in the substratum

*Available water capacity:* Very low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil are woodland.

## ***Use and Management***

### **Farming**

The steep slopes and erosion hazard are severe limitations for all farming of the soil. Operation of modern farming equipment on these slopes is hazardous. Some of the moderately steep areas can be used for pasture, but maintenance of good quality grasses and legumes is a concern. Severe erosion may develop along cattle trails.

### **Woodland**

Moisture content is adequate for good softwood growth, especially eastern white pine, but this soil is limited for woodland management by erosion hazard, slope, and seedling mortality.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with drought-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by the use of track equipment and careful planning to avoid steepest areas. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

### **Community Development**

This soil is limited for community development by slope and erosion. Limitations are severe for excavations because the sides tend to slough, and deep excavations may require special equipment. Erosion is a concern during periods of construction but can generally be controlled with a few simple measures. The slope of this soil is a severe limitation for dwellings with or without basements and for small commercial buildings. This soil has severe slope limitations for roads and streets, and the resulting cuts and side slopes are difficult to stabilize and revegetate on this droughty soil.

For onsite waste disposal, there is a severe limitation because the gravelly, very permeable subsoil and substratum do not effectively filter the effluent, and there is a hazard of ground-water pollution. The slope of the soil is an additional limitation.

This soil is a probable source of gravel, but extensive test pitting should be done at the site.

### **Recreation**

The slope of this soil is a severe limitation for most recreational uses.

### **Wildlife Habitat**

Suitability is poor for habitat areas for openland or woodland wildlife. This soil is very poorly suited for

wetland wildlife except as resting or nesting areas adjacent to wetlands.

The capability subclass is VIIs.

### 313—Deerfield fine sandy loam

This soil is very deep, nearly level, and moderately well drained. It is on loamy terraces along the Connecticut River valley. Slopes are 0 to 3 percent. The areas are long and narrow and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 9 inches, very dark grayish brown fine sandy loam

*Subsoil:*

9 to 16 inches, yellowish brown loamy fine sand

16 to 27 inches, light olive brown loamy fine sand

*Substratum:*

27 to 65 inches, grayish brown fine sand

#### ***Inclusions***

Included with this soil in mapping are small or narrow depressions of Walpole and Binghamville soils, low mounds or narrow ridges of well drained Windsor or Agawam soils, and a few areas with slopes of more than 3 percent. Also included are areas with a gravelly subsoil and gravelly or very gravelly substratum. The included soils make up about 15 percent of this unit.

#### ***Major properties of the Deerfield soil***

*Permeability:* Rapid in the surface layer and subsoil; very rapid in the substratum

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 1.5 to 3.0 feet from December through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this Deerfield soil are farmed. A few areas are forested, and some have been used for residential or commercial development.

#### ***Use and Management***

##### **Farming**

This soil has fair suitability for farming. Droughtiness may be a concern during dry years, and legumes such as alfalfa may be difficult to maintain. Surface and subsurface drainage will allow earlier spring tillage, eliminate some of the harvesting concerns of a wet autumn, and improve legume survival. Fair to good

yields of silage corn, grasses, and legumes can be obtained with the proper management.

##### **Woodland**

Soil moisture is adequate for good softwood growth, especially eastern white pine, on this Deerfield soil.

Seedling mortality and plant competition are limitations that affect woodland management.

Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains. Site preparation following harvest helps reduce the invasion of undesirable species.

##### **Community Development**

This soil is limited by a seasonal high water table and frost action. The sides of excavations tend to slough and fill with water. Deep excavations may require special equipment. Wetness is a severe limitation for dwellings with basements and a moderate limitation for dwellings without basements and for small commercial buildings. Foundation drains will help to control wetness and frost action. The moderate limitations for local roads and streets can be overcome by providing coarser grained base material to frost depth and installing drainage.

Wetness and the poor filtering properties of this soil are severe limitations for onsite waste disposal systems. The very permeable subsoil and substratum do not effectively filter effluent, and there is a hazard of ground-water pollution.

This soil is a probable source of sand, but extensive test pitting should be done at the site.

##### **Recreation**

This soil has moderate limitations for camp and picnic areas due to wetness. Limitations are moderate for playgrounds and athletic fields due to wetness and slope.

##### **Wildlife Habitat**

Suitability is fair for habitat for openland wildlife and poor for woodland wildlife. This soil is poorly suited for wetland wildlife except as resting or nesting areas adjacent to wetlands.

The capability subclass is IIIw.

### 330B—Bernardston silt loam, 3 to 8 percent slopes

This soil is very deep, gently sloping, and well drained. It is on silty glaciated hills in the southwestern part of the county. The areas are irregular in shape and

range from 5 to 25 acres in size. Some areas have stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, dark grayish brown silt loam

*Subsoil:*

6 to 11 inches, olive brown silt loam

11 to 16 inches, light olive brown silt loam

*Substratum:*

16 to 28 inches, olive gray silt loam

28 to 65 inches, mottled, olive gray, firm silt loam

Some areas are fine sandy loam throughout.

### ***Inclusions***

Included with this unit are small areas with slopes of less than 3 percent or more than 8 percent. In depressions and along narrow drainageways are moderately well drained Pittstown soils and poorly drained Stissing soils. Also included are small isolated areas of well drained Cardigan soils or somewhat excessively Kearsarge soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Bernardston soil***

*Permeability:* Moderate in the surface layer and subsoil; slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 16 to 36 inches to hardpan

*Depth to water table:* 1.5 to 3.0 feet from February through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil have been cleared for farming. Some areas are reverting to woodland. Other areas have been used for residential development.

### ***Use and Management***

#### **Farming**

Bernardston soil is classified as prime farmland in this survey area. Excellent yields of silage corn, grasses, and legumes can be obtained with the proper use of lime and fertilizers. Home gardens have good yields of small fruits and vegetables, but very little truck farming is done in the county. Areas used for continuous row cropping should be contour farmed and have winter cover crops to prevent erosion and help maintain organic matter levels. Contour tillage and

strip cropping will help reduce soil losses where row crops are grown.

#### **Woodland**

Fertility and moisture are favorable on this Bernardston soil for high quality hardwoods. Windthrow hazard and plant competition are limitations that affect woodland management.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

#### **Community Development**

This soil is limited by a perched water table in the spring, a slowly permeable hardpan, and frost action. Wetness and the dense hardpan are moderate limitations for shallow excavations. There is a moderate wetness limitation for dwellings with or without basements. Foundation drains will help to control wetness and frost action. There is a moderate limitation for local roads and streets due to wetness and frost action. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage.

For onsite sewage disposal, the depth to the slowly permeable hardpan is a severe limitation that can be overcome with fill to raise and increase the size of absorption fields.

#### **Recreation**

This soil has moderate limitations for camping and picnic areas due to wetness and small stones. Limitations are severe for playgrounds and athletic fields due to small stones.

#### **Wildlife Habitat**

Suitability is good for habitat areas for openland and woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IIe.

### **330C—Bernardston silt loam, 8 to 15 percent slopes**

This soil is very deep, strongly sloping, and well drained. It is on silty glaciated hills in the southwestern part of the county. The areas are irregular in shape and

range from 5 to 35 acres in size. Some areas have stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, dark grayish brown silt loam

*Subsoil:*

6 to 11 inches, olive brown silt loam

11 to 16 inches, light olive brown silt loam

*Substratum:*

16 to 28 inches, olive gray silt loam

28 to 65 inches, mottled, olive gray, firm silt loam

Some areas are fine sandy loam throughout.

### **Inclusions**

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. In depressions and along narrow drainageways are moderately well drained Pittstown soils and poorly drained Stissing soils. Also included are small isolated areas of well drained Cardigan soils or somewhat excessively Kearsarge soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

### **Major properties of the Bernardston soil**

*Permeability:* Moderate in the surface layer and subsoil; slow in the substratum.

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 16 to 36 inches to hardpan

*Depth to water table:* 1.5 to 3.0 feet from February through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil have been cleared for farming. Some areas are reverting to woodland. Other areas have been used for residential development.

### **Farming**

The slope and erosion hazard of this Bernardston soil limit its use for row crops. Excellent yields of grasses and legumes can be obtained with the proper use of lime and fertilizers. Home gardens have good yields of adapted small fruits and vegetables, but very little truck farming is done in the county. If areas are used for continuous row cropping, they should be contour farmed and have winter cover crops to prevent erosion and help maintain organic matter levels.

Contour tillage and stripcropping will help reduce soil losses where row crops are grown.

### **Woodland**

Fertility and moisture are favorable on this Bernardston soil for high quality hardwoods. Windthrow hazard and plant competition are limitations that affect woodland management.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

### **Community Development**

This soil is limited by a perched water table in the spring, a slowly permeable hardpan, slope, and frost action. Wetness, the hardpan, and slope are moderate limitations for shallow excavations. There are moderate wetness and slope limitations for dwellings with or without basements. Foundation drains will help to control wetness and frost action. There is a moderate limitation for local roads and streets due to wetness, slope, and frost action. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage. Slope limitations can be reduced by using cut and fill to level these strongly sloping areas. However, cuts made into slopes below hardpan layers may make it necessary to use drainage to remove the water on the hardpan during wet times of the year.

For onsite sewage disposal, the depth to the slowly permeable hardpan is a severe limitation that can be overcome with fill to raise and increase the size of absorption fields.

### **Recreation**

This soil has moderate limitations for camping and picnic areas due to slope, small stones, and wetness. Limitations are severe for playgrounds and athletic fields due to slope and small stones.

### **Wildlife Habitat**

Suitability is good for habitat areas for openland and woodland wildlife. This well drained soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IIIe.

### 330D—Bernardston silt loam, 15 to 25 percent slopes

This soil is very deep, moderately steep, and well drained. It is on glaciated hills in the southwestern part of the county. The areas are irregular in shape and range from 5 to 25 acres in size. Some areas have stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, dark grayish brown silt loam

*Subsoil:*

6 to 11 inches, olive brown silt loam

11 to 16 inches, light olive brown silt loam

*Substratum:*

16 to 28 inches, olive gray silt loam

28 to 65 inches, mottled, olive gray, firm silt loam

Some areas are fine sandy loam throughout.

#### ***Inclusions***

Included with this unit are small areas with slopes of less than 15 percent or more than 25 percent. In depressions and along narrow drainageways are moderately well drained Pittstown soils and poorly drained Stissing soils. Also included are small isolated areas of well drained Cardigan soils or somewhat excessively Kearsarge soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

#### ***Major properties of the Bernardston soil***

*Permeability:* Moderate in the surface layer and subsoil; slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 16 to 36 inches to hardpan

*Depth to water table:* 1.5 to 3.0 feet from February through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil have been cleared for farming. Many areas are reverting to woodland. A few areas have been used for residential development.

#### ***Use and Management***

##### **Farming**

The slope and erosion hazard generally limit the farming of this Bernardston soil to pasture. A few areas are used for hayland, but the operation of modern hay

equipment is hazardous on these slopes. Good yields of grasses and legumes can be obtained with the proper use of lime and fertilizers.

##### **Woodland**

Fertility and moisture are favorable on this Bernardston soil for high quality hardwoods. Slope, windthrow hazard, and plant competition are limitations that affect woodland management.

Equipment limitations due to slope can be reduced by careful planning to avoid steepest areas. Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

##### **Community Development**

This Bernardston soil is severely limited for community development by moderately steep slopes. Slope limitations can be reduced by using cut and fill to level this area. However, cuts made into slopes below hardpan layers may make it necessary to use drainage to remove the water on the hardpan during wet times of the year.

For onsite sewage disposal, the depth to the slowly permeable hardpan is a severe limitation that can be overcome with fill to raise and increase the size of absorption fields.

##### **Recreation**

This soil has severe limitations for camping and picnic areas due to slope. Limitations are severe for playgrounds and athletic fields due to slope and small stones. There is a moderate limitation for hiking trails due to slope.

##### **Wildlife Habitat**

Suitability is fair for habitat areas for openland wildlife and good for woodland wildlife. This soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IVE.

### 331B—Bernardston silt loam, 3 to 8 percent slopes, very stony

This soil is very deep, gently sloping, and well drained. It is on glaciated hills in the southwestern part of the county. The areas are irregular in shape and range from 5 to 35 acres in size. Stones on the surface

are 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, dark grayish brown silt loam

*Subsoil:*

6 to 11 inches, olive brown silt loam

11 to 16 inches, light olive brown silt loam

*Substratum:*

16 to 28 inches, olive gray silt loam

28 to 65 inches, mottled, olive gray, firm silt loam

Some areas are fine sandy loam throughout.

### ***Inclusions***

Included with this unit are small areas with slopes of less than 3 percent or more than 8 percent. In depressions and along narrow drainageways are moderately well drained Pittstown soils and poorly drained Stissing soils. Also included are small isolated areas of well drained Cardigan soils or somewhat excessively Kearsarge soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Bernardston soil***

*Permeability:* Moderate in the surface layer and subsoil; slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 16 to 36 inches to hardpan

*Depth to water table:* 1.5 to 3.0 feet from February through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested. A few areas that are farmed are used for pasture. Some areas have been developed for residential uses.

### ***Use and Management***

#### **Farming**

This soil is too stony for most farming other than pasture. The surface stones are generally small and scattered enough that some of the pastures have been improved by broadcasting lime and fertilizer without tillage. If cleared of surface stones, the soil meets the criteria for prime farmland.

#### **Woodland**

Fertility and moisture are favorable on this Bernardston soil for high quality hardwoods. Windthrow

hazard and plant competition are limitations that affect woodland management.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

### **Community Development**

This soil is limited by a perched water table in the spring, a slowly permeable hardpan, and frost action. There is a moderate wetness limitation for shallow excavations and dwellings with or without basements. The dense hardpan in the substratum is an additional limitation for shallow excavations. Foundation drains will help to control wetness and frost action. There is a moderate limitation for local roads and streets due to wetness and frost action. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage.

For onsite sewage disposal, the depth to the slowly permeable hardpan is a severe limitation that can be overcome with fill to raise and increase the size of absorption fields.

### **Recreation**

This soil has moderate limitations for camping and picnic areas due to large stones and slow permeability in the substratum. Limitations are severe for playgrounds and athletic fields due to large and small stones. Hiking paths and trails can be planned and maintained with few limitations.

### **Wildlife Habitat**

Suitability is poor for habitat areas for openland wildlife and good for woodland wildlife. This soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

## **331C—Bernardston silt loam, 8 to 15 percent slopes, very stony**

This soil is very deep, strongly sloping, and well drained. It is on silty glaciated hills in the southwestern part of the county. The areas are irregular in shape and range from 5 to 35 acres in size. Stones on the surface are 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the

layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, dark grayish brown silt loam

*Subsoil:*

6 to 11 inches, olive brown silt loam

11 to 16 inches, light olive brown silt loam

*Substratum:*

16 to 28 inches, olive gray silt loam

28 to 65 inches, mottled, olive gray, firm silt loam

Some areas are fine sandy loam throughout.

### ***Inclusions***

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. In depressions and along narrow drainageways are moderately well drained Pittstown soils and poorly drained Stissing soils. Also included are small isolated areas of well drained Cardigan soils or somewhat excessively Kearsarge soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Bernardston soil***

*Permeability:* Moderate in the surface layer and subsoil; slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 16 to 36 inches to hardpan

*Depth to water table:* 1.5 to 3.0 feet from February through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested. Other areas are used for pasture or have been developed for residential or commercial uses.

### ***Use and Management***

#### **Farming**

This soil is too stony for most farming other than pasture. Pastures may be improved by broadcasting lime and fertilizer without tillage. If cleared of surface stones, the soil is good grassland, but the slope and erosion hazard limit use for row crops.

#### **Woodland**

Fertility and moisture are favorable on this Bernardston soil for high quality hardwoods. Windthrow hazard and plant competition are limitations that affect woodland management.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused

by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

### **Community Development**

This soil is limited by a perched water table in the spring, a slowly permeable hardpan, slope, and frost action. The seasonal wetness, the hardpan, and slope of this soil are moderate limitations for shallow excavations. The dense hardpan in the substratum is an additional limitation for shallow excavations. There are moderate wetness and slope limitations for dwellings with or without basements. Foundation drains will help to control wetness and frost action. There is a moderate limitation for local roads and streets due to wetness, slope, and frost action. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage. Limitations due to slope can be reduced by cut and fill. However, in areas cut into slopes below hardpan layers, water moves on the hardpan during wet times of the year.

For onsite sewage disposal, the depth to the slowly permeable hardpan is a severe limitation that can be overcome with fill to raise and increase the size of absorption fields.

### **Recreation**

This soil has moderate limitations for camping areas and picnic areas due to large stones and slow permeability. Limitations are severe for playgrounds and athletic fields due to large stones, slope, and small stones.

### **Wildlife Habitat**

Suitability is poor for habitat areas for openland wildlife and good for woodland wildlife. This soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

### **331D—Bernardston silt loam, 15 to 25 percent slopes, very stony**

This soil is very deep, moderately steep, and well drained. It is on glaciated hills in the southwestern part of the county. The areas are irregular in shape and range from 5 to 60 acres in size. Stones on the surface are 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the

layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, dark grayish brown silt loam

*Subsoil:*

6 to 11 inches, olive brown silt loam

11 to 16 inches, light olive brown silt loam

*Substratum:*

16 to 28 inches, olive gray silt loam

28 to 65 inches, mottled, olive gray, firm silt loam

Some areas are fine sandy loam throughout.

### ***Inclusions***

Included with this unit are small areas with slopes of less than 15 percent or more than 25 percent. In depressions and along narrow drainageways are moderately well drained Pittstown soils and poorly drained Stissing soils. Also included are small isolated areas of well drained Cardigan soils or somewhat excessively Kearsarge soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Bernardston soil***

*Permeability:* Moderate in the surface layer and subsoil; slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 16 to 36 inches to hardpan

*Depth to water table:* 1.5 to 3.0 feet from February through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested. A few areas are used for unimproved pasture or have been developed for residential uses.

### ***Use and Management***

#### **Farming**

This soil is too stony and steep for most farming other than pasture. Even if the soil is cleared of surface stones, the high erosion hazard limits use to improved pasture. Good yields of grasses and legumes are obtained with the proper use of lime and fertilizers. The slope of this soil makes the operation of modern haying equipment difficult and hazardous.

#### **Woodland**

Fertility and moisture are favorable on this Bernardston soil for high quality hardwoods. Slope, windthrow hazard, and plant competition are limitations that affect woodland management.

Equipment limitations due to slope can be reduced by careful planning to avoid steepest areas. Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

### **Community Development**

This soil is limited by slope for most phases of community development. Severe slope limitations can be reduced by using cut and fill to level this area. However, cuts made into slopes below hardpan layers may make it necessary to use drainage to remove the water on the hardpan during wet times of the year.

For onsite sewage disposal, the depth to the slowly permeable hardpan and slope are severe limitations that can be overcome with fill to raise, level, and increase the size of absorption fields.

### **Recreation**

This soil has severe limitations for camping areas and picnic areas due to slope. Soil limitations are severe for playgrounds and athletic fields due to large stones, slope, and small stones. Limitations are moderate for hiking paths and trails due to slope.

### **Wildlife Habitat**

Suitability is poor for habitat areas for openland wildlife and good for woodland wildlife. This soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

## **331E—Bernardston silt loam, 25 to 35 percent slopes, very stony.**

This soil is very deep, steep, and well drained. It is on glaciated hills in the southwestern part of the county. The areas are irregular in shape and range from 5 to 100 acres in size. Stones on the surface are 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 6 inches, dark grayish brown silt loam

*Subsoil:*

6 to 11 inches, olive brown silt loam

11 to 16 inches, light olive brown silt loam

*Substratum:*

16 to 28 inches, olive gray silt loam  
 28 to 65 inches, mottled, olive gray, firm silt loam  
 Some areas are fine sandy loam throughout.

***Inclusions***

Included with this unit are small areas with slopes of less than 25 percent or more than 35 percent. In depressions and along narrow drainageways are moderately well drained Pittstown soils and poorly drained Stissing soils. Also included are small isolated areas of well drained Cardigan soils or somewhat excessively Kearsarge soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

***Major properties of the Bernardston soil***

*Permeability:* Moderate in the surface layer and subsoil; slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 16 to 36 inches to hardpan

*Depth to water table:* 1.5 to 3.0 feet from February through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this steep are forested.

***Use and Management*****Farming**

The steep slopes and surface stones make this soil unsuited for farming.

**Woodland**

Fertility and moisture are favorable on this Bernardston soil for high quality hardwoods. Slope, windthrow hazard, and plant competition are limitations that affect woodland management.

Equipment limitations due to slope can be reduced by careful planning to avoid steepest areas. Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

**Community Development**

This Bernardston soil is severely limited for most phases of community development by steep slopes. Slope limitations can be reduced by using cut and fill to level these steep areas. However, cuts made into slopes below hardpan layers may make it necessary to use drainage to remove the water on the hardpan during wet times of the year.

For onsite sewage disposal, the depth to the slowly permeable hardpan and steep slopes are severe limitations that can be overcome with fill to raise, level, and increase the size of absorption fields.

**Recreation**

Recreational developments have severe limitations due to slope. This soil has an additional limitation for playgrounds and athletic fields due to surface stones.

**Wildlife Habitat**

Suitability is poor for habitat areas for openland wildlife and good for woodland wildlife. This soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VII<sub>s</sub>.

**334B—Pittstown loam, 3 to 8 percent slopes**

This soil is very deep, gently sloping, and moderately well drained. It is on glaciated hills in the southwestern part of the county. The areas are broad and irregular in shape and range from 5 to 60 acres in size. Some areas have stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 8 inches, very dark grayish brown loam

*Subsoil:*

8 to 11 inches, olive brown loam

11 to 19 inches, light olive brown loam with yellowish brown, yellowish red, and reddish gray mottles

*Substratum:*

19 to 25 inches, olive gray loam

25 to 65 inches, olive, firm loam

***Inclusions***

Included with this unit are small areas with slopes of less than 3 percent or more than 8 percent. In depressions and along narrow drainageways are poorly drained areas of Stissing soils and low mounds and

ridges of well drained Bernardston soils. Also included are small isolated areas of well drained Cardigan soils or somewhat excessively drained Kearsarge soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Pittstown soil***

*Permeability:* Moderate in the surface layer and subsoil; slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 1.5 to 3.0 feet from November through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil have been cleared for farming. A few areas are reverting to woodland. Some areas have been used for residential development.

### ***Use and Management***

#### **Farming**

This Pittstown soil is classified as prime farmland in this survey area. Good to excellent yields of silage corn, grasses, and legumes can be obtained with the proper use of lime and fertilizers. Seasonal wetness may delay spring tillage and be a concern during fall harvest. It can be alleviated with surface or subsurface drainage. Areas used for continuous row cropping should be contour farmed and have winter cover crops to prevent erosion and help maintain organic matter levels. Contour tillage and stripcropping will help reduce soil losses where row crops are grown.

#### **Woodland**

Fertility and moisture are favorable on this Pittstown soil for high quality hardwoods. This soil is limited for woodland management by windthrow hazard and plant competition.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

#### **Community Development**

This soil is limited by wetness and frost action. Wetness is a moderate limitation for dwellings without basements. Wetness is a severe limitation for dwellings with basements and for shallow excavations. Foundation drains will help to control wetness and frost action. Wetness and frost action are severe limitations for local roads and streets. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage.

For onsite sewage disposal, wetness and slow permeability are severe limitations that may make it necessary to use fill to raise and increase in the size of absorption fields.

#### **Recreation**

This soil has moderate limitations for camping areas, picnic areas, and hiking paths and trails due to wetness. Limitations are moderate for playgrounds and athletic fields due to slope, wetness, and small stones.

#### **Wildlife Habitat**

Suitability is good for habitat for openland wildlife and fair for woodland wildlife. This soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IIe.

### **334C—Pittstown loam, 8 to 15 percent slopes**

This soil is very deep, strongly sloping, and moderately well drained. It is on glaciated hills in the southwestern part of the county. The areas are broad and irregular in shape and range from 5 to 50 acres in size. Some areas have stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 8 inches, very dark grayish brown loam

*Subsoil:*

8 to 11 inches, olive brown loam

11 to 19 inches, light olive brown loam with yellowish brown, yellowish red, and reddish gray mottles

*Substratum:*

19 to 25 inches, olive gray loam

25 to 65 inches, olive, firm loam

#### ***Inclusions***

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. In

depressions and along narrow drainageways are poorly drained areas of Stissing soils and low mounds and ridges of well drained Bernardston soils. Also included are small isolated areas of well drained Cardigan soils or somewhat excessively drained Kearsarge soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Pittstown soil***

*Permeability:* Moderate in the surface layer and subsoil; slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 1.5 to 3.0 feet from November through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil have been cleared for farming. A few areas are reverting to woodland. Some areas have been used for residential development.

### ***Use and Management***

#### **Farming**

Farming of this soil is generally limited to hay and pasture. The erosion hazard on this strongly sloping soil is severe for normal row crop production. Seasonal wetness is an additional limitation. Drainage of the soil will allow better varieties of grasses and legumes to be grown. Good to excellent yields of grasses and legumes can be obtained with the proper use of lime and fertilizers.

#### **Woodland**

Fertility and moisture are favorable on this Pittstown soil for high quality hardwoods. This soil is limited for woodland management by windthrow hazard and plant competition.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

#### **Community Development**

This soil is limited for community development by wetness, slope, and frost action. Wetness is a moderate limitation for dwellings without basements. Wetness is a severe limitation for dwellings with basements and for shallow excavations. Foundation drains will help to control wetness and frost action. Wetness, slope, and frost action are moderate limitations for local roads and streets. Frost action and wetness limitations can be overcome by providing coarser grained base material to frost depth and installing drainage. Slope limitations on this unit can be reduced by cut and fill to level the soil. However, cuts made into slopes into hardpan layers may make it necessary to use drainage to remove the water on the hardpan during wet times of the year.

For onsite sewage disposal, wetness and slow permeability are severe limitations that may make it necessary to use fill to raise and increase the size of absorption fields.

#### **Recreation**

This soil has moderate limitations for camping and picnic areas due to slope and wetness. Limitations are severe for playgrounds and athletic fields due to slope. Wetness is a moderate limitation for hiking trails and paths.

#### **Wildlife Habitat**

Suitability is good for habitat areas for openland wildlife and fair for woodland wildlife. This soil is very poorly suited for wetland wildlife habitat.

The capability subclass is IIIe.

### **336B—Pittstown loam, 3 to 8 percent slopes, very stony**

This soil is very deep, gently sloping, and moderately well drained. It is on glaciated hills in the southwestern part of the county. The areas are broad and irregular in shape and range from 5 to 60 acres in size. Stones are generally 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 8 inches, very dark grayish brown loam.

*Subsoil:*

8 to 11 inches, olive brown loam.

11 to 19 inches, light olive brown loam with yellowish brown, yellowish red, and reddish gray mottles.

*Substratum:*

19 to 25 inches, olive gray loam.

25 to 65 inches, olive, firm loam.

***Inclusions***

Included with this unit are small areas with slopes of less than 3 percent or more than 8 percent. In depressions and along narrow drainageways are poorly drained areas of Stissing soils and low mounds and ridges of well drained Bernardston soils. Also included are small isolated areas of well drained Cardigan soils or somewhat excessively drained Kearsarge soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

***Major properties of the Pittstown soil***

*Permeability:* Moderate in the surface layer and subsoil; slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 1.5 to 3.0 feet from November through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested. A few areas are used as unimproved pasture or developed for residential uses.

***Use and Management*****Farming**

This unit is too stony for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones. If cleared of surface stones, the soil is classified as prime farmland. Seasonal wetness is an additional limitation. Drainage of the soil will allow better varieties of grasses and legumes to be grown.

**Woodland**

Fertility and moisture are favorable on these Pittstown soils for high quality hardwoods. This soil is limited for woodland management by windthrow hazard and plant competition.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the

hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

**Community Development**

This soil is limited for community development by wetness and frost action. Wetness is a moderate limitation for dwellings without basements. Wetness is a severe limitation for dwellings with basements and for shallow excavations. Foundation drains will help control wetness and frost action. Wetness and frost action are moderate limitations for local roads and streets. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage. Limitations are moderate for lawns and landscaping due to large stones.

For onsite sewage disposal, wetness and slow permeability are severe limitations that may make it necessary to use fill to raise and increase the size of absorption fields.

**Recreation**

This soil has moderate limitations for camping and picnic areas due to wetness and large stones. Limitations for this soil are severe for playgrounds and athletic fields due to large and small stones. Wetness is a moderate limitation for hiking trails and paths.

**Wildlife Habitat**

Suitability is poor for habitat areas for openland wildlife and fair for woodland wildlife. This soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

**336C—Pittstown loam, 8 to 15 percent slopes, very stony**

This soil is very deep, strongly sloping, and moderately well drained. It is on glaciated hills in the southwestern part of the county. The areas are broad and irregular in shape and range from 5 to 60 acres in size. Stones are generally 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 8 inches, very dark grayish brown loam

*Subsoil:*

8 to 11 inches, olive brown loam

11 to 19 inches, light olive brown loam with yellowish brown, yellowish red, and reddish gray mottles

*Substratum:*

19 to 25 inches, olive gray loam

25 to 65 inches, olive, firm loam

### ***Inclusions***

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. In depressions and along narrow drainageways are poorly drained areas of Stissing soils and low mounds and ridges of well drained Bernardston soils. Also included are small isolated areas of well drained Cardigan soils or somewhat excessively drained Kearsarge soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Pittstown soil***

*Permeability:* Moderate in the surface layer and subsoil; slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 1.5 to 3.0 feet from November through April

*Potential frost action:* Moderate

*Flood hazard:* None

This soil is generally forested. A few areas are used as unimproved pasture or for residential development.

### ***Use and Management***

#### **Farming**

This unit is too stony and sloping for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones.

#### **Woodland**

Fertility and moisture are favorable for high quality hardwoods. This soil is limited for woodland management by windthrow hazard and plant competition.

Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads may require coarser grained base material to frost depth and drainage to reduce frost action.

#### **Community Development**

This soil is limited for community development by wetness, slope, and frost action. Wetness is a

moderate limitation for dwellings without basements. Wetness is a severe limitation for dwellings with basements and for shallow excavations. Foundation drains will help control wetness and frost action. Wetness, slope, and frost action are moderate limitations for local roads and streets. Frost action and wetness can be reduced by providing coarser grained base material to frost depth and installing drainage. Slope limitations can be reduced by using cut and fill to level these strongly sloping areas. However, cuts made into slopes below hardpan layers may make it necessary to use drainage to remove the water on the hardpan during wet times of the year. Lawns and landscaping have a moderate limitation due to slope and large stones.

For onsite sewage disposal, wetness and slow permeability are severe limitations that may make it necessary to use fill to raise and increase the size of absorption fields.

#### **Recreation**

This soil has moderate limitations for camping and picnic areas due to slope and large stones. Limitations are severe for playgrounds and athletic fields due to slope and stones. This soil has moderate limitations for hiking paths and trails due to wetness.

#### **Wildlife Habitat**

Suitability is poor for habitat areas for openland wildlife and fair for woodland wildlife. The soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VI<sub>s</sub>.

### **336D—Pittstown loam, 15 to 25 percent slopes, very stony**

This soil is very deep, moderately steep, and moderately well drained. It is on glaciated hills in the southwestern part of the county. The areas are broad and irregular in shape and range from 5 to 60 acres in size. Some areas have stones and boulders more than 30 feet apart and generally more than 80 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 8 inches, very dark grayish brown loam

*Subsoil:*

8 to 11 inches, olive brown loam

11 to 19 inches, light olive brown loam with yellowish brown, yellowish red, and reddish gray mottles

*Substratum:*

19 to 25 inches, olive gray loam

25 to 65 inches, olive, firm loam

### ***Inclusions***

Included with this unit are small areas with slopes of less than 15 percent or more than 25 percent. In depressions and along narrow drainageways are poorly drained areas of Stissing soils and low mounds and ridges of well drained Bernardston soils. Also included are small isolated areas of well drained Cardigan soils or somewhat excessively drained Kearsarge soils and a few areas where the hardpan is more than 40 inches below the surface. A few areas have been cleared of stones or have surface stones less than 5 feet or more than 30 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Pittstown soil***

*Permeability:* Moderate in the surface layer and subsoil; slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches

*Depth to water table:* 1.5 to 3.0 feet from November through April

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this soil are forested. A few areas are used as unimproved pasture or for residential development.

### **Farming**

This unit is too stony and steep for most farming other than pasture. The degree of pasture improvement that can be done depends on the amount of surface stones.

### **Woodland**

Fertility and moisture are favorable for high quality hardwoods. This soil is limited for woodland management by erosion hazard, slope, windthrow hazard, and plant competition.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by careful planning to avoid steepest areas. Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

In areas where road beds are cut below the hardpan, drainage is necessary to remove the water on the hardpan during wet times of the year. Access roads

may require coarser grained base material to frost depth and drainage to reduce frost action.

### **Community Development**

This soil is limited for community development by slope and wetness. Slope is a severe limitation for dwellings without basements. Slope and wetness are severe limitations for dwellings with basements and for shallow excavations. Foundation drains will help control wetness and frost action. Slope is a severe limitation for local roads and streets. Slope limitations can be reduced by using cut and fill to level these moderately steep areas. However, cuts made into slopes below hardpan layers may make it necessary to use drainage to remove the water on the hardpan during wet times of the year.

For onsite sewage disposal, the slope, wetness and slow permeability are severe limitations that may make it necessary to use special designs and fill to level, raise, and increase the size of absorption fields.

### **Recreation**

This soil has severe limitations for camping and picnic areas due to slope. Limitations are severe for playgrounds and athletic fields due to slope and stones. This soil has moderate limitations for hiking paths and trails due to slope and wetness.

### **Wildlife Habitat**

Suitability is poor for habitat areas for openland wildlife and fair for woodland wildlife. This soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VIs.

## **341A—Stissing silt loam, 0 to 3 percent slopes, very stony**

This soil is very deep, level to nearly level, and poorly drained. It is on glaciated hilltops and in valleys in the southwestern part of the county. The areas are irregular in shape and range from 5 to 40 acres in size. Stones are generally 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 10 inches, very dark brown silt loam

*Subsoil:*

10 to 20 inches, 60 percent dark gray and 40 percent dark brown gravelly loam

*Substratum:*

20 to 65 inches, olive gray, very firm loam with dark brown mottles

Some areas are fine sandy loam throughout the soil.

### ***Inclusions***

Included with this unit are small areas with slopes of more than 3 percent, very poorly drained depressions with a thin black organic surface layer, and low mounds or ridges of moderately well drained Pittstown soils. Also included are areas that have been cleared of surface stones for farming and areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 5 feet apart. Some areas are periodically ponded by beaver dams. The included soils make up about 15 percent of this unit.

### ***Major properties of the Stissing soil***

*Permeability:* Moderate in the surface layer and subsoil; slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches to hardpan

*Depth to water table:* 0 to 1.5 feet from October through May

*Potential frost action:* High

*Flood hazard:* None

Most areas of this soil are forested. A few areas have been cleared for farming, but many are abandoned and are reverting to woodland.

### **Farming**

This unit is too wet and stony for most farming other than unimproved pasture. The few areas that have been cleared of surface stones are producing fair yields of silage corn, grasses, and legumes.

### **Woodland**

Fertility and moisture are fair to poor for hardwood growth and fair to good for softwoods, especially red spruce and balsam fir. This soil is limited for woodland management by slope, seedling mortality, windthrow hazard, and plant competition.

Equipment limitations due to wetness are reduced if tree harvesting and management operations are restricted to times when the ground is frozen or during the driest summer months. Seedling mortality can be reduced by special site preparation or by planting species that are suited for wet sites. Windthrow hazard can be reduced by careful thinning to avoid surface-root damage caused by harvesting equipment. Site preparation following tree harvest helps decrease invasion of undesirable species.

### **Community Development**

This soil is limited for community development by

wetness, a slowly permeable hardpan, and frost action. Wetness is a severe limitation for dwellings with or without basements and for shallow excavations. Foundation drains will help to control wetness and frost action. Locating drain outlets on these level and nearly level areas may be a concern. Wetness and frost action are severe limitations for local roads and streets. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage. This soil is limited for lawns and landscaping due to wetness.

For onsite sewage disposal, wetness and slow permeability are severe limitations that may make it necessary to use fill to raise and increase the size absorption fields.

The areas of this soil improve and maintain water quality by acting as natural filters to remove harmful chemicals, nutrients, and sediment. They also recharge ground-water aquifers and store runoff, which lessens flood damage.

### **Recreation**

This soil has severe limitations for camping areas, picnic areas, and hiking paths and trails due to wetness. Limitations are severe for playgrounds and athletic fields due to small stones and wetness.

### **Wildlife Habitat**

Suitability is poor for habitat areas for openland wildlife and fair for woodland wildlife. Suitability is fair for wetland wildlife habitat.

The capability subclass is VII<sub>s</sub>.

## **341B—Stissing silt loam, 3 to 8 percent slopes, very stony**

This soil is very deep, gently sloping, and poorly drained. It is on glaciated hilltops and in valleys in the southwestern part of the county. The areas are irregular in shape and range from 5 to 50 acres in size. Stones are generally 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 10 inches, very dark brown silt loam

*Subsoil:*

10 to 20 inches, 60 percent dark gray and 40 percent dark brown gravelly loam

*Substratum:*

20 to 65 inches, olive gray, very firm loam with dark brown mottles

Some areas are fine sandy loam throughout the soil.

### ***Inclusions***

Included with this unit are small areas with slopes less than 3 percent or more than 8 percent, very poorly drained depressions with a thin black organic surface layer, and low mounds or ridges of moderately well drained Pittstown soils. Also included are areas that have been cleared of surface stones for farming and areas where the hardpan is more than 40 inches below the surface. A few areas have surface stones less than 5 feet apart. Some areas are periodically ponded by beaver dams. The included soils make up about 15 percent of this unit.

#### ***Major properties of the Stissing soil***

*Permeability:* Moderate in the surface layer and subsoil; slow in the substratum

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* 18 to 36 inches to hardpan

*Depth to water table:* 0 to 1.5 feet from October through May

*Potential frost action:* High

*Flood hazard:* None

Most areas of this soil are forested. A few areas have been cleared for farming, but many are abandoned and are reverting to woodland.

### ***Use and Management***

#### **Farming**

This unit is too wet and stony for most farming other than unimproved pasture. The few areas that have been cleared of surface stones are producing fair yields of silage corn, grasses, and legumes.

#### **Woodland**

Fertility and moisture are fair to poor for hardwood growth and fair to good for softwoods, especially red spruce and balsam fir. This soil is limited for woodland management by slope, seedling mortality, windthrow hazard, and plant competition.

Equipment limitations due to wetness are reduced if tree harvesting and management operations are restricted to times when the ground is frozen or during the driest summer months. Seedling mortality can be reduced by special site preparation or by planting species that are suited for wet sites. Windthrow hazard can be reduced by careful thinning to avoid surface-root damage caused by harvesting equipment. Site preparation following tree harvest helps decrease invasion of undesirable species.

### **Community Development**

This soil is limited for community development by wetness, a slowly permeable hardpan, and frost action. Wetness is a severe limitation for dwellings with or without basements and for shallow excavations. Foundation drains will help to control wetness and frost action. Wetness and frost action are severe limitations for local roads and streets. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage. This soil is limited for lawns and landscaping due to wetness.

For onsite sewage disposal, wetness and slow permeability are severe limitations that may make it necessary to use fill to raise and increase the size of absorption fields.

The areas of this soil improve and maintain water quality by acting as natural filters to remove harmful chemicals, nutrients, and sediment. They also recharge ground-water aquifers and store runoff, which lessens flood damage.

### **Recreation**

This soil has severe limitations for camping areas, picnic areas, and hiking paths and trails due to wetness. Limitations are severe for playgrounds and athletic fields due to small stones and wetness.

### **Wildlife Habitat**

Suitability is poor for habitat areas for openland wildlife and fair for woodland wildlife. Suitability is very poor for wetland wildlife habitat.

The capability subclass is VII<sub>s</sub>.

## **347A—Lyme and Moosilauke soils, 0 to 3 percent slopes, very stony**

These very deep, poorly drained soils are on nearly level valley floors in the glaciated uplands. The areas of the unit are long and narrow and range from 5 to 100 acres in size. Stones are 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface. This unit consists of about 55 percent Lyme soils, 30 percent Moosilauke soils, and 15 percent other soils.

The Lyme and Moosilauke soils are mapped together because they have no significant differences in use and management.

The typical sequence, depth, and composition of the layers of the Lyme soil are as follows—

*Surface layer:*

1 inch to 0, undecomposed leaves and twigs

0 to 2 inches, partially decomposed leaves and twigs

2 to 6 inches, black highly decomposed organic material

*Subsoil:*

6 to 11 inches, gray cobbly fine sandy loam with olive mottles

11 to 23 inches, olive cobbly fine sandy loam with light olive brown mottles

*Substratum:*

23 to 65 inches, olive gray gravelly fine sandy loam

The typical sequence, depth, and composition of the layers of the Moosilauke soil are as follows—

*Surface layer:*

2 inches to 0, partially decomposed needles, leaves, and twigs

0 to 5 inches, very dark gray fine sandy loam

*Subsoil:*

5 to 11 inches, gray sandy loam

11 to 22 inches, light olive brown fine sandy loam with olive gray and yellowish brown mottles

*Substratum:*

22 to 65 inches, dark grayish brown sand

### ***Inclusions***

Included in mapping are small or narrow areas of very poorly drained soils, low mounds or ridges of moderately well drained soils, and small areas with slopes of more than 3 percent. Also included are small, poorly drained areas that are shallow or moderately deep to bedrock and a few areas that have been cleared of surface stones for farming. A few areas have surface stones less than 5 feet apart. The included soils make up about 15 percent of this unit.

### ***Major properties of the Lyme soil***

*Permeability:* Moderate or moderately rapid throughout

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 0 to 1.5 feet from November through May

*Potential frost action:* High

*Flood hazard:* None

### ***Major properties of the Moosilauke soil***

*Permeability:* Moderately rapid in the surface layer and subsoil; rapid in the substratum

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 0 to 1.5 feet from November through May

*Potential frost action:* High

*Flood hazard:* None

Most areas of this soil are forested. A few areas have been cleared for farming and are used for pasture. Other areas have been developed for residential or commercial use.

### **Farming**

This unit is generally too wet and stony for farming. Even if cleared of stones, the soil is suited only to pasture.

### **Woodland**

Fertility and moisture are fair to poor for hardwood growth and fair to good for softwoods, especially red spruce and balsam fir. Slope, seedling mortality, windthrow hazard, and plant competition are limitations that affect woodland management.

Equipment limitations due to wetness are reduced if tree harvesting and management operations are restricted to times when the ground is frozen or during the driest summer months. Seedling mortality can be reduced by special site preparation or by planting species that are suited for wet sites. Windthrow hazard can be reduced by careful thinning to avoid surface-root damage caused by harvesting equipment. Site preparation following tree harvest helps decrease invasion of undesirable species.

### **Community Development**

These soils have severe limitations for most phases of community development due to wetness and frost action. In addition, there are severe limitations during construction because the sides of excavations tend to slough and fill with water. Deep excavations may require special equipment. Foundation drains will help to control wetness and frost action. Locating drain outlets on these nearly level areas may be a concern. In many areas the large stones and boulders in the substratum are an additional limitation for excavations. Severe limitations on the soil for local roads and streets can be overcome by providing coarser grained base material to frost depth. Limitations are severe for onsite waste disposal systems. The wetness limitation may make it necessary to use fill to raise absorption fields. There is an additional hazard of ground-water pollution on areas of Moosilauke soils because the rapidly permeable substratum may not adequately filter the effluent.

The areas of these soils improve and maintain water quality by acting as natural filters to remove harmful chemicals, nutrients, and sediment. They also recharge ground-water aquifers and store runoff, which lessens flood damage.

## Recreation

These soils have severe limitations for recreational developments due to wetness. Small stones are an additional severe limitation for playgrounds and athletic fields.

## Wildlife Habitat

These soils are poorly suited for habitat for openland wildlife, and suitability is fair for the development for openland wildlife. The suitability for development of wetland wildlife habitat is very poor.

The capability subclass is VIIIs.

## 347B—Lyme and Moosilauke soils, 3 to 8 percent slopes, very stony

These very deep, poorly drained soils are on gently sloping valley floors in the glaciated uplands. The areas of the unit are long and narrow and range from 5 to 100 acres in size. Stones are 5 to 30 feet apart and cover from less than 1 percent to 3 percent of the surface. This unit consists of about 55 percent Lyme soils, 30 percent Moosilauke soils, and 15 percent other soils.

The Lyme and Moosilauke soils are mapped together because they have no significant differences in use and management.

The typical sequence, depth, and composition of the layers of the Lyme soil are as follows—

### Surface layer:

1 inch to 0, undecomposed leaves and twigs  
0 to 2 inches, partially decomposed leaves and twigs  
2 to 6 inches, black highly decomposed organic material

### Subsoil:

6 to 11 inches, gray cobbly fine sandy loam with olive mottles  
11 to 23 inches, olive cobbly fine sandy loam with light olive brown mottles

### Stratum:

23 to 65 inches, olive gray gravelly fine sandy loam

The typical sequence, depth, and composition of the layers of the Moosilauke soil are as follows—

### Surface layer:

2 inches to 0, partially decomposed needles, leaves, and twigs  
0 to 5 inches, very dark gray fine sandy loam

### Subsoil:

5 to 11 inches, gray sandy loam  
11 to 22 inches, light olive brown fine sandy loam with olive gray and yellowish brown mottles

### Stratum:

22 to 65 inches, dark grayish brown sand

## Inclusions

Included in mapping are small or narrow areas of very poorly drained soils, low mounds or ridges of moderately well drained soils, and small areas with slopes of less than 3 percent or more than 8 percent. Also included are small, poorly drained areas that are shallow or moderately deep to bedrock and a few areas that have been cleared of surface stones for farming. A few areas have surface stones less than 5 feet apart. The included soils make up about 15 percent of this unit.

### Major properties of the Lyme soil

*Permeability:* Moderate or moderately rapid throughout

*Available water capacity:* Moderate

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 0 to 1.5 feet from November through May

*Potential frost action:* High

*Flood hazard:* None

### Major properties of the Moosilauke soil

*Permeability:* Moderately rapid in the surface layer and subsoil; rapid in the substratum

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* 0 to 1.5 feet from November through May

*Potential frost action:* High

*Flood hazard:* None

Most areas of this unit are forested. A few areas have been cleared for farming and are used primarily for pasture. Other areas have been developed for residential or commercial use.

## Use and Management

### Farming

This unit is too wet and stony for farming. Even if cleared of stones, the soils are suited only to pasture.

### Woodland

Fertility and moisture are fair to poor for hardwood growth and fair to good for softwoods, especially red spruce and balsam fir. Slope, seedling mortality, windthrow hazard, and plant competition are limitations that affect woodland management.

Equipment limitations due to wetness are reduced if tree harvesting and management operations are restricted to times when the ground is frozen or during the driest summer months. Seedling mortality can be

reduced by special site preparation or by planting species that are suited for wet sites. Windthrow hazard can be reduced by careful thinning to avoid surface-root damage caused by harvesting equipment. Site preparation following tree harvest helps decrease invasion of undesirable species.

### Community Development

Wetness and frost action on the soil are limitations for most phases of community development. In addition, there are severe limitations during construction because the sides of excavations tend to slough and fill with water. Deep excavations may require special equipment. Foundation drains will help to control wetness and frost action. In many areas the large stones and boulders in the substratum are an additional concern for excavations. Severe limitations on the soil for local roads and streets can be overcome by providing coarser grained base material to frost depth.

Limitations are severe for onsite waste disposal systems on this unit. Wetness limitations may make it necessary to use fill to raise absorption fields. There is an additional hazard of ground-water pollution on areas of Moosilauke soils because the rapidly permeable substratum may not adequately filter the effluent.

The areas of these soils improve and maintain water quality by acting as natural filters to remove harmful chemicals, nutrients, and sediment. They also recharge ground-water aquifers and store runoff, which lessens flood damage.

### Recreation

These soils have severe limitations for recreational developments due to wetness. Small stones are an additional severe limitation for playgrounds and athletic fields.

### Wildlife Habitat

These soils are poorly suited for habitat for openland wildlife, and suitability is fair for the development for openland wildlife. The suitability for development of wetland wildlife habitat is very poor.

The capability subclass is VIIc.

## 355C—Hermon fine sandy loam, 8 to 15 percent slopes, extremely bouldery

This soil is very deep, rolling, and somewhat excessively drained. It is on loamy glaciated hills and mountainsides. The areas are irregular in shape and range from 10 to 30 acres in size. Stones and boulders are less than 5 feet apart and cover 3.0 to 15 percent of the surface (fig. 23).

The typical sequence, depth, and composition of the layers of this soil are as follows—

#### *Surface layer:*

0 to 5 inches, dark brown fine sandy loam

5 to 7 inches, light gray fine sandy loam

#### *Subsoil:*

7 to 15 inches, dark yellowish brown gravelly fine sandy loam

15 to 22 inches, light olive brown gravelly loamy sand

#### *Substratum:*

22 to 65 inches, grayish brown very gravelly loamy sand

In some areas the surface layer or upper part of the subsoil is loamy sand.

### **Inclusions**

Included with this unit are small areas with slopes of less than 8 percent or more than 15 percent. In depressions and along narrow drainageways are moderately well drained Waumbek soils and poorly drained Lyme soils. The included soils make up about 15 percent of this unit.

### **Major properties of the Hermon soil**

*Permeability:* Rapid throughout

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil are forested. A few areas are used for residential development.

### **Use and Management**

#### **Farming**

The surface stones and boulders make this soil unsuited for most farming.

#### **Woodland**

Fertility and moisture are adequate on this Hermon soil for good tree growth, but boulders and seedling mortality are factors that restrict woodland. The boulders limit the use of equipment. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

#### **Community Development**

This soil is limited by slope and surface stones and boulders for most phases of community development. Limitations are severe for excavations because the sides tend to slough. Deep excavations may require special equipment. In many areas the large stones and



Figure 23.— Hermon fine sandy loam, 15 to 25 percent slopes, extremely bouldery. These areas are severely limited for most uses due to boulders and stones.

boulders in the substratum are an additional concern for excavations. Erosion control measures such as sediment catch basins, heavy mulches, straw bales, terraces, and diversions should be used during periods of construction. Road cuts in this soil are difficult to shape in the stony subsoil and substratum, and droughtiness is a concern when revegetating these cuts. Most slope limitations can be reduced by cut and fill techniques.

For onsite waste disposal, this rapidly permeable soil may not effectively filter the effluent, and there is a severe hazard of ground-water pollution.

This soil is a probable source of sand and gravel, but screening or crushing is required to remove large stones and boulders. Extensive test pitting should be done at the site.

#### Recreation

This soil has severe limitations for recreational

developments. Large stones limit the use of this soil for camping areas, picnic areas, and hiking paths and trails.

Large stones, slope, and small stones are limitations for playgrounds and athletic fields.

#### Wildlife Habitat

Suitability is poor for habitat areas for openland wildlife and fair for woodland wildlife. This soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VII.

#### **355D—Hermon fine sandy loam, 15 to 25 percent slopes, extremely bouldery**

This soil is very deep, hilly, and somewhat excessively drained. It is on loamy glaciated hills and mountainsides. The areas are irregular in shape and

range from 10 to 50 acres in size. Stones and boulders are less than 5 feet apart and cover 3.0 to 15 percent of the surface.

The typical sequence, depth, and composition of the layers of this soil are as follows—

*Surface layer:*

0 to 5 inches, dark brown fine sandy loam

5 to 7 inches, light gray fine sandy loam

*Subsoil:*

7 to 15 inches, dark yellowish brown gravelly fine sandy loam

15 to 22 inches, light olive brown gravelly loamy sand

*Substratum:*

22 to 65 inches, grayish brown very gravelly loamy sand

In some areas the surface layer or upper part of the subsoil is loamy sand.

### ***Inclusions***

Included with this unit are small areas with slopes of less than 15 percent or more than 25 percent. In depressions and along narrow drainageways are moderately well drained Waumbek soils and poorly drained Lyme soils. The included soils make up about 15 percent of this unit.

### ***Major properties of the soil***

*Permeability:* Rapid throughout

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil are forested. A few areas are used for residential development.

### ***Use and Management***

#### **Farming**

The surface stones and boulders make this soil unsuited for most farming.

#### **Woodland**

Fertility and moisture are adequate on this Hermon soil for good tree growth, but erosion, equipment limitations, and seedling mortality are factors that restrict woodland management.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with drought-tolerant grasses after logging is completed. Equipment limitations are due to the extremely bouldery surface. Seedling mortality can be reduced by

planting seedlings in the spring to obtain sufficient moisture from early-season rains.

#### **Community Development**

This Hermon soil is severely limited by slope for all phases of community development. Excavations for basements and underground utilities tend to slough, and deep excavations may need special equipment. In many areas large stones and boulders in the substratum are an additional concern for excavations. Erosion control measures such as sediment catch basins, heavy mulches, straw bales, terraces, and diversions should be used during periods of construction. Road cuts in this soil will be difficult to shape in the stony subsoil and substratum, and the droughtiness of the exposed substratum is a concern when revegetating these cuts. Most slope limitations can be reduced by cut and fill techniques to level areas.

For onsite waste disposal, there are severe limitations due to poor filtering properties and slope. The sandy, very permeable subsoil and substratum do not effectively filter the effluent from onsite waste disposal systems, and there is a hazard of ground-water pollution.

This soil is a probable source of sand and gravel, but screening or crushing is required to remove large stones and boulders. Extensive test pitting should be done at the site.

#### **Recreation**

This soil is severely limited by slope and large stones and boulders for camp areas, picnic areas, playgrounds, and athletic fields. Large surface stones and boulders are severe limitations for the design and construction of hiking paths and trails.

#### **Wildlife Habitat**

Suitability is poor for habitat for openland wildlife and fair for woodland wildlife. This soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VII.

### **355E—Hermon fine sandy loam, 25 to 35 percent slopes, extremely bouldery**

This soil is very deep, steep, and somewhat excessively drained. It is on loamy glaciated hills and mountainsides. The areas are irregular in shape and range from 10 to 60 acres in size. Stones and boulders are less than 5 feet apart and cover 3.0 to 15 percent of the surface.

The typical sequence, depth, and composition of the

layers of this soil are as follows—

*Surface layer:*

0 to 5 inches, dark brown fine sandy loam

5 to 7 inches, light gray fine sandy loam

*Subsoil:*

7 to 15 inches, dark yellowish brown gravelly fine sandy loam

15 to 22 inches, light olive brown gravelly loamy sand

*Substratum:*

22 to 65 inches, grayish brown very gravelly loamy sand

In some areas the surface layer or upper part of the subsoil is loamy sand.

### ***Inclusions***

Included with this unit are small areas with slopes of less than 25 percent or more than 35 percent. In depressions and along narrow drainageways are moderately well drained Waumbek soils and poorly drained Lyme soils. The included soils make up about 15 percent of this unit.

### ***Major properties of the soil***

*Permeability:* Rapid throughout

*Available water capacity:* Low

*Depth to bedrock:* More than 65 inches

*Depth to dense basal till:* More than 65 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Low

*Flood hazard:* None

Most areas of this soil are forested. A few areas are used for residential development.

### ***Use and Management***

#### **Farming**

The surface stones and boulders and the slope make this soil unsuited for farming.

#### **Woodland**

Fertility and moisture are adequate on this Hermon soil, but erosion, equipment limitations, and seedling mortality are factors that restrict woodland management.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with drought-tolerant grasses after logging is completed. Equipment limitations are due to the extremely bouldery surface. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains.

### **Community Development**

This soil has severe limitations for all phases of community and commercial development due to steep slopes and large stones and boulders. Most slope limitations on this unit can be reduced by cut and fill techniques to level areas.

For onsite waste disposal, there are severe limitations due to poor filtering properties and slope. The sandy, very permeable subsoil and substratum do not effectively filter the effluent from onsite waste disposal systems, and there is a hazard of ground-water pollution.

This soil is a probable source of sand and gravel, but screening or crushing is required to remove large stones and boulders. The steep slopes and large stones and boulders may severely limit access to the soil.

### **Recreation**

This soil has severe limitations for all types of recreational developments due to steep slopes and large stones and boulders.

### **Wildlife Habitat**

Suitability of this soil is poor for habitat for openland wildlife and fair for woodland wildlife. This soil is very poorly suited for wetland wildlife habitat.

The capability subclass is VII<sub>s</sub>.

## **360B—Cardigan-Kearsarge complex, 3 to 8 percent slopes**

The Cardigan and Kearsarge soils in this unit are in such intricate patterns that it was not practical to map them separately. The Cardigan soils are silty, moderately deep, and well drained. The Kearsarge soils are silty, shallow, and somewhat excessively drained. The soils are on undulating or gently sloping hilltops and hillsides. The areas are oval or irregular in shape and range from 5 to 50 acres in size. Some areas have stones and boulders more than 30 feet apart and generally more than 80 feet apart. Cardigan soils make up about 45 percent of this unit, Kearsarge soils 30 percent, and other soils 25 percent.

The typical sequence, depth, and composition of the layers of the Cardigan soil are as follows—

*Surface layer:*

0 to 6 inches, dark brown silt loam

*Subsoil:*

6 to 23 inches, yellowish brown friable loam

23 inches, hard schist bedrock

Some areas are fine sandy loam throughout.

The typical sequence, depth, and composition of the layers of the Kearsarge soil are as follows—

*Surface layer:*

0 to 4 inches, very dark grayish brown silt loam

*Subsoil:*

4 to 12 inches, dark yellowish brown silt loam

*Substratum:*

12 to 15 inches, olive gray friable loam

15 inches, hard schist bedrock

Some areas are fine sandy loam throughout.

### ***Use and Management***

Included with this complex are areas of well drained Bernardston soils or moderately well drained Pittstown soils, small areas of very shallow soils, and areas with surface stones less than 30 feet apart. These inclusions make up about 15 percent of this complex. Also included are occasional rock outcrops, small areas with slopes of less than 3 percent or more than 8 percent, and small areas where bedrock blocks the drainage patterns and the shallow and moderately deep soils are moderately well drained to poorly drained. These inclusions make up about 10 percent of this complex.

#### ***Major properties of the Cardigan soil***

*Permeability:* Moderate throughout

*Available water capacity:* Moderate

*Depth to bedrock:* 20 to 40 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

#### ***Major properties of the Kearsarge soil***

*Permeability:* Moderate throughout

*Available water capacity:* Low

*Depth to bedrock:* 10 to 20 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this complex have been cleared for farming. Some areas are still farmed, but many are reverting to woodland. A few areas are used for residential development.

### ***Use and Management***

#### **Farming**

This complex is moderately well suited for row crops. With the proper use of lime and fertilizers, good yields are obtained on the Cardigan soils but only fair yields on the shallow, droughty Kearsarge soils. If row crops are grown, tillage should be on the contour and

winter cover crops should be used to control erosion and then incorporated into surface layer to maintain organic matter content. These soils are well suited for grasses and legumes for hay or pasture. Good yields are obtained except on the shallow Kearsarge areas, where yields are only fair and stands are difficult to maintain.

#### **Woodland**

Fertility and moisture are adequate on these Cardigan and Kearsarge soils for good tree growth. Seedling mortality and windthrow hazard are limitations that affect woodland management. On areas of Cardigan soils in this complex, plant competition is an additional limitation.

Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains. Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

#### **Community Development**

Bedrock at a depth of less than 40 inches is the primary limiting factor for community development. Foundation drains will help to control wetness to remove water on the bedrock and in the fractures. Foundation drains will also reduce frost action. Gravity outlets for the drains may make it necessary to use additional blasting. Drilling and blasting generally are necessary for road construction and underground utilities. These soils have limitations for local roads and streets due to frost action and depth to rock. Frost action can be reduced by providing coarser grained base material to frost depth and installing drainage.

Limitations are severe for septic tank absorption fields. Areas with sufficient depth for a system must be located, or a site can be filled to obtain adequate depth. The included areas of Bernardston and Pittstown soils have the necessary depth, but have limitations of slow permeability and a seasonal water table.

#### **Recreation**

Areas of Kearsarge soils have severe limitations for camp or picnic areas due to the shallow depth to bedrock. If this complex is used as a playground or athletic field, the areas of Cardigan soils have moderate limitations due to the slope and depth to bedrock, while limitations are severe on areas of Kearsarge soils due to the depth to bedrock. Maintaining adequate grass cover on the shallow, droughty Kearsarge soils is an additional concern.

These soils have severe limitations for the design, layout, and maintenance of hiking paths and trails due to erodibility.

#### **Wildlife Habitat**

Suitability on the Cardigan soils is fair for habitat areas for openland and woodland wildlife. Suitability on the Kearsarge soils is poor for openland wildlife habitat and fair for woodland wildlife habitat. The suitability for wetland wildlife habitat on this complex is very poor.

The capability subclass is IIIe.

### **360C—Cardigan-Kearsarge complex, 8 to 15 percent slopes**

The Cardigan and Kearsarge soils in this unit are in such intricate patterns that it was not practical to map them separately. The Cardigan soils are silty, moderately deep, and well drained. The Kearsarge soils are silty, shallow, and somewhat excessively drained. The soils are on rolling or strongly sloping hilltops and hillsides. The areas are oval or irregular in shape and range from 5 to 50 acres in size. Some areas have stones and boulders more than 30 feet apart and generally more than 80 feet apart. Cardigan soils make up about 45 percent of this unit, Kearsarge soils 30 percent, and other soils 25 percent.

The typical sequence, depth, and composition of the layers of the Cardigan soil are as follows—

*Surface layer:*

0 to 6 inches, dark brown silt loam

*Subsoil:*

6 to 23 inches, yellowish brown friable loam

23 inches, hard schist bedrock

Some areas are fine sandy loam throughout.

The typical sequence, depth, and composition of the layers of the Kearsarge soil are as follows—

*Surface layer:*

0 to 4 inches, very dark grayish brown silt loam

*Subsoil:*

4 to 12 inches, dark yellowish brown silt loam

*Substratum:*

12 to 15 inches, olive gray friable loam

15 inches, hard schist bedrock

Some areas are fine sandy loam throughout.

#### **Inclusions**

Included with this complex are areas of well drained Bernardston soils or moderately well drained Pittstown soils, small areas of very shallow soils, and areas with surface stones less than 30 feet apart. These inclusions make up about 15 percent of this complex. Also included are occasional rock outcrops, small

areas with slopes of less than 8 percent or more than 15 percent, and small areas where bedrock blocks the drainage patterns and the shallow and moderately deep soils are moderately well drained to poorly drained. These inclusions make up about 10 percent of this complex.

#### **Major properties of the Cardigan soil**

*Permeability:* Moderate throughout

*Available water capacity:* Moderate

*Depth to bedrock:* 20 to 40 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

#### **Major properties of the Kearsarge soil**

*Permeability:* Moderate throughout

*Available water capacity:* Low

*Depth to bedrock:* 10 to 20 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this complex have been cleared for farming. Some areas are still farmed, but many are reverting to woodland. A few areas are used for residential development.

#### **Use and Management**

##### **Farming**

This complex is moderately well to poorly suited for row crop production because of the erosion hazard. Row crops can be grown in a long term rotation where the area is used for hay and pasture crops most of the time. Even then, intensive erosion control measures such as contour stripcropping and winter cover crops are required to keep erosion within allowable limits. These areas are best suited for the production of grasses and legumes for hay and pasture. With the proper use of lime and fertilizers, good yields are obtained except on the shallow, droughty Kearsarge soils, where yields are only fair and stands are difficult to maintain.

##### **Woodland**

Fertility and moisture are adequate on these Cardigan and Kearsarge soils for good tree growth. Seedling mortality and windthrow hazard are limitations that affect woodland management. Plant competition is an additional limitation on areas of Cardigan soils.

Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains. Windthrow hazard can be decreased with careful thinning and by avoiding

surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

### Community Development

Bedrock at a depth of less than 40 inches and slope are the primary limiting factors for the soils of this complex. Foundation drains will help to control wetness to remove water on the bedrock and in the fractures. Foundation drains will also reduce frost action. Gravity outlets for the drains may make it necessary to use additional blasting. These soils have limitations for local roads and streets due to depth to rock, slope, and frost action. Road construction through the soil will often encounter bedrock. Either drilling and blasting of the bedrock or covering with additional fill material will be needed. Frost action on the soil can be reduced by providing coarser grained base material to frost depth and installing drainage. Careful planning and location of roads will reduce limitations.

Limitations are severe for septic tank absorption field. Deeper areas must be located, or a site can be filled to obtain adequate depth. The included areas of Bernardston and Pittstown soils have the necessary depth, but have limitations of slow permeability and seasonal water table.

### Recreation

Areas of Cardigan soils have moderate limitations for camp or picnic areas due to slope. Kearsarge soils in this complex have severe limitations for camp or picnic areas due to the shallow depth to bedrock. Limitations are severe for a playground or athletic field due to slope and depth to bedrock. Maintaining adequate grass cover on the droughty Kearsarge soils is an additional concern. The soils have severe limitations for the design, layout, and maintenance of hiking paths and trails due to erodibility.

### Wildlife Habitat

Suitability on the Cardigan soils is fair for habitat areas for openland and woodland wildlife. Suitability on the Kearsarge soils is poor for openland wildlife habitat and fair for woodland wildlife habitat. The suitability for wetland wildlife habitat on this complex is very poor.

The capability subclass is IVE.

## 360D—Cardigan-Kearsarge complex, 15 to 25 percent slopes.

The Cardigan and Kearsarge soils in this unit are in such intricate patterns that it was not practical to map them separately. The Cardigan soils are silty, moderately deep, and well drained. The Kearsarge soils

are silty, shallow, and somewhat excessively drained. The soils are on hilly or moderately steep hilltops and hillsides. The areas are oval or irregular in shape and range from 5 to 25 acres in size. Some areas have stones and boulders more than 30 feet apart and generally more than 80 feet apart. Cardigan soils make up about 45 percent of this unit, Kearsarge soils 30 percent, and other soils 25 percent.

The typical sequence, depth, and composition of the layers of the Cardigan soil are as follows—

*Surface layer:*

0 to 6 inches, dark brown silt loam

*Subsoil:*

6 to 23 inches, yellowish brown friable loam

23 inches, hard schist bedrock

Some areas are fine sandy loam throughout.

The typical sequence, depth, and composition of the layers of the Kearsarge soil are as follows—

*Surface layer:*

0 to 4 inches, very dark grayish brown silt loam

*Subsoil:*

4 to 12 inches, dark yellowish brown silt loam

*Substratum:*

12 to 15 inches, olive gray friable loam

15 inches, hard schist bedrock

Some areas are fine sandy loam throughout.

### Inclusions

Included with this complex are areas of well drained Bernardston soils or moderately well drained Pittstown soils, small areas of very shallow soils, and areas with surface stones less than 30 feet apart. These inclusions make up about 15 percent of this complex. Also included are occasional rock outcrops, small areas with slopes of less than 15 percent or more than 25 percent, and small areas where bedrock blocks the drainage patterns and the shallow and moderately deep soils are moderately well drained to poorly drained. These inclusions make up about 10 percent of this complex.

### Major properties of the Cardigan soil

*Permeability:* Moderate throughout

*Available water capacity:* Moderate

*Depth to bedrock:* 20 to 40 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

### Major properties of the Kearsarge soil

*Permeability:* Moderate throughout

*Available water capacity:* Low

*Depth to bedrock:* 10 to 20 inches

*Depth to water table:* More than 6 feet

*Potential frost action:* Moderate

*Flood hazard:* None

Most areas of this complex have been cleared for farming. Some areas are still farmed, but many are reverting to woodland. A few areas are used for residential development.

### ***Use and Management***

#### **Farming**

This complex are not suited for row crops due to the moderately steep slopes and severe erosion hazard. The soils will produce fair yields of grasses and legumes with the proper use of lime and fertilizers. The soils are best suited for use as pasture. Hay crops can be harvested, but the use of modern equipment on these slopes is hazardous.

#### **Woodland**

Fertility and moisture are adequate on these Cardigan and Kearsarge soils for good tree growth. Erosion hazard, slope, seedling mortality, and windthrow hazard are limitations that affect woodland management. On areas of Cardigan soils, plant competition is an additional limitation.

Erosion along roads and skid trails can be reduced by building the roads and trails across slopes with frequent water bars and culverts, then seeding with shade-tolerant grasses after logging is completed. Equipment limitations due to slope can be reduced by careful planning to avoid steepest areas. Seedling mortality can be reduced by planting seedlings in the spring to obtain sufficient moisture from early-season rains. Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

#### **Community Development**

The soils of this complex have severe limitations for all phases of community development because of bedrock at a depth of less than 40 inches and the slope. Drilling and blasting generally are necessary for road construction and the installation of underground utilities. Homes with basements require special design to fit these slopes and may need blasting to obtain the desired depths. Foundation drains will help to control wetness to remove water on the bedrock and in the fractures.

Depth to bedrock and slope are severe limitations for septic tank absorption fields. Areas with sufficient depth for a system must be located or a site can be filled to obtain adequate depth. The included areas of

Bernardston and Pittstown soils have the necessary depth, but have limitations of slow permeability and seasonal water table.

#### **Recreation**

These soils have severe limitations for recreational uses due to slope, depth to bedrock, and erodibility. Hiking paths and trails crossing the soil require careful planning and water bars to control erosion.

#### **Wildlife Habitat**

Suitability is fair on the Cardigan soils in this complex for habitat areas for openland and woodland wildlife. Suitability is poor on the Kearsarge soils for openland wildlife habitat and fair for woodland wildlife habitat. The suitability for wetland wildlife habitat on this complex is very poor.

The capability subclass is VIe.

### **361B—Cardigan-Kearsarge-Rock outcrop complex, 3 to 8 percent slopes**

The Cardigan and Kearsarge soils and rock outcrop in this unit are in such intricate patterns that it was not practical to map them separately. The Cardigan soils are silty, moderately deep, and well drained. The Kearsarge soils are silty, shallow, and somewhat excessively drained. The areas of rock outcrop are less than 100 feet apart. The unit is on undulating or gently sloping hilltops and hillsides. The areas are oval or irregular in shape and range from 5 to 25 acres in size. Stones are generally 5 to 30 feet apart on the surface and cover from less than 1 percent to 3 percent of the surface. The Cardigan soils make up about 40 percent of this unit, Kearsarge soils 30 percent, rock outcrops 15 percent, and other soils 15 percent.

The typical sequence, depth, and composition of the layers of the Cardigan soil are as follows—

*Surface layer:*

0 to 6 inches, dark brown silt loam

*Subsoil:*

6 to 23 inches, yellowish brown friable loam

23 inches, hard schist bedrock

Some areas are fine sandy loam throughout.

The typical sequence, depth, and composition of the layers of the Kearsarge soil are as follows—

*Surface layer:*

0 to 4 inches, very dark grayish brown silt loam

*Subsoil:*

4 to 12 inches, dark yellowish brown silt loam

*Substratum:*

12 to 15 inches, olive gray friable loam

15 inches, hard schist bedrock

Some areas are fine sandy loam throughout.

### ***Inclusions***

Included with this complex are areas of well drained Bernardston soils or moderately well drained Pittstown soils and small areas of soils with slopes of less than 3 percent or more than 8 percent. These inclusions make up about 5 percent of the unit. Also included are small areas of very shallow soils and small areas where bedrock blocks the drainage patterns and the shallow and moderately deep soils are moderately well drained to poorly drained. These inclusions make up about 10 percent of this complex.

### ***Major properties of the Cardigan soil***

*Permeability:* Moderate throughout  
*Available water capacity:* Moderate  
*Depth to bedrock:* 20 to 40 inches  
*Depth to water table:* More than 6 feet  
*Potential frost action:* Moderate  
*Flood hazard:* None

### ***Major properties of the Kearsarge soil***

*Permeability:* Moderate throughout  
*Available water capacity:* Low  
*Depth to bedrock:* 10 to 20 inches  
*Depth to water table:* More than 6 feet  
*Potential frost action:* Moderate  
*Flood hazard:* None

Most areas of this complex are forested. A few areas have been cleared for pasture, but most of these have been abandoned and have reverted to woodland. Some areas are used for residential development.

### ***Use and Management***

#### **Farming**

This complex is not suited for farming other than pasture due to surface stones and rock outcrops. In some areas the spacing of the surface stones and the position of the rock outcrops may allow limited pasture improvement by broadcasting lime and fertilizer without tillage. Erosion is a concern in areas adjoining broad, smooth outcrops because the soil is generally too shallow to support adequate plant cover.

#### **Woodland**

Fertility and moisture are adequate on these Cardigan and Kearsarge soils for good tree growth, but seedling mortality and windthrow hazard on the soil are limitations that affect woodland management. Plant competition is an additional limitation on areas of Cardigan soils in this complex.

Seedling mortality can be reduced by planting

seedlings in the spring to obtain sufficient moisture from early-season rains. Windthrow hazard can be decreased with careful thinning and by avoiding surface-root damage caused by harvesting equipment. Site preparation following harvest helps reduce the invasion of undesirable species.

Roads are limited in some areas because of the size, shape, or slope of the rock outcrop.

#### **Community Development**

Bedrock at a depth of less than 40 inches, rock outcrops, frost action, and surface stones are the major limiting factors for the soils of this complex. Foundation drains are needed to remove water on the bedrock and in the fractures. Foundation drains will also reduce the frost action. Gravity outlets for these drains may be difficult to locate or require additional blasting. Drilling and blasting generally are necessary for road construction and the installation of underground utilities

The soils also have moderate limitations for local roads and streets due to frost action. This limitation can be overcome by providing coarser grained base material to frost depth and installing drainage.

For onsite waste disposal, the depth to bedrock is a severe limitation. Areas with sufficient depth for the system must be located, or a site can be filled to obtain adequate depth. The included areas of Bernardston and Pittstown soils have the necessary depth, but have limitations of slow permeability and seasonal water table.

#### **Recreation**

The soils in this complex have limitations for most recreational uses. There is a moderate limitation on the Cardigan soils for camp or picnic areas due to large stones. On areas of Kearsarge soils or rock outcrop, limitations for camp or picnic areas are severe due to the shallow depth to bedrock. For playground or athletic fields, there are severe limitations due to small stones on the Cardigan soils. Limitations for playgrounds and athletic fields on the Kearsarge soils are severe due to small stones and depth to bedrock. Maintaining adequate grass cover on the shallow, droughty Kearsarge areas is also a limitation.

#### **Wildlife Habitat**

Suitability is fair on the Cardigan soils for openland wildlife habitat and good for woodland wildlife habitat. Suitability is poor on the Kearsarge soils for openland wildlife habitat and fair for woodland wildlife habitat. The suitability for wetland wildlife habitat on this complex is very poor.

The capability subclass is VI<sub>s</sub>.

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